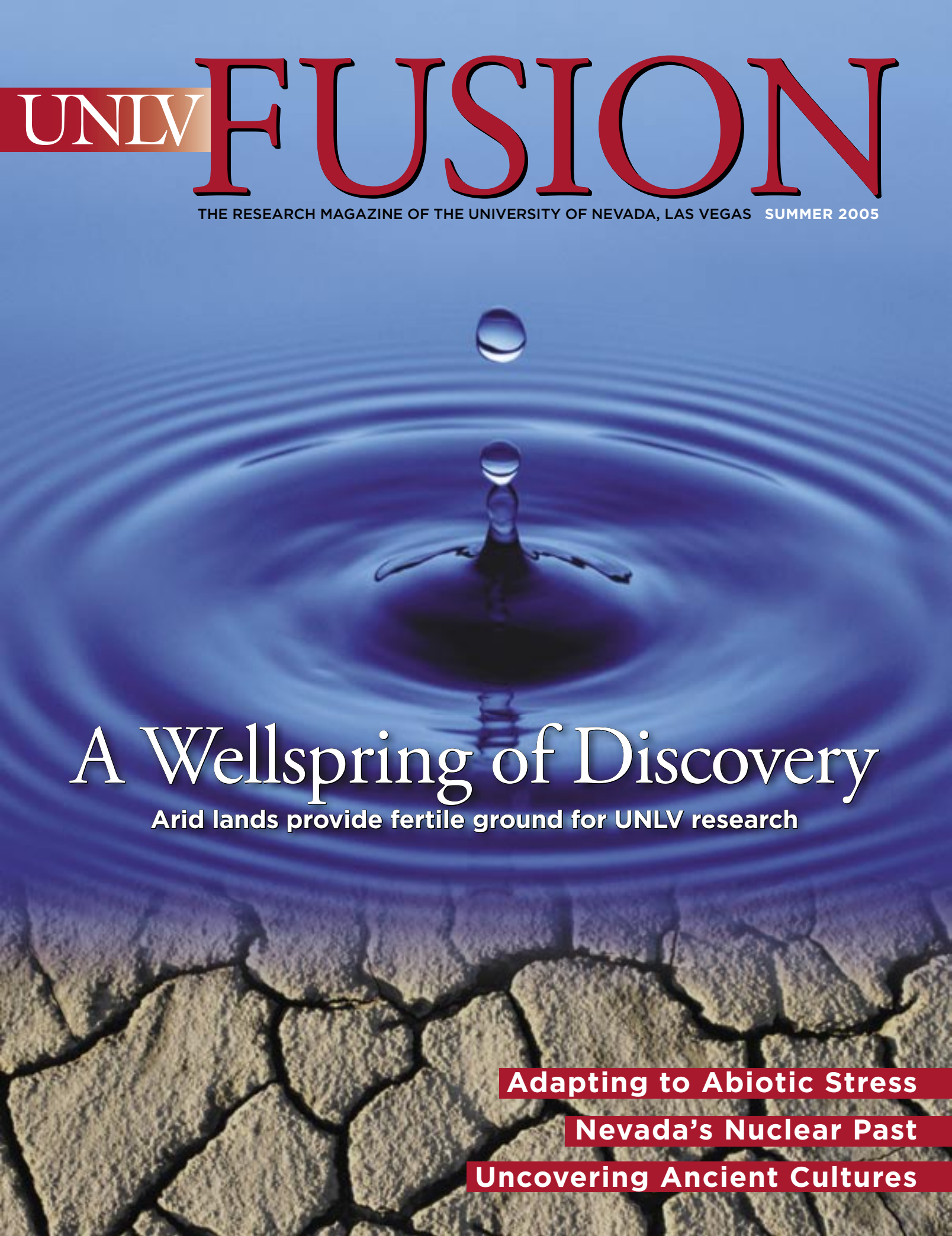
UNLV FUSION
THE RESEARCH MAGAZINE OF THE UNIVERSITY OF NEVADA, LAS VEGAS SUMMER 2005



A Wellspring of Discovery

Arid lands provide fertile ground for UNLV research

Adapting to Abiotic Stress

Nevada's Nuclear Past

Uncovering Ancient Cultures

Dr. Carol C. Harter
President, University
of Nevada, Las Vegas

ADVANCING RESEARCH AT UNLV

I am delighted to present the inaugural issue of *UNLV Fusion*. I hope that our new research magazine offers you a glimpse of the dynamic university that we have become. UNLV is increasingly acknowledged as a premier metropolitan research university, and I am pleased to see that recognition of our achievements in the critical area of research will be enhanced further by this publication.

