IN THE BONES
Anthropologist Debra Martin uncovers the vestiges of violence

CREATIVE DISRUPTION
Clashes are part of the plan for UNLV’s fine arts faculty

RESERVATIONS PLEASE
Hospitality researchers crack the code on consumer choice

Charting Neurological Horizons
UNLV brain scientists seek causality and cure
No Debating UNLV’s Bright Future

EVEN AS THE UNIVERSITY is poised to capture the world’s attention in a new way—as host of the final U.S. Presidential Debate on October 19—the achievements of UNLV scientists and scholars will continue to keep our university in the spotlight long after the candidates move on.

This year alone, our researchers received funding from the National Science Foundation, the National Institutes of Health, the Environmental Protection Agency, the U.S. Department of Energy, the National Nuclear Security Administration, the Office of Naval Research, the Nevada Governor’s Office of Economic Development, and others. Whether it’s HIV-related discoveries that could prevent transmission of the devastating virus, gaming research that could advance Southern Nevada’s economy, or one of the myriad endeavors also under way on our campus, this much is clear: UNLV is taking the lead on addressing issues that affect us locally, nationally, and globally.

Our impressive roster of centers and institutes continues to boost UNLV’s interdisciplinary, private-sector, and public-sector collaborations, expanding the reach of our research even further. Our National Supercomputing Institute’s tremendous high-performance computing capabilities have spurred more than 40 research publications as well as partnerships with companies such as Switch, Intel, Cisco, the Cleveland Clinic Lou Ruvo Center for Brain Health, and many more. The International Gaming Institute continues to raise the bar for gaming research worldwide, launching a Hospitality Lab this spring to complement its Center for Gaming Innovation, which has filed 23 patent applications and commercialized five games in its two-year existence. Proposed centers such as the Global Health Institute; Center for Migration, Demography and Population Studies; and Institute for Big Data will aim to broaden the scope and scale of UNLV’s impact as well.

This important work isn’t exclusive to UNLV faculty. As you’ll learn in this issue of Innovation, opportunities abound for our students and community partners to get involved and serve as agents of change alongside our esteemed faculty.

We are daring. We are different. We are Rebels. And we are proud of the research, scholarly, and creative activity that sets us apart from all others.

Dr. Len Jessup
UNLV President

WELCOME TO THE TENTH issue of UNLV’s research magazine, Innovation. We’re pleased to share with you some of the stories that have our campus abuzz this year.

Researchers across a number of disciplines have their minds on, well, the mind. They’re examining how genes and environment affect cognition, which in turn affects behavior and brain-related pathology, while also searching for the cures to neurodegenerative diseases like Alzheimer’s and Parkinson’s. Faculty at our world-renowned William F. Harrah College of Hotel Administration, meanwhile, are using a consumer-centered approach to get to the heart of why customers behave the way they do. Other UNLV scholars have been shaking up the scene in a different way, through their films, music, photography, and performances. And let’s not forget UNLV anthropologist Debra Martin, whose methods for examining violence through skeletal data earned her the 2015 Harry Reid Silver State Research Award.

And the stories don’t stop here. To learn more about all we’re doing to improve the lives of our community, our country, and the world, visit unlv.edu/research.

Dr. Carolyn Yucha
Acting Vice President for Research and Economic Development

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Editor-in-Chief
Raegen Pietrucha
Associate Editor
Charles E. Reineke
Art Director
S. A. Lien
Photographers
Josh Hawkins
R. Marsh Starks
Aaron Mayes
Contributing Writers
Afsha Bawany
Shane Bevell
Brian Hedlund
Francis McCabe
Chelsea Sendgraff
Keyonna Summers
Proofreaders
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Xiangning Chen researches genetic links between schizophrenia and smoking. More on his findings on Page 25 of our cover story, “Brain Power.”
SOME LIKE IT HOT
UNLV researcher Brian Hedlund and fellow scientists identified a new bacterial phylum that lives exclusively in hot springs.

Bacterial Discovery Highlights Biology of a ‘Deep-Branching Lineage’

UNLV’S BRIAN HEDLUND IS ONE OF A group of scientists who use genomic sleuthing to discover “novel branches on the tree of life.” He and his colleagues’ latest breakthrough, published earlier this year in the journal *Nature Communications*, involves the identification of a new bacterial phylum that, when accredited, will become one of just 29 bacterial phyla identified to date.

Dubbed “Kryptonia,” the phylum consists of bacteria that live exclusively in hot springs—in this case, the Great Boiling Spring in Nevada, Dewar Creek Spring in Canada, and the Gongxiaoshie and Jinze pools in China. It was discovered through the combined examination of single-cell genomics and metagenomics data—a type of genomic analysis that, as described by *Nature*, “is based on microbial DNA extracted directly from communities in environmental samples.”

The research, organized by the U.S. Department of Energy’s (DOE) Joint Genome Institute, provides the first insights into the biology of this deep-branching lineage of bacteria, which likely diverged from other major lineages over a billion years ago. The team’s findings also indicated the presence within Kryptonia of a “phage-defense system,” a type of immunity to foreign bodies that can be used to trace infection history and the specific foreign bodies that caused it.

Because Kryptonia has the ability to digest plant matter, Hedlund says further research could lead to the discovery of commercial applications of useful enzymes encoded by Kryptonia genomes. “I do believe that applications are there if people spend time and money looking for the microbes,” he said in a DOE Joint Genome Institute news release.

Hedlund’s work at UNLV focuses mostly on life in high-temperature habitats, providing unique insights into the foundations of life, the functions of major new microbial lineages, and the diversity of life on Earth. This Kryptonia publication marks Hedlund’s fifth appearance in high-impact journals published by the Nature Publishing Group since 2013.
NEW ‘INNOVATION CORPS’ TO BOOST CAMPUS ENTREPRENEURS

AN INTERDISCIPLINARY TEAM OF UNLV business and engineering faculty members has received funding from the National Science Foundation (NSF) to develop an “entrepreneurship advancement program” aimed at enhancing ongoing commercialization efforts at UNLV.

The three-year, $255,000 grant will create an “innovation corps” site that will nurture and support faculty members, staff, and students seeking to bring university-developed technology into the marketplace. The i-Corps sites will provide infrastructure, advice, resources, networking opportunities, training, and modest funding.

Andrew Hardin, associate dean for research in the Lee Business School, will serve as lead principal investigator. Engineering faculty members Brendan O’Toole and Pushkin Kachroo will serve as co-PIs. The project will be housed in the UNLV Center for Entrepreneurship and the Mendenhall Innovation Program in the Lee Business School, and will involve the Division of Research and Economic Development and the Nevada Small Business Development Center.

“This is an exciting opportunity for our campus and for the business community,” Hardin says. “This funding will enable us to provide teams up to $3,000 each for prototype refinement and customer development.”

Hardin says team membership will have three components: a student, postdoctoral fellow, or staff member who will serve as an “entrepreneurial lead”; an “academic lead” from UNLV faculty to act as the principal investigator on future proposals or submissions to NSF; and a private-sector “mentor” with industry-relevant experience.

“This grant provides funding and support for the unified efforts of the Lee Business School, the Division of Research and Economic Development, and the Howard R. Hughes College of Engineering to promote UNLV commercialization opportunities and to increase engagement with the community,” says Zach Miles, associate vice president for the Office of Economic Development.

Students and faculty with discoveries will be encouraged to apply to the program. A committee of UNLV faculty and staff, along with business community members, will choose the most promising ideas for funding.

GRANT FUNDS RESEARCH TO PREVENT HIV TRANSMISSION IN NIGERIA

THE NATIONAL INSTITUTES OF HEALTH (NIH) RECENTLY AWARDED A FIVE-YEAR, $3.3 million grant to Echezona Ezeanolue, a professor of pediatrics and public health at UNLV and the director of the UNLV Global Health Initiative. The funding will allow Ezeanolue to evaluate the effectiveness of Intervention for Sustained Testing and Retention (iSTAR), an international effort aimed at reducing mother-to-child transmission of the HIV virus in Nigeria.

iSTAR is designed to test, link, engage, and sustain HIV-positive women in health care, Ezeanolue says. His current project will assess differences in linkage, engagement, retention, and viral suppression rates among patients using the “community-and-clinic-based intervention approach,” a social-networking model advocated by iSTAR, versus those who use clinics alone.

Researchers will randomly assign 400 HIV-positive women from 50 churches in Nigeria’s “South South Zone” to either iSTAR or a clinic-based program, then track the differences between the two groups. As part of the study, iSTAR will provide participating women with confidential, on-site integrated laboratory testing and access to a network of church-based health advisors. In addition, the project will deploy clinic-based teams trained in “motivational interviewing,” a form of engagement meant to mitigate harmful human behaviors; advance quality-improvement skills that can help health care workers more fully engage and support HIV-infected women; and implement integrated case management to help clinicians better coordinate patient care and assistance.

“We are hoping to reduce HIV treatment dropout, increase retention, and reduce mother-to-child transmission,” Ezeanolue says. “Fifty thousand children are infected with HIV each year. Our goal is to drop that number.”

The iSTAR program is a collaboration among the University of Nigeria; the University of Southern California; the University of California, San Diego; the University of Illinois at Chicago; Nevada State College; and UNLV. Chima Onoka, a health economist and community health physician at the University of Nigeria, will serve as a co-principal investigator for the grant. The study is supported by the NIH’s Eunice Kennedy Shriver National Institute of Child Health & Human Development.

PASSIONATE ABOUT PREVENTION Echezona Ezeanolue aims to reduce mother-to-child transmission of HIV.
Music video games may make players smarter, according to three UNLV researchers. So rock on!

MUSIC-ORIENTED VIDEO GAMES IMPROVE MUSIC LISTENING SKILLS

KIDS DRIVING YOU CRAZY BY ROCKING OUT AT ALL HOURS ON Rock Band and Guitar Hero? Relax. Research findings from three UNLV psychology researchers suggest they may be laying the groundwork for a lifetime of sophisticated music appreciation.

The study, conducted by doctoral student Amanda Pasinski with Erin Hannon and Joel Snyder (both associate professors) showed that people who often play music video games tend to outperform nonmusicians on music-related listening skills, such as the perception of melody, tuning, tempo, and rhythm.

“It’s well established that ‘trained musicians’ outperform ‘nonmusicians’ on measures of sensory, cognitive, and motor functions,” Pasinski explains.

The conventional wisdom, she adds, has long been that the only way to gain these cognitive benefits was to engage in formal training. “But not everyone has the time, money, or perseverance to learn a musical instrument,” she says.

Pasinski and her collaborators wondered whether music video games might fill the void. To find answers, the researchers tested music skills among three groups of people: traditionally trained musicians, nonmusicians, and music video game players (or “gamers,” in the parlance of the Xbox crowd).

“We found that scores on the Profile of Music Perception Skills, a test of basic musical listening abilities, were equivalently high for formally trained musicians and music video game players, who both scored higher than nonmusicians,” Pasinski says.

The researchers say the reasons why gamers scored so well are not entirely clear. It could be that playing music video games directly improves musical aptitude. But it’s also possible that gamers (especially those who mimic real musicians in games such as Rock Band) tend to already have natural musical talent. Further research should provide answers.

According to Pasinski, this is the first study to suggest that musical aptitude may be higher among individuals who engage in informal music activities. “Our findings support the notion that such listening advantages are not limited to musicians who have the time and resources to pursue formal training,” Pasinski says.

The study was published in the journal Psychonomic Bulletin & Review.

WALKER RECEIVES TOP NSHE RESEARCH AWARD

THE NEVADA SYSTEM OF HIGHER EDUCATION (NSHE) bestowed its top annual research honor, the Nevada Regents’ Researcher Award, to UNLV School of Life Sciences professor Lawrence “Lars” Walker.

This award is given to a faculty member who has made major advances in his/her field and has served the NSHE at least 10 years. Recipients must be nominated for this honor, which carries a $5,000 stipend.

An acclaimed plant ecologist, Walker studies community assembly in succession, or how groups or communities of plants grow after a disturbance occurs and how they change during decades and centuries following a disturbance. He has studied succession after disturbances from volcanoes, melting glaciers, landslides, floods, mining, and abandoned roads.

Walker also studies how to restore damaged ecosystems by manipulating responses to disturbances, and he compares ecosystem responses across disturbance types and a variety of countries and climates to find generalizable patterns. His research is vital to understanding how disrupted ecosystems respond and how these responses can be modified to benefit society’s interests in hazard management, clean water, soil conservation, and other advantages that intact ecosystems provide.

“Professor Walker has had an exemplary career here at UNLV as both a teacher and as a researcher,” says Tim Porter, the former dean of the College of Sciences and Walker’s dean when he received the award. “His work in plant ecology and how plant life responds to extreme environmental events has become increasingly important as the world faces unprecedented biological challenges owing to both natural and man-made factors.”

Walker’s work has earned approximately $17 million in funding from agencies, including the U.S. National Science Foundation, U.S. Fish and Wildlife Service, National Park Service, Bureau of Reclamation, U.S. Forest Service, Bureau of Land Management, academic institutions, private corporations, and the New Zealand government.

Walker’s 133 peer-reviewed publications have been cited more than 11,000 times, making him one of the top three scholars at UNLV in citation strength. Walker has received other prestigious research awards as well, including the Barrick Scholar, the Barrick Distinguished Scholar, and the College of Sciences’ Distinguished Researcher Award.

He is the second consecutive UNLV researcher to win the Nevada Regents’ Researcher Award. Engineering professor Kwang Kim won the award in 2015. Prior to Kim, the honor was bestowed on philosophy professor Maurice Finocchiaro in 1993 and former life sciences professor Warren Burggren in 1997.
SCIENTISTS POSTULATE THE RISE AND FALL OF AN ANCIENT ‘SUPER-EARTH’

A STUDY BY TWO UNLV ASTROPHYSICISTS SUGGESTS that a super-Earth—a planet larger than Earth but smaller than icy giants such as Neptune and Uranus—may have formed in the early days of our solar system before falling into the sun and being destroyed.

Rebecca Martin and Mario Livio, both professors in the physics and astronomy department at UNLV, infer the previous existence of a super-Earth based on the presence of similar bodies in so-called “exoplanetary systems,” solar systems that orbit a star other than our Sun.

“The lack of super-Earths in our solar system is somewhat surprising, given that more than half of observed exoplanetary systems contain one,” Martin says, adding that “there is no planet in the intermediate mass range between the Earth and giant planets such as Neptune and Uranus.”

Our solar system is also unusual in that there are no planets in the region inside Mercury’s orbit, the researchers say. Other exoplanetary systems can have several planets in that region, but we don’t have any.

There are two theories as to how super-Earths form, Martin says. One is that super-Earths form in situ (where they are currently observed), which would have to be close to the sun.

Forming in situ requires the presence of a massive “disk” around a star, one with lots of material. Stars are born from the collapse of a massive cloud of gas. When that collapse involves angular momentum or spin, a “protoplanetary” disk of dust and debris continues to circle the newly formed star. These protoplanetary disks are thought to have cold “dead zones” that allow solids to settle and form into a super-Earth-size planet.

The second theory is that super-Earths form further out, where there is more solid material, and then migrate inward through the disk to where they reside.

Martin and Livio’s work combines these two ideas, speculating that both processes could be occurring around different stars. If the dead zone is large, a super-Earth could form close to the sun. But if the dead zone is too small, the super-Earths form further out, where there is more solid material, and then move inward.

“We think that the reason we don’t have any super-Earths is that they formed in this inner part of our solar system where there is now nothing, clearing out all of the solid material before falling into the sun,” Martin says.

