

The UNLV logo is a red square with the letters 'UNLV' in white, serif font.

# Innovation

The Research Magazine of the University of Nevada, Las Vegas

## REALIZING THE PROMISE

Research and Discovery  
in UNLV's Science and  
Engineering Building



**Growth Through Innovation**

Why Does Southern Nevada Need R&D?

**The Next Generation**

Student Research at UNLV



Dr. Neal J. Smatresk  
UNLV President

## Higher Education, Research, and the Future of Nevada

“May you live in interesting times.”

This Chinese proverb comes to mind lately, as we are indeed living through some interesting times at UNLV.

It’s been quite a year. I was deeply honored to receive Board of Regent approval to continue serving as UNLV’s president, and I consider myself lucky to serve.

Not so lucky, however, is my timing. During my presidency, the university has been assailed by budget cuts no other UNLV president has had to face. In this session we are being asked to prepare for \$47.5 million in further funding cuts from the state of Nevada over the next two years.

Realizing that Nevada is facing an unprecedented fiscal crisis, we are committed to demonstrating to our state leaders the vital importance of higher education in economic recovery and to the future of Nevada.

Higher education is one of surest ways to improve a person’s quality of life, and economic diversification is one of the best ways to enhance the financial health of a region. Research fuels business opportunities by building a sophisticated work force, producing intellectual property with commercialization potential, and attracting investments. It generates funding for the university and benefits students tremendously. It addresses community issues while building institutional reputation.

For all of these reasons, UNLV remains committed to research and development – the discovery and the application of new knowledge – not in spite of the dire financial times we face, but *because of* the dire financial times we face. It is precisely during such “interesting” times that the work of higher education must be supported. We hope you will do so; one way you can help is to become an ambassador for UNLV. To find out more, visit <http://go.unlv.edu/ambassadors>. Meanwhile, please enjoy *UNLV Innovation*.

Sincerely,  
Dr. Neal J. Smatresk  
UNLV President



Dr. Ron Smith  
Vice President for  
Research and Dean  
of the Graduate College

## A Commitment to Research

*UNLV Innovation*, the university’s annual research magazine, was established to inform Nevadans and other stakeholders about the outstanding research being performed by UNLV faculty and students.

Even in these challenging times, something special is happening in Las Vegas. We are seeing UNLV become a central hub for activities that diversify our economy, develop our human capital and social systems, and create the critical infrastructure that Nevada needs for a sustainable future.

We are ever mindful that our ability to succeed is built upon years of efforts by our faculty and students. In this sense, this issue of *UNLV Innovation* celebrates both our past and our future.

Dr. Ron Smith  
Vice President for Research and  
Dean of the Graduate College



On the cover: UNLV's Science and Engineering Building. Photographed by R. Marsh Starks.

## UNLV Innovation

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# Research Briefs



Ralf Sudowe, Health Physics Professor

R. MARSH STARKS

## UNLV Part of International Research Team that Discovers Newest Element on the Periodic Table

Two UNLV researchers were part of an international team of scientists from Russia and the United States who discovered the newest addition to the periodic table, element 117.

The team included scientists from the Joint Institute for Nuclear Research (JINR), the Research Institute for Advanced Reactors, Lawrence Livermore National Laboratory (LLNL), Oak Ridge National Laboratory, UNLV, and Vanderbilt University.

Six atoms of element 117 were produced by bombarding two known elements, calcium and radioactive berkelium, using an advanced particle accelerator at the JINR facility in Dubna, Russia. The team established the existence of the new element by studying the decay patterns of the six atoms produced.

"This is a significant breakthrough for science," LLNL director George Miller says. "The discovery of a new element provides new insight into

the makeup of the universe and is a testimony to the strength of science and technology at the partner institutions."

UNLV radiochemistry doctoral student Megan Bennett and her faculty advisor, UNLV health physics professor Ralf Sudowe, provided data analysis support for the project.

"Discovering a new element is, in essence, the holy grail for nuclear chemists," says Sudowe. "It tests our understanding of nuclear physics and will lead to greater knowledge of the chemistry of previously discovered heavy elements."

According to Bennett, the byproducts of the discovery of element 117 also fed into her primary research interest, which involves analyzing another rare element known as dubnium.

Researchers found that as element 117 decays, in some instances it produces an isotope of dubnium with the longest half-life to date of more

than 33 hours. This is more than six hours longer than produced in previous efforts, allowing researchers like Bennett their greatest opportunity to study how dubnium behaves chemically. A better understanding of the chemistry of dubnium and other newly created elements is necessary to determine where they fit on the periodic table of elements.

"It's definitely exciting to play even a small role in the discovery of a new element," Bennett says. "This experiment will open up new opportunities to improve our understanding of the chemistry of both recently discovered elements and those that have been on the periodic table for years."

Since 1940, 26 new elements beyond uranium have been added to the periodic table of elements. Once an independent research team confirms the discovery of element 117 – which could take years due to the scarcity of berkelium – it will be named and officially placed on the periodic table.

An article documenting the discovery appears in the April 2010 issue of the journal *Physical Review Letters*.

## Untreated Tooth Decay in Nevada Youth Higher Than National Average; Oral Lesions Associated with Tobacco Use on the Rise

Nevada youth who participated in UNLV's Crackdown on Cancer (CDOC) Initiative had a significantly higher percentage of untreated tooth decay than the national average, according to a study conducted by researchers at UNLV's School of Dental Medicine.

They also had a small but increasing rate of occurrence of precancerous and cancerous oral lesions associated with tobacco use.

More than 78,000 Nevada students, most between the ages of 14 and 18, were screened through the nine-year initiative, which included both research and outreach.

On average, children 13-15 years of age had approximately 30 percent more untreated tooth decay, and children 16-18 years had 35 percent more than the national average reported in the National Health and Nutrition Examination Survey, which assesses the health and nutritional status of U.S. adults and children.

The UNLV researchers are still assessing the possible causes for this

higher than average prevalence, according to Marcia Ditmyer, a professor in the School of Dental Medicine.

"We suspect the strongest contributor to be lack of municipal water fluoridation in some Nevada counties, followed by exposure to environmental smoke," Ditmyer says.

The oral cancer screenings through the CDOC program identified 2,150 tissue abnormalities, with the more severe ones referred for biopsy. The rate of oral lesions increased from 1.4 per 100 students in 2003 to 4.0 per 100 students in 2008.

The higher-than-national rate for youth tobacco use in Nevada in past years is suspected to be one of the factors associated with the increasing trends in precancerous and cancerous oral conditions, according to the researchers. However, the CDOC program has helped bring down the



Marcia Ditmyer, Dental Medicine Professor

rate of tobacco use, says Christina Demopoulos, the CDOC grant administrator and one of the researchers involved in the study.

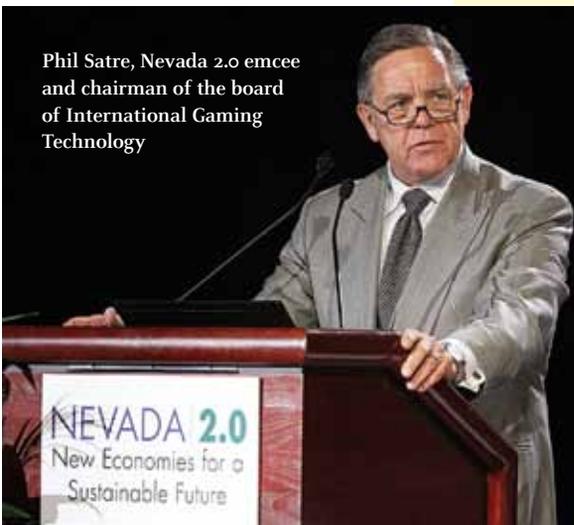
"At the inception of the program, Nevada was ranked number one in youth tobacco use," she says, adding that the rates have declined more recently. The state rate of smoking prevalence among youths is now 17 percent, compared to a national rate of 19.5 percent.

However, the program is ending due to lack of funding, and the researchers wonder if the tobacco use rate will climb again. As part of the program, nearly 4,500 tobacco education presentations were delivered to more than 170,000 students. The CDOC program was supported by over \$5.8 million in grant funding from the Fund for a Healthy Nevada and the Trust Fund for Public Health.

## Nevada 2.0: Economic Diversification Subject of UNLV Conference

UNLV recently hosted "Nevada 2.0: New Economies for a Sustainable Future," a conference designed to explore opportunities to diversify Nevada's economy by examining similar efforts in nearby states. More than 400 political leaders, representatives of the business community, government officials, and university scholars attended. The conference included presentations by guest speakers from Salt Lake City, Denver, Phoenix, and Dallas, as well as interactive panel discussions on the next steps Nevada should take to advance new business expansion. The value of research in jump-starting the economy was discussed, as well as the importance of strategic investments, improved capacities, and policy changes needed to develop and sustain a more diversified state economy.

Phil Satre, Nevada 2.0 emcee and chairman of the board of International Gaming Technology



AARON MAYES



Jean Cline,  
Geology Professor

GERI KODEY

## New Model for Nevada Gold Deposit Formation May Help in Gold Exploration

A team of researchers has devised a new model that describes how some of Nevada’s unique gold deposits were formed, which may help exploration geologists find similar deposits around the world.

The deposits, known as Carlin-type gold deposits, are characterized by extremely fine-grained, nanometer-sized particles of gold incorporated in pyrite and distributed over large areas that can extend to great depths.

More gold has been mined from these deposits in Nevada in the last 50 years – over \$225 billion worth at today’s gold prices – than was ever mined during the California gold rush of the 1800s.

The recent Nevada gold boom started in 1961 with the discovery of the Carlin gold mine, near the town of Carlin, located in Northern Nevada. It was discovered at a spot where early westward-moving prospectors no doubt missed the gold because it was too fine-grained to be seen.

Since the 1960s, geologists have found clusters of these “Carlin-type”

deposits throughout northern Nevada. These deposits constitute the second largest concentration of gold on Earth after South Africa. Geologists have long speculated on how they were formed.