Research at UNLV is certainly one of our greatest success stories, and there are many others as well. Allow me to share with you a few of our points of pride:

- We now serve more than 27,000 students – 5,500 of whom are graduate/professional students. We offer more than 220 degree programs, including 34 doctoral and professional degrees.
- UNLV received more than $73 million in external funding in 2004 with nearly $47 million supporting research. The quality of research by faculty and students is being recognized nationally through extensive publication in top-tier journals.
- UNLV is committed to a process of community engagement through which the university's research, creative activity, and outreach are catalysts for change and enhanced quality of life in Nevada.
- UNLV is located in Las Vegas, a vital, rapidly growing city with a style all its own and ever-increasing interests in cultural and economic diversification.

As UNLV approaches its 50th anniversary in 2007, I am gratified to note that we have made incredible strides in advancing our research agenda. As you read the first issue of this publication, I am certain you will experience an appreciation for the highly regarded work that our faculty, staff, and students are doing in a variety of disciplines. *UNLV Fusion* represents an important milestone in the life of UNLV; it will provide an effective forum for the discussion of the ongoing creative and scholarly endeavors being pursued here. We are proud to share them with you.

Dr. Paul W. Ferguson,
Vice President for
Research and Graduate
Studies

WHY *FUSION*?

It is my distinct pleasure to introduce to you the first issue of UNLV's new research magazine, *UNLV Fusion*. We are eager to share the important research, scholarship, and creative activity being performed at our institution. UNLV is committed to becoming a premier, metropolitan research university; thus, we believe it is critical to provide a greater understanding of the work being done here because it attests to the academic success of our institution. It is my hope that *UNLV Fusion* helps to spread the word of that success.

As we approached the creation of this new venue for showcasing UNLV's research, scholarship, and creative activity, one of our first challenges was to select the most appropriate magazine title. Although the scientific term "fusion" refers to the generation of energy through "nuclear fusion" (the power of the sun), it is from the perhaps less technical usage that our magazine title is derived. Defined as "a coming together, or fusing," "fusion" here represents the process of collaboration, integration, adaptation, connection, and unification. Whether used in contemporary references to music, cooking, or marketing (or any number of other contexts), the term reflects the process of combining the best components from a variety of sources to produce an improved or enriched product, concept, or value. I believe it is a wonderful metaphor for the process of discovery through research.

Thus, it is the intent of *UNLV Fusion* to illustrate how the blending of various forms of research and creative expression from the diverse academic experience of UNLV students and faculty strengthens, improves, and transforms our local, state, and national community. I sincerely hope that you enjoy the first issue of *UNLV Fusion* … and draw from it a greater sense of the compelling research and intellectual activity that is making UNLV the respected institution it is today.

UNLV FUSION

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FEATURES

DEPARTMENTS

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UNLV
UNIVERSITY OF NEVADA LAS VEGAS

ON THE COVER: The desert provides fertile ground for UNLV research. Cover concept by Brown & Partners.

Shadow Lane Campus

UNLV has developed a new campus that has emerged as a leading facility for health, biomedical, and biotechnological research

With more than 27,000 students and nearly 900 faculty members, UNLV is rapidly outgrowing its 340-acre main campus. As the university continues to expand its educational programs and research facilities on the main campus, it is also developing new campuses in Southern Nevada.

The first, the Shadow Lane Campus, opened in fall 2004 and has emerged as a focal point for educational and research-related pursuits in the health, biomedical, and biotechnological sciences. The 18.2-acre campus, located in the heart of the city's medical district, is also home to UNLV's School of Dental Medicine.

The three-building campus provides accommodations to a variety of business, academic, and campus partners who are creating a stimulating environment for teaching, research, advanced training, and economic development opportunities. At full build-out, the campus will provide nearly 420,000 square feet of learning and research space for use by a diverse group of organizations. Currently, the campus is home to three primary occupants, including the Nevada Cancer Institute, the UNLV Biotechnology Center, and the School of Dental Medicine.

Nevada Cancer Institute

The Nevada Cancer Institute, formally launched in April 2002, is a private foundation designated by the

state Legislature as the official cancer institute of Nevada. While construction of the center's flagship facility is under way, Deputy Director Dr. David Ward is located at the Shadow Lane Campus and leads studies in the areas of cancer and genetic epidemiology. Ward, who was a distinguished member of the Yale faculty for more than 30 years and was elected to the National Academy of Sciences in 1998, will work in close collaboration with faculty and students from UNLV, the University of Nevada School of Medicine, and the University of Nevada, Reno.

