The Visionaries Issue

SHOOT THE MOON

Vision is the driving force behind change. USC Dornsife’s world-class scholars demonstrate the power of vision to make a better community, country and world.
Dieuwertje “DJ” Kast is still haunted by two unforgettable sounds. The first is the glassy tinkle made by shards of candle ice in a thawing Arctic lake. “It’s a strange and beautiful music,” she said.

The second is the whining of giant mosquitoes swarming the Arctic in summer. “They’re called the Alaskan state bird for a reason.”

Kast spent three weeks using underwater robots to collect specimens from the deep sea off Canada’s western coast, followed by 24 days at an Arctic research station in Alaska.

Kast earned a bachelor’s degree in biological sciences and a master’s degree in marine environmental biology from USC Dornsife in 2011 and then a Master of Arts in Teaching from USC Rossier School of Education in 2014. She is now USC Dornsife’s Joint Educational Project (JEP) STEM program manager. She hopes to inspire the teachers she works with at the USC Family of Schools to apply for similar programs.

“Sharing these experiences with their students enables teachers to tie science to the real world,” Kast said. “And that makes it more relevant to the challenges we face today.”
The Bold Journey

When we think of a visionary, we are quick to admire his or her capacity to see a new opportunity and affect great change in the world. But the effort involved — the rigorous process of turning dreams into reality — often goes unnoticed. That oversight pushes a critical piece of the story into the background — the part where ambition is channeled into action, where setbacks are combated by resilience. Here is where the visionary deconstructs the abstract ideal and rebuilds it as a concrete strategy. This is among the most defining elements of a dynamic liberal arts mindset.

At USC Dornsife, we prepare tomorrow’s leaders to both imagine new possibilities and to excel in a journey that brings these to fruition. Whether it is a fresh perspective on global ecology that Professor Jan Annuell inspires through his studies of the deep ocean floor, or the artistic innovation of literary talents such as Professor Aimee Bender, USC Dornsife is creating pipelines through which every member of our academic community can contribute to society in a visionary way.

I have the great pleasure of engaging with our talented faculty and students every day. And every day it becomes more clear to me that USC Dornsife has something unique to offer the world. We know that a vision cannot simply unfold — it must be earned. Our leading thinkers today make the bold journey to transcend the status quo and lead the way in developing knowledge that will inspire tomorrow’s solutions. I hope you will follow the evolution of these visionary ideas with me in the coming years.

Amber D. Miller
Dean of USC Dornsife
Anna H. Bing Dean’s Chair

THE VISIONARIES ISSUE

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How do writers bring their creative vision to the page? Five of USC Dornsife’s leading authors, writing across genres of fiction, poetry, memoir, criticism and narrative nonfiction, share their insights.

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More than 40 USC Dornsife centers and institutes play home to faculty, staff and students who aim to impact the global community through innovative, collaborative scholarship.
The differences in how male and female fruit flies resist and adapt to oxidative stress may shed new light on how age-related diseases such as Alzheimer’s and Parkinson’s affect men and women differently. USC Dornsife researchers found that female fruit flies were better able to respond to stress caused by a common oxidant, hydrogen peroxide (produced naturally in the body), than males. However, males were better able to adapt to another oxidant, the common herbicide paraquat.

Both oxidants have been implicated in human diseases. Elevated levels of hydrogen peroxide are found in patients suffering from stroke, heart attack or Alzheimer’s disease. Paraquat can damage the neurons involved in Parkinson’s disease.

Oxidative stress occurs when unstable, uncharged molecules called free radicals overwhelm the body’s anti-oxidants, then react with other substances to damage cells or generate abnormal ones. The damage from this stress accumulates with age.

The male and female responses to the stress seem to differ in part because of a protein called Lon protease that is found in mitochondria, the cell’s energy generators, contain their own DNA and are inherited from the mother. Interestingly, they are the focus of age-related research.

“Many human diseases involve chronic oxidative stress, and mitochondria are the main source,” Tower said.

Also, many of the illnesses related to oxidative stress have different prevalence rates between men and women, he said. “For instance, Alzheimer’s disease and diabetes-related heart disease affect more women than men, while Parkinson’s disease and cancer affect more men than women.”

This may be due to differences in the Lon protease between the sexes. Female flies expressed an extra version of the protein, which “may help regulate sex-specific stress response,” Tower said.

The authors offered a few possible reasons for the differences in male and female responses to hydrogen peroxide. For instance, because mitochondria are inherited from the mother, females may have evolved to better respond to hydrogen peroxide because it is a normal signaling molecule produced by mitochondria.

As for males’ adaptation and resistance to paraquat? Males express greater dopamine receptor levels, which may have helped them adapt to oxidative stress from the herbicide. While that response may help them adapt to low stress, however, it may make them a more vulnerable target to toxic stress, such as Parkinson’s disease.
If you’ve ever wedged your feet into sparkling ruby red slippers and sentimentally clicked your heels together, you clearly relate to the film The Wizard of Oz (1939). But fans of the original book — The Wonderful Wizard of Oz, published in 1900 — know that famous Dorothy Gale’s shoes are actually silver. The addition of color is one of those slight changes in the cinematic adaptation process that results in an iconic slice of pop culture. Although the movie version is arguably better known than the book to contemporary audiences, L. Frank Baum’s story captured the imagination of scores of children, and also delighted older readers. “Baum and his wife moved from Chicago to Los Angeles in 1900,” says Leo Braudy, University Professor and Huntington-USC Institute on California and the West, “and they built a home they called Ozcul. Themselves, Baum dabbled unsuccessfully in the movie business and wrote more Oz books as well as other works of fantasy.” The Wonderful Wizard of Oz was written as a standalone book, but pleas from children for further Emerald City adventures compelled Baum to write additional volumes — 14 in all. After Baum’s death in 1919, other writers invented new Oz stories, but for many and readers, all of the Wizard of Oz magic is contained within the covers of Baum’s timeless books. — D.K.

City of the Future

Los Angeles has long served as inspiration for some of the best science fiction ever produced. Its urban landscape and iconic architecture have served time and again as backdrops for dystopian visions of the future. The long list of leading science fiction writers who have called the city home includes such stars of the genre as Ray Bradbury, Philip K. Dick, Robert Heinlein and Octavia Butler. The place — of course — is Los Angeles, a city long hailed as one of the world’s great science fiction capitals. “Science Fiction L.A.: Words and World Building in the City of Angels,” a two-day conference organized by William Deverell, professor of history and director of the Huntington-USC Institute on California and the West, and David Ulin, assistant professor of the practice of English and Huntington-USC Institute on California and the West, showed how Southern California’s particular blend of high and pop culture made L.A. an incubator of the form. “Los Angeles can be seen as the ‘City of the Future’ because so much of the futurism of science fiction is set against the backdrop of the city, or written here,” Deverell said. “The sheer decentralization of Los Angeles sets it apart as unusual in the world lexicon of cities. Add to that its reputation for being at the cutting edge of popular culture and its iconic architectural landscape, and all of those things suggest that Los Angeles is, and can be, a trendsetter.” L.A. architectural landmarks have played key roles in cinematic futures, whose lungs have been damaged by chemicals and irritants they may have encountered in combat. It may one day help those soldiers and other long patients receive more targeted treatment. Cutrale and Fraser see the technology as a giant leap forward for both research and medicine. “Better, faster, cheaper,” Cutrale said. “That’s the payoff here.” — D.E.

Imaging Insight

A new algorithm for analyzing images could make tracking biomolecules easier and cheaper. Researchers use fluorescent imaging to locate proteins and other molecules in cells and tissues within organisms. It can help scientists understand which molecules are involved in cancer or other diseases, which in turn may be useful in diagnosing or in identifying drug targets. A technique, called Hyper-Spectral PhaseSHp analysis (HySP), makes the process faster, less expensive and more reliable.

Little does Hollywood know that heroine Dorothy Gale’s shoes are actually silver. The film The Wizard of Oz (1939) is the 11th movie adaptation of L. Frank Baum’s classic 1900 novel. The movie’s success inspired a trendsetter. "Los Angeles can be seen as the ‘City of the Future’ because so much of the futurism of science fiction is set against the backdrop of the city, or written here," Deverell said. "The sheer decentralization of Los Angeles sets it apart as unusual in the world lexicon of cities. Add to that its reputation for being at the cutting edge of popular culture and its iconic architectural landscape, and all of those things suggest that Los Angeles is, and can be, a trendsetter." L.A. architectural landmarks have played key roles in cinematic futures, whose lungs have been damaged by chemicals and irritants they may have encountered in combat. It may one day help those soldiers and other long patients receive more targeted treatment. Cutrale and Fraser see the technology as a giant leap forward for both research and medicine. “Better, faster, cheaper,” Cutrale said. “That’s the payoff here.” — D.E.

FROM THE HEART OF USC
Jacquelle Amankonah has been known to go above and beyond. The first thing she does when she wakes up is check her work email before getting out of bed. “I’m guilty of working on a 24/7 clock,” she admits with a laugh. “Even though it’s such a terrible habit, if you have that burning desire and passion, why not send an email and get things done? It’s a great indicator that you’re doing something that really drives you.”

Amankonah’s passion and determination are what drove her career as a global program manager at YouTube. That same laser-focus helped propel her to a professional life that she first envisioned for herself as a freshman in college. She has always been ahead of the curve. Amankonah began college at age 16, having graduated early from high school. She was intent on pursuing a business career in the entertainment industry. As an undergraduate, Amankonah was accepted into USC’s highly selective Business Cinematic Arts Program, offered jointly through the USC Marshall School of Business and the USC School of Cinematic Arts, where she focused on entrepreneurship and the music industry. Amankonah decided to continue her education at USC by pursuing a progressive master’s degree in philosophy and law at USC Dornsife. Two disciplines she knew would prepare her for a future in the entertainment industry.

After earning her master’s degree in 2012, she began working for BET Networks, a digital music label, and later worked with an entrepreneur helping to form a number of start-ups including a digital music label.

“That helped me understand how to go from an idea through execution,” she explained. After finishing her master’s degree in 2012, she began working for BET Networks in the mobile technologies department to build applications for music fans. During her 3½ years there, she helped to launch five different mobile apps that focused on celebrities and music. “This was a time when mobile was the new thing that people were experimenting with and I completely immersed myself in that world,” Amankonah said. However, she realized that while she enjoyed working in the television industry, she really wanted to be part of a company on the cutting edge of technology. “I wanted to work anywhere where the future is, there’s this one online video site called YouTube that I believe is the future.” Amankonah applied for a job with the company and told herself she would consider changing jobs only if she could work for YouTube. She was invited to interview with Google, which owns YouTube, and, after an intense interview process, was hired. She was elated.

Amankonah started by working with the team that provides support to video creators. Her critical thinking skills were an asset. “This is where the strategic thinking came in—we had to think of ways to proactively offer help to millions of users at scale including a help center of topics to address common issues and tutorials.”