Recently, researchers from UNLV and the University of Nevada, Reno, combined results from decades of previous studies with fresh data of their own to reach new conclusions. The resulting publication appeared in the February issue of *Nature Geoscience*, which can be found online at <http://www.nature.com/ngeo>.

The research team relates formation of the gold deposits to a change in plate tectonics and a major magma event about 40 million years ago. It is the most complete explanation for Carlin-type gold deposits to date.

The researchers include Jean Cline, a professor of geology at UNLV and a leading authority on Carlin-type gold deposits; Adam Simon, an assistant professor of geoscience who provided new experimental data and his expertise on the interplay between magmas and ore deposits; John Muntean, a research economic geologist with the Nevada Bureau of Mines and Geology at the University of Nevada, Reno; and Tony Longo, a post-doctoral fellow who carried out detailed microanalyses of the ore minerals.

“The published research provides insights that may be applied by exploration geologists to locate similar deposits in other areas around the world,” Cline says. “It also provides suggestions as to why Nevada is the only currently known location for these unique deposits and their vast gold resource.”

The work was funded by grants from the National Science Foundation, the United States Geological Survey, Placer Dome Exploration, and Barrick Gold.

## Study Examines the Effects of Air Transport on Muscle Injury

UNLV nursing professor Barbara St. Pierre Schneider was awarded \$2.26 million from the U.S. Air Force to study the effects of air transport on skeletal muscle crush injury – an effort that could lead to new ways to treat wounded soldiers.

Thousands of wounded soldiers are evacuated by air transport each month from military bases and battlefields around the world due to injuries suffered during combat. During transport, injured muscle and other tissue are exposed to high-altitude conditions that can alter the body’s normal inflammatory response and could worsen injuries.

St. Pierre Schneider and her team are investigating how hypobaric



Barbara St. Pierre Schneider,  
Nursing Professor

hypoxia – a low-oxygen, high-altitude environment experienced during flight – alters the immune response.

“Hypobaric hypoxia may interfere with the repair of injured muscle and other tissue by altering the body’s immune response,” says St. Pierre Schneider. “In this case, counteracting strategies are needed so that our wounded service men and women can recover as quickly as possible.”

After a muscle is injured, the immune system triggers an inflammatory response that includes the activation of specialized cells called leukocytes, which, in part, clean up debris in the injured area and play a role in muscle repair. Hypobaric hypoxia may lead to an excessive inflammation, which can do more harm than good.

For this three-year study, St. Pierre Schneider’s team will use a mouse model to simulate the effects of hypobaric hypoxia and determine whether an exaggerated leukocyte response occurs in crush-injured muscle. Then the team will test whether estrogen – which has been shown to reduce the leukocyte response in injured muscle in previous studies – has a positive impact.

## UNLV Hotel College Professor Researches How Faith Influences Fun

**W**hat do Catholics, Muslims, and New Paradigm Christians do for fun?

UNLV hotel college professor Jennifer Livengood examines the reasons why some individuals look to faith before choosing their next hobby and why some draw a line between church and entertainment.

Gaining a better understanding of the relationship between religion and pastimes provides insights into both areas, says Livengood, a professor of recreation and sport management. On a practical level, a greater understanding of this area could be useful to recreation supervisors and tourism

organizers who develop programs and events for diverse religious groups.

She notes that religious calendars are often not consulted when recreation programmers plan events. By being aware of religious practices, these programmers can have more successful events, she says.

“The activities then become inclusive, and participants feel a sense of belonging,” Livengood says. “Participants have the opportunity to engage in activities that are comfortable and appropriate according to their spiritual needs.”

Livengood’s research includes an examination of how the events of Sept. 11 affected American Muslims’ leisure participation and whether religious constraints affect the leisure options for Catholics and Muslims.

In her latest study, Livengood interviewed members of New Paradigm Churches – a branch of faith within Christianity – to understand what role spirituality plays in their leisure habits.

The results, published in the August 2009 *Journal of Leisure/Loisir*, found that the majority of the respondents view being with people of similar faith as a spiritual activity – even if the activity is unrelated to a church event. Livengood is currently researching how the hospitality industry can better meet the needs of Muslims.

## Loeb Receives Regents’ Creative Activity Award

**U**NLV associate professor of music David Loeb has been awarded the 2011 Nevada System of Higher Education Regents’ Award for Creative Activity.

The award honors significant accomplishments that bring recognition as well as national and international stature to the Nevada System of Higher Education. The honoree receives a \$5,000 stipend and a medal.

Loeb, who serves as UNLV’s director of jazz studies, conducts the university’s jazz ensembles and is an instructor of jazz piano and jazz composition. As a



David Loeb,  
Music Professor

jazz pianist, he has performed with a number of renowned jazz artists, including Freddie Hubbard, Tom Scott, Bobby Shew, Bill Watrous, Tom Harrell, Nancy Wilson, Joe Williams, and Anita O’Day.

Loeb, who is the 21st UNLV recipient of the creative activity award, is a successful studio keyboardist and has played for such television shows as “Hill Street Blues,” “Quantum Leap,” and “Family Guy.” He has also performed for feature films, including “The Birdcage” and “Pocahontas.” He orchestrated for George Benson and Doc Severinsen and arranged music for the Academy Awards and the American Music Awards. He also composed music for notable PBS television documentaries and for Dolly Parton’s album, “Rainbow.”

Loeb has performed as principal keyboardist with the Hollywood Bowl Orchestra and accompanied several musical artists, including Andrea Bocelli, Garth Brooks, Celine Dion, Bette Midler, Quincy Jones, Jewel, Herbie Hancock, Placido Domingo, David Foster, Diana Ross, and Jessye Norman. He was also a guest conductor with the Philadelphia Orchestra for Grammy-award winning vocalist Dee Dee Bridgewater and with the National Symphony Orchestra for the Tony-award winning entertainer Ben Vereen.

Under Loeb’s direction, UNLV’s jazz studies program has received numerous honors and has achieved national recognition, including winning the prestigious DownBeat Magazine Student Music Award for large ensemble graduate college outstanding performance.

HARRY REID SILVER STATE RESEARCH AWARD



Mechanical engineering professor Darrell Pepper was the 2010 winner of the Harry Reid Silver State Research Award, the university's top research honor.

# The Eclectic Engineer

An open mind and an eclectic orientation have led UNLV engineering professor Darrell Pepper to pursue widely varying and innovative research. What will the Harry Reid Silver State Research Award winner think of next?

STORY BY DIANE RUSSELL

PHOTOGRAPHY BY R. MARSH STARKS

**D**arrell Pepper's research impacts Nevada, but many of his research interests reach far beyond the state's borders.

In fact, some even reach beyond our planet.

From solar power to wind energy to building a habitat on Mars, the research subjects that interest the long-time mechanical engineering professor seem endless. He acknowledges that he finds few limits when it comes to his research pursuits.

Pepper received the 2010 Harry Reid Silver State Research Award, which was established in 2001 to honor the U.S. senator for his support of UNLV and to recognize research that is both highly regarded and responsive to the needs of the community and state. As part of the award, he received a \$10,000 stipend, funded with private donations from the UNLV Foundation.

"I'm honored to receive this award," says Pepper, who joined the UNLV engineering faculty 18 years ago. The director of the Nevada Center for Advanced Computational Methods and a previous interim dean of the Howard R. Hughes College of Engineering, Pepper has several areas of expertise, including computational fluid dynamics and heat transfer. He has channeled his expertise into a number of innovative projects.

One is a small prototype of a solar-powered airplane. At only 15 pounds, it has flown successfully, powered solely by extremely thin solar panels attached to its exterior. The thin-film panels serve as the skin of the upper part of the wing surface. The airplane is small, but its solar panels, if perfected, have

the potential to be installed in any number of places, including cars, home roofs, and even airplanes, he says.

One characteristic that makes the plane project different from many solar-powered projects is that the panels on the plane do not have to have a direct, 90-degree orientation to the sun. As long as the panels receive some amount of solar radiation, they will absorb energy from the sun.

Another of his alternative energy projects involves the conversion of wind power to electricity, an area he has been studying for years.

"Some years ago, I conducted the first wind assessment in Nevada using meteorological data from the Nevada Test Site," he says, noting that he is currently assessing the potential for wind energy in other locations in Nevada and northern Arizona. "I've been working on wind energy projects for Nevada since the mid-'90s. Nobody was interested back then. Turns out I'm getting more than I can handle now. Recently, I've been assessing the viability of small vertical axis wind turbines that individuals could use to produce their own electricity."

One of his other interests is how to build lunar and Mars habitats. In conjunction with engineering professor Nader Ghafoori, who is an expert in concrete, Pepper is working toward creating habitats that can be built from regolith (more commonly known as moon or lunar dust) and from dust on Mars. The idea is that someday astronauts may be able to build and live in these shelters.

The regolith can be poured into

aluminum forms. Once the material is compressed and vibrated inside the forms, it will become rigid, producing walls that can stand vertically without support. Because of the consistency of the regolith, compacting the material into the forms will result in strong, easily produced walls that astronauts can then fashion into a dome. In order to conduct research on this subject here on Earth, basalt that has been ground into dust is substituted for regolith because its consistency is similar.

This research is being put to use in post-earthquake Haiti, where concrete is substituted for the regolith and basalt, Pepper says. He explains that by pouring the cement and water mixture into the forms and compressing the forms, walls can be produced much more quickly than they can be made by traditional means, thus facilitating a faster rebuilding process.

Asked how he has come up with such unusual and innovative research projects, Pepper says they are often just dropped in his lap, and he finds himself saying, "That's interesting; let's see what we can do."

"A good idea is always a good idea. It's just a question of timing as to whether it will catch on."

Pepper will have an opportunity to share his ideas with a different group of students soon. He was recently appointed distinguished visiting professor at the U.S. Air Force Academy and will serve there for 10 months in the engineering mechanics department beginning this summer. He was also recently nominated for the international ENI Award for his work on wind energy modeling.

Construction management graduate student Vik Sehdev.



# The Next Generation

Who says research is just for faculty? Meet six of the many UNLV students who know that research is the best way to learn their disciplines, build their skills, and change the world.