Martin and Livio’s research was performed using computer modeling and numerical simulations with information from the Kepler telescope. The results were published in the Astrophysical Journal.
NATIONAL ARCHIVES GRANT FUNDS PRESERVATION OF GAMING COLLECTIONS

UNLV UNIVERSITY LIBRARIES SPECIAL COLLECTIONS’ CENTER FOR GAMING

Research was awarded a $129,000 grant from the federal National Historical Publications and Records Commission, an agency of the National Archives. The funding will support a two-year project aimed at preserving and making more accessible three important archival collections on gaming and gambling.

Archivists say the collections—consisting of the Katherine Spilde Papers on Tribal Gaming (1974-2012), the Eugene Christiansen Papers on Gaming (1970-2008), and the Gary Royer Papers on Gaming (1955-1996)—will provide new insights and historical contexts related to the rapid expansion of casinos and legalized gambling in the United States between 1970 and 2010.

‘Making these collections more widely available will add to the University Libraries’ already strong reputation in documenting the gaming industry and help us continue to attract interdisciplinary scholars from around the world to study gambling and gaming at UNLV,” says Michelle Light, director of the University Libraries Special Collections and the project’s principal investigator.

The grant, Light says, will fund two temporary archivist staff members who will organize, preserve, describe, and publicize the collections. The University Libraries will then generate online finding aids and catalog records to help researchers discover the collections and use them.

‘The project, titled “America’s Great Gamble: A Project to Promote the Discovery of Sources About the Expansion of Legalized Gambling Across the United States,” launched on April 1, 2016.

A BOOMING BUSINESS

Left: Construction workers build a resort property. Right: William F. Harrah (right), founder of Harrah’s Hotels and Casinos, personally contributed to the expansion of gambling from the 1930s through his death in 1978, and his legacy lives on in the gaming community as well as at UNLV, as he is the namesake of UNLV’s William F. Harrah College of Hotel Administration.
Elisabeth Hausrath received an award for researching Mars’ soil, which may someday provide insight into life on the planet.

UNLV GEOSCIENCE PROFESSOR ELISABETH (Libby) Hausrath was honored with the Nevada Regents’ Rising Researcher Award during the Nevada System of Higher Education Board of Regents’ March 4 meeting.

Hausrath, who joined the UNLV faculty in 2009, conducts research on soil-forming processes, water-rock interaction, chemical weathering, and the geochemistry of the planet Mars. Her work was previously featured in the Winter 2014 issue of Innovation.

One of her most high-profile projects involves working to interpret data from NASA’s Mars Exploration Program, an investigation that will determine how soil and water might have once interacted on the surface of our solar system’s most Earthlike neighbor.

“My research program aims to better understand chemical weathering and soil formation on Earth and on Mars,” Hausrath says. “The Mars Exploration Program results in increasing amounts of fascinating data from Mars. Our goal is to help interpret and understand these data and their implications for Mars as a potentially habitable planet.”

Her research team also conducts analyses of clay minerals and clay-mineral precursors. Because these form in the presence of water, they are of intense interest to scientists studying habitability.

“Our research on transitions in clay-mineral chemistry is yielding fascinating results that may help us better interpret the potential habitability of clay-mineral-containing Martian environments,” Hausrath says. “This project is providing new insights that could lead to further studies conducted at UNLV or other institutions.”

Her work has implications closer to home as well; she has received external funding from agencies supporting her work.

“I am part of a group that recently received funding to look at snow dynamics,” Hausrath says. “We are examining interactions between snow algae, microorganisms, and minerals in the nutrient-poor environment present in snow, which may also be an analog to Mars. I am also interested in impacts of minerals, particularly phosphate minerals, on prebiotic chemistry.”

Hausrath received her bachelor’s degree in geology-chemistry from Brown University. She earned a doctorate in geoscience and astrobiology from Penn State University and worked as a National Science Foundation graduate fellow there. She received a NASA postdoctoral fellowship to work at the NASA Johnson Space Center, where she began to study phosphate mobility on Mars.

She was also recently selected by NASA to be one of 14 scientists to serve on the Returned Sample Science Board to help provide scientific input into the design and implementation of the upcoming Mars 2020 rover mission. Her publication record includes articles in Nature Geoscience, Geobiology, American Journal of Science, Astrobiology, and American Mineralogist.
RESEARCHERS’ HEALTH-TRACKER TECHNOLOGY LICENSED BY STARTUP

SMARTWATCHES THAT HELP YOU TRACK DAILY STEPS and heart rate? That’s old hat, according to UNLV researchers who have recently licensed their latest patent for a fitness tracker that makes calorie-counting as easy as taking a picture.

Professors in engineering and nursing set out to up the ante in the wearable-technology industry by creating a device that combines and exceeds the best of existing activity-tracking devices such as Fitbit. UNLV’s version will merge current fitness-assessment functions with camera and scanning technology that allows users to photograph their food and find out its nutritional content, including the caloric value, based on the type of food, portion sizes and fat content.

“The missing piece within the fitness tracking space is nutrition monitoring,” says Jason Pottinger, director of business strategy at MealCheck Technologies, Inc.—the startup that, per a recently signed licensing agreement, will commercially develop, manufacture and sell UNLV’s device. “What can’t be accomplished through self-reporting and apps will be possible through this technology we’re producing.”

MealCheck—an offshoot of Academic Technology Ventures, Inc., which specializes in sponsoring and commercializing academic research—was founded specifically to bring this invention to market.

The device is the brainchild of UNLV’s Jillian Inouye, professor and associate dean for research in the Schools of Nursing and Allied Health Sciences; Mohamed B. Trabia, mechanical engineering professor and associate dean for research, graduate studies and computing in the Howard R. Hughes College of Engineering; and Venkatesan Muthukumar, associate professor of electrical and computer engineering.

“This technology highlights the impactful nature of interdisciplinary research taking place at UNLV,” says Tom Piechota, UNLV’s former vice president for research and economic development. “What our researchers achieve together on campus today can end up in the hands of consumers tomorrow.”
RESEARCHER TO EXPLORE STRUGGLES OF UNDERAGE TRAFFICKING VICTIMS

LAST YEAR, THE NEVADA ATTORNEY GENERAL’S OFFICE RELEASED STATISTICS indicating that Las Vegas police recovered 2,229 victims of human trafficking since 1994. All of these victims were children forced into prostitution—young people who, because of the psychological scars they’ve incurred, will likely struggle to avoid future sexual exploitation, says Alexis Kennedy, an associate professor of criminal justice at UNLV.

Kennedy is investigating ways to help these and other victims end the cycle of abuse, work that was recently funded as part of a $44 million U.S. Department of Justice grant to combat traffickers and support survivors. Kennedy, a forensic psychologist and former attorney with an extensive research history interviewing exploited adults and children, received more than $623,000.

The funding, she says, will allow her to further explore the physical and psychological barriers that hinder young people’s attempts to exit prostitution—young people who, because of the psychological scars they’ve incurred, will likely struggle to avoid future sexual exploitation, says Alexis Kennedy, an associate professor of criminal justice at UNLV.

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The funding, she says, will allow her to further explore the physical and psychological barriers that hinder young people’s attempts to exit prostitution. Sexually exploited children, she indicates, often run away from services offered—placements, treatment programs, etc.—in part because of their strong psychological attachments to traffickers and pimps. Very little is known about the mental barriers associated with leaving commercial sexual exploitation, including victims’ readiness to change.

Kennedy will be joined on the project by two prominent colleagues from Johns Hopkins University in Baltimore. Michele Decker is an associate professor of population, family, and reproductive health at Johns Hopkins’ Bloomberg School of Public Health. A social epidemiologist with expertise on the health effects of trafficking for sexual exploitation, Decker also directs the Women’s Health and Rights Program of the Center for Public Health and Human Rights. Andrea Cimino, a postdoctoral fellow who works with Johns Hopkins’ Interdisciplinary Violence Research Project, is also a co-investigator.
Since the Office of Undergraduate Research opened its doors in January 2015, hundreds of UNLV students have teamed up with some of the university’s most prominent scientists and scholars on projects of discovery, innovation, and creativity—projects that change for the better the way both faculty and students think about higher education.

“We are truly championing a culture that is open to new ideas and collaboration while valuing our diversity and unique academic strengths,” says UNLV President Len Jessup. “I am consistently impressed by the innovation and creativity of our undergraduate students, and even more amazed at how well UNLV’s research community fosters and promotes their contributions.”

One of the newest units within the Division of Research and Economic Development and the Office of the Executive Vice President and Provost, the Office of Undergraduate Research, or OUR, provides students with faculty mentors, professional development opportunities, and project funding. In the spring of 2016 alone, more than 600 undergraduates worked alongside UNLV faculty research mentors. Students have contributed to investigations seeking HIV/AIDS therapies, solutions to Nevada’s water crisis, methods for tissue regeneration, and other high-profile undertakings.

“My mentor, Dr. (Ai-Sun) Tseng, always encouraged me,” says Diana Peña, a UNLV Honors College double major in biology and psychology. Peña’s work in Tseng’s biology lab earned Peña one of UNLV’s Outstanding Graduates titles, the 2016 OUR Undergraduate Scholar Award, and two rounds of funding from the National Science Foundation. “Having Dr. Tseng as a principal investigator," she adds, “helped me feel a lot more comfortable approaching faculty because the relationship that we formed was so supportive.”

Liam Frink, anthropology professor and OUR’s founding director, says it’s not at all unusual for students such as Peña to report positive experiences, both academically and professionally. “Research is fun, but it’s also essential for students’ professional development,” Frink says. “That’s really what we’re dedicated to in this office.”

Professional development involves acquiring hands-on, practical skills alongside dedicated faculty, a process that prepares students to make real contributions. Just ask Corby Hovis, program director at the National...
Science Foundation and a guest speaker at a previous UNLV Undergraduate Research Forum.

“If you look at many of the pioneering papers that result from NSF research, you’ll find undergraduate authors on those papers, and some of those have been great discoveries that have won Nobel Prizes,” Hovis says.

Research administrators such as Tom Piechota, former vice president for research and economic development at UNLV, say this potential is why supporting undergraduate researchers with adequate funding is a priority.

“I’ve worked time and again with UNLV undergrads, I know all they are capable of, and their talent never ceases to amaze me,” Piechota says, “so we’ve made it top priority through OUR to ensure these gifted students receive the funding they need to succeed.”

Frink says OUR is seeking external grants—including one from the W. M. Keck Foundation, one of the nation’s largest philanthropic grant-making organizations—and growing internal funds. A partnership, for example, between OUR and the university’s undergraduate student government, CSUN, recently yielded a stipend for student researchers (who might not otherwise be able to engage in a research project without additional employment), funding for two scholarships, and a travel-grant match program that provides funds to match OUR’s travel support for undergraduate researchers seeking to participate in academic conferences.

“Undergraduate research fits right in with our college’s mission statement: ‘Educate, Engage, Inspire, Innovate.’ Undergraduate research first of all educates the students. Undergraduate researchers are engaged in research work. Undergraduate researchers get inspired by graduate and postgraduate researchers and professors. The undergraduate research experience provides an opportunity to innovate and come up with new ideas, concepts, processes, and products.”

—Rama Venkat, dean of the Howard R. Hughes College of Engineering

New OUR initiatives include developing an Undergraduate Research Registry that will enable student researchers to complete required training online in matters such as lab safety and human subjects protocol. OUR is also working to more effectively integrate students with disabilities into research activities, part of its ongoing effort to attract a diverse cross-section of students into UNLV’s research endeavor. The office is collecting data on the impacts of UNLV’s undergraduate research as well.

“Our undergraduates have access to deep, broad, and highly compelling educational experiences because we focus on both research and student success at UNLV,” says Executive Vice President and Provost Diane Chase. “Both components are equally important in our Top Tier initiative, and the Office of Undergraduate Research not only drives both, but also embodies the vision and spirit of these ideals. I’m impressed by what this office has accomplished thus far and look forward to seeing all it accomplishes in the future.”
Brutality in Our Bones

Debra Martin, winner of the 2015 Harry Reid Silver State Research Award, reveals that the answers about our darkest impulses can sometimes be found within what remains.

BY CHARLES E. REINEKE
PHOTOGRAPHY BY AARON MAYES
LAST SPRING, RESEARCHERS WORKING with 430,000-year-old Neanderthal remains in northern Spain published an extraordinary finding: A skull at the site showed unmistakable evidence that its owner had died during a violent attack from another hominin. The discovery, the scientists said, represented perhaps the earliest known instance of a homicide, an indication that the grim phenomenon known to anthropologists as “lethal interpersonal violence” has been going on for a very, very long time.

UNLV’s Debra Martin has spent more than three decades using skeletal remains to gain insights into how violence, ancient and modern, affects human populations. When a reporter from the BBC News asked her to comment on the Spanish discovery, Martin said she wasn’t at all surprised by the finding.

“I suspect the further we push back and find straight-up forensic evidence such as these authors have, we will find that violence is culturally mediated and has been with us as long as culture itself has been with us,” she said.

Queries from reporters are nothing new to Martin, the Lincy Professor of Anthropology at UNLV. As one of the nation’s most respected authorities on skeletal biology and violence, she has long been the go-to source for information on our species’ murderous ways. And not just for media. Scholars and students from around the world routinely seek out her thoughts.

“She is a consummate scholar—exceptionally well published; internationally renowned for her high-quality work; and a valued mentor to her students, all of whom are well on their way to becoming renowned scholars themselves, thanks to her dedication and support,” says Barbara Roth, chair of UNLV’s anthropology department.

Martin’s work goes beyond analyzing skeletal data, Roth adds; Martin is “one of only a handful of scholars who specialize in this field who integrates theoretical approaches on the evolution of violence, social inequality, and human health into her analysis and interpretations.”

Roth is not alone in her regard for Martin’s achievements. Earlier this year a committee of UNLV scholars named Martin as the recipient of the 2015 Harry Reid Silver State Research Award, the university’s most prestigious research honor. The award recognizes faculty members whose work significantly advances the recipient’s academic field, addresses real-world needs and concerns, and contributes to Nevada’s economic growth and development.

“Professor Martin has done terrific work at UNLV and throughout Southern Nevada. I congratulate her for receiving this award,” says Reid, Nevada’s senior U.S. senator. “I am honored to be associated with such an important program, which has promoted the work of many outstanding scholars over the years. As the accomplishments of Professor Martin and her colleagues show, UNLV continues to make great strides as a world-class research institution.”

CONNECTING THE DOTS

Perhaps not surprisingly, Martin didn’t grow up thinking she’d spend her career investigating the nature of human cruelty. Instead, she says, her goal was to use her aptitude for the biological sciences to help people. As with many similarly gifted young people, she thought becoming a medical doctor was the best way forward—a plan enthusiastically supported by her parents, both Eastern-European immigrants to the United States.

Coursework at Cleveland State University resulted in a rethink for the first-generation undergraduate. “Somewhere along the line, medicine and anthropology came together for me,” Martin says, a circumstance that led her to search for a mentor at the next level. “I found a really good person to do graduate work with at the University of Massachusetts, Amherst. His interest was the origin and evolution of disease, so he was looking at disease as far back as we could go by doing analyses of skeletons.”

Martin credits that person, renowned paleopathology and bioarcheology pioneer George J. Armelagos, with being her “guiding light.” An early project involved working with Armelagos on an investigation of ancient skeletal remains that had been previously unearthed in the Nubian desert of Sudan. The study reinforced Martin’s growing sense that the bones of the dead had much to teach us.

“I used thin sections of these bones to do what essentially a physician would do if they took a bone biopsy from a living human,” she says. By examining the bones’ cellular structure, Martin was able to show that many women from the area were dying young. The finding itself was not a surprise, she says, but the reason why was. Most scientists believed women were dying young. The finding itself was not a surprise, she says, but the reason why was. Most scientists believed women in these ancient populations were in greater jeopardy of early death due to risks related to pregnancy and childbirth. In fact, other factors were to blame.