After a year, she transitioned to the development side of operations at YouTube, where she created the strategic plan to help popular video creators continue to grow their success. That role included rethinking how YouTube communicated with these creators, formulating best practices for starting a YouTube channel and finding ways to showcase successful YouTubers. But during the process, Amankonah realized she missed the product development side of technology that she had been involved in at BET and with her work at startups. “I never started from scratch with an idea, coming up with solutions for customers and seeing those products through their launch,” she said. So she made what’s considered a big career jump at YouTube, moving from business to product at the company. She began as global program manager, overseeing the roll-out of new products for the YouTube platform. She has since become a product manager and is now driving the vision and execution of YouTube products that better connect video creators and their fans.

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“When you’re in business, you’re faced with a number of decisions that call for you to break down a problem, look at it clearly, and then derive a logical conclusion. That’s what philosophy provides you with the ability to do.”

“Break down the specific steps you need to follow your path,” she said. “Don’t sit and think about that amazing dream you have because you think it’s unachievable.”

With unwavering commitment and a background in philosophy, Amankonah believes that better connect video creators and their fans. For students who are working toward their dream career,
Cultivating Arts Experts

Students develop their knowledge of artists and artwork at the J. Paul Getty Museum to share stories about the masters and their works with art lovers. By Michelle Brown

A small group of students gathered around a portrait of a modestly dressed woman, carefully inspecting her likeness. Painted in 1841 by French artist Jean-François Millet, the subject — clad in a simple black dress with a delicate, white lace collar — stands with her arms crossed, looking squarely at the viewer.

“What strikes you immediately about this portrait?” Arielle Murphy asked. Murphy is a senior art history major at the University of Southern California. At the Getty Museum, assistant professor (teaching) of art history Hector Reyes taught the course on art history.

“The eyes are her most expressive feature,” noted Aurora Morandi, a double major in business administration and art history. “That’s very interesting that you would point that out,” Murphy said. The portrait was painted in the 19th century, when painters were looking back to Dutch portraiture.

Theresa Murphy said. “Aside from the beauty of the art, and that it provides a way to get acquainted more closely with their subjects, and to practice their docent presentations, which we do to use for the public during the Getty’s College Night this spring. Peter Tishok, senior public programs specialist at the Getty who worked with the students in the course, sees a huge benefit for both the students and the community when local universities engage with the museum’s collections. In addition to connecting with museum goers and learning how to present to a wide range of learners, the interaction nurtures critical thinking.

“On the contrary, their insistence on mutual regard is remarkably mature, and can be considered inspirational. Adults may want to turn to these preschoilers as role models when it comes to perceiving and relating to other humans.”

Hildegreen Moll, assistant professor of psychology, and Allie Kirelline, Ph.D. student, is bows and rubs. The Conversation sharing their research, which suggests children can understand others’ views and prefer reciprocity and mutual engagement between individuals, contrary to previous presumptions.

“Inclusion (inclu) / inclu / noun / inclu, inclu, inclu, inclu. A solid fragment, globule of solid, or gas bubble enclosed within a mineral, rock, etc.; a discrete body or particle recognizably distinct from the substance in which it is embedded. 2. A borrowing from Latin. Inclusion: Latin inclusions, related.

Usage Inclusions are small particles, liquid droplets or bubbles of gas that have been trapped inside mineral formations. Inclusions often record information about the conditions when the mineral that encloses them formed, encoded in features such as their shapes and chemical makeups. Studies of inclusions can provide clues that help Earth scientists recreate the geological past — whether that be unraveling the history of mountain building, reconstructing past climates and seawater chemistry, or even searching for signs of early life.

Joshua West, Wilford and Daris Zinnemeyer Early Career Chair in Marine Studies and associate professor of earth science and environmental studies, researches the chemical processes operating at the Earth’s surface — an area known as marine geochemistry. Understanding these processes is fundamental to developing policies seeking to reduce the planet’s carbon cycle so that determines the characteristics of important natural resources.

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By Michelle Boston

The Conversation
In the Field

EARTH SCIENCES

LEAF LUCIDITY

Sarah Feakins is a climate detective. Her research allows her to travel back millions of years, thus allowing us a window into past climates that serves as a guide to the future.

"The remarkable thing about leaf waxes and their carbon isotopes ..." - Sarah Feakins, climate detective

BELIEF AND THE BRAIN

USC Dornsife scientists confirm it: People are hardheaded about their political beliefs, even when provided with contradictory evidence.

USC Dornsife scientists confirm it: People are hardheaded about their political beliefs, even when provided with contradictory evidence. - E.G.

BOOSTING LITERACY

New partnership helps fifth-graders polish their dramatic reading skills.

Ten-year-old Joseph Vega had always struggled with reading. But, the fifth-grader was about to embark on a daring mission that required him to summon as much courage as it would take to perform any of the intrepid feats undertaken by his hero, James Bond.

"This students will now look at reading in a different light and have a different kind of attachment to stories," she said.

"They’re going to read silently to themselves in a different way. The voices in their heads will be more expressive and they’re going to understand more. That will go with them throughout their lives. — E.B.

Belief and the Brain

Challenging political beliefs triggers brain regions that govern personal identity and responses to threats.

USC Dornsife scientists confirm: People are headstrong about their political beliefs, even when provided with contradictory evidence.

"The study found that people who were most resistant to changing their beliefs had more activity in the amygdala and the insular cortex, compared with people who were most willing to change their minds. Understanding when and why people are likely to change their minds is an urgent objective," said Sarah Gobet, a research scientist at the JEP. "Knowing how and which statements may persuade people to change their political beliefs could be key for society's progress." — E.G.
Crime Finders
Using Los Angeles' innovative GeoHub, researchers visualize where violent crimes take place to improve safety for residents.

When the mayor of Los Angeles considers your research on crime data and public safety so valuable that he invites you to work with his team, it’s pretty exciting.

Last December, six undergraduates plus Postdoctoral Research Associate Noli Brazil and GIS Project Specialist Beau MacDonald from USC Dornsife’s Spatial Sciences Institute (SSI) presented findings from the research they had undertaken that fall to Mayor Eric Garcetti’s Data Team and the Los Angeles Police Department (LAPD).

Using data from GeoHub — Los Angeles’ new public platform for exploring and visualizing location-based open data — the student researchers created a mapping application that brought together information about crime occurrences with social and built-environment features. They incorporated variables like unemployment rates, the presence of street lights and proximity to public transportation, and then visualized this data by specific street segments.

In their presentation, the SSI team members shared their analysis, which underscored the importance of connecting place and space to improve public safety. They also showed how their mapping application can uncover important patterns of crime.

“We were so impressed with the high quality of work that SSI has done. They have brought us an innovative approach that will be tremendously useful as the Mayor's office, LAPD and other city stakeholders work to develop policies and strategies to improve community safety,” said Brian Buchner, Garcetti’s policy director for public safety.

Richard Windisch, an L.A. native, is a junior at USC Dornsife majoring in GeoDesign. He related putting his learning into practice through this project.

“The opportunity to present a semester’s worth of research to city officials and partners was a unique experience,” he said. “I was able to see the importance of my degree in spatial sciences and how it can benefit an entire city as well as improve the understanding of Los Angeles’ working parts through the lens of different city departments.”

South Los Angeles and its people have been in a state of transition for more than a century. The area is the site of an immense demographic shift, from majority African American to majority Latino. Researchers at USC Dornsife’s Center for the Study of Immigrant Integration (CSII) documented the impact of this change in a recent report, “Roots/Raíces Latino Engagement, Place Identities and Shared Futures in South Los Angeles.”

The integration of Latinos in immigrant communities has exposed divides of conflict and community for both populations on a range of issues.

“The new narrative recognizes not just the poverty, history and tensions of the past, but the area’s evolving identity and the successful black-brown coalitions that are leading significant social, economic and political improvements in the area,” said Manuel Pastor, co-author of the report, co-director of CSII, Turpanjian Chair in Civil Society and Social Change, and professor of sociology and American studies and ethnicity.

Racial tensions at times in this recent history of South L.A. have defined the relationship between blacks and Latinos, but both groups have much in common, as they cope with issues such as job availability and access to education. Such challenges could unite rather than divide residents.

The researchers said many cities around the country are experiencing similar demographic shifts. They hailed South L.A. as a potential model.

“Similiar population changes have taken place — or are presently taking place — in other U.S. cities such as Oakland, Calif., Jackson, Miss., and Orlando, Fla.,” Pastor said. “The results of our effort to assess the impacts and lessons of these transformations can help Los Angeles and other cities develop and implement strategies that engage residents, reduce conflict, connect them with organizations and services, and provide support that improves equity and opportunity.”

Crime Finders
Using Los Angeles' innovative GeoHub, researchers visualize where violent crimes take place to improve safety for residents.
How do writers bring their creative vision to the page?
Five of USC Dornsife’s leading authors, writing across genres of fiction, poetry, memoir, criticism and narrative nonfiction, unlock the mystery.

Early in her writing career, best-selling author Aimee Bender followed the widely accepted wisdom of the day by diligently jotting down ideas whenever — and wherever — they came to her. The theory, expounded by celebrated writing coaches, was that these notes would work as memory aids, recording inspirational moments, unlocking creativity and making writer’s block a thing of the past. Index cards (small, easily portable) were deemed the perfect tool for the job.

Bender, however, backed the trend.
“‘I tried jotting down notes on index cards for a while,” she confides, “and it was almost shocking to me, when I’d sit down to write, how much they didn’t give me.”
“When I first moved here from New York and started taking the subway and started driving, I noticed that instead of thinking in fragments — which is how things sound — I found myself starting conversations, where you catch conversations and see different things every minute — I found myself plotting the arc of my books and imagining their form as I drove. That has allowed me to take on larger projects because I’ve had the mental and physical space to lay them out.

“I have a really strong belief that that is where the work lives and the work is not necessarily that anything I can predict or know about in advance. I can plan it and I can’t impose on it.”

A MYSTERIOUS ALCHEMY

In almost 30 years of writing literary criticism, author David Ulin, assistant professor of the practice of English and former book critic of the Los Angeles Times, has talked to hundreds of writers about their creative vision. What struck him most is that there is no one, agreed-upon path. Moreover, some writers, he found, are adept at talking about their process, how they develop a story and the ideas they’re writing about, while others are stymied.

“For instance, Zadie Smith is very articulate about what she’s doing and wants to engage in that conversation, whereas Philip Roth doesn’t want to unpack the mystery of his process,” he said. “My understanding is that Toni Morrison maps out everything scrupulously before she begins to write, so the discovery occurs as much in the pre-writing stage as in the actual writing.”

Bender takes the path opposite to Morrison’s, eschewing notebooks, outlines and — especially — index cards, indeed, planning of any sort. Rather, Bender says she tries to be as open, present and receptive to the world as possible. How that vision is processed onto the page is the mysterious alchemy that becomes the act of writing.