PHOTOGRAPHY BY R. MARSH STARKS

**Vik Sehdev**  
Master's Degree Student  
Construction Management,  
Howard R. Hughes College  
of Engineering

**Research:** I previously studied ways to develop ground source heat exchange systems, which utilize the earth's constant temperatures to cool or heat water that is then used to help control building temperatures. What I learned about drilling from that research project has increased my interest in large tunneling projects. I'm now studying the project cycle for drilling, blasting, and stabilizing large tunnels used for water transmission and transportation.

**Impact:** I'm interested in making tunneling projects more time- and cost-efficient. I hope to link engineering and business savvy to maximize productivity on these types of projects. By focusing on the connection between time, materials, and money, we can bring these large civil engineering projects in on time and under budget.

**Benefits:** As an undergraduate in civil and environmental engineering in the Howard R. Hughes College of Engineering, I learned the basics. Now that I'm a graduate student, I'm learning to think outside the box, to understand issues influenced by many dynamic factors, and to discover answers to questions that no one has previously addressed. Conducting research teaches students these skills.

**Career Goals:** One of my goals is to become a successful executive for an international engineering and construction firm. I love the challenge of meeting an objective with a solution that is both profitable and revolutionary. For me to reach this goal, I need to build my expertise and gain experience. My graduate work has helped prepare me for my current position with Vegas Tunnel Constructors, which is building the third straw at Lake Mead.

**Campus Affiliation:** I formerly served as a graduate assistant, helping to promote UNLV's recently established solar and renewable energy minor. I worked to recruit students interested in the program, conduct research, and assist on research-related projects. I'll soon serve as an advisor to the student chapter of the American Society of Civil Engineers, and I'm a member of the Graduate and Professional Student Association.

**Courtney Waldron**  
Undergraduate Student  
Economics, College of Business

**Research:** My research sheds light on how members of the public perceive the risk of climate change and, in turn, how this impacts their willingness to pay for measures designed to limit the production of greenhouse gases. More specifically, I'm trying to determine if providing information about climate change affects research subjects' willingness to bear actual monetary costs in support of measures resulting from international treaties or government action intended to stop climate change.

**Impact:** My research asks, "Is it worth it to us to try to stop global warming? How much value do we place on stopping climate change? Are we so uncertain about its future effects that we are willing to chance doing nothing?" My research addresses all of these questions. It also seeks to expand understanding of the influence that various sources of information, the media, and politics have on public opinion about a scientific issue. In a broader sense, the project helps illustrate how people perceive risk and how they behave in relation to these perceptions.

**Benefits:** Conducting research has challenged me to think about a problem in many different ways. I've loved the opportunity to really dig into the topic and be part of the solution to a problem. I have also learned that I would be happy to spend my career conducting research in economics.



Economics student  
Courtney Waldron

**Career goal:** I'd like to pursue a Ph.D. in economics, but it's difficult for me to say exactly what specialty within economics I'd choose at this stage of my life. There are so many interesting sub-fields of economics; I'm sure I'm not even aware of some yet! I could see myself spending a lifetime studying resource economics – which explores, for instance, how we get our energy and how we grow our food – or in the field of cultural economics, which examines the influence of the arts, architecture, and culture on economies.

**Campus Affiliation:** As a student in the Honors College, I've had the opportunity to explore my topic in depth this year. By the time I finish my bachelor's degree, I will have produced a thorough, richly developed project. I'll be extremely proud of the project, and it will help me greatly in graduate school.



**Joseph Asante**  
**Doctoral student**  
**Geoscience, College of Sciences**

**Research:** I study groundwater in the lower Virgin River Basin and adjacent basins, examining spatial groundwater sources, movement, and discharge. I hope to gain a better understanding of the availability and sustainability of water resources in the lower Virgin River Basin and to develop a conceptual model of groundwater flow systems in a typical intermountain basin.

**Impact:** This study is critical because of the potential of these basins to supply water to the city of Las Vegas, communities near the state line between Nevada and Arizona, and irrigated agriculture in the area. It will provide the scientific knowledge needed for the sustainable development of the area's water resources. Also, the procedures that will be developed can be used to characterize sources, movement, and discharge of groundwater in similar hydrogeologic settings.

**Benefits:** Through this study, I have begun to recognize the complexities of groundwater investigations, the vulnerability of groundwater to contamination, and the necessity of developing and managing resources on the basis of groundwater study information. I hope to contribute to my discipline's understanding of developing and maintaining a sustainable water supply in desert areas such as Southern Nevada.

**Career Goal:** My career goal is to educate and conduct research on groundwater resource occurrence and movement, as well as on the processes that control water quality and related water quality protection and contamination issues.

**Campus Affiliation:** I have served as a graduate assistant through UNLV's Urban Sustainability Initiative, which has enabled me to participate in a variety of campus events associated with sustainability and renewable energy.

**Adla Earl**  
**Doctoral Student**  
**History, College of Liberal Arts**

**Research:** I am currently conducting research on the incorporation of Indian Territory into the Confederacy at the moment of southern secession from the Union. For the Indian nations that had been removed from their homes in the southeastern portion of the U.S., the issues of education, transportation, and the health, safety, and welfare of their communities were all complicated by antagonistic relationships with the federal government and the southern states that had expelled them from their ancestral homelands.

**Impact:** This topic is important because it opens up new ways of exploring the debates over expansion, slavery, and states' rights, all of which are considered critical to understanding the Civil War and the formation of regionally defined American identities. In general, the discipline of history is as much about critical thinking and problem solving as it is about discovering the past.

**Benefits:** I am cognizant of the importance of both funding and research to the foundation of academic success, and I believe that universities should seek to contribute to the community at large. Research helps build community relationships and facilitates this contribution.

**Career Goal:** I've completed my coursework and will now focus on taking the comprehensive exams and finishing my dissertation. My overall goal is to write about 19th century American history and to teach at an institution of higher learning while working with nonprofits and social organizations within the community.

**Campus Affiliation:** I am an active member of the UNLV chapter of Phi Alpha Theta, a national honor society for historians, and I serve as one of the editors of the chapter's journal and as its webmaster. The chapter recently held a regional conference at UNLV, and I was on the planning committee and made a presentation as well. I also serve as a Lincy Institute graduate assistant, and I formerly served as the history department representative to the Graduate and Professional Student Association.





Kinesiology student  
Cristina Macke

**Cristina Macke**  
Undergraduate, Kinesiology,  
School of Allied Health Sciences

**Research:** Previously, I explored the best way to calculate an athlete’s work intensity during a game as compared to practice. This year, I will be performing a review of the various clinical tools designed to assess individuals’ balance.

**Impact:** The over-arching goal of this review is to determine if solid research exists supporting the use of certain balance tools by physical therapists. I hope my research helps physical therapists better understand which techniques produce the most effective results for patients.

**Benefits:** Conducting research has improved my confidence in my academic abilities tenfold. I no longer question my ability to compile, interpret, and analyze scientific data. This will definitely smooth my transition from undergraduate to graduate-level studies.

**Career goal:** After I receive my bachelor’s degree and complete the appropriate prerequisites, I hope to enroll in UNLV’s physical therapy doctoral program. Eventually, I would like to open my own physical therapy practice and apply my knowledge and skills by aiding in the rehabilitation of athletes and the care of geriatric populations.

**Campus Affiliation:** I’m a participant in the McNair Summer Research Institute, which promotes undergraduate research by enabling students to travel to national conferences to present their research findings and to meet other students involved in research. The institute also helps participants create a step-by-step plan to reach their goal of graduate school admission. Through this program, I was able to present my findings at the 11th National Conference for McNair Scholars at the University of Maryland last year. This was an incredible opportunity and great preparation for graduate school.

**Abby Hasberry**  
Doctoral Student  
Curriculum and Instruction,  
College of Education

**Research:** My research interests include the experiences of African-American teachers in predominantly white independent and/or suburban schools. More specifically, I focus on their coping strategies, the roles of mentoring and affinity groups, the effects of tokenism, and black racial identity development.

**Impact:** This research has financial implications for independent schools and implications for the recruitment and retention of both teachers and students of color. Studying the experiences and successes of black teachers will help schools create culturally sensitive environments, programs, and support for teachers of color. The more diverse the faculty, the easier it is to recruit a diverse student body and boost enrollment.

**Benefits:** As a new Nevadan – I moved here last year – I’ve found that conducting research has helped me become more familiar with education in Southern Nevada, as well as the research areas and expertise of the impressive UNLV faculty. In addition, it has given me valuable experiences in data mining, collection, and analysis that I will use in my future research.

**Career goal:** I plan to teach at a university and work with an independent school association or in an independent school, either in administration or on a board working to help fulfill the diversity mission statement.

**Campus Affiliation:** I previously served as a graduate assistant for The Lincy Institute, which conducts and supports research that

focuses on improving Nevada’s health care, education, and social services. I was responsible for collecting data on the funded, non-funded, and volunteer work of the faculty in the College of Education. Additionally, I collected data on Southern Nevada nonprofit organizations that work within the area of education. This data will be compiled with similar data on health and social services to form a report for The Lincy Institute to use as it evolves.