“Childbearing is actually something that we’re pretty well adapted to do,” Martin says. “The problem comes when your diet is not great.” For these Nubian women, she says, the skeletal samples showed that sorghum and millet had comprised the bulk of their nutritional intake. Both are deficient in the usable calcium and other nutrients that women need to stay healthy while pregnant and lactating.

On top of this, Martin adds, there was another, less benign revelation hidden in the bones. “There seemed to be a lot of gender differences: The age-matched males seemed robust and well-fed, their bones were doing great, and they didn’t die as frequently at those young ages.” Young men, it seems, were
“This wasn’t a pathway to thinking about violence, but I was starting to think about male and female health, what puts females at risk, and what makes it harder for females to live past that reproductive period,” Martin says.

Things changed with a follow-up project, this one involving field work in the northeastern Arizona desert. There Martin joined a team that was excavating an ancient Native American site that was slated to be destroyed by surface mining. Evidence of violent conflict was common. “We were seeing skeletons that indicated people had a lot of fractures that had healed, head wounds that were healed. It got me thinking about the ways you could track interpersonal violence by looking at skeletal remains.”

The Arizona project yielded enough material for years of study, work that Martin pursued while simultaneously immersing herself in scientific publications related to modern forensics. “That’s where it really opened up for me,” she says, “that the skills we use to read the ancient bones also allow us to think about the bones of people who died last year.”

**MAKING MEANING FROM MURDEROUSNESS**

Martin earned her doctorate at UMass Amherst in 1983. After a stint of postdoctoral work, she joined the faculty of Hampshire College, a small liberal arts institution noted for its nontraditional approach to student learning and achievement. Martin recalls it as a great place to develop both research and teaching skills—two aspects of her professorial duties that she still works hard to perfect.

“At Hampshire College, promotion and tenure were based on you doing innovative things in the classroom. Are you, for example, engaging the students? Are you really helping them to learn versus just forcing them to memorize things that were going to be on the test?” Martin says. “One of the things Hampshire also emphasized was that the best teachers were the ones who were engaged in doing original research. I certainly agree.” Researchers make good teachers, she says, because they tend to share with students the excitement and enthusiasm of their investigations. They also often include students directly in hands-on, real-world research projects.

At UNLV, for example, Martin has created an internship program in forensic anthropology through the Clark County Coroner/Medical Examiner’s Office. The first undergraduate to participate, Vanessa Alarcia, recently received a fully funded National Science Foundation research award to excavate and study skeletons in Italy. In addition, Martin currently has four doctoral students who are developing projects with the Coroner’s Office aimed at understanding patterns of violent death in Southern Nevada.

The decision to come to UNLV, where Martin arrived in 2006, was an easy one. Changes in her personal life had made a move attractive, and the allure of a desert location was also a big draw, considering Martin had spent the bulk of her professional career doing field work in such environments. That she would be following in the footsteps of emeritus professor Sheilagh Brooks,
namesake of UNLV’s Sheilagh Brooks Osteology Research Laboratory and one of the nation’s most distinguished scholars of bioarchaeology and forensic anthropology, sealed the deal. “When the call came,” she says, remembering the day her faculty appointment was confirmed, “it was almost too perfect.”

Her time at UNLV, Martin says, has been the most productive of her career. “I have had seven books come out, all of them co-authored or co-edited with my graduate students. I had one book in the first 20 years of my career, and now, over this next 10 years, I’ve already multiplied that productivity by seven.”

Martin’s productivity is not limited to books. During her years at UNLV, she’s worked with skeletal remains from Egypt and Sudan as well as sites across the American Southwest and Mexico. She and her graduate students are currently analyzing skeletal remains from a 5,000-year-old Bronze Age tomb from the United Arab Emirates. Martin excavated the remains and was able to bring the 400-plus individual burials back to UNLV for study. She has published in dozens of prominent peer-reviewed journals; among recent examples is an often-cited study in the *Proceedings of the National Academy of Sciences* that has spurred anthropologists to reexamine the nature of interethnic violence. In 2015, she received the UNLV Barrick Distinguished Scholar Award and the American Anthropological Association/Oxford University Press Award for Excellence in Undergraduate Teaching of Anthropology.

Some of Martin’s most celebrated work at UNLV involves her forays into cultural questions raised by the harsh events she’s documented in the bioarchaeological record. How, in other words, has conflict, brutality and physical trauma throughout the whole of human history shaped the nature of our social beings? And what do the remains of past victims have to tell us about why violence is such a persistent feature of the human condition?

“It’s one thing to identify and diagnose—this person died of a head wound, this person had injuries from a sword—but anthropologists want to make meaning,” Martin says. Deriving meaning from murderousness involves the deft deployment of constructs developed by social theorists. It also takes asking the right questions.

Many nonprofessionals get distracted by the numbers, asking, “Is there more or less violence now than 50, 100 or 1,000 years ago?” Such queries, says Martin, aren’t terribly helpful. “The right question to ask,” she says, “is ‘Why is there violence in this group, and what problem is it solving?’ Most of the violent acts that we’re studying are those that are patterned. They may not be culturally sanctioned, but they happen with great frequency.”

**CONTESTING THE ACCEPTED**

Martin says she and her students often begin their search for such patterns by reframing the issue under consideration, asking, “If violence is the answer, what was the question?”

“Perpetrators carry out violent acts for all kinds of different reasons, so we have to broaden our analysis, after identifying the victim, to get at perpetrators’ motives,” Martin says. “We have to look into the culture to see whether [the violence] was about disputes over resource distribution or environmental constraints. Was it gendered; that is, did it involve ideas and cultural restrictions that put females at more risk for violence than males?” Such environmental and cultural contexts, she says, allow her and her colleagues to locate both individual perpetrators and victims within the larger, more powerful social forces that sowed the seeds of the violence in the first place.

A recent, groundbreaking instance of this process at work involves a book-length study related to violence and climate change, an area in which Martin and other anthropologists are intensely interested. The prevailing wisdom, Martin says, is that drought and other weather-related crop failures—conditions that scientists see as a likely outcome of a warming planet—will automatically lead to violent disruptions around the globe.

Martin and her graduate student Ryan Harrod—now an assistant professor of anthropology at the University of Alaska, Anchorage—used bioarchaeological case studies of ancient farmers to show that the reality is much more nuanced. In fact, they determined that “humans are not more prone to violence when under severe restrictions of food or water due to droughts and other changes in climate.” Even under stress, Martin and Harrod wrote, people “tend to be very creative and innovative” in seeking homegrown solutions, only attempting to migrate to better areas as a last resort.

Martin points to this finding as a particularly vivid instance of how studying the remains of our ancestors can have real-world policy implications: Because it is migration and not climatological effects, per se, that spurred ancient violence, policymakers today would do well to focus on helping climate-change victims stay at home rather than mobilizing soldiers to avoid migrants breaching their borders.

Another recent project involved examining the nature of massacres—more specifically, the strange and unsettling way in which perpetrators sometimes practice “extreme violence” against their victims. Such behavior is often marked by continuing assaults after the victim has died, taking trophies, and mutilating or manipulating the bodies of the dead. Martin says she and her doctoral students, Cheryl Anderson (recipient of the UNLV Foundation Board of Trustees Graduate College Fellowship) and Amber Osterholt, have discovered that these displays are “highly symbolic.”

Says Martin: “It’s not just about destroying individuals, but essentially destroying their identity.” This insight, Martin continues, would not have been possible without the work of another of her students, Anna Osterholtz, whose doctoral research showed that marks on bones can reveal evidence of extreme violence during massacres. Osterholtz’s findings, which Martin says were the first to identify torture in the archaeological record, resulted in a job for Osterholtz at Mississippi State University, where she is now an assistant professor.

Martin is also working to systematically debunk a common academic stereotype related to gender: the idea that because men do most of the fighting, they suffer most from violence. The reality, Martin argues, is more complicated. In both past and present, she says, the same patriarchal forces that have traditionally given men greater access to resources have also ensured that “women were suffering; women were dying younger.” Some of her students are using lessons learned from this insight to chart patterns of violence against women in Southern Nevada, data that may ultimately promote earlier and more effective interventions.

For many scholars, the pursuit of such numerous and wide-ranging projects would be a daunting, not to say exhausting, way to define a career. Martin simply thinks of it as the fulfillment of her youthful goal: using her aptitude for science to help people.

Does she ever regret not getting that M.D.? Not at all, she says, though she remembers her parents weren’t so sure. “My mother, even until she died a couple of years ago, used to tell people, ‘Well, she could have been a real doctor! But instead she does this anthropology stuff,” Martin recalls with a laugh.

For her part, Martin says she couldn’t be happier with the way the “anthropology stuff” has worked out, especially since making the move to the desert. “Once I took the job at UNLV, I’ve never looked back. It’s been fabulous to be at a major research institution and to build and grow a graduate program. Right now I have nine doctoral students who are all interested in the effects of violence on human health, the origins of violence, [and] patterns of violent death. It’s a really neat research team that we’ve put together here at UNLV, and I’m really excited about where we’re heading.”

*The Harry Reid Silver State Research Award is funded by the UNLV Foundation.*
Where the fossils are

A camel caravan winds its way through the sun-blasted hills of Ethiopia's Ledi-Geraru region.
Checking Into Research

Four UNLV researchers are studying what makes hotel and resort customers tick, then using that knowledge to help industry leaders better serve their patrons.

By Angela Ramsey
Photography by Josh Hawkins
Blocking the Brain Drain
James Busser and Wen Chang provide resorts with the insights they need to keep star employees.

The hotel-resort industry has long prided itself on its hiring prowess, handpicking and grooming newly hired managers for careers intended to span years, if not decades. So, why are so many entry-level managers resigning just weeks after completing training?

One major hospitality brand recently turned to Harrah Hotel College professor James Busser and his doctoral student Wen Chang for answers. Could deficiencies in its management-training program be to blame?

“They wanted us to take a critical look at the program to find areas for improvement,” Busser says. The company’s name, he adds, must be kept confidential due to a nondisclosure agreement.

As part of their study, Busser and Chang surveyed dozens of former management-program trainees through several cycles of the training. The two also worked with the company’s team of human resources managers to better understand the types of trainees it attracted. They soon learned that only a select few students, identified as stellar performers, were recruited into the program directly out of college. “It’s a very competitive program,” says Chang. “This organization accepts only a small percentage of students.”

Once on board, trainees were assigned a mentor from the company’s corporate headquarters, a close advisor whose role involved helping their charges navigate the year-long training process. Training complete, the new managers were assigned to one of the company’s hotel or resort properties to begin their careers. Many chose to resign instead.

“Despite a significant investment of money and time in these trainees,” Busser says, “the company couldn’t keep them following completion of the program.”

The reason, the surveys revealed, was pretty straightforward: Employees were leaving because their expectations were not being met. But why? Busser and Chang suspected the mentor-trainee relationship might be playing a role.

“The mentor portion of the program was highly controlled at the corporate level,” Busser says. “But it became clear that some unevenness in the training program was occurring at the property level, resulting in situations that were inconsistent with employee expectations.”

“We wanted to sort this out,” adds Chang. Together the researchers dove deep into the survey data to explore the role mentors played in two specific areas: career development (relating to workplace skills and knowledge) and psychosocial support (the process of integrating employees into corporate culture).

Busser and Chang discovered that the mentors were doing a better job reinforcing the psychosocial aspects of the program than focusing on career development. The two then met with the brand’s human resources managers to recommend more training—this time for the mentors. Mentors, they said, were focusing too heavily on developing personal relationships. Instead, they needed to place more emphasis on developing trainees’ knowledge and skills. Focusing on the career-development part, Busser and Chang reasoned, would help trainees develop more realistic expectations about the day-to-day reality of their new careers.

“There needs to be consistency among mentors about how they communicate organizational culture and expectations about progression within the company,” Busser says.

Interestingly, trainees who resigned after completing the program didn’t appear to depart with hard feelings. Most, in fact, continued to hold a favorable view of the organization.

“The incredible strength of the program is that the employees who were leaving still had very positive feelings about promoting the brand to others,” Chang says. She and Busser also discovered that, while employed, the trainees were willing to go above and beyond their duties, which was of huge benefit to the company.

Busser and Chang’s study has been submitted to the International Journal of Hospitality Management for publication. It is currently in its second round of peer reviews.

Chang, meanwhile, has had no second thoughts about her own training. She recently completed her doctorate and will join the faculty of Iowa State University this fall.

“Ph.D. students here at the Harrah College really get to take advantage of the partnerships that have been formed between the college and the industry over the years,” Chang says. “These kinds of research opportunities only happen at UNLV. Doing research projects like this, you can see how your work has an impact.”

Busser echoes the sentiment. “The company was so energized by the findings and receptive to moving forward with improvements,” he says. “It has been a tremendous experience for all of us involved.”

To Book or Not to Book?
Chih-Chien Chen’s research explores why consumers ‘seal the deal’ when they do.

What drives customers’ decision-making? The question has long fascinated Harrah Hotel College assistant professor Chih-Chien Chen, whose efforts aimed at demystifying consumer behavior have caught the attention of the hotel and resort industry.

Her research, rooted in revenue management concepts, considers consumer behavior as it relates to purchasing. The topic is of particular interest to an industry relentless in its efforts to fill rooms, restaurants, showrooms and casinos.
“Hotels are constantly playing with their price structures and trying to understand the variables that work for or against these price structures,” says Chen, who explored the effects of an expanding online customer review landscape in a recent *Journal of Travel and Tourism Marketing* article.

One factor that affects consumer behavior, according to Chen, is their level of awareness. “Consumers, particularly in the U.S., understand that online room rates fluctuate over time,” she says. “For this reason, they are continuously debating whether to wait for prices to drop or to jump on a price because they feel they are at risk of losing a room.”

So, what makes a consumer take that final leap and book a room, especially when so many online booking options are available? One influencer is a hotel’s cancellation policy.

As part of a study recently published in *International Journal of Hospitality Management*, Chen tested a variety of cancellation models, examining penalty fees, dates, and times to see how these affect the booking behavior of potential guests. “Traditionally, hotels have adopted a one-size-fits-all cancellation policy,” Chen says, “in which customers accrue standard penalties for cancelling within 24 or 48 hours of their reservation.” She thought departing from this model might make a difference.

And so it did. Chen’s big research takeaway: Consumers are drawn to hotels that take a more nuanced and—you guessed it—more lenient approach when it comes to cancellations.

Although Chen writes about human behavior as an academic, the subject carries personal meaning for her. “When I was little, I was always very curious,” says Chen, who grew up in Taiwan before leaving to study in the U.S. and earning a doctorate at the University of Illinois Urbana-Champaign. “I liked to observe people, and I liked to inquire.”

Chen’s inquiring mind has led her to explore other research questions, including how perceptions of room occupancy influence consumers’ decisions. In a study published in the *Cornell Hotel and Restaurant Administration Quarterly*, she explored the idea of integrating shaded diagrams for online room selections, much like the diagrams used when choosing concert or airplane seats.

“On a direct level, you are selecting a room, but indirectly, you are seeing how many rooms are booked,” Chen says. “I believe the introduction of that occupancy information will affect the customer’s behavior. The idea is that when rooms seem scarce, the less consumers care about price.”

Chen advises hotel managers to remain “creative and fluid” with respect to pricing strategies. Hotels seem to be taking note. “One year after we published the article regarding occupancy rates, we’ve seen this room-selection model being used online in smaller hotels,” she says.