UNLV Biotechnology Center

The UNLV Biotechnology Center, also located at the Shadow Lane Campus, was established with the goal of educating and training students interested in pursuing careers in the growing biotechnology field, as well as offering professionals in the industry advanced learning opportunities. Additionally, the center seeks to support new community-based biotechnology business and industry.

The center offers a variety of biotechnology and biomedical workshops, including one on forensic DNA fingerprinting. It is the first in a series of post-graduate professional development courses in the fields of forensic and microbiological sciences. Offered in partnership with the Las Vegas Metropolitan Police Department, this hands-on course provides participants with the chance to operate state-of-the-art instrumentation used in DNA processing and to analyze data using the very latest software programs.

School of Dental Medicine

Today's dental student requires a learning environment that not only provides opportunities for interaction with patients and other health-care professionals, but also a setting that offers exposure to innovative treatment protocols and research techniques.

In order to provide UNLV students with optimal access to the latest technological advances, the UNLV School of Dental Medicine is housed in a newly renovated building on the Shadow Lane Campus. Equipped with 165 dental chairs and increased classroom, office, and patient-care space, the school serves not only as an outstanding teaching facility but also as a clinic for those in the community who need dental care the most.

To date, more than 90,000 Medicaid patients have been treated at UNLV's dental clinics. Additionally, dental school students, faculty, and staff have provided oral cancer and oral health screenings, as well as dental and nutrition education, to more than 14,000 community members — primarily preschool, elementary, and high school students. The School of Dental Medicine will soon offer an advanced educational program that will produce Nevada's first class of orthodontists by 2008.

What Is Biotechnology?

The application of biological knowledge and techniques to develop commercial products is a simple definition of biotechnology, which is also known as "applied biology." It may be further defined as the use of living organisms to make a product or run a process. By this definition, the classic techniques used for plant and animal breeding, fermentation, and enzyme purification would be considered biotechnology. The term "biotechnology" is now also being used to refer to the newer tools of genetic science. In this context, biotechnology may be defined as the use of biotechnical methods to modify the genetic materials of living cells so they will produce new substances or perform new functions. Examples include recombinant DNA technology, in which a copy of a piece of DNA containing one or a few genes is transferred between organisms or "recombined" within an organism.

In Print

UNLV faculty authors shed light on medieval science, airfield pavements, and juvenile justice

Medieval Science and Technology
by Dr. Elspeth Whitney
Greenwood Press, 2004

In *Medieval Science and Technology*, UNLV history professor Dr. Elspeth Whitney seeks to shed light on a little-known aspect of the Middle Ages.

"When I tell people that I study medieval science and technology, the response is often, 'Oh, I didn't know there was any,'" Whitney says. "I wrote this book in part to rectify this false impression and to convince readers that science and technology in the Middle Ages were vital, innovative enterprises that helped create the modern world."

Her book, which is intended for a general audience, is the first to include an examination of both the history of medieval science and the history of medieval technology. In addition to discussing individual sciences from alchemy to zoology, Whitney presents an overview of the medieval scientific worldview and the social context of the practice of science and technology. The volume also contains biographies of important scientists and philosophers and a selection of representative scientific writing.

She asserts in the book that although medieval scientific methods were significantly different from those of modern science, it was in the Middle Ages that the institutional, technological, and intellectual frameworks responsible for the later success of western science were first developed.

Airfield Pavements: Challenges and New Technologies
Edited by Dr. Moses Karakouzian
American Society of Civil Engineers, 2004

Airfield Pavements: Challenges and New Technologies addresses advances in the analysis, design, and construction of airport runways. The book is a collection of 35 contributed papers presented at the 2003 Airfield Pavement Specialty Conference, which was held in Las Vegas.

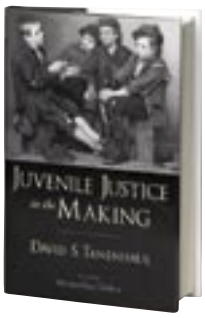
The proceedings provide a technical but broad-based discussion of runway pavement design and research, pavement materials and performance, and airfield construction procedures. Editor Moses Karakouzian, a UNLV professor of civil and environmental engineering, says the book will be of interest to researchers and engineers, as well as others involved in airfield construction, maintenance, and management.

"This book provides a networking opportunity for professionals interested in airfields," Karakouzian says. "It is our hope that this book will produce synergy and new ideas among those interested in this subject. Long-lasting and cost-effective airport runways are in high demand, so it is our goal to encourage new ideas and discussion." Karakouzian says highway and pavement designers will also find the book valuable and an excellent addition to the literature in this field of research.