AARON MAYES



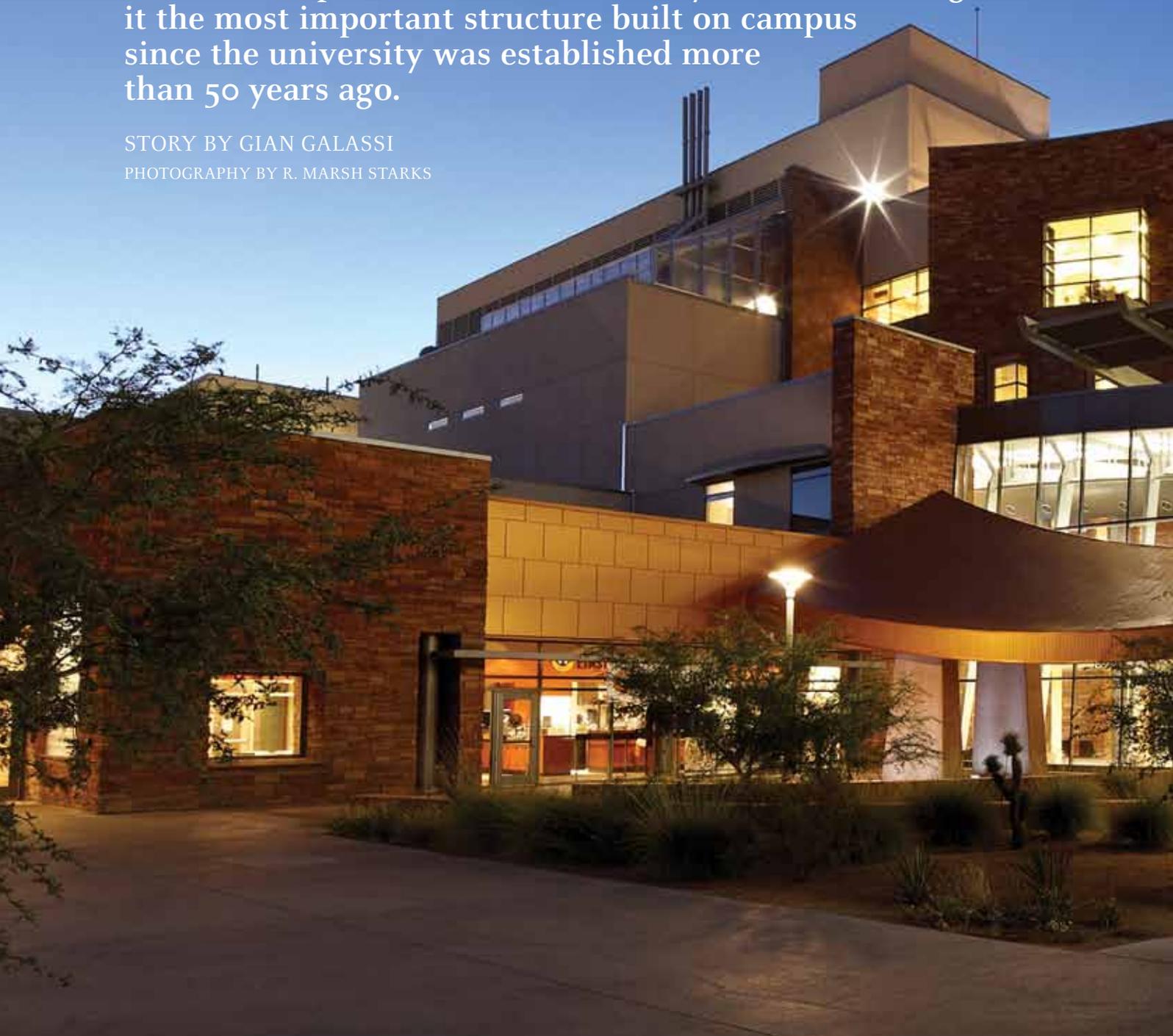
Curriculum  
and instruction  
graduate student  
Abby Hasberry

# Realizing *The* Promise

UNLV's Science and Engineering Building is open for business – the business of conducting world-class research. Step inside and find out why some are calling it the most important structure built on campus since the university was established more than 50 years ago.

STORY BY GIAN GALASSI

PHOTOGRAPHY BY R. MARSH STARKS





UNLV's Science and Engineering Building is home to a variety of multidisciplinary research teams that focus on wide-ranging subjects, from arid lands to transportation.



**W**hat is a building, if not a bricks-and-mortar promise to house an activity of significance?

In the case of UNLV's Science and Engineering Building (SEB), the promise is research, and the significance is the impact it will have on the future of the community, state, region, and beyond.

Containing more than 205,000 square feet and housing some of the most advanced technology available, the SEB creates an environment ideal for interdisciplinary research. It was specifically designed as a research facility to support innovative approaches that are conceived and developed through collaboration among faculty in the sciences, engineering, health sciences, and other units

on campus.

The vision for the research facility began to take shape more than a decade ago when economic diversification re-emerged as one of the state's top priorities. State and community leaders, including the late Gov. Kenny Guinn, key legislators, and the Nevada Development Authority, recognized the need to provide additional space for research on new technologies with commercialization potential that would support a more diverse Nevada economy.

In the meantime, enrollment was also growing in engineering and the sciences, placing heavy space demands on the colleges housing these disciplines. Given that a highly educated workforce also helps support economic diversification, it became clear that a new technology-based research facility would be critical to the future of UNLV and Nevada.



The Science and Engineering Building has a number of striking architectural features and environmentally responsible design elements (opposite page), including high-performance glazing that reduces solar heat gain; decorative stone work, quarried in Southern Nevada; and a 200-seat “smart” auditorium designed to accommodate conferences and symposia on research. This page, the SEB houses sophisticated laboratories that facilitate collaboration and contain unique, high-tech equipment.



University, government, and private-sector representatives recognized a shared interest in building such a facility and began to commit time and resources to making the SEB a reality. Support for the new building expanded, and it moved from the university’s wish list to the top of the state’s planning and construction project list. The building was approved by the 2001-03 Nevada Legislature; construction started in 2005, and a phased move-in and commissioning of equipment has been under way since construction was completed in early 2009.

“The SEB serves as a testament not only to the vision of UNLV’s current and former administrators, but also to those leaders in Nevada who recognized the contribution that academic research can make to the state’s economic progress and resiliency,” says Ron Smith, vice president for research and dean of the Graduate College. “In many ways, the SEB was developed for and is dedicated to the future of this state.”

This point is not lost on faculty now occupying the building. UNLV chemistry professor David Hatchett, who recently moved into the SEB with his research team, sees the opportunities the building and its research can provide.

“Applied research results in technology,” Hatchett says. “The ability to leverage research dollars and produce technology that can be patented, marketed, and generate revenue in a time of budget constraint is extremely important to the university, community, and region. The research and technology developed at SEB can provide business opportunities for the future success of this region and the state.”

In order to achieve this kind of success, the SEB was designed to address one of the most pressing challenges facing academia: how to foster the interdisciplinary research collaboration that is often credited with jumpstarting scientific innovation and discovery and

garnering grant funding.

“Interdisciplinary collaboration is not just some fleeting trend in academic research, but rather the model by which all great research programs and institutions will be measured going forward,” says Stan Smith, associate vice president for research and director of the SEB. “UNLV scientists and engineers have long recognized and embraced the importance of developing close working relationships with their colleagues, but the SEB actually makes physical interaction among them a daily occurrence. It fosters an easier, more free-flowing exchange of ideas, which has always been the foundation of discovery and innovation.”

The SEB design concept is deceptively simple: Position researchers and their labs in close proximity to their peers,

provide ample opportunity for professional interaction, and support the flourishing partnerships that result. The building accommodates this goal through unique design principles, including a “dance-floor” configuration, which means that faculty labs are not separated by walls. This provides researchers from a variety of disciplines greater opportunity for interaction and facilitates their access to highly specialized equipment. These labs also contain movable lab benches and casework, as well as open overhead utility line carriers, which provide easy access and flexibility in use of the space. Near each group of labs are also breakout rooms where researchers can congregate and discuss ideas.

Look around the nation at the institutions that are historically synonymous with scientific innovation,

## Design with the Future in Mind

The Science and Engineering Building has obtained a Leadership in Energy and Environmental Design (LEED) Silver rating, which indicates that the building meets environmentally responsible and sustainable design, construction, and operation standards. Its design received the 2004 Citation Award in the Unbuilt Category in the American Institute of Architects’ Nevada Design Awards. It also received the Best Green Practices Award in the building category from the Las Vegas Business Press in 2009. Some of its sustainability-oriented features include the following:

- A satellite energy plant, housed in a separate building, provides heating and cooling for the SEB and future buildings on the north side of campus.
- Construction materials for the building include recycled glass, steel, concrete, and wood. More than 60 percent of the leftover construction waste was recycled for future use instead of being sent to a landfill.
- High-performance glazing reduces solar heat gain from the exterior, insulates the building from heat loss on the interior, and allows adequate levels of light to penetrate the building.



AARON MAYES

- Incoming air is pre-cooled through evaporation, reducing air-conditioning needs. Occupancy and ambient sensor controls are used to automatically turn off lights in unoccupied rooms, reducing electric light usage during the day.
- The building is also designed to reduce water consumption by 42 percent through use of drought-tolerant native landscaping and a drip irrigation system, along with low-flow plumbing.

and you'll see buildings like the SEB that were either recently completed or currently under construction. It's a relatively new concept, but one that's gathering momentum, according to Ron Smith.

"The SEB sends a clear message that UNLV is serious about inspiring, developing, and increasing the kind of intellectual infrastructure necessary to support economic diversification," he says. "The impressive portfolio of our faculty scholarship, combined with the high caliber of students and the great potential of this new facility, demonstrates our commitment to this goal."

Take a look at the directory of the SEB and you'll see no shortage of "star" scientists and engineers who are leading teams that collaborate on research of critical significance to the state and region. The building houses a wide range of research projects on such subjects as increasing the efficiency of renewable energy technologies, analyzing cutting-edge materials science, and enhancing understanding of the effects of climate change on desert environments. Here are just a few of the research themes being addressed in the SEB.

## Arid Lands – Soil/Plant/Water Stress Interactions

The team of researchers focusing on this theme studies how arid land plants adapt to stressful environments. Their goal is to advance landscape water conservation, water reuse for urban applications, development of crops for tolerance to desert lands, and restoration of disturbed desert areas. Researchers conduct studies on a variety of subjects, including utilizing urban reuse water to grow turfgrass and ornamental trees; inserting plant genes that promote stress tolerance into crops to make them more resilient; and restoring the ecology of desert lands after devastating wildfires. Their work involves scientists in the areas of plant physiology and ecology, molecular biology, and soil science. Each of the principal investigators in this group conducts extensive outreach activities associated with their research. They have formed partnerships with such off-campus organizations as the Southern Nevada Water Authority, Nevada Cooperative Extension, Las Vegas Master Gardeners, and Lake Mead National Recreation Area.