“What I’m always hoping to do is surprise myself and therefore the reader,” Bender said. “I don’t do surrealism to be strange or odd. I do it because it’s the best way I know to get an emotion.”

For Bender, the essence of creative vision can be distilled into two words: structure and surrender.

“You create a structure so that you can surrender,” she said.

“Language provides that structure. It is the holder of what is underneath: that inexplicable force that brings artistic im-

Indeed, unlike many novelists whose writing focus is largely character or plot, Bender’s fiction is primarily driven by language.

“I love words and how they relate to each other, how the combination of certain words creates a state of mind or feel-

ing, or an idea that you haven’t thought of before, and that’s also a big part of how I track — how certain words create a kind of energy, and how remarkable that is.

“In my view, language is actually your guide to where the good material is. If the language has life in it, then that’s probably where your story is.”

To channel her unique creative vision, Bender relies on a self-enforced structure that gives her room to surrender.

“My writing improved a lot when I started working on a fairly rigid schedule,” she said. “Previously I’d just written whenever I felt like it and it had this kind of boundless, daunting feel. Now there’s a discipline to it and I find so much more comfort in the idea that I don’t have to write a single word.

“All I have to do is sit there and it does become so boring, and then I get bored if I know too much.”

“Tuning into creativity some-times involves tuning out. Tuning into creativity sometimes involves being under-whelmed by the world, or finding most unhelpful, she says.

“It’s actually counterproductive,” she added. “I want to re- impose on it.”

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“Structure” and “surrender.”
to pay more attention to following my interests in a more coherent way.

Nelson’s sensitivity to place is echoed by New York Times best-selling novelist Marie Lu ’06. Lamented by critics, Lu has always been fascinated by her characters’ unique visions, and the dystopian fantasy worlds she builds in her fiction — worlds that offer the possibility to hold up a mirror to reality.

“Writing is my own form of therapy,” Lu said. “It’s my way of making sense of the world.”

Lu credits her first job in the video game industry for kick-starting her creativity and motivation as a writer. It also inspired her latest novel, *Thornvale*, due out from G.P. Putnam’s Sons Books for Young Readers in fall 2017. The book explores a dystopian universe dominated by a video game that becomes a way of life for its millions of fans.

*Thornvale* is set in Tokyo, a city Lu visited last spring and found mesmerizing — a quality she was determined to maintain in her writing. “I knew so well from living in L.A., and tweak them to fit a dystopian vision.”

Lu also taps into her background as an artist to make detailed drawings of her characters before she starts writing about them. “If I don’t draw them I have trouble understanding who they are. This physical exploration of character also helps me figure out the rest of the story.”

Music is also key to Lu’s creative process. “I have a lot of trouble writing in silence,” she said. “It’s too distracting, too loud.”

She overcomes that loudness by curating playlists tailored to each novel. She weaves electronic music and soundtracks from video games and sci-fi movies interspersed with mood music to help her get into the right frame of mind to write certain scenes.

Lu also travels extensively. A trip to Canada to see the Northern Lights resulted in a rich haul of sensory detail that she used to good effect in *In the End*.

“It’s just no replacing the feeling of actually standing in a place to understand it with all my senses,” she said. “In Canada, it was 50 below zero and I could feel the surface of my eyeballs freezing. Ice crystals formed on my lashes, and when I took a breath, it hurt because the air was so cold. I don’t think I would have been able to write these scenes so successfully without having actually experienced that kind of cold.”

**EXILE AND IDEENTITY**

Place also occupies a central role in the creative vision of Safiya Sinclair, a doctoral student in creative writing and literature at USC Dornsife. An award-winning poet, Sinclair earned a prestigious 2016 Whiting Writers’ Award for her first full-length collection, *Northern Lights* (University of Nebraska Press, 2016).

Born in Jamaica into a Rastafarian household, Sinclair says she always felt like an outsider in her native land where Rastafarians — a minority — suffer discrimination.

“My siblings and I always felt some sense of otherness, of being an outsider, something akin to a kind of exile, feeling like a stranger in your own home, your own body, your own country.”

For Sinclair, writing poetry was a saving grace, a way to make sense of growing up as a young Rastafarian woman under the constant specter of violence or joy. It can say the thing, without saying the thing, by showing you.”

**SOWING THE SEEDS**

Lu studied political science and biology and says those lenses that overlay another reality on top of the real world are rooted in violence against women, “from the landscape of memory, of growing up in Jamaica with the violence of language,” she said, “to my students would be for them not to make choices that feel contrived, but to make choices that feel organic.”

“Downtown is half-bloody, and steel skyscrapers like the U.S. Bank Tower rise out of a vast lace. They’re abandoned, and people swim over to them to sit on the sidewalks and dangle their feet in the water,” Lu said. “It was fascinating to take what was familiar to me, the streets and buildings that I knew so well from living in L.A., and tweak them to fit a dystopian vision.”

As part of her thesis, Sinclair is writing a prose memoir about growing up as a young woman under a strict patriarchal system — if they can let it. Too often, she says, a student writing something that shocks them or makes them laugh. “So many words and expressions in our everyday vernacular are rooted in violence against women,” she said, “from describing a singlet as a ‘wife-beater,’ to saying ‘knocked up’ instead of pregnant. I’m interested in how these words come down to us and how they contribute to furthering violence against women because the language we use shapes the way we think and live.”

Imagery is crucial to Sinclair and her poetry uses recurring sensuous tropes of the hibiscus and hibiscus that bloom freely in Jamaica.

“A well-crafted image can convey anything,” she said. “It can convey violence, it can convey joy. It can convey the thing without saying the thing, by showing you. It’s a way to subtly give the reader an invitation into the poem and the meaning of the poem or the ‘why’ of the poem without premarital. It’s an opportunity for the poet to be painted.”

The sea is always in the background of Sinclair’s poems, even if it’s never named or mentioned. “The sea is the lyric landscape that I find my mind wandering to when I’m entering into a poem,” she said. “I was born in a fishing village right on the beach and the sea is always something I’m trying to rifle, whether rhythmically or metrically, or simply a rich place for me to frame many of my poems. I’m interested in trying to mirror this natural world on the page.”

As she writes, Sinclair reads her poems aloud because — as she notes — “this is where the words and music and movement, and the poems energy emerges.”

**KEEPING THE FAITH**

As Sinclair grew up under a strict patriarchal, Bendler’s youth was strongly influenced by the liberating qualities of modern dance. The daughter of a psychoanalyst and a choreographer, her childhood resonated with poetry, fairy tales, theater, and the introspection from her father that exploration of feelings and the characters was worth pursuing.

“Her combination of psychology and theater was potent and compelling to me,” Bendler said. “As a result, the conflict between what’s on the surface and what’s underneat, what’s on display, what’s being seen, what’s in terms of how we navigate each other and ourselves.”

She has participated in nearly community outreach projects, from teaching creative writing to underserved elementary students at the USC Family of Schools, to doing theater work with underserved students.

“With a young girl from the Caribbean who was well known for her writing. She was being treated differently than her classmates. She was being treated as if she didn’t belong, as if she wasn’t good enough, as if she was the other.”

“My vision was to use the power of words to change the world, and to make a difference in the world.”

For Sinclair, writing poetry was a saving grace, a way to make sense of growing up as a young woman under the constant specter of violence or joy. It can say the thing, without saying the thing, by showing you.”

**WELL OF CREATIVITY**

Writers may have widely different processes, but most agree that their vision springs from a deeper place than logical thought.
On a mild October evening, The Francisco Homes, a social justice nonprofit providing support to former prisoners, held its annual Night of Appreciation event. Standing before a full room of donors and a prison population, so to get out the humanity from behind their stories is really interesting." For some of the readers, it was their first time sharing their writing outside of the workshop. David "feeble" Smith was among them. Smith, who served more than 20 years in state prison, began attending the creative writing sessions early on. He appreciated the insights the workshops gave him on how to transfer some of his feelings into language. "I've benefited from the opportunity to practice, or put down in words, things that I've just sat around in my head," he said. "But most important is the opportunity to learn and use the lessons to refine a writing process." Murray reflected on how valuable the act of writing can be. "I think [working with these men] is a grand reminder of what a luxury it is to write, or to be able to articulate and process your experience and understand yourself better through writing." 

BUILDING A NEW IDENTITY  After joining the USC faculty last year, Artiano jumped at the chance to participate when Murray contacted a few colleagues about the creative writing workshops at The Francisco Homes. Once she began working with the former prisoners, Artiano quickly understood what those who were most interested in talking about their individual transformations. "I wasn't expecting their commitment to wanting to make sure it was clear that transformation is possible, in spite of all the difficulties and the system being stacked against them," she said. Many of the men say that the experience of writing is cathartic for them. "Watching this in action is really moving," Artiano said. "They're always eager to hear critiques and at times resist what they feel is excessive praise of their work." Bower has observed how meaningful it is for the men to talk about their experiences and to explore their shifting sense of self. "One of the guys talked about how he's involved in making the journey from a prison mentality to that of a citizen, a human being. And he's recognized the way that writing plays an essential role in that journey." The notion of restorative justice is an important aspect of the mission of The Francisco Homes. In the context of crimes, restorative justice strives to bring reconciliation between the parties, working to provide healing and unity to all affected—as individuals when possible, but ultimately as a community. "This work has made me much more aware of restorative justice," Murray said. "I see how much of the general population doesn't consider this approach to crimes, and the notion of healing as opposed to retribution, but it's a really interesting idea." IMPACT THAT GOES BOTH WAYS It's certainly not just the participants for whom the writing workshops are meaningful. For Murray, working with this community has impacted her both personally and intellectually. "I think that to be out there with these guys—to understand and be comfortable with them—humanizes how I read research and understand current events now. It's made me aware of my own lens, of someone with my education and background. I thought I was unbiased, but I realized I was very comfortable with how I conceptualized people. For me as a person, that realization is really important, and it's a reminder that it is to lapse into thinking you know who it is you're talking to or reading about." Though Bower sometimes dreads the long drive between her house and The Francisco Homes, the journey always pays off. "Every day I feel grateful to be there," she said. "They're just something about being in that space and seeing how appreciative they are—seeing the way that words give life to new realities and new ways of being in the world, and being the audience and the listener for that." Murray's work reflects the process of reconciliation that he and his peers have embarked upon. For him, it is ultimately a message of hope and gratitude. "I believe I will spend the rest of my life changing into the man I am supposed to be. Every day is not an adventure—it holds triumphs and defeats. To me it is a called life. Now I live a life of ethics. The moments where I stood down the street from the first time I ate out; the first time I saw a child; and so many more, each one more precious than the last... What all this means is not the ending of my story but just the beginning. Each day a gift, and I must always give thanks. And never forget how I got here."
Sandwiched between a group of Afghan goat herders and a Sikh businessman, Julian Leuthold inched forward in the long customs line at Delhi airport. It was New Year’s Day 2010, and inside the teeming terminal, Christmas carols were still blaring over the loudspeaker system.