Juvenile Justice in the Making
by Dr. David S. Tanenhaus
Oxford University Press, 2004

In *Juvenile Justice in the Making*, Dr. David S. Tanenhaus, the James E. Rogers Professor of History and Law at UNLV, offers insight into the creation of America's first juvenile court, providing a framework for discussion of the complex, often controversial, questions surrounding youth legal policy.

The author describes how children's advocates worked to establish a separate court system for juveniles in turn-of-the-century Chicago and, in doing so, advanced a basic tenet that guides juvenile justice in America today: Children deserve special treatment by the courts because they are developmentally different from adults.



"The book explores the fundamental question of how the law should treat the young," says Tanenhaus. "By exploring the early history of juvenile justice, we can begin to think more clearly about what its future should be."

The book was written for the general reader and designed for classroom adoption in history, law, criminal justice, political science, and social work courses.

Progress Report

UNLV's nationally recognized department of educational psychology, housed within the College of Education, has made remarkable strides recently

In less than five years UNLV's department of educational psychology has achieved national recognition on the basis of increased faculty research productivity, public visibility, and academic influence, department chair Ralph E. Reynolds says, adding that there are several indications of the progress the department has made.

Perhaps the most noteworthy is the department's listing in the top 20 educational psychology programs ranked by *U.S. News & World Report*. The department was ranked 19th among all U.S. graduate programs evaluated in the study and was selected for the honor by deans at peer institutions.

"It's an extraordinary accomplishment," says Reynolds. "It's an indication of both the greater recognition of the program and the growing academic influence of the department faculty." Reynolds adds that he hopes that the department's *U.S. News* ranking helped support the visibility of UNLV's College of Education, which also received acknowledgement this year as one of the top graduate-level education programs in the country.

He notes that another example of the department's success is the annual number of faculty publications: They increased 200 percent from 14 in 2000 to 42 in 2003. Also, the quality of the journals in which faculty members are publishing has increased significantly. National paper presentations have increased 81 percent also.

These are just a few of the accomplishments of the department, according to College of Education Interim Dean Thomas Pierce.

"We are delighted to see this progress in the department of educational psychology," Pierce says. "There are many additional indicators of the excellence the department is achieving. The College of Education is proud to see the wonderful strides they've made."

For example, in just a few short years a department faculty that once held only nine editorial board positions now holds 30 such positions on the boards of influential professional publications such as the *Journal of Educational Psychology* and *Contemporary Educational Psychology*. Additionally, five years ago, no professor from the department held an appointment as editor on any of the major educational psychology journals; in 2004, department faculty members held four such positions.

Since 1999, the department also has successfully established two new Ph.D. programs, including the first in learning and technology, created in collaboration with technology faculty from the department of curriculum and instruction. The second is in education psychology with strands in assessment and evaluation, learning and cognition, school counseling, school psychology, and content area emphases.

Most remarkable, however, is the upswing in the graduate student population, Reynolds says. This year, the educational psychology department formally admitted 90 master's and doctoral students; the number of graduate students admitted in 2000 was 18.

"At the core of any successful university department is its faculty," Reynolds explains. "Without question, it is the professors – teachers, scholars, and researchers – who build the educational foundation that provides the exceptional learning experience for today's students and tomorrow's teaching professionals."

The department's successes can be traced back to 2000, Reynolds says, when a group of newly hired faculty, working with existing faculty, created a shared vision with the following goals: (1) to achieve national prominence in research by increasing department-wide scholarly productivity, (2) to create new doctoral programs and attract exceptional local, national, and international students, and (3) to maintain the department's traditional excellence in teaching and the preparation of education professionals. Additionally, the faculty established a goal to seek national visibility and prominence relative to doctoral program quality and student research opportunities.

According to Reynolds, the five essential steps used to establish the department's highly successful research culture and program excellence included:

- Creating a shared vision that is not mandated, but instead emerges from honest, continuous faculty dialogue.
- Establishing goals that pertain to, and are achieved by, the department as a whole, thus allowing each faculty member to contribute to meeting these goals in ways that best suit his/her particular talents and interests.
- Hiring new academic faculty to support existing faculty in creating an environment of collegiality and productivity.
- Initiating and maintaining a workload policy that allows time for faculty to do more research and grant writing while continuing to value traditional faculty excellence in teaching and professional educator preparation.
- Initiating and maintaining equitable treatment of faculty in relation to these new goals and policies.

"While all of these components are significant, the most crucial element in this entire process is trust," Reynolds says. "It is the creation of trust within a department that allows important activities to continue, regardless of changes in administration and faculty."