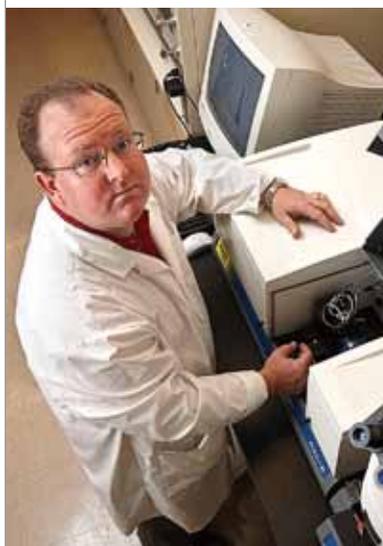
## Inorganic Materials and Nanomaterials

This research team employs experimental and theoretical methods to investigate solids, surfaces, and interfaces in a variety of materials systems. This research has applications



### Lloyd Stark, Arid Lands Research Group

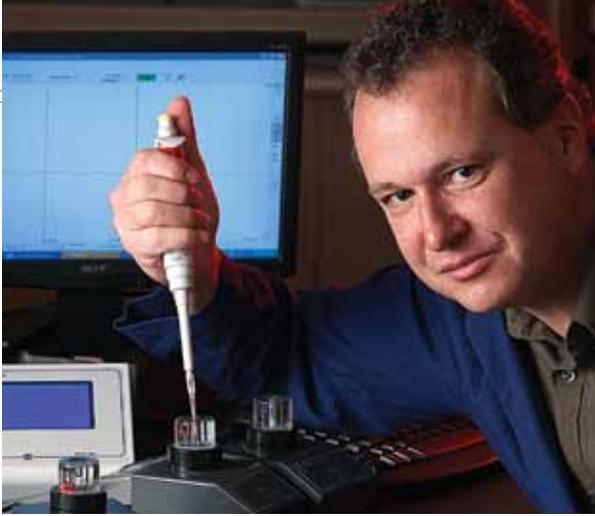
"The SEB allows faculty to 'bring the lab into the classroom' by bringing our research experiences to bear on current concepts. Similarly, we can 'bring the classroom into the lab' by inviting promising students into our research programs, where they can initiate and conduct research under supervision. This is where research meets the educational goals of the university. UNLV does this much better than other universities with which I am familiar. We encourage the active participation of undergraduates in research. Several of us in biology publish with our students, which gives their careers in science a great boost."



### David Hatchett, Inorganic and Nanomaterials Research Group

"The Science and Engineering Building has provided a central research facility and laboratory that houses all of the equipment for my research that was previously housed in four different facilities. This has increased the efficiency of my laboratory and

research. Also, the quality of the lab space and the ability to collaborate with a diverse group of researchers is greatly appreciated. Currently, there are faculty and students from engineering, physics, health sciences, and radiochemistry that regularly use my laboratory to run experiments."



**Frank Van Breukelen,  
Integrative Physiology Research Group**

“The Science and Engineering Building offers a very modern venue to conduct our research. The little things that come with the SEB add up and significantly facilitate our work. For example, the air supply in the building is much cleaner than in our old building; this translates into a better environment for conducting research. Having a machine shop on site is also very helpful. We had a collaborator from out of state who forgot a piece to his instrument set up. We just went downstairs to the machine shop, fabricated the piece, and we were up and running in an hour.”

**Brendan O’Toole,  
Materials and Structures Research Group**

“The SEB has allowed our research group to have a materials processing lab separate from our mechanical testing and computational lab. We were able to fabricate components for four different projects last semester (including two from outside our group) without interrupting our testing or computational work. This was not possible before, and we would have had to turn down some of that work when we were crowded in the older building.”



in a variety of fields, including nanoscale light-emitting devices; renewable energy conversion (e.g., solar cells and hydrogen fuel cells); chemical sensors; nuclear waste management and stockpile stewardship; and combustion science. These investigations cut across several fields of science and engineering, requiring, by their very nature, interdisciplinary research collaborations. This involves chemists and physicists, engineers, spectroscopists, and theoreticians; the team also collaborates with industrial and national laboratory partners, helping to raise the profile of UNLV in the research and business communities.

## Integrative Physiology

SEB researchers who focus on integrative physiology take a multi-disciplinary approach to how animals interact with their environment, from the level of individual genes to animals in their natural habitats. These internationally recognized faculty members investigate how long-term and short-term climatic changes affect a wide variety of animals by studying behavioral and physiological responses to environmental stress. They also support a core genomics facility located in the SEB. The integrative physiology team is highly collaborative and works closely with other UNLV research groups as well as scientists at other universities. Their research is funded by the National Science Foundation, the National Institutes of Health, and other sponsors.

## Materials and Structures

The goal of the research in this thematic area is to develop and analyze new materials and structural components that help optimize the performance of machines, vehicles, manufacturing equipment, and large engineering systems. Most of the research projects in this area involve making materials or components, measuring their physical and mechanical properties, and developing computational simulations of their behavior, including failure analysis under extreme environments such as high temperature, multi-axial loading, impact, and blast loading. The researchers in this group utilize well-equipped labs with sophisticated systems used to measure material properties and test their components. They employ control and data acquisition systems for tests in tension, compression, bending, fatigue, impact, and high temperature. They also use high-speed cameras and 3-D digital scanners, as well as several different commercial software programs for design and computational simulations.

## Renewable and Alternative Energy

This team focuses on a broad range of solar and renewable energy projects with the goal of advancing renewable energy technologies, developing concepts that could evolve into commercial products, and working with private partners to refine and improve renewable energy systems. The researchers focus on such areas as utility scale power generation, building applications, and advanced vehicular systems (hydrogen and fuel cells), utilizing a wide range of techniques and types of analysis. Their research involves several engineering disciplines, environmental studies, business, and architecture.

## Transportation

This group of researchers seeks to address a broad range of transportation issues, including safety and congestion on highways and surface streets; traffic flow and incident management; roadway access; and strategies for traffic control, to name a few. The group's goal is to contribute scientific data and analysis to traffic and pedestrian issues through multi-disciplinary research in order to bring solutions to fundamental and applied transportation problems. This research involves faculty from civil engineering, electrical engineering, statistics, mathematics, finance, and marketing, among others.

To learn more about the Science and Engineering Building, please visit the website at <http://seb.unlv.edu/>. To schedule a tour of the building, call the SEB administrative offices at (702) 774-4732.

### Building Quick Facts

**Project Cost:** \$113 million

**Size:** 205,779 square feet

**Architecture Firm:** Dekker/Perich/Sabatini

**Construction Firm:** Sletten Companies

**Special Features:** Contains a 200-seat auditorium, a dance-floor configuration of labs, smart conference rooms, and a café/coffee shop, which is located adjacent to the lobby.

**Location:** The Science and Engineering Building is located on the north side of campus along Cottage Grove Avenue, just west of the Cottage Grove parking structure.



### Sean Hsieh, Renewable and Alternative Energy Research Group

"My research is on information technology integration with renewable energy systems and smart grid applications. The SEB facility provides reliable IT infrastructure that I can use to productively pursue such research, which involves intensive information exchange and data manipulation activities. Also, the building's design elements, such as small breakout rooms and low-noise student office/laboratory spaces, produce an effective research communication environment for interaction with students and other researchers."

### Pushkin Kachroo, Transportation Research Group

"We must invest in research so that we can diversify the state economy and make it more technology-driven. This will protect our state from economic downturns. The Science and Engineering Building will contribute to this effort by providing an environment that facilitates research and fosters collaboration. Its attractive architecture and design, combined with its effective function and amenities, make it a wonderful addition to the campus."





# In Print

Faculty authors explore the coming of the frontier press, life on the Round Valley Indian Reservation, and more.

STORY BY LAURIE FRUTH

PHOTOGRAPHY BY R. MARSH STARKS AND AARON MAYES

## *The Coming of the Frontier Press: How the West Was Really Won*

By Barbara Cloud

Northwestern University Press, 2008

**A**s she notes in her introduction to *The Coming of the Frontier Press: How the West Was Really Won*, the late Barbara Cloud had a special affinity for the early settlers who “packed all their earthly goods into a wagon ... to head out to an unknown land fraught with natural and human dangers.”

But then, Cloud herself was a pioneer both in spirit and

deed. A professor emerita of the Hank Greenspun School of Journalism and Media Studies, Cloud passed away in late 2009, a year after the book’s publication.

Her husband, Stan Cloud, notes that Barbara shared the adventurous mindset of the pioneers she studied. In the late 1960s, he notes, she pressed him to choose a postdoctoral fellowship in Canberra, Australia, over those offered stateside because she “wanted to embark on an adventure.”

The two spent eight years in the Land Down Under, and it was there that she learned what it was like to long for news from home – much as the early Western pioneers hungered for news from the homes they had left behind.

At left, this 1854 drawing and water color titled “Butte City” by George Henry Burgess serves as cover art for Barbara Cloud’s book, *The Coming of the Frontier Press: How the West Was Really Won*. Image courtesy of the Library of Congress.

So when it came time to tell the story of the frontier press, Cloud was eager to “help place both the West and its newspapers in the context of American history, where they belong.”

Cloud constructed the story of the frontier press from census data, biographies, historical accounts, other scholars’ works, and from the newspapers themselves. Her investigation focused on newspapers in areas west of the 100<sup>th</sup> meridian, produced in the period between the 1840s and the early 20<sup>th</sup> century, a period she describes as “the traditional West of cowboys and Indians, cattlemen, sheepherders and sod busters, dance-hall girls and the miner forty-niners.”

Cloud chronicles the humble beginnings of frontier newspapers in far-flung mining camps and remote settlements, noting the vital role they played for the thousands of people who came west seeking their fortunes.

“Frontier newspapers conferred legitimacy, provided a link to lives left behind, an opportunity to participate in political debate, and a sense of community in areas too remote for face-to-face congress,” Cloud writes. “The arrival of a printing press in a mining camp was often an occasion for festivities.”

Cloud effectively debunks Hollywood depictions of 19<sup>th</sup> century life in mining camps as populated solely by whiskey-swilling, whore-seeking ruffians, arguing that most of the fortune-seekers were literate; early frontier newspapers grew in response to demand for news about the world and the surrounding community. She notes that the aforementioned nefarious activities were clearly part of the picture, but they existed alongside churches, schools, and other nods to civilized life in the camps.