It would seem reasonable for someone whose research focuses on hotel stays to occasionally take a break, book a nice room, and enjoy a proper getaway. But like the hospitality industry, Chen’s mind works 24 hours a day. “I’m always writing down research questions,” she says, “even when I’m on vacation.”

**The Science Behind Employee Loyalty**

Anthony Gatling measures ‘workplace spirituality’ to gauge hospitality employee satisfaction.

For years, Harrah Hotel College’s Anthony Gatling, an assistant professor, has used data-driven analyses to test factors affecting workplace culture, leader commitment, and performance. One of these factors is, surprisingly, “spirituality.”

This form of spirituality, Gatling says, is not of a religious nature. Rather, it is the pursuit of meaning and purpose, a sense of community, and alignment of professional values in the workplace.

“The conflation of spirituality and religion is common, but these are two distinct concepts,” he says. “Religion can be divisive. Spirituality in the workplace, on the other hand, enables leaders and employees to see how their work has higher purpose and fulfills the need to belong and to be interconnected. Workplace spirituality should not only be a cultural objective, it should be a strategic imperative.”

A former restaurant-industry executive, Gatling spent more than 20 years observing firsthand how leadership development affected companies’ culture and employee attitudes.

“All hospitality organizations want their leaders to have an emotional connection to the organization,” Gatling says. “They want...
them to create an environment where they and their employees can see the higher purpose in the mission.”

Gatling’s passion for leadership and organizational development has carried into his academic work at UNLV. In a study recently published in the International Journal of Contemporary Hospitality Management, Gatling and co-authors Jungsun Kim (an assistant professor in the Harrah Hotel College) and John Milliman (a professor of management and organization at the University of Colorado, Colorado Springs) tested relationships among workplace spirituality, organizational commitment, and turnover in 190 hospitality supervisors.

Although many hospitality organizations may not consciously recognize what Gatling calls an “innate link between hospitality and workplace spirituality,” they are indeed looking for answers when it comes to strengthening organizational culture; increasing employee commitment; and reducing the costly impact of poor employee-retention rates, which have been climbing steadily in the last five years. In fact, from 2014 to 2015 alone, the turnover rate in the U.S. economy’s hospitality segment rose to 72.1 percent from 66.7, according to the most recent Bureau of Labor Statistics figures.

Gatling sees this “innate link” through the lens of what management scholars refer to as self-determination. In the business context, Gatling says, “self-determination theory proposes that all human beings are intrinsically motivated to fulfill three core psychological needs in the workplace: autonomy, competence, and relatedness. When organizations enable greater empowerment, encourage creativity, engage intellectual potential, [and] provide a social setting where leaders have a sense of purpose and belonging, these psychological needs are fulfilled exponentially.”

Gatling’s findings suggest that workplace spirituality increases the commitment level of hospitality supervisors and decreases turnover. “It’s clear that workplace spirituality strengthens leaders’ emotional connection to their organization and significantly reduces the intentions of supervisors to quit their jobs,” he says.

The big takeaway for the hospitality industry, Gatling says, is that organizations should be intentional in creating, maintaining, and enhancing their cultures through the development of their frontline leaders. “It makes strategic sense,” Gatling says, “and is the key factor that will separate the good from the great in the hospitality industry.”

Hospitality in Hospitals
Dina Zemke uses hospitality expertise to solve problems in health care.

“I never thought I would be involved in medically focused research,” says Dina Zemke, Harrah Hotel College assistant professor. “There is, however, a cross-discipline appeal to the questions we are asking.”

Such questions are the subject of Zemke’s ongoing exploration of what hospitals should be doing to boost patient satisfaction. “Hospitals want to know what defines a good patient experience. Where did things go right? Where did things go wrong?” Zemke says. “This is where the fundamentals of good customer service come into play.”

Striving for happy clients is nothing new to administrators at both hotels and hospitals. As with the hospitality business, the health care industry has long been aware that patient satisfaction, or its opposite, has a big effect on peer recommendations, repeat business and, ultimately, revenue. But since the 2012 introduction of the federally mandated Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) in 2012—a reporting initiative that allows patients to rate their hospital experiences—patient opinion holds even greater sway.

“Medicaid and Medicare reimbursements are tied directly to HCAHPS scores determined from patient-experience surveys,” Zemke says. “Health care providers with low patient-satisfaction scores get less reimbursement. That’s why the health care industry has turned to the hospitality field to find insight.”

For Zemke, who earned a doctorate in hospitality administration from UNLV in 2003, the hospital study was a departure from her typical research. That work had primarily focused on hotel design—specifically, the effects of ambient noise, scents and hotel cleanliness on guests. But she was convinced to change course after Harrah Hotel College Dean Stowe Shoemaker—a notable researcher in the area of hospitality in health care—urged her to join him on the study, which had been commissioned by a local hospital.

Zemke, Shoemaker, and a small research team (including UNLV psychology professor
Since its inception in 1993, the International Gaming Institute (IGI) at UNLV has grown into a major hub for the global gaming industry, providing gaming-related research and programming to 50 jurisdictions worldwide. The Center for Gaming Innovation and Hospitality Lab, funded by the Nevada Governor’s Office of Economic Development, supports students seeking to bring both patent-worthy concepts to the casino/internet gaming space and creative, technical solutions to challenges facing integrated resorts. The International Center for Gaming Regulation, a newly created partnership between IGI and the William S. Boyd School of Law, is another state-supported program. It offers custom educational curricula and research services for gaming’s worldwide regulatory community.

“These centers of excellence cover the two areas—innovation and regulation—that serve as the crucial foundation for the long-term health of gaming and hospitality economies, and we’re proud to partner with the state of Nevada in building for our future,” said Bo Bernhard, executive director of IGI and a professor in UNLV’s Harrah Hotel College.

The IGI recently hosted the 16th International Conference on Gambling and Risk Taking, an event that attracted more than 600 researchers and scholars from 31 countries. The conference, held at The Mirage Hotel in Las Vegas, included sessions on the evolution of the casino-resort industry, gambling research, hospitality management, law, and other topics. Gaming mogul and The Mirage founder Steve Wynn was the event’s keynote speaker.
Through collaboration and innovation, UNLV researchers are changing the way we think about the brain.
Jeff Kinney chose to join the UNLV psychology faculty in 2007 for many reasons, but the one that clinched the deal was the opportunity to build out the neuroscience area.

“The prospect of building a program from the ground up was far more appealing to me than joining an already established group,” says Kinney. “For me, carving out something new had great appeal.”

Today, Kinney’s hopes—and his efforts in his first several years here—are coming to fruition. In the last year, he led a UNLV research team that joined with the Cleveland Clinic Lou Ruvo Center for Brain Health to obtain an $11.1 million grant from the National Institutes of Health for advanced study of both Parkinson’s and Alzheimer’s diseases. Additionally, the department now offers a Ph.D. area of emphasis in neuroscience, with plans to offer a stand-alone neuroscience doctorate soon. The department also recently launched a neuroscience minor, in which more than 100 undergraduates are currently enrolled.

“And now the department is approaching a critical mass of faculty in neuroscience, and faculty from other departments are collaborating with us as well,” he says. “This will enable us to begin building a center of excellence in neuroscience that will dramatically help with securing research funding in the form of collaborative and individual grants.”

One of the keys to the successful acquisition of research dollars, he notes, is the inclusion of collaborators, both on and off campus. Kinney and his team are working with several UNLV faculty members studying myriad topics. The following profiles offer a glimpse into the growing neuroscience research being conducted on the UNLV campus.

Patterns of Activity

As a 19-year-old education major, Rochelle Hines’ career ambition was to work with schoolchildren who have special needs. Then she enrolled in an elective course called “Brain and Behavior.”

“I was captivated,” Hines says. “By the second week of this class, I had changed my major and started working in the lab of my professor.”

The undergraduate research experience that followed enabled Hines to use various advanced technologies—electron microscopy among them—to gain a thrilling view of cerebral structures at the molecular level. From there, she recalls, she went on to explore sites of communication between brain cells, called synapses, falling “in love with their incredible intricacy.

“I became focused on wanting to understand how we build billions of these complex structures so reliably during normal development, and how a failure in this process may lead to developmental disorders like those that I observed working with children with special needs.”

Her early fascination with neuroscience has spawned a career rich in research. Today, Rochelle Hines, along with her husband and collaborator Dustin Hines, is rapidly expanding our understanding of how, for better or worse, neuronal activity patterns guide human behavior and ultimately contribute to pathology.

“Patterned activity in the brain is achieved through a balanced relationship between ‘on’ signals originating from excitatory cells and ‘off’ signals from inhibitory cells that act to modulate the activity of the excitatory cells,” she says. Her focus, she adds, tends toward the inhibitory cells, cellular “dimmer switches” that finely tune levels of excitation in the brain.

“Rochelle and I have a common thread, in that we both study cells in the brain that modulate brain activity patterns,” says Dustin, noting that he focuses more on the brain’s abundant glial cells, which surround neurons and provide support for and insulation between them.

The couple, who recently moved to Las Vegas together to continue their research in UNLV’s psychology department, shares an interest in this area of neuroscience for a number of reasons.

“The subject of modulatory cells has been attractive to us, as many studies are now pointing to this area as the most likely avenue for therapeutic advancement,” says Dustin, noting that pharmaceutical companies have been interested in his research. “We also enjoy working in these areas because, to date, they are largely understudied in neuroscience. So it’s exciting to work on topics where there are a lot of new discoveries and advancements to be made.”

The two researchers, who met early in their careers, work synergistically. Both explore the functioning of these modulatory systems in the brain, but each has a specialty area. Rochelle uses a molecular and cellular approach to focus on interneurons, also called “relay neurons,” cells that modulate communication between other neurons. Dustin’s work with glial cells, specifically astrocytes and microglia, involves a cellular physiological and behavioral approach to understand how glia modulate neuronal communication.

His research has implications for degenerative maladies such as depression and stroke. For example, one of his studies examined how the chemicals activated in sleep deprivation may be used to help diminish depression. His research team used an animal model to examine how a certain compound that affects adenosine receptors in the brain mimics sleep deprivation and improves mood and behavior.

He believes glial cells have been largely overlooked in brain research and provide an oasis for novel therapeutics.

“The tools that were needed to study glial cells were not available early on in neuroscience research,” he says. “After World War II, many electrical technologies used to detect submarines, like oscilloscopes, drove the research; consequently, the electrical properties of neurons became the focus of the field. In the late 1980s, the development of new microscopes and genetic tools allowed us to see how glial cells contribute to brain function by modulating neurons.”

Rochelle’s research, meanwhile, examines how interneurons and inhibitory synapses affect neurodevelopmental disorders such as autism and schizophrenia. By investigating the activities of inhibitory cells in the brain—those “dimmer-switch” cells that finely tune...
levels of excitation—she seeks to learn more about the development of signaling in the nervous system.

“Excitatory signaling can be thought of as a typical light switch, either fully on or fully off,” she says, adding that inhibitory signaling modulates this activity, allowing for subtler variations of brain activity.

Like her husband, Rochelle chose to study a research area that has abundant potential for discovery.

“The role of inhibitory signaling is becoming increasingly apparent, and much of it is based on the symptoms associated with these disorders as well as studies in postmortem tissue from human subjects with these disorders,” she says.

She recently authored an article describing a study of inhibitory receptors in the brain and how certain inhibitory synapses might contribute to the symptoms of schizophrenia.

“These receptors are the target for many drugs that are in wide clinical use, including anesthetics and anti-anxiety and sleep drugs, so we know that they are a powerful target,” she says. Her work has also garnered the interest of pharmaceutical companies.

The couple has more than 50 scholarly journal articles between them. By the end of the year, they expect to submit their first jointly authored article emanating from their UNLV research. It will focus on how the brain regulates sleep.

—SUE DIBELLA

**Smoking and Schizophrenia**

**Y**ou might be surprised to learn that the smoking rate for schizophrenic patients is 45 to 88 percent higher than the general population’s, according to “Co-Morbidity of Smoking in Patients With Psychiatric and Substance Use Disorders,” published in the *American Journal on Addictions*. And if you wonder what the underlying cause of such a pervasive habit might be, you’re not alone.

Xiangning Chen and Jingchun Chen of the UNLV Nevada Institute of Personalized Medicine (NIPM) are looking to genetics for the answer.

“Genetics actually influences everything we are and do,” Xiangning Chen says. “Genetics defines your potential or capacity, and how you reach that capacity depends on the environment you’re in.”

People with schizophrenia can experience delusions, hallucinations, dissociations from reality, abnormal social behavior, erratic speech and behavior, and the inability to focus and recall information. Although environmental factors may contribute to the development of schizophrenia, the disorder has been linked to specific genetic variants that predispose a person to developing the condition.

“Researchers have performed a lot of twin studies and family studies with respect to schizophrenia,” Jingchun Chen says. “The results show time and again that the more overlap people have in their genetic makeup, the greater their chances are for developing this disorder. For instance, if one twin sibling has schizophrenia, the other has a 50 percent chance of developing it as well. So there’s clearly a genetic component.”

Previous research has noted a strong correlation between heavy smoking and schizophrenia. A 2011 finding in the journal *Psychiatric Services*, for example, concluded that the “prevalence of smoking has remained alarmingly high among individuals with schizophrenia and bipolar disorder in routine psychiatric settings.” Although there is some dispute among researchers as to why, the most commonly cited explanation is that patients are attempting to “self-medicate.” In short, researchers have concluded schizophrenic patients smoke because it makes them feel better.

Xiangning Chen and Jingchun Chen wondered whether genetics might play a role in creating this analgesic effect.

Supported in part by separate grants from the National Institutes of Health, Xiangning Chen and Jingchun Chen examined genes associated with both schizophrenia and smoking to determine whether the disorder and nicotine dependence might be linked. Using sophisticated analytic techniques as well as data on the genetic components involved in the general population’s smoking behavior, the two discovered that while there was likely a genetic predisposition to smoking in schizophrenics, the cause of schizophrenic patients’ excessive tobacco use was not entirely due to nicotine dependence or addiction, as is often the case with smokers in the general population.

“Schizophrenic patients have some unique behavioral factors that cause them to smoke, and smoke quite a bit,” says Xiangning Chen, a professor in both UNLV’s Department of Psychology and NIPM. “One of the challenges for schizophrenic patients is that they cannot remember things accurately, follow their thoughts easily, or concentrate effectively. Therefore, they use cigarettes to help them cope and overcome some of the symptoms caused by the disorder, as one effect of nicotine on humans is to improve cognitive function.”

Although schizophrenic patients are smoking for reasons that extend beyond what their genomes might predispose them to, the discovery of genetic liability between the schizophrenia and smoking has troubling implications.

“Schizophrenia and smoking are considered complex disorders, meaning that more than one gene contributes to them,” says Jingchun Chen, an assistant professor at NIPM. “Because we found some genes and pathways that are shared between schizophrenia and smoking, we now believe that smoking may actually increase the risk of schizophrenia developing in a person who has these genes, so the next step is to find out what the function of those genes are.”

The scientists say their work to pinpoint those genes could one day lead to personalized treatments aimed at improving patients’ quality of...
of life or even preventing the condition entirely. The two researchers indicate that their plan to take advantage of the capacity of UNLV’s Cherry Creek II supercomputer, one of the fastest and most powerful supercomputers in the world, should enhance their ability to deliver results.

In the meantime, they say, they’ll be looking at genes associated with other disorders and diseases to see if these might also be related to schizophrenia. At this point, for example, the researchers know that schizophrenic patients have an increased chance of developing an autoimmune disorder—and vice versa—and are working to determine what genetic liability might link the two.