The goal of the National Supercomputing Center for Energy and the Environment is to facilitate the discovery and evaluation process for researchers, scientists, and government entities, according to NSCEE Director Joe Lombardo.

Enhancing Research

UNLV's National Supercomputing Center provides research support

From air quality forecasting to medical informatics, UNLV's National Supercomputing Center for Energy and the Environment (NSCEE) provides users from 24 states and three countries with the most advanced high-performance computing system in Nevada.

More than 200 scientific projects related to global atmospheric modeling and fossil energy research have been supported by the NSCEE since the center was established in 1989.

Initially, the center was designed to study nuclear waste isolation, disposal, and transmutation in conjunction with the Department of Energy's work associated with the Yucca Mountain Nuclear Repository project, located approximately 100 miles northwest of Las Vegas. In 1989, the U.S. Congress appropriated $10 million for the purchase and development of the supercomputing facility to be operated exclusively by UNLV.

The NSCEE has since grown to partner with 14 affiliates and now addresses a much wider range of national scientific challenges.

The NSCEE occupies approximately 5,000 square feet on the third floor of the Thomas T. Beam Engineering Complex. The center's central computing system is an SGI® Onyx® 3800 visualization system with InfiniteReality3™ graphics supported by more than 200 terabytes of storage.

This system, with high-band-width CC-NUMA architecture, combines supercomputing and visualization technologies to support 3-D graphics and video streaming in real time, according to Joseph Lombardo, the center's director.

"Our program capabilities currently span the entire sequence of turning raw data into practical knowledge that ultimately makes the discovery and evaluation process easier for researchers, scientists, and government entities," Lombardo says.

An example of just one of several major research projects under way at the NSCEE is the Air Quality Forecasting Research Initiative. UNLV faculty and students work in collaboration with the Department of Energy, the Environmental Protection Agency, and the National Oceanic

and Atmospheric Administration to develop and assess techniques for investigating multidimensional atmospheric flows, assessing air quality and wind fields, and related chemical interactions dealing with arid lands in the Southwest.

With the aid of UNLV's supercomputer, the Regional Atmospheric Modeling System formulates daily predictions of weather for the entire Southwestern region of the United States. Future efforts will include developing computational techniques that can be used to predict three-dimensional wind fields over the Las Vegas valley. Accurate wind field prediction is necessary for urban air quality assessments, severe weather and flooding forecasting, and emergency response planning associated with hazardous material released into the atmosphere.

An additional venture of the NSCEE is the Advanced Computing in Environmental Sciences initiative associated with the EPSCoR Ring True II project. The primary mission of the initiative is to elevate environmental science research and education in Nevada to a new level of excellence. The program is fostering research activities in such areas as complex modeling of groundwater flow, hydrochemistry, and floods; climate data analysis; atmospheric and air-quality modeling; applications of geographic information systems; remote sensing; and research and development of algorithms for high-performance computing and scientific visualization.

"Because of our involvement with the Advanced Computing in Environmental Sciences initiative, new computing and scientific visualization capabilities are helping to remove limitations experienced by Nevada environmental researchers in applications of advanced numerical modeling and other data-intensive research techniques," Lombardo says.

E-Records Technology

UNLV helps develop sophisticated electronic records management system

New statutory and regulatory directives are leading federal agencies to recognize a tremendous need for integrated electronic records management and archiving systems capable of maintaining huge amounts of data.

In a unique public-private partnership, UNLV and Quest Technology are working to create just such a system for the U.S. Department of Energy (DOE).

With an initial grant in 2000 of $1.4 million from the DOE and other federal appropriations provided with the support of U.S. Sen. Harry Reid, university researchers are working to develop an electronic records system that will provide a highly efficient method for processing massive amounts of medical information.

The project will help the DOE manage information in areas such as occupational medicine, industrial hygiene, and radiation exposure.

Under the guidance of Dr. Stephen Rice, associate vice president of research and economic development at UNLV, two research teams, composed of several faculty members and both undergraduate and graduate students, are actively focused on this project.

The first team, led by UNLV computer science professor Dr. Angelo Yfantis, is working to automate the recognition of forms and hand-written information. The second team, led by School of Computer Science Director Dr. Hal Berghel, is developing cyber-security techniques. The innovations produced by these teams will then be integrated with software designed and developed by Quest Technology to create the new "enterprise records system."

Once existing DOE information is processed using the e-records technology, it will then be centrally housed at the UNLV National Supercomputing Center for Energy and the Environment.

According to Rice, this highly technical but user-friendly approach to medical records management allows for easy access of information while enhancing the timely and secure exchange of critical data between individuals and organizations.