Leuthold had come to explore the country’s nuclear policy as part of a study abroad program. It was his first trip to India and the culture shock was intense. However, the senior, who graduated later that year with a bachelor’s in international relations from USC Dornsife and marketing from USC Marshall School of Business, kept an open heart and mind as he plunged into this unfamiliar new world.

That generosity of spirit has repaid him a thousand times over, most notably in his successful career as the founder and CEO of Geoskope, the company behind GetGlobal, the first conference on how to succeed in foreign markets.

Leuthold traces the germ of the idea for GetGlobal back to some unexpected observations he made during that study abroad program.

Two factors helped him adapt to his new life. First — unusually for an expat — he didn’t hang out with many Americans.

“All my friends were Indian and I started to feel very comfortable because I left behind all my assumptions,” he said. “I tried to live my life in India the way Indians live theirs.”

Second, although no one in his family had ever been to India, his mother and grandmother both had Hindu gurus and Leuthold spent his childhood surrounded by Indian books and artifacts.

“Growing up, I also became familiar with the Tibetan diaspora,” he said. “So it was an easy jump for me to understand India on its own terms because the words, lifestyle and cultural materials had been so familiar to me from a very young age.”

After taking his way into a semester of graduate study at New Delhi’s prestigious Jawaharlal Nehru University, Leuthold’s circle of friends expanded to include numerous Indian executives.

“They kept asking me, ‘Julian, why do American companies come here and make so many mistakes? Why do they repeat the same errors, time and time again?’”

Leuthold didn’t have a ready answer, but couldn’t get the question out of his head.

As he pondered, he began to recognize a pattern. Companies going into India assumed there was a subcontinent full of people just waiting to buy their products. “And that just isn’t the case,” Leuthold said. “If they want to succeed, they need to stop underestimating the sophistication of the country they’re dealing with. American companies need to get to know Indian society and how it works and figure out the best way to meet it — its diverse cultures, structure and history — halfway. Instead, I realized, most business executives are just making it up as they go along and Indians easily recognize this.”

“The more he explored, the more Leuthold realized this lack of cultural and institutional fluency was not limited to India.

“It’s Brazil, it’s Mexico, it’s the countries of Africa and even Canada. American companies have a really difficult time understanding how things work in most countries,” he said. “That isn’t to say that nobody gets it right, but it’s not made easy.”

A Brookings Institution report confirmed his worst suspicions. “It made plain what I’d been suspecting the entire time: Nobody was pulling together all the necessary participants of trade and investment under one roof.”

Alumnus Julian Leuthold, the visionary founder of GetGlobal — the first conference on how to succeed in foreign markets — attributes his success to the open-minded approach to life and business he learned from the country he now calls his second home: India. By Susan Bell
Leuthold was determined to change that. In 2011, and later with the help of two of his former USC Dornsife professors, David Karl and Pamela Starr, he founded GeoSkope, a company that grew out of his astute observation that businesses with ambitions to expand into foreign markets lacked a one-stop destination to get their questions answered.

“I realized this was a major opportunity to pull together key participants in international trade and investment and build a conversation about how to compete successfully internationally,” Leuthold said.

Held in Los Angeles in October 2016, GeoSkope’s first GetGlobal conference drew almost 1,000 registered attendees, including delegations from the United Arab Emirates, Southeast Asia and Colombia, all keen to hear the insights of GetGlobal’s 150 international experts.

“This was the big experiment,” Leuthold said. “Will they join? The answer was a resounding yes.

“We had former Mexican intelligence officials sitting next to a virtual reality game producer and executives from an organic beverage company.”

We had former Mexican intelligence officials sitting next to a virtual reality game producer and executives from an organic beverage company.

“Also, L.A. was born and raised in L.A., where his father worked in banking and entertainment. The family moved often, so as a child Leuthold constantly had to make new friends.

This feeling of being “forever the outsider,” Leuthold confesses, was his primary motivation for launching his earlier ventures, which later proved to be a model for organic beverage company.

“I did it because I felt like a loner. I was really shy.”

He may have been shy, but Leuthold exemplifies many qualities associated with visionaries. He thinks in unconventional ways, sees opportunities rather than setbacks; combines elements in unexpected ways to create something new; and is unafraid of failure. Plus, he thinks big.

He is also exceptionally open — to diversity, to new people and situations, and to new ideas — a character trait he attributes to his time in India.

“What I love most about India is that its diversity constantly forces you to keep an open mind. In fact, it’s a necessity to survive there.”

Yet, Leuthold says his career has been driven by a feeling of not knowing what to do next.

“To me, everybody always looks like they’ve got it all figured out, but I wouldn’t know how to do it like they do, so I have to come up with something else,” he said.

One strategy included living for a year in Washington, D.C., where he attended think tank discussions and sought clients in the area.

“So here are the VSPs — the very serious people — sitting in these really serious places in a very serious town and they’re there to see other very serious people talk about very serious things. Many of them didn’t want to ask questions because they didn’t want to look stupid. Nobody rewards an executive for saying, ‘I don’t know.’ But there’s beauty in saying, ‘I don’t know.’ It says, I’m ready for more. I’m ready to learn.”

Leuthold said he spent time wondering, “Gods, how am I going to ‘out-serious’ the serious people? Instead, he started to think about what it would take to make people feel comfortable enough to say, “I don’t know.” Because when it came to India or so many other foreign markets, he knew that most of them didn’t know.

“I thought, maybe they need some music, or a few drinks, or a lighter hearted atmosphere where openness is encouraged,” he said. All those elements can be found at GetGlobal, which also owns its style in part to Leuthold’s 2½-year stint working for an online magazine and investment owned by Track Entertainment — manager of many of Miami’s biggest music festivals.

The gig, which he gave up after transferring to USC in Spring 2006, enabled him to gain invaluable experience in concert and event management.

“I thought I’d never use that stuff again, but it turns out I’m applying a lot of music festival concepts to GetGlobal,” said Leuthold, who isn’t shy about borrowing ideas from the rock world to inject an unexpected dose of glamour into the usually sober milieu of international business. For its launch GetGlobal shook up expectations, housing a live art show, cool lighting design and a cutting-edge music system. 

Leuthold’s decision to hold GetGlobal in his hometown is a strategic one.

“In D.C., everyone asks me, ‘Why L.A.? The answer is that we can get away with more in L.A.: more humor, more glamour. We can break a few rules. It might not fit in D.C., but here it makes sense and our attendees delight in that.”

Initially drawn to USC by its diversity, Leuthold now finds that the same quality in the international Trojan Family is of enormous benefit in building his business. Leading Indian economist and alumnus Ajay Shah “couldn’t have been friendlier,” for instance, when Leuthold reached out.

“Initially drawn to USC by its diversity, Leuthold now finds that the same quality in the international Trojan Family is of enormous benefit in building his business. Leading Indian economist and alumnus Ajay Shah ‘couldn’t have been friendlier,’ for instance, when Leuthold reached out.

“Asked what stood out for him the support I’m referred from Starr, associate professor (teaching) of international relations, and Karl, former lecturer of international relations, in developing and building his company, Leuthold didn’t miss a beat.

“They cared,” he said. “And they stuck with me. David works with me today while Pamela still lends advice.”

Leuthold remembers Starr’s class on nanoscale material economics, which he took last semester before going to India.

“It was a political risk analysis class that tied everything together,” he said. “I wouldn’t be able to do what I’m doing now without that kind of foundation.”

Leuthold’s decision to hold GetGlobal in his hometown is a strategic one.

“One day, it will draw 80,000 people to downtown L.A.,” he said with a grin.

His confidence, however, is tempered by humility.

“The standards in international business, policy and economics are exceptionally high and you can’t just BS your way through that. You have to have to be tremendous good — inside and out — to parade on in with a circus behind you. Am I there? Absolutely not. We’re an ongoing struggle every day to make myself better, but I think the process of having no footholds, no place to rest anything, has helped me.”

“THERE’S BEAUTY IN SAYING, ‘I DON’T KNOW.’ IT SAYS… I’M READY TO LEARN.”

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At the USC Image Understanding Laboratory, Irving Biederman and the late Bosco Tjan’s pioneering research into vision and the mind seeks to unlock the mystery of how our brains can recognize previously unseen scenes, objects or faces in a fraction of a second.

By Susan Bell
At the end of a long day, as we put our feet up, reach for the remote control and begin watching TV, we may find ourselves confronted with images beyond our experience — such as “The Upside-Down,” the mysterious parallel dimension inhabited by a tulip-headed monster portrayed in the Netflix show Stranger Things. This shadowy world holds up a bizarre mirror to our own, showing us a place of endless darkness and decay, where familiar infrastructure is so overgrown with twisted rope-like tendrils and webs of biological matter as to render it almost unrecognizable. And yet, even though those strange images lie in the realm of the unknown, do we struggle to recognize them? No, we do not.

In about a tenth of a second — too quickly for us to even be aware it’s happening — our brains figure out what we are seeing and make sense of it. The extraordinary speed and mastery of interpretation that our brains exercise in such situations is the focus of pioneering research by USC Dornsife vision scientists Boyan Biederman and the late Boush Tjan.

“It’s the miracle of pattern recognition,” said Biederman, Harold Dornsife Chair in Neurosciences and professor of psychology and computer science. “People can mislead into thinking it’s a very easy, simple process because it occurs so quickly and automatically, but the fact is half of our brain is dedicated almost exclusively to vision.”

Indeed, Biederman and Tjan’s research is focused not on the eye itself — what most people think of when they hear “recording images.” The eye is a recording device, and the brain is the interpreter. “Like a camera, the eye doesn’t know what it’s looking at,” he said. “It’s our brain that interprets the image, not the eye.”

Biederman directs the Image Understanding Laboratory, which is researching how a scene, object or face can be interpreted and understanding what we see.

“Our retina is two-dimensional while the world is three-dimensional. The question is, ‘How is that done?’ How is it possible to achieve visual understanding of a scene we’ve never experienced before?”

First, we need to overcome a deceptively complex problem: Our retina is a two-dimensional world while the world is three-dimensional.

Biederman invites us to think of a chair and imagine looking at it, or indeed trying to draw it, from the most unusual perspectives.

“If we rotate that chair it can present an infinity of images, many of which — upside down and viewed from below, for instance — we’ve never experienced before. Yet, with the exception of a few unusual projections of that image, we’ll almost always be able to appreciate its three-dimensional shape.”

This ability becomes the miracle of pattern recognition: how we’re able to understand scenes never seen before, from viewpoints never viewed before.