Another project involves using Cherry Creek II to look for genetic ties between smoking and lung cancer—that is, whether a gene or set of genes might predispose a person to lung cancer, nicotine addiction, or both. Contrary to popular belief, Xiangning Chen says, the relationship between cigarette smoking and lung cancer is much more complicated.

“Smokers that develop or die of lung cancer are actually the minority,” Xiangning Chen says. “If smoking directly caused lung cancer, you’d expect to see more of it.”

Discovery of genetic roots in disease and disorder rests at the heart of NIPM’s mission. If research can determine which genes cause a particular condition, a “personalized” treatment strategy can be established. This would eliminate expensive guesswork associated with treatments that patients may or may not respond to, while increasing the likelihood of an individualized treatment’s success at the same time.

“I never expect that what I do will change the world,” Xiangning Chen says. “But what I can do is give people something to think about from the information I can give them. If you find out you carry a gene that predisposes you to lung cancer, for example, maybe you won’t smoke. That’s what NIPM and researchers like me are here for—to try to find a way to better treat people and help them make more informed decisions.”

— RAEGEN PIETRUCHA

A Powerful Protein

Cell and molecular biologist Nora Caberoy never thought that a protein she worked with years ago could potentially lead to new discoveries in the fight against Alzheimer’s disease. But that’s exactly what the protein, called “tubby” because it is encoded by the TUB gene, may offer scientists.

It all started in 2007 while Caberoy, now an assistant professor in UNLV’s School of Life Sciences, was working as a postdoctoral fellow at the Bascom Palmer Eye Institute in Miami. While occupied with a project related to macular degeneration—a retinal condition that causes a loss in central vision—she identified a tubby protein that is involved in the clearance of photoreceptor debris in the eye.

Photoreceptors are cells responsible for reception and processing of light as well as sending the signal to the brain. When old bits of cellular debris accumulate around the ends of photoreceptors, these need to be removed. Specialized cells make this happen, but they need proteins to guide the process.

This is where tubby comes in. Tubby proteins bind onto cellular debris while inviting another type of cell, phagocytes, to begin clearing it. Tubby serves, in other words, as a bridge between the cells that need to be consumed and those that are supposed to eat them.

“So, what does all this have to do with Alzheimer’s disease? Patients with Alzheimer’s have an accumulation of amyloid beta, a protein that aggregates in the brain. Caberoy says that, for reasons that are not entirely clear, the amyloid beta deposits of those with Alzheimer’s squeeze in between the brain cells, eventually killing them.

“We all produce amyloid beta, but in healthy individuals, the production of amyloid beta is somehow equal to the degradation,” she says. “In those with Alzheimer’s, the balance is not equal.”

According to Caberoy, the body maintains this balance in part thanks to the work of debris-and pathogen-eating microglial cells that, in addition to gobbling up diseased cells, also have a taste for excess amyloid beta. But many scientists suspect that this microglial assault may have a serious side effect: an increase in inflammation that may hasten the disease’s progress and the subsequent death of brain cells.

Caberoy noted from her research on photoreceptors that the tubby protein assisted in the removal of damaged cells in the eye without inflammation. Could they perhaps be repurposed for use in the brain?

“We know that the active receptor in the eye also is present in the brain, but for some reason, it is not the preferred receptor,” she said. “We also know that the molecules that bridge that amyloid beta are not binding directly to the receptor.”

In an attempt to encourage such binding, Caberoy is working to create a new type of molecular “bridge,” one that could link amyloid beta to a less inflammatory protein that might neutralize it.

In the lab, her research team undertook screenings to discover proteins that could bind to amyloid beta. They were able to identify several. Caberoy then “optimized” these proteins by mutational analysis until she found one that could bind to the most toxic form of amyloid beta.

“I fused the amyloid beta binding protein to the part of tubby that recognizes the silent receptor,” she said. “Through testing, we were able to show that chimeric protein, which is created through the joining of two or more separate proteins, was able to bind to both the receptor and the amyloid beta. We also found that this process could reduce the production of inflammatory factors.”

Over the next few months, Caberoy’s research team will test this process on mice with Alzheimer’s. She says they will first inject the affected mice with the chimeric protein, then see if it results in a reduction in the level of amyloid beta in the brain with the production of inflammatory factors in the blood.

If successful, this process will bolster the patent application Caberoy has submitted for this method of clearing amyloid beta.

Additionally, if the results are positive, the approach could eventually be used to develop therapies for human patients, although she cautions that there are still questions as to whether such treatment would need to be deployed before the disease develops or if it might help individuals already affected.

Regardless, she says, there is much to be hopeful about.

“There could be clinical applications where we would produce proteins that could be injected into an individual,” she says. “You can imagine someone that has a family history of Alzheimer’s disease taking a pill or getting an injection before the disease develops.”

— SHANE BEVELL

Learning From Cancer

UNLV biochemist Ron Gary is deeply interested in physiological processes affecting human health, a fact that’s not immediately obvious as one gazes down at the petri dishes positioned around his lab. But Gary’s molecular-level work with the cells housed in these dishes continues to yield important cancer-related discoveries and, more recently, potentially game-changing neuroscientific findings related to Alzheimer’s disease.

The Alzheimer’s discoveries were an outgrowth of the cancer research. Gary and his laboratory team were working to learn whether inhibiting the aberrant activity of a particular “sizing” enzyme, glycogen synthase kinase-3 (GSK-3), might slow the explosive growth of cancer cells. Because the enzyme has also been implicated in the development of Alzheimer’s, Gary’s team soon found themselves thinking about the ways in which inhibiting GSK-3 might affect a key component of that disease as well.

There are two microscopic structures that are characteristically found in the brains of
Alzheimer’s patients: plaques and neurofibrillary “tangles.” At the molecular level, neurofibrillary tangles are perhaps the illness’s most distinguishing feature. The tangles are composed of tau—proteins that, when working normally, play a key role in transporting nutrients and other important materials throughout the cell. When tau proteins aggregate in the brain and form tangled clumps, the transportation system breaks down, cells begin to die, and Alzheimer’s symptoms appear.

Gary, a professor in UNLV’s Department of Chemistry and Biochemistry, suspects that GSK-3 may be inadvertently inducing tau tangling by accelerating a process called phosphorylation—a crucial metabolic step by which, under normal circumstances, cells regulate various molecular processes.

“Though we don’t know why it becomes overactive and produces tangled tau, our thinking is that, if you could suppress or slow that phosphorylation activity of GSK-3, you could stop or slow the formation of tau tangles,” Gary says. “Then maybe you could prevent or slow the progression of Alzheimer’s.”

In order to reduce GSK-3 and suppress the formation of tangles, Gary says, researchers would need to develop an inhibitor, a compound or drug that would depress its activity. Gary and his team of students are working to do just that.

“We take human cells of brain origin, treat them with different drugs in a dish, and look at the molecular consequences of that treatment,” he said. “You can’t just eliminate the GSK-3 enzyme, because that would be problematic as well.”

Gary says a handful of key questions are guiding his lab team’s efforts. What are the consequences more broadly throughout the cell, and specifically, do different types of inhibitors do the same thing throughout the different areas where GSK-3 has a function? Or could different inhibitors have subtly different effects on GSK-3-related systems?

Gary says he’s also interested in examining beta-catenin, another important molecule influenced by GSK-3. Beta-catenin plays a crucial role in the control of cell growth. If out of balance, it could potentially be a contributing cause of cancer.

According to Gary, when you inhibit GSK-3 with the goal of reducing tau tangles, it seems likely you would also reduce the phosphorylation of beta-catenin.

“You would initially assume that any inhibitor that suppresses GSK-3 enzyme activity would have a similar effect on beta-catenin, but we found that different inhibitors have different effects on beta-catenin,” he says. “This is important because Alzheimer’s work covers everything from treating patients to the other end of the spectrum, looking at molecular effects in isolated cells. But if we ever want to use this class of compound to treat patients, we would want to know what else happens in the cell when you suppress tau phosphorylation by inhibiting GSK-3.”

— SHANE BEVELL

Treatments in Balance

Much like other parents, Merrill Landers, a father of four who chairs UNLV’s Department of Physical Therapy, often admonishes his children to go outside and play. Sometimes, he admits, he does this so that he and his wife have a moment’s peace. More often, he says, it’s to encourage his children to be more physically active. Landers knows that outdoor activities such as running around in the yard, kicking a soccer ball, or riding a bicycle are crucial to the growth and development of healthy young bodies.

And that may not be the only benefit. According to recent research findings, Landers indicated, an accumulation of steady physical activity during our youth and college years may generate a protective effect in the brain—one that could reduce the risk of, or even prevent, neurodegenerative diseases like Parkinson’s disease.

Landers’ research has focused on Parkinson’s disease since he joined the UNLV faculty in 2001. His recent work involves examining how exercise might influence the disease’s
“Falling represents one of the two leading causes of premature death among people with Parkinson’s disease,” says Merrill Landers. “Falling can cause the domino effect of fractures to surgery to postoperative complications to other falls. For me, preventing falls is a big issue.”

course and determining whether patients’ physical activity might improve their balance and walking—work that has neatly segued into a broader set of findings on activity and neurodegenerative protective effects within the field, he indicated.

The four cardinal signs in Parkinson’s disease, Landers says, are bradykinesia (slowness of movement), rigidity, resting tremors, and postural instability (poor balance). The first three respond to and can be improved with medication. Postural instability does not respond to Parkinson’s disease medications; the only treatment approach that has been demonstrated to be beneficial is balance training.

“Falling represents one of the two leading causes of premature death among people with Parkinson’s disease,” says Landers. “The first is aspiration pneumonia. Falling can cause the domino effect of fractures to surgery to postoperative complications to other falls. For me, preventing falls is a big issue.”

One aspect of Parkinson’s disease that piques Landers’ curiosity is how falls affect people with the disease. Healthy adults typically evaluate the circumstances of a fall in two ways. If it’s a fluke, they forget about it. If there is a reasonable chance the fall could happen again, they seek ways to prevent future tumbles.

For people with Parkinson’s disease, it’s more complicated. A fall may cause anxiety or fear, emotions that may result in an unhealthy avoidance of normal activities. They may limit visits to friends, attending church, or venturing out in public. Some become reclusive, a condition that can initiate a spiral of declining health. When fall-averse people with Parkinson’s disease seldom leave their homes, they tend to lose strength, coordination, and balance. These deficits, in a cruel irony, make them more susceptible to falling in their homes as they move from room to room.

“Some level of fear is good and can be protective, but too much can become harmful, especially in this disease population,” says Landers. “Those who shouldn’t be going out can be coached to become more careful and trained to improve their balance. Those who have high levels of fear need additional help.”

During a study involving older adults, Landers first measured “balance characteristics,” or participants’ ability to balance, while asking them to self-report their “balance confidence.” He followed the study participants for one year, noting when and how often they fell. The results indicated the self-assessments were the best predictors of future falls. The next best predictor was fall-avoidance behavior.

Using data obtained from another study, Landers helped rebuild the confidence of those who reported lower levels of balance and stability. Balance training became a key prescription.

As with his own children, Landers says, adults need exercise to maintain and strengthen muscles. Most people with Parkinson’s disease are prescribed a regimen of low-intensity exercise—a level so low, Landers says, it’s ridiculous.

“When we look at someone with Parkinson’s disease and see the poor posture and the slow movements, we assume he or she can’t handle exercise. I think this is a big misconception and became something I wanted to test.”

In 2015, Landers led an “exercise boot camp” study to evaluate the ability of people with Parkinson’s to handle high-intensity exercise, which comprised three components: strength exercises at greater than 70 percent of the person’s one-repetition maximum, endurance exercises at 70 to 75 percent of the person’s estimated maximum heart rate, and exercises using dynamic and challenging balance-coordination tasks.

The results were clear: Those with high-intensity workouts responded well to the increased level of activity, and they did not experience more falls than the low-intensity group. What’s more, they enjoyed it—even more so than the low-intensity group enjoyed their activity.

Landers next sought to determine whether such intense exercise might act as an inhibitor of the disease’s progression. Many studies among laboratory animals had previously indicated that exercise can protect the brain from the disease. Some of the results even showed small animals actually recovering from the disease.

Landers then found results from five or six studies that indicated exercise during a person’s early adult life could have a cumulative effect and protect against the disease—that is, the risk...
Stimulating Parkinson’s Research

UNLV’s Brach Poston is exploring how low levels of electrical stimulation may contribute to improved motor performance in people with neurodegenerative diseases such as Parkinson’s disease. And how did he choose this scientific path? Foresight.

After earning a master’s degree in exercise physiology from UNLV and a doctorate at the University of Colorado, Boulder, Poston began a postdoctoral program at Arizona State University. There he learned about brain stimulation, immediately recognizing its potential as the next “big thing” in his field.

“I was introduced to the methods of transcranial magnetic stimulation [TMS] and transcranial direct current brain stimulation [tDCS],” Poston says. “I saw tDCS as a promising [way] to help people, and I was fortunate enough to be admitted to a postdoc program at the National Institutes of Health [NIH], where I was able to learn about this type of stimulation.”

Poston spent the next year and a half studying how to use multiple noninvasive brain-stimulation techniques. After reviewing studies from other scientists, he became convinced that, as he puts it, “tDCS was most likely to be the best noninvasive stimulation option for aiding those with Parkinson’s disease.”

Parkinson’s is a disease of the basal ganglia, an area of the brain that is vital to motor control and the production of dopamine. Dopamine is more known for its involvement in reward mechanisms and reinforcement learning in the brain, but it also plays a crucial role in mobility. When a person completes a complex movement, action, or task, dopamine is required to enable the basal ganglia to assist his or her motor cortex with movement planning, execution, and learning.

When using tDCS to treat Parkinson’s patients, clinicians connect saline-soaked sponges to rubber electrodes that are distributed across the scalp. They then pass a weak electric current from one electrode to the other. The idea is to use the current to excite or inhibit activities that are thought to originate in specific areas of the brain. For Parkinson’s disease patients, these areas often include the motor cortex, a part of the brain’s cerebral cortex associated with muscular activity.

Preliminary findings by Poston and others have shown promise: tDSC does appear, in fact, to improve performance of simple motor tasks performed by hands and arms. These tasks can include using a pinch-grip movement to generate force against an object, retrieving small objects like buttons or coins, or performing an arm movement to a target.

The electric current doesn’t cause the action to happen, Poston explains; it simply augments the normal increase in the “excitability of cortical neurons” when a task is practiced. When someone wants to lift an object—picking up a glass, for example—cortical neurons become excitable and act to execute that movement. When you practice a particular action, such as throwing a ball, the neurons become more excitable over time. This leads to improved accuracy and efficiency of movement.

The lower levels of dopamine common among Parkinson’s patients cause impairments in the communication between the basal ganglia and the motor cortex, a breakdown that reduces cortical neurons’ excitability during movement execution—thus the slower movements, reduced muscle activity, and less accurate movements experienced by Parkinson’s disease patients. By augmenting excitability among cortical neurons when tasks are being attempted, tDCS boosts motor control in the short term.

Although tDCS today is used only on outer areas of the brain, the technique might one day be used to elicit effects within deeper brain structures.

Poston’s first studies at UNLV sought to identify the optimal method for one-time tDCS treatment among people with the disease. His findings helped identify optimal placements of electrodes, correct electric current strengths, and optimal durations for stimulation.

With these parameters established, Poston moved on to explore using daily stimulation to treat patients during a two-week period. “During a single treatment, we and other research groups have typically seen a 10 to 15 percent performance improvement, with the effects lasting up to 90 minutes,” he says. “Daily application could produce a cumulative effect, and we hope to be able to elicit performance improvements of approximately 30 percent, which were seen in studies among young adults, when we apply stimulation over a two-week period.”