"The implications of this project are highly significant," Rice notes. "In the event of an epidemic outbreak, for example, crucial medical information can be made instantly available to health care and government officials throughout the world in just a matter of minutes."

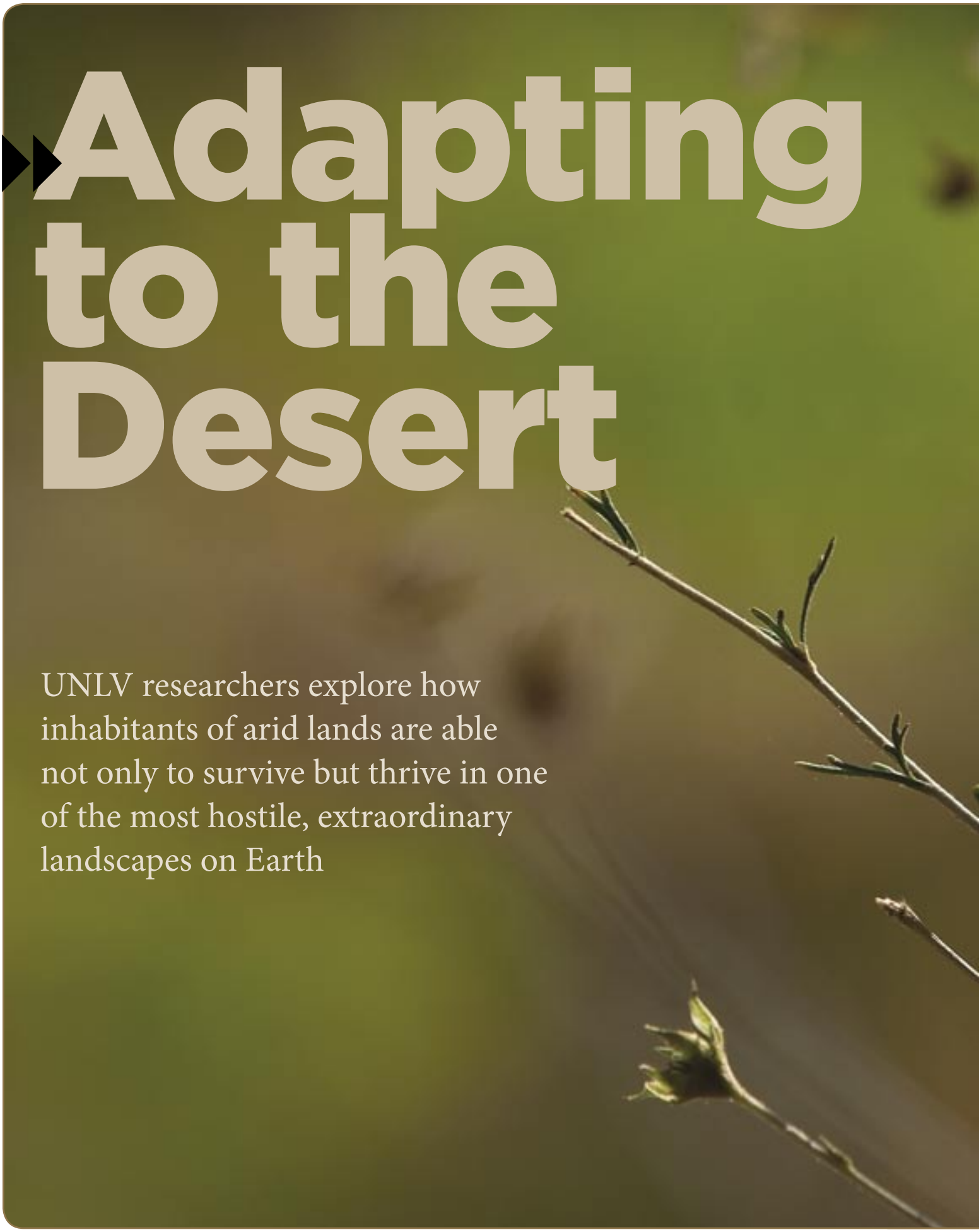
The project is the largest externally sponsored research effort currently under way at UNLV; it has garnered approximately $23.4 million in funding during the last five years. Rice notes that it serves as an example of how higher education, industry, and government are working together to find solutions to some of today's most challenging human-service issues.