“These scenes and objects are projecting images that are completely novel and yet we can instantly make sense of them,” Biederman said. “It would seem to be an impossible feat and yet we do it all the time. A child does it and we do it so easily that we’re hardly aware that it reflects an extraordinary achievement.”

THE BREAKDOWN

So how do our brains pull it off?

The answer, Biederman says, lies in the brain’s ability to decompose complex objects into simple shapes like cylinders, bricks, wedges and cones, which he calls “geons.”

“It turns out that you can model most objects in terms of a very small vocabulary of these simple shapes, numbering about 30 or 40,” he said.

“If we represent an object we’re looking at in terms of geons, then we’re able to recognize what the object is from almost any viewpoint.” That’s because the components — the geons — that make up the object are easily distinguishable from one another regardless of viewpoint.

The characteristics of an object that enable us to do this — what Biederman terms “nonaccidental properties” — are small in number. They include points where contours (the lines that mark the edges of an object and form its outline) meet and end, like the corner of a table; whether a contour is straight or curved, such as a door or a ball; and whether a pair of contours are parallel or converging, such as those on an ice cream sandwich or an ice cream cone.

A few exceptions do exist. For instance, a brick and a cylinder both look the same if viewed directly from the side. “But even then,” Biederman notes, “a slight change in orientation of the brick or the cylinder will tell you, ‘That’s the cylinder and that’s the brick.’”

Ultimately, he says, geons and nonaccidental properties are what enable us to look at a previously unseen abstract sculpture and understand its shape. Our brain is able to break down the various parts that make up the whole into comprehensible geons and then come up with an interpretation in terms of nonaccidental properties and vertices. When we cannot represent the object in terms of its simple parts, such as with a nebulous mass, then we will have trouble distinguishing it from another at different viewpoints.

SPARKING VISION

It is our brains, not our eyes, that are responsible for achieving vision by interpreting what we see.
The region of the cortex that is responsible for this amazing feat of perception is the lateral occipital complex (LOC), an area of the brain at the border between the occipital and temporal lobes, just above and behind the ears. Given an image, the LOC will not only determine the geons that make it up, but also the relationships between them.

Functional magnetic resonance imaging (fMRI), which measures changes in blood flow within the brain, made identifying the LOC relatively easy, Biederman said. It clearly indicated greater activity in that region of the brain when subjects were shown intact images of objects than when shown scrambled versions of those objects. That knowledge enabled the scientists to concentrate their studies on that area.

Research by Biederman and Tjan, who at the time was professor of psychology and co-director of the Dana and David Dornsife Cognitive Neuroimaging Center, showed that the activation of the LOC does not depend on whether an object is familiar. They tested this by rearranging the geons of familiar objects so that they appeared as novel items, similar to rearranging letters of a word to make a non-word.

“We found that the LOC is activated equally by abstract sculptures and familiar objects,” Biederman said.

Understanding Scenes
In addition to identifying objects, our brain also needs to make sense of all that we see. Often a single glance is all it takes; however, if faced with a random array of objects, we may have to look at each individually to gain an appreciation of the whole scene. For example, a quick glance at a kitchen is usually enough to immediately understand what we’re looking at, but comprehending a messy collection of items piled up in a teenager’s closet may require us to look at each object separately.

A recent experiment carried out by Tjan, Biederman and Eshed Margalit, who graduated from USC Dornsife in 2016 with a bachelor’s degree in computational neuroscience and is now pursuing graduate studies in neuroscience at Stanford University, addressed this. The study showed that separating the geons of an object so they are no longer interacting — in other words, no longer making up the object but simply separated from each other — causes even less activity to occur in the LOC than for an intact object.

If we go one step further and scramble the geons into a mass of random pixels, the LOC shows still less activity. Similarly, this sensitivity of the LOC to the relations between parts composing an object is also witnessed with the relations between objects composing a scene. Thus, the LOC shows stronger activation with an image of a hand holding a cup than an image of a hand beside a cup.

“This applies generally, not just to hands and cups but to any pair of objects,” Biederman said. “One might have thought the opposite, that two things — a hand and a cup — would cause more activity in the brain than essentially one thing, a hand holding a cup. But we found that more activity occurs in the LOC if objects are shown as interactting, rather than side-by-side.

“The LOC is an extraordinary mechanism for giving us not only the shapes of parts, but also how they relate to each other, and it does the same for scenes, giving us the shapes of the objects making up the scenes as well as the relations between them,” he added. “It is the area where objects become scenes.”

A Pathway to Pleasure
Biederman’s study of higher-level vision led him to explore the neural basis of the pleasure we derive from seeing and understanding, especially something new.

Visual signals travel a pathway from the retina at the back of the eye, through the optic nerve and along neural fibers to the occipital cortex in the back of the brain. Activation of the LOC follows, and then regions at the back of the temporal lobe spark. This last area is where we achieve a rich interpretation of the visual input, be it a scene, object or face.

Interestingly, opioid receptors, which convey nerve signals linked to pleasure, are dispersed in a gradient along the entire visual pathway, with few receptors in the early stages building up to more and more in the later stages.

“We found that being able to recognize a scene that we specifically have never seen before gives us more opioid release — and thus more pleasure — than something we can’t recognize or that we’ve seen many times before,” Biederman said.

This opioid fix explains the joy and appeal of new experiences. But why is novelty important to us? Biederman explains:

“When you have a new experience, initially many neurons are activated. But once the experience is over, the neurons that were most strongly activated inhibit the neurons that were only weakly or moderately activated by that experience. The next time you have the same experience, you get less opioid release. This explains why we seek out new experiences.

“Don’t feel sorry for the inhibited neurons, though. They are now freed up to code different experiences. It’s a reflection of the brain’s extraordinary capacity to divvy up its own neural connections, leaving only a minimal number of neurons to code prior experience and having lots of neurons in reserve to code new experiences.”

Humor and Creativity
This desire for novelty is further borne out by Biederman’s research into the links between vision and creativity. Using The New Yorker’s popular weekly cartoon caption contest, he is exploring what happens in the brain when it attempts to solve humor challenges. He opted to study humor, he said, “because it provides a practical and universal way to explore creativity that can occur in time frames sufficiently short to be amenable to fMRI analyses.

“In contrast, visual art may be able to give us the new experience we crave, but it can be debatable whether a certain work of abstract art is creative,” he said. On the other hand,
there is no debate when humor is successful, as the end result — laughter — is pretty much universal. A cartoon contains an incongruous element, something that doesn’t quite fit. “The caption to the cartoons, to be funny, cannot be obvious but has to link remote concepts that resolve the incongruity in the drawing,” he said. “Because the concepts are remote, their linking will necessarily result in the activation of a great number of intervening neurons with a concomitant and sudden deluge of opioid activity, causing us to laugh. But once we’ve seen the cartoon and we’ve got the joke, the inhibition of the weakly activated cells by the strongly activated cells reduces the amount of opioid release and thus the pleasure is diminished.”

Biederman says this desire for new but interpretable information is a system that makes us “infovores” — eager consumers of information. In earlier research, Biederman and Ori Amir ’15, a former USC Dornsife Ph.D. student now at the University of California, Santa Barbara, studied preferences for viewing simple geons. When presented with a pair of dissimilar geons, say a cylinder on the left and a cone on the right, both 4-month-old infants and college students preferred looking at the geons with non-parallel sides or with curves. This correlated with similar studies in the lab that showed how curvy or nonparallel shapes produced higher activity in visual pathway neurons than straight or parallel shapes. “That greater activity means we get more opioid release and thus more pleasure from looking at those shapes,” Biederman said. “Our eye movements are not random but, when we are not engaged in a deliberate search, such as looking for our car in a parking lot, they are directed towards entities that will give us more opioid activity — a system that is established as early as four months.”

FOCUS ON VISUAL CROWDING

Tjan, who died on Dec. 2, 2016, was an international expert on visual crowding. Postdoctoral and doctoral students in Tjan’s laboratory are continuing his legacy of pioneering research, aimed in part at bringing hope to macular degeneration patients with impaired vision. About 20 percent of us will find our vision degraded as the macula, a region near the center of the retina, degenerates in our later years. As patients lose their high-resolution central vision, many develop a preferred retinal locus (PRL). This means they have learned to compensate for their impaired central vision by looking slightly away from objects on which they wish to focus, thus using the part of the retina with the highest remaining resolution. While PRL is helpful, it comes with a major disadvantage: visual crowding. This occurs because cells in the periphery of the retina have larger receptive fields than the tightly packed center. Patients with macular degeneration who use PRL to focus on, say, a given letter on a page, often experience visual crowding when other nearby letters activate the same receptive field being employed to perceive a given letter. This results in mixed-up shapes, making it difficult if not impossible to interpret the shapes of letters, objects and scenes.

Tjan successfully demonstrated how a training regimen could reduce visual crowding’s deleterious effects on vision. Tjan pioneered the study of PRL in normal subjects without macular degeneration so he could understand how the condition progresses. By deliberately occluding their central vision, he was able to train his test subjects to use a region of reasonable clarity or resolution away from the center of the retina. Although not as good as the original central vision, this area provides better focus than more peripheral regions. Further, Tjan and his team used fMRI to show that training actually changes the way the brain works, improving visual processing in the primary visual cortex, the starting point for visual processing in the brain. “There are just a few really great mysteries in the world,” Biederman said. “There is cosmology and dark matter, and then there is higher-level vision and the brain. And we have come a long way in explaining how we make sense of what we see, this extraordinary achievement of the brain that had never been understood before.”

IF WE REPRESENT AN OBJECT ... IN TERMS OF GEONS, THEN WE’RE ABLE TO RECOGNIZE [IT] FROM ALMOST ANY VIEWPOINT.
Ideas are the engine of change. Nurtured, refined and converted to action, they build to a critical mass, sending shockwaves through the status quo.

At USC Dornsife, more than 40 centers and institutes are home to faculty, staff and students who aim to impact the global community through intensive, innovative scholarship in the social sciences, humanities and natural sciences. More important, their visionary work not only results in significant, positive change now, but sets the stage for ongoing progress by giving students the skills to think differently and find their own paths to a brighter future.
grounded in the idea of intellectual leadership. “My strategy has always been to have the bravery to say, ‘This is the way in which academic needs to evolve and we’re going to demonstrate that.’ I don’t think you win many accolades by copying. Rather, my vision grew out of the question: How can we build a spatial sciences institute that will be as relevant in its impact five or 10 years from now as it is today?”

His conclusion? Innovation is the key. “Our research and teaching must be both cutting edge and actionable,” he said. “We want academic programs that provide expertise and training that people can take and apply wherever they want, more or less instantly.”

The success of this strategy can be seen in the long list of SSI graduates and faculty who are improving the world in visionary ways. Graduate student Kelly Wright, for example, is using her online training in geographic information science and technology (GIST) to fight leprosy, a painful, debilitating and disfiguring disease that affects the lives of millions of the world’s poor.