Poston also broke some new ground last summer by using tDCS on the cerebellum. This hasn’t been done in Parkinson’s disease before but has been shown to increase motor performance in both younger and older adults. The rationale for this is that, because the cerebellum has been shown to compensate for impaired basal ganglia activity in Parkinson’s disease, applying tDCS to excite the cerebellum may enhance this compensation.

Poston’s previous and current studies focus exclusively on the hands and arms, but he says he now has the funding that will enable him to test tDCS while a person is walking. Doing this will involve Parkinson’s disease patients walking on a treadmill. The goal is to determine how tDCS treatments affect patients’ stride length, velocity, and movement variability.

So far, Poston says his results are positive and that, in the future, he expects the treatment to become a more widely used adjunctive therapy. He also says that affordable, wearable tDCS devices have a realistic potential to become available for home use, a place where patients or caregivers could easily apply the stimulation as needed.

— KEVIN DUNEGAN
From the artist’s portfolio To Embrace by Catherine Angel
Disruptive by Design

The song you can’t get out of your head. That image burned into your memory. The scene that melts even the most hardened hearts.

Art is crafted to make an emotional impact. But beyond the emotions it inspires are the ideas it promotes, concepts that have the power to transform both artist and audience. Through their unique brainchildren, artists introduce us to new ways of thinking and undermine our sense of complacency and certitude, forcing us to question, to rethink, to see ourselves anew.

Four UNLV fine arts faculty are disrupting our perceptions of artists, the arts, and our world.
Going Off Script

Nate Bynum says today’s actors need to be more than just performers.

Actors, by trade, are people of many faces. But some of the faces Nate Bynum wears might surprise you.

Bynum has played dramatic roles, comedic roles, and even musical roles. He’s a screen and stage actor, favoring neither one over the other because he simply loves being creative. He is also a senior professor of theatre. A writer. And one day, he may even go on to be a producer and director.

Bynum has disrupted his craft by embracing a down-to-earth, businesslike approach to his fine art. And he’s moved beyond it into other areas that make his life—and the lives of the artists he teaches—more sustainable professionally.

"Acting is fine," Bynum says. "I love it. It’s what I do. But I would like to see actors become writers, directors, and producers—to learn the business end of it as opposed to thinking being an actor is the end-all. It’s not. As an actor, you’re the last person hired, and there are lots of actors to choose from."

With more than three decades of experience in his industry, Bynum is no stranger to the realities of acting. From roles in movies like Iron Man 3, My Dog Skip, and The Rainmaker to TV shows like Grey’s Anatomy, Brooklyn Nine-Nine, and Crash to plays like The Killing Ground, Seven Guitars, and Urinetown, he’s seen it all—and brings that knowledge to bear practically as he approaches his roles.

While Bynum is a student of many different acting approaches—classical, method, masque, and more—in today’s acting world, it’s the role that determines the amount of preparation an actor can do. For the roles that allow for some groundwork, Bynum goes deep. He does character studies. He researches speech patterns, occupations and geographical regions related to the role. He practices with dialect and accent tapes. He examines the tone and nature of a given part as well as the show and director to which it belongs.

"The idea is this: You want to walk into the room and be the visual perception of what they see in their minds, so you have to make a choice as to which vision you want to or can present," Bynum says. "That helps take away that part of the challenge of convincing them you’re right for the role. It then becomes your acting that helps you."

For the roles that require him to act on his toes, Bynum relies on his well-honed improvisational skills. Perhaps this is why he so values the art of improvisation.

"I teach and use improvisation regularly because you never know what you might face out there," Bynum says. "For instance, I never knew I was doing Ironman 3 until I got on the set. We did three auditions, but they didn’t tell us what we were shooting. It was very private because it was a big-budget movie."

"As an actor, you have to be able to adjust for the unexpected. I always tell my [student] actors, ‘Know your lines. Know your character. Be willing to go with the flow,’ because the stars you work with may come on set without having looked at the script, and they’ll say, ‘I’m going to go with this. We know how it has to end. Just follow along with me.’ Well, that’s your job. That’s what you have to do, so that must be part of your training."

But only part. Bynum believes that training for today’s actors must go well beyond creative flexibility. The interdisciplinary stage and screen acting curriculum he created at UNLV reflects this. In addition to film and theater courses, Bynum’s curriculum includes screenwriting, Shakespeare, voiceover, and production classes.

"When I got here, the first thing I realized was that we’re four hours away from L.A., but we weren’t training students to work in L.A.," Bynum says. "That made no sense to me."

Bynum knows Los Angeles well. He recently shot four commercials there: one for Cox Cable, one for Sears, one for FedEx, and one for a new pharmaceutical that strengthens bones. He’s also being considered for two movie roles and one TV role.

Bynum is quick to note, however, that he’s actually got much more than this going on—and indicates this is the case because he’s branched out beyond acting.

"If you know how to direct, produce, write, and do other things, there are just going to be more opportunities for you professionally," Bynum says. "That’s why I write more than I act now."

In addition to two scholarly articles he co-authored this year, “Stemming the Tide: The Presentation of Women Scientists in CSI” and “Using Reader’s Theatre to Improve Reading Fluency in African-American Male Students With Learning and Behavioral Challenges,” Bynum is in the middle of writing biopics (biographical movies).
Strange Songfellows

By marrying the contradictory, Linda Lister shakes up the opera scene.

Dissonance: inharmonious sound, an unresolved chord, a disagreement or incongruity. In most cases, it’s the exact opposite of what a musician hopes to achieve.

That’s not the case for Linda Lister. The opera singer, choreographer, composer, producer, director, and UNLV associate professor of voice actively creates discord by pairing the seemingly incongruent together. Through this discord, she aims to disrupt how we think about opera, education, and the arts in general.

Take, for instance, one of her more recent works, an opera based on the idea of Lady Gaga and Madonna “diva-fighting”—complete with meat dress—that Lister set to Mozart. Or her version of La bohème set in modern-day, hipster Brooklyn. Or the juxtaposition of two very different operas—Puccini’s Suor Angelica and Hindemith’s Sancta Susanna—that had mostly just nuns (yes, nuns) in common, and for which Lister garnered the 2014 American Prize in Directing.

Pairing Puccini’s famous and emotional one-act opera with, in Lister’s words, a “really bizarre piece” from Hindemith about a nun who perhaps had a sexual awakening ... or perhaps is crazy ... or perhaps is possessed by the devil ... or perhaps is just a wild child who doesn’t belong in a nunnery is the type of thing that inspires Lister creatively.

“As I’ve progressed as an artist, I look for something that’s really going to impact people—not just a pretty song,” Lister says. “With opera, you’ve hopefully been true to what the composer or librettist wants, but then you’ve got to bring something new to it, something different. That pairing was the most out there I’d gone with a production, and it took these singers going to the edge, to that weird place, for it to work.”

For audiences, she admits, such performances can be a bit unsettling. “By pairing two very different works together, people are hopefully thinking critically about how they interrelate, compare, and contrast—[these] different...”

ARTIST’S ADVICE: BRANCH OUT
“Acting is fine,” says Nate Bynum, senior professor of theater. “But I would like to see actors become writers, directors, and producers.”

ARTIST’S ADVICE: DO IT DIFFERENTLY
“As I’ve progressed as an artist, I look for something that’s really going to impact people—not just a pretty song,” says Linda Lister, associate professor of voice and director of opera. “But then you’ve got to bring something new to it, something different.”

Bynum’s script of the same name tells the story of a young feminist in the 1920s who, after graduating from law school, returns to her hometown to discover that a local court is ignoring a rape case. At the time, women had won the right to vote, but they were not permitted to sit on juries. Bynum’s protagonist realizes that to gain justice for the rape victim, she will first have to fight for women’s inclusion on the jury.

“I tend to write about topical material that has some social grit to it,” Bynum says. “All actors are recorders of history. We document the world as it is now. However, because I’m also a professor, I gravitate toward this notion of, ‘How can I contribute, how can I make a difference, and how can I get my voice heard through my art?’”

Bynum was recently informed by a major production company that his pilot submission of Women Come to Judgment was accepted. If that’s any indication of the impact he’s making as a professor and an artist, his unique approach to this business of acting has paid off.

on singer Joe Tex and comedian Flip Wilson. The writing project he’s most excited about, though, is a period piece he adapted from the Margaret Culkin Banning story “Women Come to Judgment,” which won a Harpers (Magazine) Prize in 1924. Bynum’s script of the same name tells the story of a young feminist in the 1920s who, after graduating from law school, returns to her hometown to discover that a local court is ignoring a rape case. At the time, women had won the right to vote, but they were not permitted to sit on juries. Bynum’s protagonist realizes that to gain justice for the rape victim, she will first have to fight for women’s inclusion on the jury.

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composers from different time periods, backgrounds, and languages,” Lister says. “Some of them may not like the newer work. That’s fine. They can be challenged by it.”

When Lister chooses music for her students to perform, she considers their unique talents and selects pieces that highlight their strengths but also teach them something. If, for instance, a student was assigned a Mozart piece to learn recitativo (recitative delivery, which adopts the rhythms of ordinary speech), Lister might also throw in something verismo (a more impassioned form of expression) to provide a greater breadth of experience.

Lister says she works to create a “safe space” for her singers so they can reach a place of genuine vulnerability during their performances. “That’s what people really want to see in live performance,” Lister says. “In this day and age, what our industry struggles with is, what’s going to get people out of their houses with the megascreen TV? If you can give them something they can feel live, that gives them goosebumps because you’ve brought them to this emotional precipice, then you’ve given them what they want, something no screen can provide.”

In addition to composing and teaching, Lister sings on a forthcoming CD, Moments of Arrival (Centaur Records), and has co-authored a book with Auburn University colleague Matthew Hoch titled Voice Secrets: 100 Performance Strategies for the Advanced Singer. Drawing from both research and her practical experience, the book provides informative tips on everything from music memorization to reputation management, language learning, and more.

Lister will also be working with a doctoral student, Bonita Bunt, who is translating the operatic version of Hamlet—currently in French—back into Shakespeare’s native tongue. From there the two plan to organize a performance and entire Hamlet festival that includes contributions from UNLV scholars working in English literature, film studies, psychology, and more.

And, of course, Lister’s always got a new odd couple she’d like us to meet. This time, it’s two distinct versions of Orpheus, the lyre player and father of song from Greek mythology. Lister has paired a well-known Orpheus opera, Orfeo ed Euridice by Christoph Gluck, with a more obscure French version, Les Malheurs d’Orphée by Darius Milhaud, to get us to think about the character—and opera itself—a bit differently.

“Opera is still an important art form,” Lister says. “There tends to be this intimidation with respect to it because of the foreign languages and musical complexity, but it’s not that different from other music forms once you learn more about it. Opera was the popular music of its day, not a museum piece. It was the hot thing. It’s about people living, loving, dying—just like any other drama. They just do it while they’re singing.”

**ARTIST’S ADVICE:**

**MAKE IT COUNT**

“I feel so much more fulfilled having done The Track, even if it never makes a dollar, because it’s raising awareness,” says Brett Levner, assistant professor of film.

This opera singer, choreographer, composer, producer, director, and UNLV associate professor of voice actively creates discord by pairing the seemingly incongruent together. Her juxtaposition of two very different operas—Puccini’s Suor Angelica and Hindemith’s Sancta Susanna—that had mostly just nuns (yes, nuns) in common garnered Lister the 2014 American Prize in Directing.
Shooting for Progress

Brett Levner, leaving reality TV behind, uses film to fight underage sex trafficking.

As she tells it, Brett Levner had no idea that the dark drama occurring outside her Berkeley, California, home would profoundly alter her focus as an artist. In fact, recalls Levner—now a director, producer and assistant professor of film at UNLV—she wasn’t quite sure what she was seeing when she looked out her window.

“I kept seeing this young girl—maybe 15, 16—on the street corner,” Levner says. “She looked like a suburban kid with a T-shirt, jeans and a Hello Kitty backpack, but she was going in and out of cars, and they were bringing her back. At first I didn’t understand what was happening. Then it occurred to me. I’d read an article about the rise of underage sex trafficking in the Oakland area. I thought, ‘What is going on here?’”

Levner, then working as an adjunct at the Academy of Art University and the College of Marin, was new to teaching; the bulk of her career had been spent successfully producing nonfiction and reality TV shows like True Life, Bridezillas, and The First 48. Right outside her window was a different reality, though—one she felt compelled to respond to through her art.

“I just wanted to do something more meaningful than my past work,” Levner says. “I started thinking, because I’m a teacher now, I had a responsibility to do something that had a message. I felt I had to be a mentor and role model, and I thought if I made a film that could make a difference in the community and raise awareness, that would be a good example to set.”

Thus Levner disrupted her own artistic trajectory, realizing that a project she could be passionate about was right in front of her. She tackled the difficult subject matter by creating a short film called The Track (after the slang term used to reference the particular area of town where prostitutes solicit customers), which combines fictionalized storytelling with a gritty, cinéma vérité shooting style native to the documentary film genre.

Levner’s preoccupation with trafficking wouldn’t end there, though. By 2011, she had joined UNLV’s faculty and was thinking about producing a feature film. When she ran across an article in the L.A. Times about underage sex trafficking in California and Las Vegas, she knew she had her subject. It was time to tell the story of Sin City’s victims.

Once again, Levner would create a fictionalized story around an underage sex trafficking victim named Barbie, whose path crosses with a mother from the suburbs, Caren, who is grieving the loss of her child. Once again, Levner would use the “run-and-gun” documentary shooting style using handheld cameras.

But this time around, she would be making a full-length film… and studying up on the subject first. “The thing I screwed up with on the short was, I didn’t do enough research,” Levner says. “I wrote a story from my imagination, and I saw the repercussions of that in the authenticity of the performances. So I said to myself, ‘This time, I’m going to do it right.’”

Levner’s research would be the in-the-field variety. She teamed up with UNLV criminal justice professor Alexis Kennedy (Page 9), an expert in the field of sex trafficking, who connected Levner with a number of locals involved in the fight against this type of exploitation. Levner was introduced to Esther Rodriguez Brown, founder of The Embracing Project, a local organization that assists youth affected by sex trafficking and gang violence. Brown took Levner, along with The Track screenwriter/producer Matthew McCue and producer/alum Domenica Castro (2013), to the courthouse to meet the judge who sentences juvenile victims. They attended a Southern Nevada Human Trafficking Task Force meeting, where they heard a former prostitute and former pimp speak. They met former Nevada Attorney General Catherine Cortez Masto, who was working diligently at the time to pass harsher regulations on sentencing for pimps. Masto provided background to the filmmakers on the legal challenges surrounding the issue.

The script was completed in 2013, and in 2014, Levner launched an Indiegogo campaign to help fund the movie. She raised $25,000, which was supplemented by additional financial support from private investors, thanks to the work of producer/alum May May Luong (2006). Cash in hand, Levner began auditioning and casting for the film. Missy Yager (from Mad Men), Sam Trammell (from True Blood), Mike Doyle (from Green Lantern and Law & Order: SVU), Michael Munney (from Veronica Mars and The Young and the Restless), Bre Blair (from Game of Silence and The Baby-Sitters Club), Clarence Gilyard (from Die Hard and Walker, Texas Ranger), and newcomer Mariah Kirstie all joined the roster.

The Track was filmed in just 17 days during October 2014. It was shot in various locations including Las Vegas, and co-starred Mariah Kirstie, Maggie geier, Kody Smith, and James Caleusk.
around Las Vegas, including the UNLV campus. Postproduction work—editing, sound design, music, and color correction—was completed in March of 2016. Every stage of the project provided UNLV students with unique professional development opportunities.