The Power of the Desert

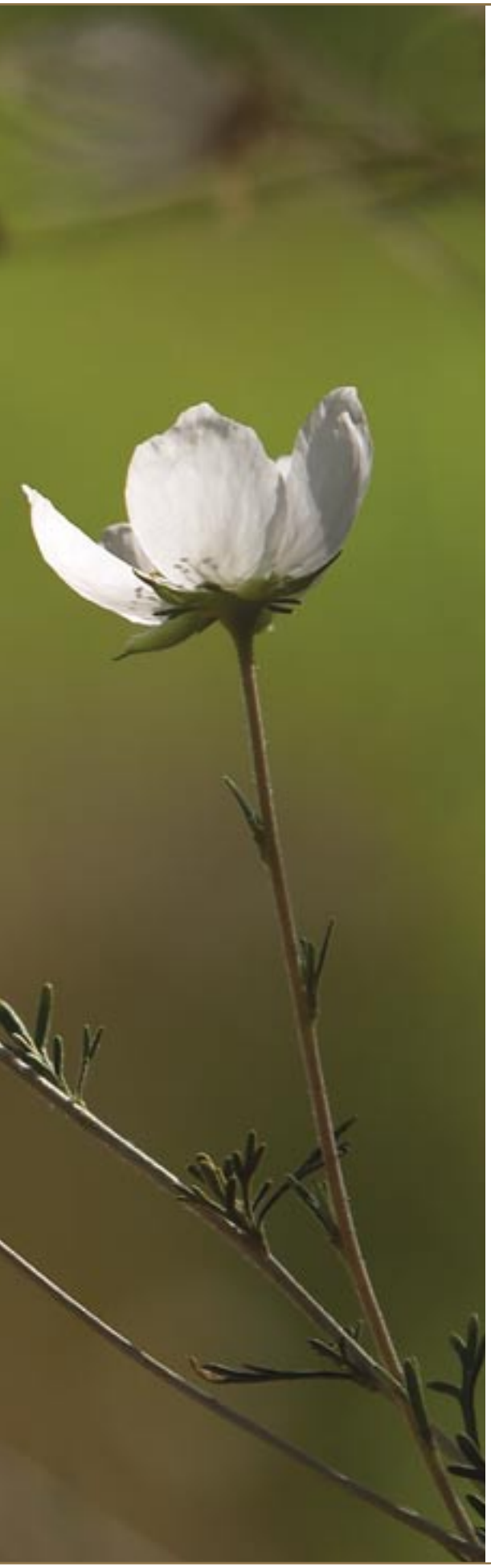
UNLV Distinguished Professor of Engineering Dr. Robert Boehm understands the desert's power in a literal sense. He believes that by tapping its plentiful solar, wind, and geothermal resources, Nevada could become a major supplier of the nation's energy. But he and many other UNLV scholars recognize the desert's figurative power as well — that of inspiration. On the following pages of our inaugural issue of *Fusion*, we celebrate the university's unique backyard laboratory and the research that thrives because of it.

PHOTO ILLUSTRATION BY AARON MAYES

Adapting to the Desert



UNLV researchers explore how inhabitants of arid lands are able not only to survive but thrive in one of the most hostile, extraordinary landscapes on Earth



PHOTOGRAPHY BY GERI KODEY

On a scorching day in July, the Mojave Desert might seem an uninviting, barren wasteland to the casual observer. But to UNLV researchers, the desert is an amazing resource and far from barren. On the contrary, they find it remarkably fertile ground — for research.

They know that America's Southwest deserts are complex yet delicate ecosystems where unique species of plants and animals continue to thrive despite some of the most extreme climate conditions in the world.

"This may not be a very comfortable place for the native Mojave plants, animals and microbes, but it's great for biologists interested in how living systems cope with extreme and otherwise stressful environmental conditions," says UNLV biological sciences professor Peter Starkweather. He adds that the study of the desert's natural environment is of vital importance, as it provides us with great insight into how its inhabitants are able to survive and adapt, and how living systems in general respond to extreme conditions.

Starkweather and several of his biological sciences colleagues are focusing their research in this area as part of UNLV's Integrated Approaches to Abiotic Stress Program (IAAS), which is dedicated to discovering how organisms adapt to the stresses of a variety of non-living — or "abiotic" — components of the desert environment (e.g., wind, heat, cold, drought, and salinity). Their findings may one day influence the preservation, protection, and maintenance of the world's many arid regions.

The abiotic stress initiative relies on faculty research strengths available throughout the Nevada System of Higher Education. The program is part of a statewide National Science Foundation EPSCoR project known locally as RING TRUE II, which stands for "Research Infrastructure for Nevada's Growth: Targeting Research with Uniqueness and Excellence." (See related article, "About EPSCoR.") More than 30 researchers from several Nevada institutions — including UNLV, the University of Nevada, Reno, and the Desert Research Institute — participate in the program.