Nathan Novak, a 2016 graduate of the GIST master’s program, completed a prize-winning thesis project that explored how new sensors can help us understand the ecology of sperm whales by using a range of geospatial data to map their movements in the Gulf of Alaska. Novak successfully turned his research into an internship and then a permanent job as a geospatial technologies manager.

A recipient of a recent grant from the National Endowment for the Humanities, Yao-Yi Chiang, assistant professor (research) of spatial sciences, is creating map-processing software that libraries can use to automatically catalogue map collections, thereby making the information they contain more accessible to researchers and the public. “Maps record changes in human societies and our physical space over a long period of time. But most of these maps exist only on paper sitting in libraries, archives and museums, and technology can’t yet find them, let alone integrate them automatically,” Chiang said. “Our work can potentially unlock a world of long-term historical information for scholars across many fields.”

Wilson illustrates the relevance of spatial sciences by asking interlocutors to think of traditional disciplines as cups of coffee. Spatial science, he says, is the cream.

“First, we taste the cream. Spatial sciences enables us to see and understand our world in new ways, whether through the lens of the past, the present or the future.” This vision is also strongly connected to service. The institute has formed relationships with a range of influential professional organizations with the view to creating a series of regular, multidisciplinary workshops around specific problems and places. Wilson’s idea? To bring citizens, experts, students and faculty together to see and understand our problems and places. Wilson’s idea? To bring citizens, experts, students and faculty together to form a collaborative regional network that looks to the future rather than the present or the past. It is the first program of its kind in the world and people are copying us.”

SSI’s research-based online master’s degree in GIST encourages students to pursue their own interests for their thesis projects, attracting people from widely varying backgrounds.

In 2014, SSI launched two online graduate certificates — in geospatial leadership and in geospatial intelligence — and added a GeoHealth track to Keck School of Medicine of USC’s online MPH degree. A year later, the institute began offering a new M.S. degree in spatial informatics with the USC Viterbi School of Engineering. In 2016, SSI launched an interdisciplinary Ph.D. in population, health and place with Keck School of Medicine and USC Dornsife’s sociology department, and a new human security and geospatial intelligence minor with the School of International Relations.

“All these academic programs speak to problem solving, interdisciplinary opportunities and the future,” Wilson said. “They all speak to training young men and women, who we have every expectation will go out in the world and make a difference. That was our vision from the get-go.”

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“We’re figuring out when to add a little to the coffee, and make the sum of the parts bigger and better than the original. In most fields — at some time, in some way — spatial sciences will add value. It’s all about collaboration.”

Rather than building a spatial sciences degree, Wilson chose to create a bachelor’s degree in geodesign in partnership with USC Price School of Public Policy and USC School of Architecture.

“Our geodesign degree focuses on collaborative decision-making and looks to the future rather than the present or the past. It is the first program of its kind in the world and people are now copying us.”

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This vision is also strongly connected to service. The institute has formed relationships with a range of influential professional organizations with the view to creating a series of regular, multidisciplinary workshops around specific problems and places. Wilson’s idea? To bring citizens, experts, students and faculty together to find common ground and suggest solutions — from how to deal with the aftermath of a major storm or nuclear accident, to working toward creating green infrastructure or ending endemic poverty.

“These are major problems, but they’re also opportunities for us to engage and work with our students to help find solutions,” Wilson said. “That’s the next step: more community outreach — not just locally, but also nationally and internationally.” — S.B. [ilustrations by james wan for USC Dornsife magazine]

**Earth Perspective**

Spatial sciences enable us to see and understand our world in new ways, whether through the lens of the past, the present or the future.

**Reverberations**

Students educated per year by the Spatial Sciences Institute at USC Dornsife.

Students and graduates of our online GIST graduate programs have won academic awards, given conference presentations or had articles published in academic journals.
When Daniel Benjamin was just beginning his Ph.D. program in economics in 2001, he attended a conference with his graduate school advisers. They took in a presentation on neuroeconomics, a nascent field dealing with how the human brain goes about making decisions.

Afterward, as they took a stroll outside, they couldn’t stop talking about what they had learned, how novel and intriguing it was. What would be next, they wondered. "There’s no restriction on which way you want to go or what you want to do. It doesn’t mean that there are no restrictions on resources, but it’s the opportunity to think about your vision of what’s really exciting in social science research. Then being able to actually implement it is absolutely fascinating," Benjamin said.

The mission of CESR is discovering how people around the world live, think, interact, age and make important decisions. The center’s researchers are dedicated to innovation and combining their analysis to deepen the understanding of human behavior in a variety of economic and social contexts.

"What we try to do is meld a disciplinary science in a very broad sense," Kapteyn said. "Because today’s problems in society, they’re really all multidisciplinary."

Case in point: Benjamin’s work combining genetics and economics. The flagship research effort for Benjamin’s CESR research group deals with genes and education. In a 2016 study, the team identified variants in 74 genes that are associated with educational attainment. In other words, people who carry more of these variants, on average, complete more years of formal schooling.

Benjamin hopes to use this data in a holistic way to create a predictive tool. "Rather than just identifying specific genes," he said, "we’re also creating methods for combining the information in a person’s entire genome into a single variable that can be used to partially predict how much education a person’s going to get."

The young field of geneconomics is still somewhat controversial, and Benjamin is careful to point out that individual genes don’t determine behavior or outcome. "The effect of any individual gene on behavior is extremely small," Benjamin explained, "but the effects of all the genes combined on almost any behavior we’re interested in is much more substantial. It’s the combined information of many genes that has predictive power, and that can be most useful for social scientists."

While the cohort of researchers actively using the available genome-wide data in this way is still somewhat limited, Benjamin says it is growing quickly. "I think across the social sciences, researchers are seeing the potential for the data, and people are starting to use it in their work and getting excited about it, but right now it’s still a small band of us trying to lay the foundations."

"We’re putting together huge data sets of hundreds of thousands of people — approaching a million people in our ongoing work on educational attainment — because you need those really big sample sizes to accurately detect the genetic influences."

As CESR works to improve social welfare by informing and influencing decision making in the public and private sectors, big data such as Benjamin’s is a growing part of that process, according to Kapteyn.

"What big data reflects is the fact that nowadays there are so many other ways in which we can learn about behaviors," he said. "As a result, I think we’ll see many more breakthroughs and gain a much better understanding of what’s going on in the world and in social science than in the past."

"I think we’re really at the beginning of something pretty spectacular. What we are doing is really only scratching the surface — there’s so much more that can be done."

Irv Rochlin
Bundled in layers of blankets for warmth, Laura Zinke settled in for a two-hour ride toward the sea floor made up of sediment teeming with microbes and the underlying rocky subsea floor — was part of a scientific research cruise to the Dorado Outcrop. The rocky ridge lies 125 miles off the west coast of Costa Rica, approximately two miles below the ocean’s surface. Her mission was to collect water and sediment samples to take back for testing and to gather data on the microbes living around the site.

As a research assistant affiliated with the Center for Dark Energy Biosphere Investigations (C-DEBI), head-quartered at USC Dornsife, Zinke’s research will help scientists understand the deep biosphere.

“When we think about the ocean, most people think about the surface of the ocean and the coastal environments close to the shores,” said Jan Amend, director of C-DEBI and professor of earth sciences and biological sciences. “But most of the ocean is not close to the coasts, and most of it is not at the surface.” The ocean covers roughly 70 percent of the Earth, reaching down an average of two miles. At the bottom, the sea floor measures another six miles or more deep at its thickest points, making it one of the largest habitats on Earth — and one of the most difficult to explore.

“It’s a large operation akin to a NASA mission, really,” Amend said.

And like NASA, C-DEBI has, from its founding in 2010, sought to expand humanity’s reach into this unexplored frontier. The center’s researchers have made it their mission to understand this ecosystem, from the muddily sediment to the microorganisms that call the subsea floor their home.

“We want to find out what kind of organisms inhabit those spaces. How are they similar or different to organisms that we know about from the open ocean or the surface world? How many are there? How are they distributed? How diverse are these communities?” Amend said. Because the subsea floor ecosystem is so large, it almost certainly affects the world’s climate, according to Julie Huber, C-DEBI associate director and an associate scientist at the Marine Biological Laboratory in Massachusetts.

“We’re trying to understand the role these microbes play in some of the most basic geochemical processes and how they affect the environment of our planet,” she said. C-DEBI is a National Science Foundation–funded Science and Technology Center led by 10 scientists, including Amend and Huber, representing eight institutions across the United States. It’s also the first NSF center to focus on study the deep biosphere. The center offers grants and fellowship, as well as a robust “K to gray” education program that fosters STEM education for professionals and novice alike.

Since its launch, research produced by C-DEBI scientists has resulted in groundbreaking discoveries that lay the foundation for understanding life below the ocean. A recent study published by Doug LaRowe, assistant professor (research) of earth sciences at USC Dornsife, characterized marine sediments on a global scale for the first time. His work produced an estimate of the total amount of marine sediment in the oceans, the average thickness of the sediment blanket, an estimate of how much water is trapped in those sediments, and the temperature of the sediments and water at the ocean floor. These numbers are incredibly helpful for researchers because they provide foundational scientific information that helps establish basic understandings of the deep biosphere, explained Amend, who collaborated with LaRowe. For instance, they found that the amount of water estimated to be trapped in marine sediments is almost three times as much as that in all glaciers and ice sheets across the continents.

“Marine sediments turn out to be the second largest reservoir of water after the oceans,” Amend said. “They’re a distant second — about five percent of the amount of ocean water — but now we can start asking questions about the exchange of water from the ocean to the sediments as well as the exchange of mass, nutrients, energy, organisms. It’s huge for us scientists.”

In another important study, C-DEBI researcher Steve D’Hondt of the University of Rhode Island discarded a long-held understanding of marine sediments. Scientists believed that ocean sediments contain no measurable oxygen below a few centimeters. Looking at samples from a wide range of locations, D’Hondt found that oxygen was, in fact, still measurable all the way to the rocky basement in some locations, though not all.

“That’s important because it means the organisms living in those sediments may be oxygen users. ‘The type of metabolism they perform is different than what we used to think,’” Amend said. “That was really, really big findings.”

Looking ahead, Amend said that C-DEBI researchers will focus their work on understanding the microbial life of the deep biosphere.

Three steps are critical for scientific discovery, but also for another reason, said Huber. “It’s the type of science that captures people’s imaginations and that is so important in training the next generation of scientists,” those like Zinke.