“It was a tremendous teaching tool,” Levner says. “A lot of my students worked in exchange for hands-on experience and credit that you typically have to work your way up the ranks for. Here, they got to jump that hurdle and go directly to being on the set of a feature film. From editing to the music and more, they brought so much to the project, and I couldn’t have made this film without them.”

Screenings of the feature film began in April 2016, and it officially premiered on June 12 at Los Angeles’ Dances With Films Film Festival. It also secured two awards at the Las Vegas Film Festival: Best Local Feature and Best First-Time Feature Director. And although Levner is waiting to hear back from potential digital distribution partners, the impact of the movie has already been felt. A charity screening Levner organized raised more than $4,000, and the film has become an important tool for Brown, a social worker in both the film and in real life, who has shared it with some of The Embracing Project’s victims and at Las Vegas detention centers.

“I feel so much more fulfilled having done The Track, even if it never makes a dollar, because it’s raising awareness,” Levner says. “It’s also been a wonderful artistic exercise that helped me hone my skills, improve, and continue on my educational journey as a director. It’s a story that could’ve been told by many people, but I became the conduit for it, and I’m proud of that.”

**Balance Through Contrast**

*For Catherine Angel, opposing modes create an unmistakable intimacy.*

If you were to visit an art gallery and see sharp, black-and-white portraits alongside mixed-media collages of objects duplicated and blurred, you’d likely assume you were looking at photos of two different artists.

Welcome to the work of Catherine Angel.

Angel’s photography disrupts the notion that artists should have only one style or aesthetic, that they must work toward cultivating a single, distinct “voice.” Her work is instead unified by an unmistakable, palpable intimacy—a sense that, whether in portrait or collage, we are nearing a personal space into which we’ll be trespassing, yet we simply can’t resist exploring it.

Angel, a professor of art at UNLV, deliberately divides her artistic modes. She uses, for example, her black-and-white, highly detailed large-format portraiture to probe the sometimes fraught relationships between herself and her subjects. “I adore deeply personal exchanges, but I don’t find them easy in everyday life,” Angel says. “That is why a lot of my work is portrait-based. There is an intimate exchange, and it gives me permission to have that exchange. My deepest wish is that a stranger looks at a photograph I took of you during that exchange and is moved. Then there’s this intimate exchange of us all being human through this art, and that makes us not alone in the world.”

For her collages, she often employs toy cameras—their plastic lenses creating softer, blurry renderings—to create images evocative of memories, recollections involving herself as a human, a woman, an artist, and a cancer survivor. “My nature is extremely private, so art gives me a place to practice not being that,” Angel says. “If I self-censor as a person in the world, I’m making work that’s about not self-censoring.”

All of Angel’s work arises from a form of personal engagement that is emotional, physical, or both. Her first serious photograph was taken at age 21. Angel says she made it while working toward a degree in dance, shortly after she was diagnosed with ovarian cancer. Unsure that

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dance would allow her to fully express such a deeply personal experience, Angel recalls how, while working on a class assignment, she looked up to see an impromptu tableau comprised of a half-empty (half-full) water bottle, flowers and a photo of herself as a young girl. She grabbed her then-husband’s camera and began shooting.

“I got lost within the creative process of photographing the objects in front of me, so I decided to be a photographer,” Angel says. “Photography gave me an avenue to immediate expression of what I was going through, if you think of art as an expression of self. Photography has an element of truth: This happened that day, that time, that month I made the photograph.”

For Angel, art requires problem solving—everything from learning the technical aspects of composing, shooting, and image processing to researching a subject and building a larger concept from it. These skills, she says, translate into the ability to solve problems in other areas of one’s life.

Angel’s images from The Embrace of Tango portfolio demonstrate this. The work emerged from her divorce, she says, an event that spurred a return to the dance floor with her camera in tow. She describes the finished work as a confirmation of art’s role in helping one move on to the next stage of life.

A more recent project was also deeply personal but packaged in a decidedly different form: small, handmade, one-of-a-kind books containing her photographs. The books were displayed in Brazil’s Arte Contemporanea Gallery and the Miami Museum of Art in 2015.

“I love how personal books are, how secretive in some ways,” Angel says. “Books are a nice way to fill up artistic making time for me if there’s a small experience I want to create images about or I’m not sure what to make next.”

For the moment, Angel is torn between two projects she’s in the midst of shooting, only one of which she can conclude by the summer of 2017. Perhaps unsurprisingly, the two projects fall into the two seemingly opposing modes she works in.

The first, born out of her horseback-riding pursuits, is a black-and-white portrait series on traditional vaquero riders.

“These men and women are just amazing salt-of-the-earth people,” Angel says. “I’m really interested in who they are as people and the beauty that can be found in such solidness as human beings.”

The second, a multimedia collage piece, was born out of her recent battle with breast cancer. She’s begun photographing herself and other female survivors in a color digital format and is considering the incorporation of interactive elements. Angel says her goal is to support other survivors and their family members.

“How do I create a kind of exhibition that people might walk into feeling stuck, but when they leave, they have a sense of a tiny opening, of ‘Maybe I could move on?’” Angel says. “Cancer can be secretive and isolating, so I’d like to create some kind of togetherness in the physical space. I don’t know if it’s the photographs that end up as documents of that or if it’s an actual place where you come into the gallery and watch a video, write your story and place it in a box, or name the people you know who’ve died of cancer. But to me, there must be some sort of an act—a participatory element, a symbolic ritual, a letting go.”

ARTIST’S ADVICE: CREATE WITH PURPOSE

“My deepest wish is that a stranger looks at a photograph I took of you during [our] exchange and is moved,” says art professor Catherine Angel. “Then there’s this intimate exchange of us all being human through this art, and that makes us not alone in the world.”
In recently published new works, UNLV faculty authors examine the century-long struggle to preserve America’s national parks, college students as taste-making fashionistas, the movement for understanding and acceptance of those born intersex, and the cultural legacy of post-9/11 literature.

**BY THE BOOK**

Conserving America’s National Parks: 1916-2016, Celebrating 100 Years of Conservation, Commitment, and Care

Scott Abella
CreateSpace

Scott Abella, an assistant professor in the School of Life Sciences at UNLV, is quickly becoming one of the nation’s foremost authorities on the National Park Service (NPS) and the many challenges it faces in protecting and maintaining America’s “crown jewels.” His first book, *Conserving America’s National Parks*, draws from his extensive research background to examine the history of conservation and restoration in the park system, which celebrated its 100th anniversary in August 2016.

When President Woodrow Wilson signed legislation creating the agency that became the National Park Service a century ago, there were nine national parks. Today the NPS manages 59 national parks and hundreds of other important...
publically owned treasures—among them national recreation areas, seashores, monuments, scenic highways, scenic riverways, historic sites, prehistoric sites, battlefields, and other federally protected parcels. From the beginning, the Park Service’s mission has been “to conserve the scenery and the natural and historic objects and wildlife therein, and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” Fulfilling this mandate has never been easy, but today’s challenges seem particularly daunting: overcrowding, climate change, invasive non-native plant species, fires, flooding, and disparities between predators and prey.

To tell the story, Abella parsed through thousands of academic papers and documents, conducted interviews with park rangers and staff, and rummaged through old files of different park properties. The book includes more than 250 photos and dozens of maps, charts, graphs, and tables.

Abella says his aim was to help readers see how conservation and restoration work has continually assisted in the maintenance of parks’ wild and scenic character. He includes examples from the very earliest of projects to the front lines of today’s work, such as the reintroduction of wolves to Yellowstone, the intentional removal of non-native plants and python snakes in the Florida Everglades, and the dismantling of Washington State’s Elwha Dam to restore natural water flow. That last project, Abella points out, was the world’s largest dam removal project and took nearly 20 years of planning. “You can’t just blow up something like that,” Abella says.

Abella also provides a compelling picture of what state-of-the-art conservation has to offer. He shows, for example, what Glacier National Park reveals through its disappearing ice sheet. He explains how tree rings from a fallen sequoia in its namesake national park provided hard data on more than 500 years of regional climate history. And he details how satellite imagery of Lake Mead can tell a 30-year story of an entire region’s water struggles.

The threats our national parks face can sometimes seem overwhelming, Abella says. But there is reason for optimism. “The permanency of these parks is pretty amazing,” Abella says. “There’s been tremendous political turnover in the last century—44 changes of Congress and 27 presidents with some very different ideologies—but these parks are stable. If there’s one area in which there’s been national consensus, it’s in preserving these special places.”

Abella’s first job at UNLV began in 2006. Through independent grant funding, he worked for six years as an associate professor conducting studies funded by several conservation organizations. When the economy turned and funding began to dry up, he left the university to become an ecologist with the National Park Service. His time away would be short-lived, however, as grant funding from the Experimental Program to Stimulate Competitive Research program (EPSCoR) allowed Abella to rejoin the UNLV faculty in 2015.

Abella’s specializations in restoration ecology and fire ecology are high-demand research areas.
The National Park Service has previously funded Abella to plan, write, and execute plant-management restoration plans for park service lands in Texas and New Mexico. More recently, he received funds from the California State Office of the U.S. Bureau of Land Management to lead a collaboration with the U.S. Geological Survey and University of California, Riverside. In total, his research team has been funded through 2019 with awards totaling $700,000.

Abella’s work extends beyond the borders of the protected lands he researches. A project in Glen Canyon, for example, includes support for a graduate student of Hualapai ancestry whose role involves identifying native plants that appear in the oral histories of her tribe.

“I really try to bring research into the classes I teach,” Abella says. “The more we can do that, the more we open doors for UNLV along with the minds and eyes of our students.”

Abella says he’s also excited to see that his book is making its way into parks’ visitor centers and gift shops. *Conserving America’s National Parks* appears in eight shops already, including those at the Lake Mead National Recreation Area and Great Basin National Park in Nevada. It is also under review for inclusion on the shelves of several other shops.

As one can imagine, there’s no shortage of beautiful books about our national parks. But few aim to do what Abella has accomplished.

“I tried to make this book an educational reference that both enlightens and entertains,” Abella says, “with real examples of projects from national parks that help readers understand the issues defining contemporary conservation.”

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**Dress Casual: How College Students Redefined American Style**

Deirdre Clemente

University of North Carolina Press

**Long before casual Fridays were even a concept, the United States was ready to loosen its tie. A new book by Deirdre Clemente, associate professor of history at UNLV, argues that America’s path toward more versatile fashion and relaxed clothing styles began taking place more than a century ago—with college students leading the cultural charge.**

“Casual dress is the uniform of the American middle class,” Clemente says. “On a global scale, casual dress is American dress. T-shirts, jeans, tennis shoes, sweaters—American college students popularized these styles now worn around the world.”

In *Dress Casual: How College Students Redefined American Style*, Clemente recounts the sartorial history of upwardly mobile youth in institutions of higher learning—specifically that of students enrolled between the years of 1900 and 1970. Clemente’s research specialty is the 20th century, but her expertise has given her a prominent voice on all eras of fashion. In the pages of publications such as *The Atlantic*, *Newsweek*, and *The New York Times*, she has weighed in on every-thing from period attire to Mar-co Rubio’s high-heeled boots and has served as a go-to media source for others whenever a fashion trend finds its way into the news.

“I’m not a fashion historian,” she specifies. “I’m a cultural historian who studies fashion. I probably care the least about the clothing itself. I care about the people in the clothing, and it’s a different set of documents that tells that story.”

Clemente is also associate director of UNLV’s Public History program, an initiative aimed at providing students with a background in the practical application of historical research. Among her responsibilities is setting up partnerships within the Las Vegas community that allow program participants to integrate coursework with real-world “applied-history” opportunities, typically with groups such as Preserve Nevada, a UNLV-affiliated nonprofit dedicated to the preservation of state historic and cultural sites.

*Dress Casual* highlights a convergence of fashion and consumerism at six universities that served as Clemente’s case studies: Princeton, Radcliffe, Penn State, Spelman, Morehouse, and the University of California at Berkeley. This sample, she says, provided a broad perspective for analysis of the roles of race, class, and gender. Collectively, it’s a story of how changing student demographics began to alter the culture of higher education, a change that soon came to influence the taste and cultural practices of America’s burgeoning middle class. In many ways, she argues, it was a transition reflected in and driven by the advent of casual clothing.
In the early to mid-20th century, with higher education opening doors to students other than white elites, clothing manufacturers sent “trend scouts” to college campuses to figure out what the younger generation was into. This marketing research produced a trove of documents that provided the bulk of her source material—order forms, trip reports, internal memos, design sketches—as textile capitalists attempted to profit from those who would later be labeled as the Greatest Generation, and then the Baby Boomers.

Complementing these documents were personal letters. An early example is one from a Cal Berkeley student at the beginning of the 20th century, a young woman writing to her mom saying her “patent kid leather” shoes weren’t rugged enough to handle Berkeley’s hills and unpaved streets. Another student, this one a Princeton undergraduate on a tight budget, wrote to his mother almost daily about his fashion anxieties.

“These student letters were so valuable. They showed the real personal side of these clothes, and they help us understand the real and practical use of clothes that would spark the casual fashion trends,” Clemente says.

American casualness came from necessity, she contends, as students sought more control of their time. This led to the adoption of sports-wear—sport coats, tennis shoes, cardigan sweaters, and eventually shorts—allowing students to go from one activity to the next without having to change clothes or, in the case of sweaters, identify with a particular sports club. The trends started with the moneyed elites, who were more comfortable snubbing authority (wearing golf knickers in the dining hall, for example).

By the time middle-class students at state universities began adopting a casual approach, however, a backlash from school administrators ensued. This only served, Clemente writes, to inject a spirit of rebellion in some fashion choices.

Regional differences existed as well, Clemente says; for example, “the sartorial proprieties of Eastern society, such as wearing an evening coat with formal wear, never traveled far.”

At the historically black colleges Clemente examined, African-American students experienced a much different dynamic. “Proper dress” was deeply ingrained in the academic culture of these institutions, with more advanced students tending to enforce a strict dress code. It took years before casualness found its way into dorm rooms.

For Clemente, it was a passion for F. Scott Fitzgerald that sparked her initial interest in early 20th-century history and the related styles. Since arriving in Las Vegas, Clemente has been a sought-after consultant on historical projects, including the Oscar-winning film The Great Gatsby. She also wrote text for a Sinatra exhibit at the Las Vegas Convention Center, consulted on a display of Liberace’s most flamboyant costumes, and has helped set up exhibits and student projects with the Nevada State Museum.

Clemente’s most recent project involves an exhibition at the Mob Museum in downtown Las Vegas. “Ready to Roar: Women’s Evening Wear in the Prohibition Era,” opened in November and runs through January 2017. It presents pre-flapper fashions from the 1920s that include hats, pins, scarves, skirts with (slowly) rising hemlines, and the stylistic metal accessories of Art Deco.

During the previous year, UNLV students played a key role in making the exhibit a reality. They used Facebook, Twitter, Instagram, and other social media to crowdsource authentic items for display. In the spring, they worked to research the history of the period. During the summer, they held museum internships. In the fall, they teamed up with Mob Museum curators to bring the exhibition to life.

“Las Vegas is such a dynamic place without a lot of roadblocks getting in your way when you have a good idea,” Clemente says. “I have more people who want exhibitions than I am able to fill.”

Contesting Intersex: The Dubious Diagnosis
Georgiann Davis
New York University Press

When UNLV sociology professor Georgiann Davis began hearing political debate about “bathroom bills,” she couldn’t help but shake her head.

New legislation recently introduced in several states has sought to require students in public schools to use gender-specific facilities, with gender determined by their chromosomes and external anatomy at birth. For Davis, who is intersex, abiding by such statutes would prove impossible.