But life in the West was not easy for frontier newspaper publishers. Cloud vividly describes the hardships associated with securing paper, moving heavy printing presses across rugged mountain terrain, and waiting months for national and international news to arrive from the East.

To emphasize just how important paper was to western newspapers, Cloud writes that in 1859, the *Territorial Enterprise* relied on extreme measures to keep the presses running.

“The mountain men made their way over the mountains, carrying rolls of paper on their backs. While waiting for the paper to arrive, the *Territorial* printed on the back of wallpaper, cigar wrappers, or wrapping paper,” Cloud writes.

When Congress passed the Homestead Act in 1862 and chartered railroads to connect the eastern and western parts of the country, frontier newspapers forged a sometimes cozy, sometimes adversarial, relationship with



STAN CLOUD

The late Barbara Cloud, a longtime journalism and media studies professor at UNLV, lived in Australia during the 1960s. Her time there gave her insight into what it was like for the Western pioneers who longed for news of home.

those building the railroads.

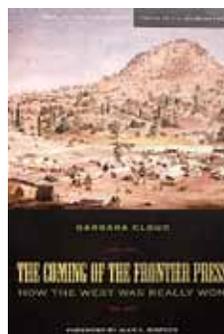
“Railway barons worked hard to ingratiate themselves with local newspaper editors and publishers, offering free train tickets and, occasionally, outright bribes. The newspapers were happy to oblige, as they saw the coming of a railroad as an indication that their newly established communities would survive,” she notes.

Although many frontier newspapers were independently owned, some were financed directly by mining companies, and later, railroad barons. Cloud writes that even those without financial ties were strong supporters of the railroad initially, with one going so far as “to choose for their logo the headlights of an oncoming locomotive.”

Cloud identifies Las Vegas as one such railroad town, born when Senator William Clark bought property in Southern Nevada to connect the Union Pacific line in Utah with Southern California.

“Even before Clark’s company completed a land auction in the Las Vegas valley, the future town had three weekly newspapers, the *Las Vegas Times*, the *Advance*, and the *Las Vegas Age*; all were started within two weeks of one another,” Cloud writes.

While newspapers thrived on the frontier, Cloud indicates that objectivity and accuracy often took a



back seat to other concerns. She cites several examples of publishers establishing newspapers to espouse their own political views and of legislators paying reporters for favorable coverage; she also notes that writers such as Samuel Clemons played fast and loose with the facts to create more colorful stories and that publishers acted more like “boosters” than newspapermen. In one humorous example, Cloud recounts how the *Oregon Statesman* told its readers that marriage notices must be signed because, “Malicious, mischievous persons are sometimes in the habit of sending names of persons to the press who have never been married.”

Cloud disputes the idealized notion that newspaper publishers were attempting to build a better society, arguing that most merely emulated newspapers in the East and turned to newspapering when they found they couldn’t tolerate the hard work associated with mining or ranching. Indeed, Cloud asserts, business savvy was the best predictor of which newspaper would survive and which would not.

“Newspapers failed not because people didn’t read them but rather because proprietors borrowed too much money, failed to collect what was due them, or otherwise mismanaged their businesses,” Cloud writes.

But not all frontier newspapers failed. Today, many western newspapers can trace their roots back to the frontier press. Notable examples include the *San Francisco Examiner*, formerly the *Daily Democratic Press*; the *Seattle-Post Intelligencer*, once known as the *Puget Sound Weekly*; the *Deseret News* in Salt Lake City that began as a frontier paper in 1850; and the *Los Angeles Times* that began with the same name in the 1880s.

However, as Cloud says in her conclusion, whether newspapers failed or thrived, they all played a pivotal role in settling and civilizing the West.

“A 20<sup>th</sup> century journalist gets credit for applying the phrase ‘first rough draft of history’ to journalism, but 19<sup>th</sup>-century journalists knew they were participating in something important, and those who did leave records understood that the West needs a repository of its history, just as the East did.”

The same could be said of Cloud herself. She leaves behind a rich collection of academic works on such subjects as early journalism in the Washington territory, the business of newspapers on the Western frontier, and media law in Nevada. She served as the editor of *Journalism History* and was researching the life of Charles “Pop” Squires, a Las Vegas newspaper pioneer, at the time of her passing.

### ***We Were All Like Migrant Workers Here: Work, Community, and Memory on California’s Round Valley Reservation***

By William J. Bauer, Jr.

The University of North Carolina Press, 2009

**U**NLV history professor William Bauer had read several books, theses, and dissertations about the Round Valley Indian Reservation in Northern California, but not one included interviews with the people who live there.

That was a problem for Bauer, an enrolled tribal member who grew up on the Round Valley Reservation, a federally established Indian reservation located primarily in Mendocino County.

So when Bauer set out to tell the story of Round Valley Indians and the role they played in California’s agricultural workforce, he made sure that native voices were part of the narrative.

“It was important to me that people who live in Round Valley recognize their history,” Bauer says. “I wanted them to read about their parents, grandparents, and other relatives in the book.”

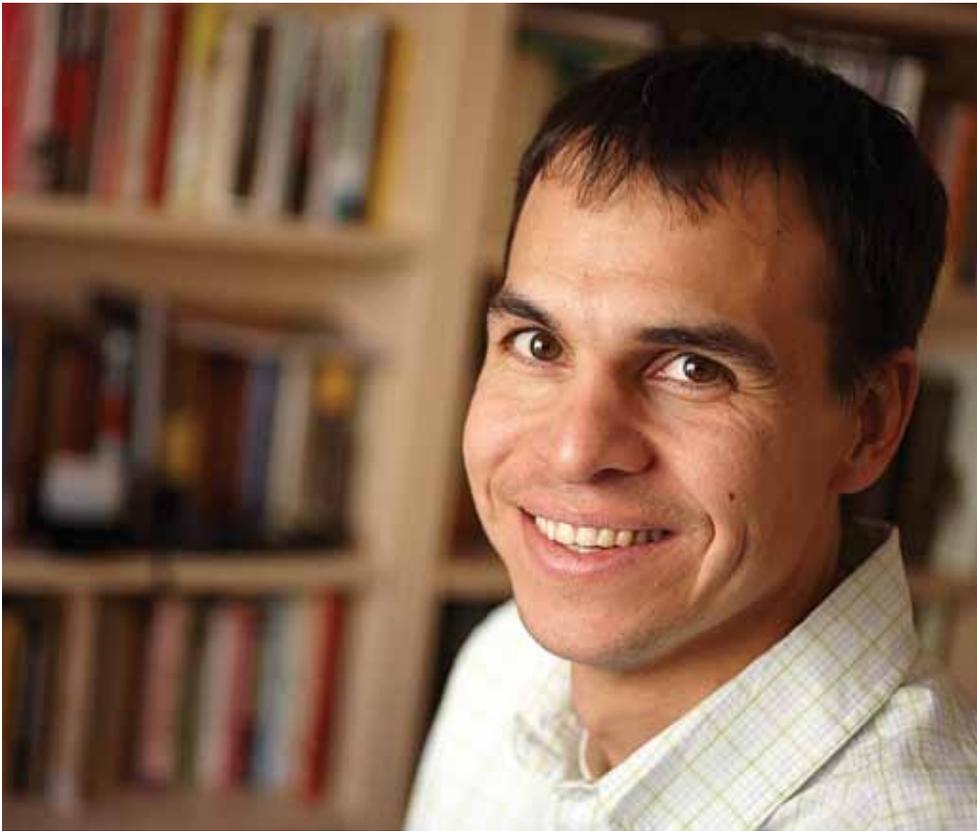
Bauer traveled back to his childhood home to collect oral histories from those who lived and worked on the Round Valley Reservation. These recollections, supplemented by extensive data collected through national government archives, are the basis of *We Were All Like Migrant Workers Here*, an in-depth examination of the lives, work, and survival of Round Valley Indians from 1850 to 1941.

Although the history of indigenous Indian tribes in Northern California extends as far back as 8,000 B.C.E., Bauer focuses on what happens “after contact” with Euro-Americans in the mid-19<sup>th</sup> century. His book chronicles the degradation of ecologically sensitive areas during the 1849 Gold Rush and the enslavement and forced labor that followed the passage of the 1850 Act for Government and Protection of the Indians, an act that permitted whites to indenture Indians to work on farms and ranches.

“At its worst, this law created a system of Indian slavery in California,” Bauer wrote. “The law’s vagrancy clause opened the door for white men to attack Indian villages, steal Indian children ... and sell them to the highest bidder.”

Bauer recounts one horrific example in 1855 when 35 children were kidnapped from the Round Valley Yuki tribe and sold “into a life of illness, servitude, and sexual violence in white and California households.”

While children were being stolen and enslaved in Northern California, federal Indian policy was undergoing



“It was important to me that people who live in Round Valley recognize their history. I wanted them to read about their parents, grandparents, and other relatives in the book.”

– William Bauer,  
History Professor

change in Washington, D. C. Public demand for land in California, coupled with a desire to “civilize” native peoples by training them to raise livestock and wheat, ultimately led to the removal of Indians from their homelands and their relocation to reservations.

Bauer says that in the 1850s and 1860s, a number of different groups were forced to relocate to the Round Valley Reservation. Joining the indigenous Yuki tribe were Concows, Wailackis, Pitt Rivers, Nomlackis, Pomos, and other smaller tribes. “Of course, they all spoke different languages and had different customs,” Bauer says. “And they settled into their own little villages on the reservation.”

Bauer compares the reservation in the 19<sup>th</sup> century to that of small ethnic, neighborhoods in turn-of-the-century Chicago and New York. And, like other neighborhoods where a single industry dominates, the various tribes in Round Valley were unified by work.

The Round Valley Indians worked the reservation farms and mills, planting crops, sawing timber, and milling grain in exchange for food, clothing, and blankets. However, Bauer notes that rations were often insufficient so they “turned to other sources of subsistence, such as hunting, fishing, and harvesting Manzanita berries, practices that had been used for centuries.”