“Before C-DEBI there wasn’t a central body saying that the deep biosphere is important, and we need to go forth and study it,” Zinke said. “But we’re looking at the really basic science questions that mean a lot in terms of how life evolves, and how ocean chemistry affects our world. It’s been really fantastic getting to be part of this research structure.” —M.B.
It was late in the afternoon on the last day of the trip, and Lyn Boyd-Judson and Mary Cate Hickman were sitting in the back of a cab. Frustrated and a little riled up, they wound through the ancient, impossibly narrow streets of Córdoba, Spain, talking about the meeting they had just left. “Despite the fact that it’s a mosque and a cathedral and a UNESCO World Heritage site, Muslims still aren’t allowed to pray there,” Hickman said, utterly perplexed. “It was in the cab that the lightbulb went on. Boyd-Judson agreed. The grassroots approach was not working. They needed to go through the United Nations. Boyd-Judson has directed the USC Levan Institute, housed at USC Dornsife, for the past 10 years. The late USC alumnus Norman Levan — professor emeritus and former chief of dermatology at the Keck School of Medicine of USC — contributed a major gift that inaugurated the center for the common humanity of USC students, and to create educational experience, such collaborations will create new platforms for scholarship of consequence through the humanities and beyond to see that they can make a difference in their world,” Boyd-Judson said. “I think it’s something that’s very important for this generation.” Hickman appreciates the opportunities the institute provides for enacting positive change. “With the mosque-cathedral, it seemed like there was a very clear goal,” said Hickman. “The humanities has an unwarrented reputation of people just discussing stuff without anything ever happening. But when we left that meeting, we started coming up with a plan.” Hickman followed Oxford Consortium Seminar attended Maren Loos, who is Muslim, to address the issue. “There was a time when [Córdoba] served as a nexus for Muslims, Christians and Jews, and for centuries they lived together peacefully,” said Loos, a philosophy major. “The current global political climate is one that is extremely conducive to Islamophobia, and in my opinion under-taking such projects as this one is the first step toward demonstrating that it is possible for people of different backgrounds to live together peacefully — as they did in medieval Córdoba.” Hickman and Loos spent their winter break writing a research paper they hope to publish in an academic journal. Backed by Boyd-Judson’s influence as a UNESCO chair, they want to eventually present their work to U.N. officials — and even Pope Francis. “[The students] are trying to come up with a strategic way to take this issue back to the Vatican now that there’s a new pope who might be more open,” Boyd-Judson said. “This is exactly the kind of global impact she is committed to helping students bring about.” “We couldn’t do anything if LB [Boyd-Judson] wasn’t a UNESCO chair,” Hickman said. “But because it seems like we have a path to actually make a change, we have to take it.” Hickman said Boyd-Judson has played a big role in inspiring her to take action. “I honestly think [the inspiration came from] meeting a professor who wanted to do something constructive and purposeful. LB is a nurturing mentor — she wants you to succeed and she wants you to make a difference. She’s so tough and so kind.” According to Hickman, Boyd-Judson is all about getting students out in the world, doing on-the-ground work. Boyd-Judson concurs. “A critical part of my mission has been not just having a place where we celebrate the humanities here at USC,” she said, “but where we take the humanities and all the big questions, the love of truth and beauty, and everything that’s in our core mission for the university, and we suffice it outward.” — L. P. H.
The largest earthquake to jolt Southern California occurred more than 150 years ago. The Great Fort Tejon Earthquake of 1857 — the biggest recorded quake in state history at magnitude 7.9 — originated in Monterey County, rumbling 225 miles along the San Andreas fault, kicking up dust all the way down to the Cajon Pass north of San Bernardino.

According to reports, the current of the mighty Kern River turned upstream and gushed 4 feet over its banks. The Los Angeles River was also reportedly thrust from its bed. Two people were killed by the tremble, a testament to how far the Earth was at the time.

Studies have shown that it is only a matter of time before another “big one” hits. The chance of having one or more magnitude 7.5 or larger earthquakes in California over the next 30 years is greater than 50 percent. Let that number sink in. With the high-density populations of cities like Los Angeles and San Francisco, a large earthquake could severely damage crucial water aqueducts and power lines, requiring repairs in the billions of dollars. Not to mention the lives that it would jeopardize.

Earthquakes have become much more disruptive to society than they used to be,” said Thomas Jordan, director of the Southern California Earthquake Center (SCEC), which is headquartered at USC Dornsife. “Our exposure to hazards is much higher, so the risks are higher. That just means we have to understand on the system level what’s going to happen in an earthquake — not just what’s going to happen to my house and what’s going to happen to USC, but what’s going to happen everywhere.”

Thankfully, SCEC, which is funded by the National Science Foundation and U.S. Geological Survey (USGS), is at the forefront of earthquake system science. The science and technology center brings together a network of more than 1,300 earthquake researchers from across the United States and the world to get to the bottom of how exactly earthquakes work and to o

The mission of ShakeOut is that everyone, everywhere, should know how to protect themselves during an earthquake," said SCEC Associate Director M.B. “We are setting a template for how you do this kind of research worldwide,” he said.

The center also has a significant education component that touches all levels of learners. Undergraduates can intern with SCEC while K-12 students can join the citizen-science Quake Catcher Network, in which volunteers place earth-
quake monitoring sensors in their classrooms or homes to collect seismic data. Students learn about earthquake science from a curriculum that complements gathering the data.

But nothing might be as far reaching as SCEC’s commu-
nication and outreach arm as exemplified by the Great ShakeOut Earthquake Drills. SCEC coordinates the annual global disaster preparedness event, which helps individuals and organizations around the world get ready for a major earthquake.

“It’s a remarkable public outreach and educational activity that has taken on significance worldwide, and it’s done right here at USC,” Jordan said.

In 2016, more than 50 million people from more than 70 countries registered to participate in the Great ShakeOut, which called for participants to practice the “drop, cover, and hold on” drill for at least one minute wherever they were — school, work, home or elsewhere. Some went further, holding tabletop exercises, tsunami and fire evacuation drills, safety equipment demonstrations, and even mock search-and-
rescue activities.

“The mission of ShakeOut is that everyone, everywhere, should know how to protect themselves during an earth-
quake,” said SCEC Associate Director M.B. who coordinates the ShakeOut drills worldwide.

In the decade and a half that Jordan has directed SCEC, he has seen the center directly impact the way scientists understand earthquakes and how the public has learned to prepare for a “tremor with the new models and simulations produced in concert with USGS and the California Geological Survey.”

A yearly state model for forecasting earthquakes called the Uniform California Earthquake Rupture Forecast (UCERF), developed in concert with USGS and the California Geological Survey. UCERF represents the most authoritative estimates of the magnitude, location and likelihood of earthquakes in California, both in the long term and in the short term.

Epically, the California Earthquake Epicenter Center is leading the charge in earthquake system science to ensure that whenever and wherever “the big one” hits, we’re prepared.

Roverberations

Sizable Shaking
Earthquakes take place around the world almost constantly, but most are relatively small; the majority of tremors average a magnitude 2.0 or less. But notices on the magnitude scale scale to a magnitude 8.0 or more.

The scale is logarithmic, meaning that for each step up in magnitude, an earthquake releases 32 times more energy. So, for instance, the Northridge earthquake that shook the San Fernando Valley with great intensity in 1994, was a magnitude 6.7 earthquake and released 3 times more energy than an earthquake with a magnitude of 5.4.

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To make these forecasts, hundreds of scientists have contributed their research to create a community earthquake

FREQUENCY OF EARTHQUAKES OF VARIOUS MAGNITUDES

Average annual number of earthquakes worldwide. (Graphic not to scale) | Source: earthquake.usgs.gov
IN APRIL 2000, PETER KUHN STEPPED OFF A PLANE IN ATHENS, GREECE. IT WAS HIS FIRST TRIP TO THE CITY, THE CENTER OF CIVILIZATION IN ANCIENT TIMES.

Hailing a cab outside the airport, he slipped into the back seat and handed the driver the address of his hotel destination, then settled in for the ride. About an hour later, they arrived. The cost: $20.

“Two days later, back to the airport from the same hotel was just shy of a $50-cab ride that took no more than 10 minutes,” said Kuhn, Dean’s Professor of Biological Sciences and professor of medicine, biomedical engineering, and aerospace and mechanical engineering. The first driver had taken advantage of Kuhn’s unfamiliarity with Athens and unnecessarily extended the trip, running up the bill.

Kuhn had actually enjoyed that scenic ride, so he didn’t mind the hassle too much. He now makes the incident an important lesson in how times have changed.

“Interestingly enough, that wouldn’t happen again today,” he said, noting the explosion of GPS and cell phone technologies.

These advances, the kind used by driving services such as Lyft and Uber, bring a new level of transparency to the process. Both driver and passenger know how long the trip should take. And by using navigation services and apps to gather data from other users on similar paths in the vicinity, they can choose to change the route to avoid traffic or skirt construction.

Kuhn, who also is associate director of the Bridge Institute at the USC Michelson Center for Convergent Bioscience, wants to bring this type of transparency and decision-making power to cancer treatment.

“It doesn’t matter where I am, using my GPS and overlaying local real-time traffic, I can see how long the trip will take,” he said. “That might be an advantage.”

He added that the drivers are “honest” and “have a sense of responsibility.”

Within each.

“Equal” to one another in topological terms based on the number of loops

Artist’s metaphorical concept of topology, expect. You stumble over things that no one product states, and much.

Dornsife that the London-born physicist succeeded in publishing two landmark papers, both in 1983, that later established his reputation.

“It is very gratifying that work, which was initially disbelieved as a bizarre prediction, has blossomed into one of the most exciting areas of new ideas on topological matter, entanglement, micro product states, and much else,” Haldane said. “All these things are things that no one expects. You stumble over something, and then you see the big picture after.” — D.B.
Phillip Sliwoski is surrounded by glass — on his desk, in cabinets, at big bins at his feet. He is a scientific glassblower, which means he designs the glass instruments that chemistry professors and students need for experiments. He has been at USC Dornsife’s Department of Chemistry for nearly 10 years and is the embodiment of a fading art form. Sliwoski, a scientiﬁc glassblower, who designs glassware for their unique chemical reactions. He is one of only a few glassblowers left you can order in across the United States, but due to everything from budget cuts to automation, they are increasingly scarce. His work, and its artistry and expertise are essential for chemists who design glassware for their unique chemical reactions. This isn’t stuff you can order in a catalog. “I make one-of-a-kind items here,” said Sliwoski, “and half the glasspeople left in Los Angeles.” It’s an art that’s been around for 2,000 years; he says, “You don’t want it to disappear. … No matter what, with automation coming, there’s still stuff we still need that is made of glass.” Sitting at his bench burner — a ﬂame of 1,500 degrees Fahrenheit — Sliwoski informs you’re not an artist, “You’re like a volcano.” Scientific glassblowing is more exact, he says, because “he’s taking parts and melting them together. But he’s also creating things never made before. “In some ways, he’s an artist and in some ways, he’s a very sophisticated engineer,” said Mark Stevens, professor of chemistry, biological sciences and director of the Bridge Institute, was named in two fields of study, the company that designs therapeutic molecules for conditions ranging from in diabetes and cancer. Fokin’s research and fueling further studies. Clarivate Analytics (formerly Thompson Reuters), a New York-based multidisciplinary medical and information ﬁrm, generates an annual Highly Cited Researchers list to determine which scientists have made the most foundational contributions to their ﬁelds. First noting the top 2 percent of cited papers indexed between 2004 and 2014 in 21 ﬁelds of study, the company then counts the number of these papers attributed to each author. These research papers describe the work that the scientiﬁc community has judged to be the most noteworthy. In the analysis, about 3,500 researchers rose to the top of their ﬁelds. The prestigious list of “The World’s Most Inﬂuential Scientiﬁc Minds” for 2016 includes four scientists from USC Dornsife. All are members of the Bridge Institute at the University of California, Los Angeles Center for Convergent Biosciences. Science does not take place in a vacuum. Countless experiments are undertaken every year, with each one drawing ideas from previous experiments, adding to the pool of knowledge and fueling further studies. Clarivate Analytics (formerly Thomson Reuters), a New York-based multidisciplinary medical and information ﬁrm, generates an annual Highly Cited Researchers list to determine which scientists have made the most foundational contributions to their ﬁelds. First noting the top 2 percent of cited papers indexed between 2004 and 2014 in 21 fields of study, the company then counts the number of these papers attributed to each author. These research papers describe the work that the scientiﬁc community has judged to be the most noteworthy. In the analysis, about 3,500 researchers rose to the top of their ﬁelds. The prestigious list of “The World’s Most Inﬂuential Scientiﬁc Minds” for 2016 includes four scientists from USC Dornsife. All are members of the Bridge Institute at the University of California, Los Angeles Center for Convergent Biosciences.