“The idea that my body can be neatly categorized into one sex or another is flat out illogical,” Davis says, adding that many of these bathroom laws fail to take into account the complexities of sex and gender. Because of their wording and the way she was born—with anatomical traits that don’t fit in a traditional male-female binary—the laws would prohibit her from using either restroom.

While she finds the intense national focus on bathrooms a bit absurd, she adds that the debate does point to the work ahead for the intersex advocacy community, which is striving to find its voice in social and political discourse.

Davis seeks to inform this discourse with her recent book, Contesting Intersex: The Dubious Diagnosis, which describes the circumstances of people born “intersex”—with traits that are neither exclusively male nor female.

In Contesting Intersex, Davis introduces some of the key intersex issues through personal narrative; her own journey provides an effective framework for discussing the medical history of intersex. But the book goes well beyond her own experiences to tell the stories of others also living with intersex as well as the unfolding history of an emergent group of activists attempting to define a community that is larger than many once believed.

Davis began researching the subject of intersex in 2008 for her doctoral dissertation, which she conducted in-depth interviews with 65 research subjects—intersex people, their families, advocates, and medical experts. Through the interview, she began to glean a more thorough understanding of issues at play as well as the commonalities and differences among intersex individuals.

By definition, intersex includes up to 30 conditions related to sex “ambiguity.” Davis has Complete Androgen Insensitivity Syndrome, which for her meant being born with external female genitalia as well as typically male XY chromosomes and undescended testes. Many other intersex variations exist, determined at birth by either genital, chromosomal, or hormonal characteristics that fall somewhere on a spectrum biologically between male and female. By contrast, transgender refers to people who are born with typical male or female anatomy but feel limited by the sex binary, and, in some cases, elect to alter their bodies through hormone therapies or gender confirmation surgeries.

Davis hesitates to quantify the occurrence of intersex traits—data are still too incomplete to be scientifically valid—but currently accepted conservative estimates suggest that at least one in 2,000 people are born with an intersex trait, some of which don’t become apparent until puberty.

What is certain is that intersex individuals, archaically known as hermaphrodites, are far more prevalent in society than previously recognized, she says.

Davis grew up as a typical kid in the Chicago-land area in the 1980s and ’90s. As a child, she played teacher to a classroom of Cabbage Patch dolls and stuffed animals; in kindergarten, she dressed up as a football player for Halloween. Punky Brewster was her preteen TV hero.
Davis had no particular medical issues until age 13, when she experienced unrelated abdominal pain that left her mother slightly concerned that she hadn’t started menstruating. That’s when doctors would learn that she was intersex, as X-rays revealed a lack of ovaries, uterus, and fallopian tubes, and genetic tests found a chromosomal makeup that was XY, not XX. But she would know none of this before having a surgery that she believed at the time was for removing dangerously precancerous ovaries. A few years later, however, when moving across town to be nearer to a boyfriend, a routine process of transferring medical records revealed the truth: What the doctors really removed were testes.

“It scared me to death,” she says. “I threw those records away. I never wanted to see them again or talk about them with anyone. I felt abnormal, like a freak.”

At the time, she never could’ve imagined she’d spend so much time talking about her genetic makeup later in life. She has written about the subject extensively in *Contesting Intersex* and delivered a TEDx talk at UNLV, in which she shared her story via a presentation titled “This Girl Has Balls.”

A key focus of her book is on the role of the pediatric medical establishment. References to intersex traits in medical journals date back to the 1800s. By the 1950s, leading doctors from Johns Hopkins were beginning to routinely perform medical procedures to quickly “correct” intersex traits. Surgical and hormonal interventions became standard treatment, with parents and doctors agreeing to keep diagnoses secret, believing doing so had psychological benefits. These practices have persisted.

“It’s happening today. There are intersex kids getting surgeries to ‘fix’ something that they are not even aware of,” she says. “The practice of forced surgeries is something we need to stop, especially when the diagnosis isn’t completely disclosed.”

What made the real change for Davis came not from her surgery but from the discovery that as an intersex person, she was not alone. Carrying her own secret quietly, Davis was in a feminist theory class as a graduate student at the University of Illinois at Chicago when she learned there was an active and welcoming intersex community.

One commonality she found among intersex people was being lied to by doctors and parents about medically unnecessary, irreversible surgeries. Now as an adult and professor, Davis sees herself as uniquely positioned to bridge the gaps among the intersex and medical communities and the public. In addition to writing the book, she has penned op-eds and other articles about intersex people and intersex lives. She served as president of the Androgen Insensitivity Syndrome – Differences of Sex Development Support Group from 2014-2015 and is currently a board member of interACT Advocates for Intersex Youth.

In her book, Davis argues that influencing change starts with language use.

“The intersex experience shows how rhetoric can influence actions,” she says. “It makes a difference. It determines how people see it, how they treat it, and how society constructs itself around the term.”

For instance, doctors no longer “fix” intersex; they now “treat” disorders of sex development. But by calling it a disorder, doctors still give the impression that intersex is an abnormality that can be medically corrected.

“Too often a diagnosis of intersex traits is presented as an emergency, a problem—a problem we can fix with a scalpel,” she says. “What’s important, she adds, is assuring that intersex youth can make informed decisions about their own bodies, which in many cases involves refusing surgeries that have proved to be medically unnecessary.

“I can’t go back in time and know how I would’ve handled learning about being intersex [before the surgery]. But I do know how kids today are handling it,” Davis says. “Almost all say they are OK with being intersex. Most embrace their uniqueness. I ask, ‘If you could, would you change your intersex trait?’ And overwhelmingly they say no, it’s who they are.”

Davis continues her research on intersex, authoring scholarly articles on a wide range of related subjects. Recently, *Contesting Intersex* was named the 2016 winner of the American Sociological Association’s Donald W. Light Award for the Applied or Public Practice of Medical Sociology.

**9/11 Fiction, Empathy, and Otherness**
Tim Gauthier
Lexington Books

Like just about everyone, Tim Gauthier remembers exactly where he was on September 11, 2001. He was at home in Las Vegas, working on the dissertation he would submit to complete his doctorate in contemporary British fiction.

“I pretty much watched TV for the next 10 days straight,” recalls Gauthier, now an associate professor in the College of Liberal Arts. His most recent book, *9/11 Fiction, Empathy, and Otherness*, examines novels published after that terrible day—fiction that aims to reveal deeper truths about America’s psyche at the start of the 21st century.

“I come at this from a New Historicism’s perspective,” says Gauthier, referring to a school of literary theory that came to prominence in the 1990s, one characterized by its ecumenical approach to assembling and interpreting historical
writings. New Historicism, he says, has shaped his approach to analysis, if not his outlook on life. “You can look at documents from a period that reflect something about the time they were written. But when you place them side by side—it doesn’t matter if it’s fiction, journalism, or government documents—you get a circulation of social energy that affects how the different texts speak about each other.”

According to Gauthier, literature hasn’t changed a great deal in recent years, but the way scholars study it has. Today’s “postmodern” approach to literary analysis requires knowledge across multiple subject areas. “The study of literature itself has become more multidisciplinary,” he says. Gauthier’s book relies on previous insights from philosophy, history, and cultural studies for its foundation—a pluralistic outlook that transcends the research itself.

9/11 Fiction is not about debunking conspiracy theories. It is instead an exploration of how a selection of post-9/11 authors used fiction to explore the ways in which the attacks have altered our cultural landscape. Gauthier’s book examines 17 novels that weave the events of that fateful day into their storyline. He analyzes these fictional representations as a means of bringing into focus how cultural contexts affect individuals’ perceptions of the day’s events. This includes a subset of French literature and describing how graphic novels provided a unique perspective from Ground Zero, including one witness account from a woman whose husband started his new job at the World Trade Center on September 10.

“These texts allow us to bring up ideas that, otherwise, we could hardly talk about,” Gauthier says. “The official narratives tend to be constant. But there is always a strand of literature questioning these narratives from different perspectives.”

Gauthier examines the role empathy does or does not play in the construction of these narratives as well as the degree to which the event and its aftermath led to unity or division. The novels he explores reveal the obstacles that often prevent people from acting upon their empathetic impulses. One chapter, for instance, presents narratives written from the perspective of a terrorist. Such texts can be troubling, Gauthier says: “If you can give a reason for why the terrorists did what they did, you can be accused of excusing them.”

Gauthier joined UNLV’s faculty in 2003. An early assignment involved helping launch University College, now the Academic Success Center, an office that connects students with success-promoting resources across campus. He then served as director of Interdisciplinary Degree Programs before transitioning to his current work as director of Multidisciplinary Studies and Social Science Studies.

A belief in the value of multidisciplinary schooling has been rising in academic programming over the past 10 years, and Gauthier has played a role in promoting these concepts at UNLV. Through interdisciplinary studies, students in the College of Liberal Arts can earn a degree for work that “cannot reasonably be met through existing majors and minors.” These programs allow students to customize their major by combining work from two or more departments—an option, he says, that has appealed to many serious students over the past 10 years. There are nearly 400 students now enrolled in these programs.

“This is more than a double minor,” he insists. “I tell students, ‘You are creating a third thing,’ You are studying ‘milosophy,’ or ‘marketing,’” he says, referring to capstone projects combining math and philosophy or history and marketing, respectively.

The list of possible combinations for scholarly research is virtually endless. To earn a degree, students must immerse themselves in the theoretical models necessary to tie the different disciplines together, then complete a “capstone” project comprised of original research. Gesturing toward a stack of these projects on his desk, Gauthier says, “No two are alike.”

Gauthier currently finds his research pulling him in two different directions. One path is continuing his 9/11-related studies, this time examining literature not included in the 9/11 Fiction book that addresses the ongoing “war on terror” as well as the conflicts in Afghanistan and Iraq.

“The story of 9/11 is not over,” he says.

His other interest revolves around a course he introduced in the Honors College this fall, “The Discourse of Contamination.” The class explores the ways in which fears about contamination, immigration, and terrorism are refracted through the lens of contemporary fiction—including stories about zombies.

“The zombie trope challenges notions of purity and embodies our fears of being turned into something ‘other.’ It begins to explain why some believe we need to build walls to keep us safe from invaders, and to root out those others already among us,” says Gauthier, who recently presented a paper on the comic series The Walking Dead.

Both interests center around how fiction articulates contemporary anxieties, often unearthing ideas and feelings too easily repressed. “I’m not sure where I’m going with all this, but I am certainly seeing something worth examining,” he adds. “I’m just beginning to flesh it out.”
THE UNLV DIVISION OF RESEARCH AND ECONOMIC DEVELOPMENT reports data characterizing institutional research activity in order to measure and evaluate campus research productivity and to facilitate benchmarking to promote future growth. The following report contains compilations of standard institutional research metrics as well as pertinent graduate education data.

Research and economic development activities increased for the fourth consecutive year. Research awards rose by 7.5 percent to nearly $34.5 million, and proposals increased by 2 percent. Total sponsored program expenditures held steady from FY2015 at roughly $49.2 million.

The College of Sciences received the largest amount of award funding among the colleges once again: nearly $15 million through more than 100 awards. Engineering followed with roughly $7.6 million in awards. The College of Education posted the largest percentage gain in award funding in FY16 with a nearly 47 percent increase from $1,776,332 in FY15 to $2,609,366 in FY16.

UNLV’s economic development activities continue to grow. Sixty-one patent applications (including conversions) were filed in FY16, an increase of 17 percent over FY15, and licensing revenue doubled from $126,242 in FY15 to $252,309 in FY16.

Another measure of university research activity is the number of doctoral degrees conferred, as doctoral programs require a strong research component culminating in the doctoral dissertation. UNLV doctoral conferrals increased nearly 13 percent in FY16 to 166 degrees conferred.
SPONSORED PROGRAM ACTIVITY

EXPENDITURES

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<tr>
<th>Year</th>
<th>Sponsored Programs*</th>
<th>Research</th>
<th>NSF Reported R&amp;D</th>
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<td>FY16</td>
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* Sponsored programs expenditures include research, instruction/training, and other sponsored activity (e.g., public service, student services, etc.).

** NSF Reported R&D expenditure data will be available February 2017.

AWARDS

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* Sponsored programs funding includes awards for research, instruction/training, and other sponsored activity (e.g., public service, student services, etc.).

PROPOSALS

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Amount of total sponsored program expenditures in FY2016: $49.2M
## UNLV AWARD DATA | FY16

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## SPONSORED PROGRAM FUNDING BY SOURCE | FY16

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### Federal Agency

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## DOCTORAL DEGREES CONFERRED | AY10/11 - 15/16

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RESEARCH DISCLOSURES, PATENT ACTIVITY & STARTUPS

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Number of Research Disclosures Submitted vs. Patent Applications Filed, FY10-16

AGREEMENTS AND LICENSING REVENUE

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MTA = Material Transfer Agreement
IIA = Inter-institutional Agreement
MOU = Memorandum of Understanding

INSTITUTIONAL REVIEW BOARD APPROVALS

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Number of Institutional Review Board Approvals, FY10-16
Research and Our Community
How does research reach beyond our campus?

BY SUE DIBELLA

I RECENTLY WROTE MY FINAL FEATURE STORY FOR this magazine. It describes the work of Rochelle and Dustin Hines (see Page 24), two rising stars in UNLV’s psychology department who are investigating the ways brain cells contribute to disorders like depression and schizophrenia. As I finalized the draft, I found myself marveling—as I have done so often during my time at UNLV—at the incredible insights of our faculty researchers on such a broad range of topics. To find this array of innovative, brilliant folks here on our campus—right in the middle of a town famous for so many attributes other than research productivity—well, it seems just wonderful to me.

Of course, both the university and its community have always been so much more than stereotypes suggest. Few know this better than I. To say UNLV and I go way back is a bit of an understatement. Between two academic degrees and 30 years of administrative posts, I’ve been on this campus most of my adult life. All of this time—and well before—Las Vegas has been my home. The combination of these two biographical details, no doubt, contributed to my recently receiving an offer to lead UNLV’s new Office of Community Engagement.

It’s a great assignment by anyone’s standard. I get to continue singing the praises of the university while supporting existing collaborations and facilitating new ones. I’m jumping in with both feet now, embracing the expanded scope of my new job. Yet, at this moment, I find myself reflecting on the special role research plays in the community. I would be remiss in not offering it a parting nod.

Many before me have noted that the best U.S. cities have Top Tier research universities—instutions that help drive economic progress, bring intellectual and cultural vitality, and enrich citizens’ lives and students’ education. UNLV does all this, but I’m partial to two other benefits.

The first is the most apparent. Research helps solve some of our state and nation’s most intractable problems. Disease, crime, drought, injustice, climate change, addiction, and myriad other ills are being addressed in some form by UNLV research.

The second benefit is more abstract, but I believe it can be summarized by the word “pride.” Southern Nevadans, understandably, want their university to make them proud. UNLV works to this end every day, especially its researchers, who perhaps best understand what most in higher education know well: A university’s prestige is based to a large extent on its production of respected research and scholarly activity.

Our university has much to crow about in this area, as this magazine has shown in its pages for over a decade. Like the two psychologists I mentioned earlier, UNLV’s star is rising because of its research. With it ascends our institution’s reputation—and the pride of our community.

Sue DiBella is the new interim executive director of UNLV’s Office of Community Engagement.
An oncology and hospice nurse for 20 years, her research examining the intersection of healthcare and technology has the potential to transform nursing education forever.

To learn more about how your private gifts to UNLV scholarships and fellowships are helping us invest in a healthier future, visit us at unlv.edu/foundation.
Honors College alum Diana Peña teamed up with Life Sciences professor Kelly Tseng to research how tadpoles are able to regrow missing tissues. Their goal: to someday harness regenerative capabilities and apply them to humans.