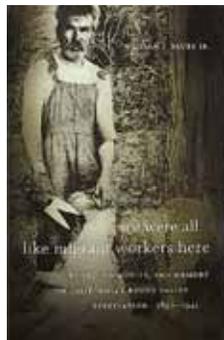
Sheep shearing and other wage labor off the reservation also added to the families’ coffers. But Bauer says the biggest draw for wage labor

was the growing hops industry in Mendocino County. Bauer notes that “During World War I, California produced the most hops in the United States.... Round Valley Indians worked in all facets of hops production, from tilling the soil to training the vines to picking the crop.”

Once the crop was harvested, the workers participated in traditional “Big Times,” a festival of games, food, and social drinking at the workplace. Round Valley Indians also took advantage of their time off the reservation to visit sacred homelands and to connect with other tribe members who had not been removed to a reservation. Bauer says this distinctive “hop culture” enabled Round Valley Indians to “forge the bond essential to the maintenance of their communities,” and he likens the annual trek to the hops fields to that of “attending an off reservation boarding school.”

Although wages were meager and the work was seasonal, Bauer says hops picking provided stable employment for families, most of whom combined their wages into a family pot. In addition, Bauer says, hops growers preferred hiring Indians to work in their fields because they returned to the reservation after the harvest and because they weren’t Chinese, whom many considered the “the pariah of California’s agricultural workforce” at the time.

But not everyone thought that migrant work was suitable for the Round Valley Indians. In the early 1880s, critics of the reservation argued that reservations locked up land that whites



wanted. This discontent led to the General Allotment Act of 1887, whereby Indians would be allowed to select individual plots of land to call their own and remaining land would be available for sale to non-Indians.

"In Round Valley, they wanted the native people to be farmers, and native people wanted to participate in migrant, agricultural work because it fit their lifestyle better," Bauer says.

In the government's view, allotment would keep the Indians at home and promote self-sufficiency through the tilling of one's own soil. This self-sufficiency, in turn, would make the Indians less dependent on government subsidies. Ultimately, the Round Valley residents agreed to the allotment.

"But each group had a different understanding of what allotment would mean. Native people saw allotment as a way to assume more control over their lands and lives. They believed that allotment would enable them to kick illegal squatters off reservation land. They thought that when the squatters were gone, they could hunt, fish, harvest, and raise livestock. Unfortunately, this is not the way allotment played out," Bauer says.

In 1892, the Office of Indian Affairs, in accordance with the 1887 Act, reduced the Round Valley reservation from more than 100,000 acres to 43,650 acres. The remaining acres were then divided into 10-acre plots and made available to Round Valley residents. Although Round Valley Indians attempted to maximize their allotments by choosing parcels near kin and then combining them into larger farms, the amount of land was never sufficient for the raising of livestock or production of market crops.

"They weren't given enough land," Bauer says. "Even today, if you were to grow grapes for a vineyard, 10 acres isn't enough and, because Round Valley is so isolated, it is too costly to transport 10 acres of grapes out of the valley to make it profitable."

Bauer calls allotment "the most economic devastating piece of legislation in the last 150 years," adding that it produced a 70 percent decline in Indian land holding.

The Great Depression in the 1930s and the introduction of a mechanical hops picker near the end of that decade were the beginnings of the end of hops picking for the Round Valley Indians. Hops were slowly replaced by pears, prunes, and grapes, and growers began to replace Indian workers with Mexican workers. Near the end of the 1950s, logging became the principal source of wages for Round Valley natives.

"My dad drove heavy machinery for some of the logging companies in the area until the early '90s when the mill closed. The entire community, not just the Indian community, has really struggled since the early 1990s

without an industry to carry employment," Bauer says.

But the community continues, and that is the story that Bauer wanted to tell.

"What I was able to find in terms of work and wage labor throughout this period, was that work and wages were almost secondary to the community or social ties that people formed while picking hops."

Bauer notes that it was this sense of unity that led him to the title of the book – and ultimately led the Round Valley Indians to their survival into the 20<sup>th</sup> century.

### ***Europe as a Political Project in the CDU: Precedents and Programs***

By Daniel Villanueva  
VDM Verlag, 2009

Visiting assistant professor of foreign languages Daniel Villanueva says his love of Germany began when he went abroad as a high school exchange student. Although he has nary a drop of German blood in his family, he says he loves everything about the country, including its history, culture, language, and politics.

It was this passion that fueled an eight-year labor of love that resulted in the publication of *Europe as Political Project in the CDU*, a book that traces the cultural and historical roots of Germany's conservative Christian Democratic Union (CDU) from its origins in pre-war Germany to present day.

The CDU, which was founded after the Second World War in 1945, is Germany's largest political party; it is non-denominational but Christian-based. Villanueva's interest in the party focuses on its commitment to the integration of Germany into the European Union.

"The CDU was very pro-European integration, but the parties from which it was formed – prior to the Hitler years – were very anti-Europe, or at least anti-Europe in the sense that they believed that Germany should be the dominant country," explains Villanueva, who also serves as the director of the Summer Advanced Gifted Education program. "So how was it that this idea, which was present in all these conservative parties before the war, suddenly changed 180 degrees after the war?"

To answer this question, Villanueva spent three years in Germany visiting various archives and poring over letters, philosophical treatises, party platforms, and speeches from party officials dating as far back as the mid-1800s.

Villanueva uses this background to examine the history of pro-European policies in the CDU – from Germany joining the European Economic Community in 1957, all the way through 1998 when the CDU was defeated in national elections for the first time in some 20 years.

Villanueva describes German conservative thought prior



“Charting the process by which the CDU answered new challenges for Europe and Germany makes for a fascinating research project indeed.”

– Daniel Villanueva,  
Visiting Assistant Professor  
of Foreign Languages

to 1945 as “essentially anti-French, anti-cosmopolitan, pre-democratic, and certainly anti-internationalist.” This philosophy ran counter to pro-European integration sentiment. After the war, however, the CDU shifted under the leadership of Konrad Adenauer, CDU chairman and chancellor. Villanueva says Adenauer recognized that West Germany had to become a part of the larger European Union in the 1950s as the Cold War era took shape.

“Of course, the average post-war West German was not completely enamored of France, and many conservative intellectuals were still suspicious of other countries whose intellectual traditions they believed to be inferior to their own,” Villanueva says. “But they made the pragmatic decision to enter the Union even though this is not what their pre-1945 ideology would have predicted.”

Villanueva says tensions between previous and current ideologies became apparent when the CDU opposed attempts to normalize relations with East Germany. Although the CDU had been in power from 1949, the party was defeated in 1969 by the Social Democrats, under the leadership of Willy Brandt.

“Brandt was anti-communist and pro-Westerner like Konrad Adenauer, but he proposed that West Germany reach out to East Germany. The CDU was dead set against recognizing the existence of East Germany, even though their historical roots – all Germans under one roof – would lead one to think otherwise,” Villanueva says. “Of course, less than a year after the fall of the Berlin Wall in 1989, West Germany, led by the CDU, engineered a political unification between East and West. The former East Germany thus ‘joined the EU’ by virtue of political union with West Germany on October 3, 1990, with solid CDU support.”

According to Villanueva, a third critical juncture occurred with the introduction of the Euro. He explains that when Germany unified in 1989, the five East German states didn’t enter the arrangement as equals. The West German constitution was in force,

West German politicians and parties were dominant, and West Germany’s social and historical traditions – with few exceptions – became the normative in unified Germany.

Because of the war, neither side could be proud of their flag or their military, so West Germans transferred their pride to the German Deutsche Mark, the official currency of West Germany (and then Germany after unification).

“Then Chancellor Helmut Kohl, the leader of the CDU, said Germans must join their European partners and adopt the Euro. This caught a lot of people off guard. Here they were, a unified Germany, proud of their economy and proud of the Deutsche Mark, but they were being asked to give that up and put their economic strength behind the Euro. This was not something a conservative German party would have said before 1945 and only reluctantly after 1990,” Villanueva says.

“Indeed, Kohl expended a significant amount of political capital to ensure that Germany adopted the Euro. His statement during the Euro debate – that ‘German unification and European unification are two sides of the same coin’ – is one of the best examples of this major sea change in conservative thought on Europe post-1945.”

The book ends when the CDU is voted out of office after 20 years in power. “No one expected Helmut Kohl to be defeated, and the CDU was not prepared for the loss,” Villanueva says. “So there was an immediate need for recalibration; a power vacuum was created, and a lot of new, often competing ideas came to the fore.”

Thus, Villanueva says his next book will focus on these opposition years and what effect Kohl’s defeat in 1998 had on the priority of European-related themes within the CDU.

“Charting the process by which the CDU answered new challenges for Europe and Germany – terrorism, economic crises, and immigration issues, to name a few – makes for a fascinating research project indeed,” Villanueva says.



# Growth Through Innovation: It Starts with R&D

BY MARK MURO

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Mark Muro is the Washington, D.C., director of Brookings Mountain West and a senior fellow at the Brookings Institution Metropolitan Policy Program.

**W**hy do metropolitan areas need to ensure that their universities, corporations, and independent laboratories conduct abundant, top-flight research and development?

Why would Southern Nevada do well to build up its research capability, particularly in the sciences and engineering?

The answer has to do with what has increasingly emerged as an unavoidable syllogism of economic competitiveness. To put it simply: Prosperity depends on productivity; productivity depends heavily on innovation, and innovation depends heavily on research and development.

The bottom line: A region thin on R&D is not likely to be innovative, and if it is not innovative, it will probably not flourish.

Innovation is the crux. Productivity and regional prosperity result from innovation – the ability to conceive and develop new products, new services, new technologies, new ways of organizing work, and new business models.

Innovation is the X-factor. Innovation is crucial to keeping a firm or a region or a nation in the vanguard. Innovation is essential to capturing and defending market share because it transforms how capital is used. Companies that develop new processes or products can either lower their costs or leapfrog the competition as Apple has with the iPhone, iPod, and iPad. Therefore, innovation plays a central role in generating and retaining high-quality jobs and responding to the challenges and opportunities presented by today's tumultuous, internationalized, increasingly competitive, and fast-moving economy.