### Honors

Four USC Dornsife researchers set a high bar for their peers, ranking among the top 1 percent of cited scientists in their respective fields of study. The prize recognizes those who have brought pharmacy, engineering and biomedical sciences, and director of the Bridge Institute, was named in 1989 the top 1 percent of cited scientists in their fields of study, the company that designs therapeutic molecules for conditions ranging from in diabetes. — D.S.J.

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Anna Journey of English publishes a collection of essays and a new book of poems that explore her fascination with the peculiar and the grotesque.

Like the wild fox she defied her mother to feed that left the page.

“Nothing except a purse browned in old glass, / glued to the bone chins edge,” Anna Journey’s poetry has a haunting, / fear that spins in its singular traces impinged on the reader’s mind long after the words have faded from the page.

Anna Journey, a poet, has published two collections of poetry and an essay collection. Her work has been recognized with numerous awards and nominations, including a fellowship from the National Endowment for the Arts.

Selling Visual Thinking in Europe From the Late Renaissance to the Early Enlightenment 2017 Assistant Professor of History Anna Journey’s new book, Selling Visual Thinking in Europe from the Late Renaissance to the Early Enlightenment, is a comprehensive study of the role of visual art and rhetoric in shaping ideas about the world. Journey argues that visual thinking was central to the development of modern concepts of the self, society, and the natural world.

The book examines the ways in which artists and thinkers used visual images to communicate their ideas and how these images were received by their audiences. Journey’s analysis of the visual culture of the late Renaissance and early Enlightenment provides a new understanding of the role of art in shaping the modern understanding of the world.

Two faces of exclusion: The unfulfilled history of anti-black racism in the United States 2018 Assistant Professor of History, Pablo Dunlop Nishizawa’s book, Two faces of exclusion: The unfulfilled history of anti-black racism in the United States, challenges the idea that racism is a purely domestic issue. Drawing on a wide range of sources, Nishizawa argues that the history of anti-black racism in the United States is part of a broader global history of exclusion and discrimination.

Nishizawa’s book is based on his research as a member of the Asian American and Pacific Islander Studies Program at the University of California, Berkeley. He is also a member of the Asian American Studies Program at the University of California, Los Angeles.

Continental ambitions: Roman Catholicism in North America: the colonial experience 2018 Assistant Professor of History, History, and Political Science, Janice Higginbotham’s book, Continental ambitions: Roman Catholicism in North America: the colonial experience, explores the role of Catholicism in shaping the political and cultural landscape of early America.

Drawing on a wide range of sources, Higginbotham argues that the Roman Catholic Church played a significant role in shaping the political and social landscape of early America. The book examines the ways in which the Church influenced politics, culture, and society, and how it was able to maintain its influence in the face of challenges.

Hannah Elise, professor of sociology and anthropology, received an Exemplary Diversity Award from the Aerospace Corporation. Elise’s work focuses on the experiences of people of color in the aerospace industry and how they navigate the challenges of discrimination and harassment.

BEAUTIFUL BRAIN: THE DRAWINGS OF SANTIAGO RAMON Y CAJAL 2018 Assistant Professor of Art History, Fernando Manzan’s book, Beautiful Brain: The Drawings of Santiago Ramón y Cajal, explores the life and work of the Spanish neuroscientist and physician. Manzan’s book is based on his research as a member of the Hispanic Institute at the University of California, Los Angeles.

The book examines the work of Ramón y Cajal, who is often described as the father of modern neuroscience. Manzan argues that Ramón y Cajal’s contributions to the field of neuroscience were significant, and that his work continues to influence the field today.

The Refugees 2018 Assistant Professor of History, Melinda A. Terrill’s book, The Refugees, is a study of the experiences of refugees in the United States. Terrill’s book draws on a wide range of sources, including interviews with refugees, to provide a comprehensive picture of the experiences of refugees in the United States.

Terrill argues that the experiences of refugees in the United States are shaped by a range of factors, including the policies of the government, the attitudes of the public, and the experiences of the refugees themselves.

The book is based on Terrill’s work as a member of the Refugee Studies Program at the University of California, Los Angeles.
Remembering George Olah

Distinguished Professor Dr. George Olah, who won USC’s first Nobel Prize, died at his home in Beverly Hills, Calif., on March 8. He was 89.

Olah had a profound influence on the world of hydrocarbon chemistry, and his discoveries had applications to everyday life: He helped pave the way for less polluting gasoline, more effective oil refining and several modern drugs.

In 1994, Olah received the Nobel Prize in Chemistry for groundbreaking work on superacids and his observations of what are known as carbocations, a class of molecules that enable the creation of new processes for energy storage as a convenient renewable liquid fuel to replace gasoline and diesel, and as a feedstock for making petroleum-derived products.

At USC, he was Distinguished Professor of Chemistry, Chemical Engineering and Materials Science and Donald P. and Katherine B. Loker Chair in Organic Chemistry, was born in Hungary in 1927. He and his family fled the country in 1946, and he eventually joined USC in 1977.

In 2005, he received the Presidential Medal from USC. The next year, Starr was awarded a National Humanities Medal by President George W. Bush and received the Centennial Medal from the Graduate School of Arts and Sciences at Harvard University. In 2010, he was inducted into the California Hall of Fame.

"Kevin Starr was a rarity in his field — an iconic figure whose scholarly understanding of the complexities and beauty of California’s history were matched only by the masterful prose he used to convey that understanding to others,” said USC Dornsife Dean Amber D. Miller. “Professor Starr was our dear friend, a beloved teacher and a USC treasure, but he truly belonged to the world.”

While Professor Olah was a world-renowned Nobel laureate and a giant in chemistry, he was also a beloved member of our Trojan Family. He will be deeply missed.”

A Nobel Achiever

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Insightful Mind

Renowned for his pioneering research, Bosco Tjan was a beloved professor of psychology.

Bosco Tjan, professor of psychology and co-director of the Dana and David Dornsife Cognitive Neuroimaging Center, died on Dec. 2, 2016, in Los Angeles. He was 50.

Tjan, who joined USC Dornsife in 2001, was a world-renowned expert on vision, particularly in how the brain recognizes shapes and scenes. Tjan recently received a $4 million grant with a team of researchers from the National Institutes of Health to study how blindness changes the brain. His ongoing research projects included image enhancement for people with impaired vision, indoor navigation aid for the blind and the visually impaired, and perception of visual speech.

"Bosco Tjan was a beloved member of our psychology faculty,” said Jo Ann Farver, professor and chair of psychology. “He was a dedicated, kind and patient teacher and mentor of graduate and undergraduate students. We will all especially miss his sense of humor, keen wit and brilliant mind.”

Irving Birderman, Harold Dornsife Chair in Neuroscience and professor of psychology and computer science, was a close friend and longtime colleague of Tjan’s. In a eulogy, Birderman described Tjan as “a major contributor to vision science.”

“I tackled a wide range of problems, and everything he published was a paragon of beautiful design and rigorous methodology.”

California Dreamer

California State Librarian Emeritus Kevin Starr was one of the leading historians of the Golden State.

Hispanics and ethnic unrest in California for a decade, died Jan. 14 in San Francisco. He was 76.

Professor Starr was our dear friend, a beloved teacher and a USC treasure, but he truly belonged to the world,” USC President C. L. Max Nikias said. “His bright mind, rigorous intellect and passion for language will be deeply missed, but his extraordinary books will continue to inform us for generations to come.”

A native of San Francisco, Starr joined USC Dornsife in 1989 and was a professor of history and policy, planning and development and special adviser to the provost. A highly sought-after lecturer and writer, he was known for his far-reaching explorations of life in California. He authored the renowned eight-volume series Americans and the California Dream, which chronicles social and cultural history in the state since its admission to the union in 1850.

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IN MY OPINION

Entrepreneurs

Sandra Tsing Loh MPH, ’89 finds insight, food and millennial dreams at South by Southwest.

When I came of age — this was back in the ‘80s — my tribe of impressionable youths all wanted to be performance artists like Laurie Anderson, writers like Bret Easton Ellis, rockers like … True, it wasn’t a golden age for rock. (One Flock of Seagulls, Pet Shop Boys. Nor was it, possibly, for fashion. (Think mouse-tail hair, parachute pants, eerily shiny Members Only jackets).

By contrast, today, in the “twentyteens,” it seems what many dreamy-eyed, creative young people aspire to be are not artists or writers or musicians but … entrepreneurs. Like — wait for it — Gary Vaynerchuk! Doesn’t ring a bell?

No matter. All this — and more — is what I learned when I attended South by Southwest (SXSW) recently in Austin, Texas. A trendsetting music, film and interactive media festival, SXSW also features a tech-based “Startups Village.” My colleagues Mark Davis and Sarah Mojarad (both joining the USC faculty this year) had invited me to their panel — “Getting to Yes: Communication and Entrepreneurship.”

My work in science, medicine and bioengineering, in combination with my background as a scientist-entrepreneur, has benefited tremendously from communicating with colleagues both inside and outside my own field. For that reason, I was very excited to be part of the USC faculty this year (and join their panel)

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Life Moment

The World Below

A friendly humphead wrasse crosses paths with environmental studies students as they plunge into Micronesian marine biodiversity at the famed Blue Corner diving spot in Palau.