Yet, what is it that drives innovation? Many factors do, of course, ranging from a locale's general education levels to the presence

of vibrant clusters of related businesses to the availability of capital and managerial skills. But in virtually every effective large-scale industry, university, government, or non-profit R&D activity represents a key prerequisite and driver of innovation because it yields inventions and adds to the knowledge base of a region's industries.

R&D is in this sense a major economic activity in itself, accounting for hundreds of millions of dollars of economic activity in dozens of U.S. metropolitan areas.

But it more importantly represents a powerful wellspring of regional innovative activity. "Pure" and applied university research helps lay the foundation for profitable future private-sector work. Pursued close to the needs of the marketplace, university, federal, and non-profit R&D may spawn patents and related technical advances that find their way into the private sector. And, of course, corporate development work – which accounts for two-thirds of U.S. R&D investment nationally – represents a top source of incremental product and process advances, not to mention entirely new lines of business.

Equally important, a region's R&D activity serves as an irreplaceable talent magnet and factory. R&D work, in this respect, gathers, trains, and organizes the region's all-important technical cadres.

This is critical because in the new economy the key drivers of growth – high-value technology, professional, manufacturing, and technical-services companies – are staffed heavily by well-trained and forward-looking technical, scientific, and engineering workers. Training or attracting these workers, therefore, must be a top priority for ambitious metropolitan areas, and, as it happens, ongoing



R&D enterprises (whether corporate or academic) are prolific and effective training grounds. In fact, notwithstanding the concern about “brain drain” of newly minted scientists and engineers to other states, the correlation between the number of employed Ph.D. scientists and engineers in a metropolitan area and the production of Ph.D. degrees in science and engineering from universities in a state is remarkably high, as observes the Information Technology and Innovation Foundation.

The logical conclusion: States and regions should invest in building strong R&D complexes because such complexes tend to anchor and generate around them the large, high-caliber science and engineering workforces that increasingly drive growth. Think Seattle. Think Austin. Think New Mexico. In such places, sizable (and eventually successful) university, federal, and non-profit R&D enterprises – assembled patiently over time – have begun to yield not just the human capital of technology-based prosperity, but also true economic diversification and constant innovation and resilience. Las Vegas should choose this path, too.

And yet, some will demur. Some

will complain that the Las Vegas area is simply so thin on its current R&D efforts, so new to the game, and so fiscally constrained for the foreseeable future that it should seek some other route to prosperity than the one that is universally deemed the soundest. Others, likewise, will note that some regions seem to have managed to become centers of high-technology without the presence of a major university research center.

And it’s true that Las Vegas does not fare well by traditional measures of R&D intensity: The Las Vegas metropolitan area records only 2.1 patents per 10,000 employees, compared to 7.1 for the largest 100 metros. Equally daunting, the share of employment in research and development in Southern Nevada is less than one-third of that of the average large metro, with just 13 of every 10,000 workers engaged in R&D work, compared to 43 per 10,000 for the nation’s large metros. Likewise, it’s also true that several cities have performed relatively well on technology-based development without a world-class, university-centered research enterprise. However, the fact remains each of these metros had strong pre-existing high-tech companies or a significant

independent research laboratory that drove local R&D in the absence of a major university. Meanwhile, there exists no reputable theory of regional economic growth that does not place great importance on a well-trained technical workforce and some degree of technical innovation, whether driven by a university, a national lab, or corporate research spending.

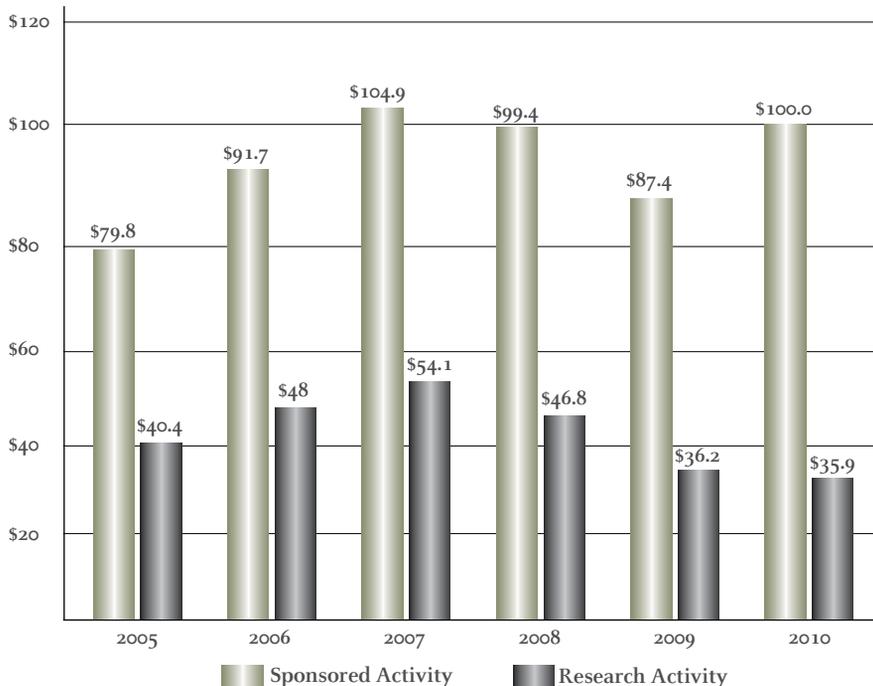
And so it is quite clear that as greater Las Vegas seeks to diversify its damaged, consumption-oriented economy with new forays into clean energy, computer game development, data processing, high-tech design, or brain health, it will need to build the infrastructure of innovation and human capital production. This means it will need to build a serious research and development complex.

Remember that syllogism: Prosperity depends on productivity; productivity depends on innovation, and innovation depends in large part on research and development. In keeping with this, the choice is stark but potentially exhilarating. Without expanded R&D activity, Southern Nevada will likely drift; with it, the sky is the limit.

# Research Report **UNLV Highlights**



**Total Sponsored Program Expenditures vs. Research Expenditures in Millions, FY05-FY10**



Sponsored program funding serves as one indication of research growth and sophistication

UNLV is a doctoral-degree-granting institution with more than 28,000 students, approximately 5,700 of whom are graduate/professional students. The university is ranked in the category of "high research activity" by the Carnegie Foundation for the Advancement of Teaching. Nearly 140 graduate degree and certificate programs are offered, including 39 doctoral and professional degrees. UNLV offers a broad range of respected academic programs and is increasingly recognized as a premier metropolitan research university.

# UNLV Study: Southwest Desert Ecosystems Can Take Decades To Recover from Wildfires

## Awards

In FY2010, UNLV received approximately \$96 million in external award funding with nearly \$38.4 million supporting research, including significant support from a number of federal agencies:

Dept. of Energy – \$13.9 million  
Dept. of Education – \$8.6 million  
Dept. of Defense – \$6.8 million  
Dept. of Health/Human Services – \$3.5 million  
National Science Foundation – \$3 million

## Top Five Academic Areas Receiving Sponsored Program Award Funding in FY2010

Sciences – \$11.1 million  
Engineering – \$10.8 million  
Harry Reid Center for Environmental Studies – \$9.3 million  
Educational Outreach – \$6.8 million  
Health Sciences – \$6.6 million

## Award Funding By Sponsor Type in FY2010

Federal – \$71.7 million  
Federal Pass Through – \$20.4 million  
State – \$1.9 million  
Foundation/Corporate – \$1.7 million  
Local – \$368,440

## Expenditures

Research expenditure data – the amount of funding expended for the purpose of research – is the gold standard for measurement of research activity in higher education. It indicates the amount of external funding spent by faculty and staff to conduct research; hence, it accurately reflects the productivity of funded researchers. Sponsored program expenditure data reflects activity on all types of sponsored program projects, including those dedicated to instruction or public service, as well as research. Hence, research expenditures are a subset of total sponsored program expenditures.

Wildfires blaze through the American Southwest each summer, threatening homes, damaging fragile ecosystems, and scarring majestic public lands that attract tourists from around the world.

According to a recent study by UNLV ecologist Scott Abella, full recovery of desert ecosystems after a wildfire can take up to 65 years and is often complicated by climate shifts and an assault from invasive plants that squeeze out native vegetation.

For the study, Abella and his team examined 47 documented instances of fire, land clearing, or road building in the Mojave and Sonoran deserts. He measured how long each disturbed area took to fully re-establish and identified which plant species were among the first to appear and which were unable to recover.

“As fires burn through arid lands, fast-growing invasive grasses like red brome tend to repopulate post-fire sites faster than native plants and trees,” says Abella, who heads the UNLV desert and dryland forest research group. “Subsequently, invasive plants and fire management practices have led to fires where they’re not historically likely or led to more severe fires in predisposed areas.”

Sites damaged by wildfires recovered faster, on average, than those affected by other disturbances. The average recovery time for all disturbed areas was 76 years. Though fire influences the chemical properties of soil, the soils themselves remain intact, leaving roots and seeds that enhance the recovery process. Abella found that long-lived desert plants like creosote, Joshua tree, and saguaro cacti reside in landscapes not historically susceptible to fire and were not likely to reappear.

Climate also changes the makeup of recovery, as shifts in temperature and the appearance of non-native plant species provide a much different ecological picture today than when the original landscapes were established. For example, Southern Nevada’s Spring Mountains – due to both climate change and fire suppression practices – have seen a dramatic increase in white fir, a ladder fuel that can carry surface fires up into taller pines.

“Large fires in our deserts and forests are becoming more frequent and severe, which makes aggressive post-fire establishment of native vegetation critical to ecosystem recovery,” says Abella. “The more we understand about how natural recovery works, the better able we’ll be to introduce successful and cost-effective management strategies.”

The results of the study appear in the April 2010 issue of the *International Journal of Environmental Research and Public Health* in an article titled “Disturbance and Plant Succession in the Mojave and Sonoran Deserts of the American Southwest.” Abella and his team received more than \$250,000 in funding from the National Park Service to conduct the study.

—Tony Allen



SCOTT ABELLA

UNLV research assistant Jessica Spencer examines the ecosystem damage caused by a wildfire near Red Rock Canyon.

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