Initiated in 2002, the IAAS program has already produced a number of major accomplishments, including:

- 79 peer-reviewed scientific papers.
- $27 million in competitive federal and other research grants (22 percent from the National Science Foundation).
- Supervised training of eight postdoctoral scholars, 18 graduate students, and 31 undergraduate students.
- Three Nevada-hosted research symposia attended by international scholars and NSF representatives.
- Contributions to start-up packages for nine newly hired faculty members.

About 15 UNLV faculty members have been working with their students on IAAS research projects. Just a few examples of their projects are noted below and serve to illustrate the nature and scope of IAAS research.

■ Biological sciences professors Carl Reiber and Peter Starkweather examine organisms that come to life in the temporary pools that form in the desert after it rains. These organisms, such as fairy shrimp and tadpole shrimp, emerge from once-dormant eggs that reside on dry desert land until a sudden shower provides them with the watery environment necessary for hatching. Then, they live out their entire existence in these shallow, ephemeral pools. "We are not exactly sure why, but the drying period of dormancy is necessary for them to come to life," Reiber says. "So the desert climate is critical to their existence. And with the research capabilities we have at UNLV, we are now able to explore the genes that take them in and out of dormancy. No one has yet been able to identify how this mechanism works in these creatures." Reiber adds that this study seeks to shed light on how the early stages of development in these life forms are influenced by the stresses of the desert. »»»

■ Penny Amy, professor of biological sciences, studies the ecology and physiology of bacterial survival in the environment. She focuses on the processes used by bacteria to adapt to specific environments; in particular, she examines the influence of microbes on corrosion/degradation processes occurring deep below the Earth's surface. "The subsurface environment is as different from the Earth's surface as another planet," Amy says. "Yet, through our research, we have discovered that there are more deep, subsurface organisms than surface organisms." Working with a number of graduate students, Amy has led the effort in applying the results of this study to a significant issue in Nevada: the Yucca Mountain Nuclear Repository. "This research has led to considerable design changes in the containment of nuclear waste to be stored in Yucca Mountain and allowed for the optimal longevity of containment packages that will be placed in that location." Amy and her team also study the microbes that pollute the natural waters of Southern Nevada and are seeking ways to improve water quality.

■ Biological sciences professors Steven de Belle and Stephen Roberts study fruit flies as a genetic model system of how stress affects organisms. "There are many biological indicators of stress, including hormone levels, behavior, and temperament," de Belle says. "What people need to understand is that although fruit flies are anatomically very different from other animals, it does not mean that they are genetically different from other animals; in fact, the metabolic process is the same." Both de Belle and Roberts have discovered that stress does compromise the ability of the brain in fruit flies to mediate learning and memory. "If we can take fruit flies under stress out in the field and determine that improving their environment will also improve their brains' capacity to learn and remember, then we may develop a clearer perspective on the very heated debate over 'nature versus nurture,'" he says, referring to the controversy over whether heredity or experience is more important to an organism's development. He hopes to add to the body of knowledge in biology that seeks to educate the public about the stress society places on natural environments and the resulting compromise all organisms may experience as a consequence.

■ Biological sciences professor Dawn Neuman leads a team investigating plant responses to environmental stress; she is examining how roots and shoots are integrated under a changing environment. As she continues her research with undergraduate and graduate students, Neuman hopes to create an understanding of how plants react to stress in order to enhance the overall knowledge of crop performance and plant survival in a natural environment. "Abiotic stress response," Neuman notes, "is the driving force for species survival."

Such projects, and the IAAS program in general, have had an enormous impact on the UNLV biological sciences department, as well as the College of Sciences, according to Ronald Yasbin, dean of the college.

"The departments are interdependent. When one does well it helps everyone," Yasbin says, adding that the program has attracted a number of internationally recognized faculty members and provided significant start-up research support for new biology faculty members.

Reiber, who is also the chair of the biological sciences department, adds that the success of this kind of program helps build the reputation of the university as a whole.

"I believe the individuals in the biological sciences department have collectively created an outstanding program that is bringing greater recognition to UNLV. We have an incredible team, including faculty, post-docs, and graduate students, who are attending international conferences and are receiving substantial grant funding. The larger academic community is taking notice."

About EPSCoR

UNLV is an active participant in the federally funded Experimental Program to Stimulate Competitive Research, or EPSCoR. Established by the National Science Foundation in 1978, EPSCoR was launched to promote the scientific expertise of university faculty and students in regions comparatively underfunded by federal agencies. Twenty-five states, including Nevada, have been designated as eligible for EPSCoR support.

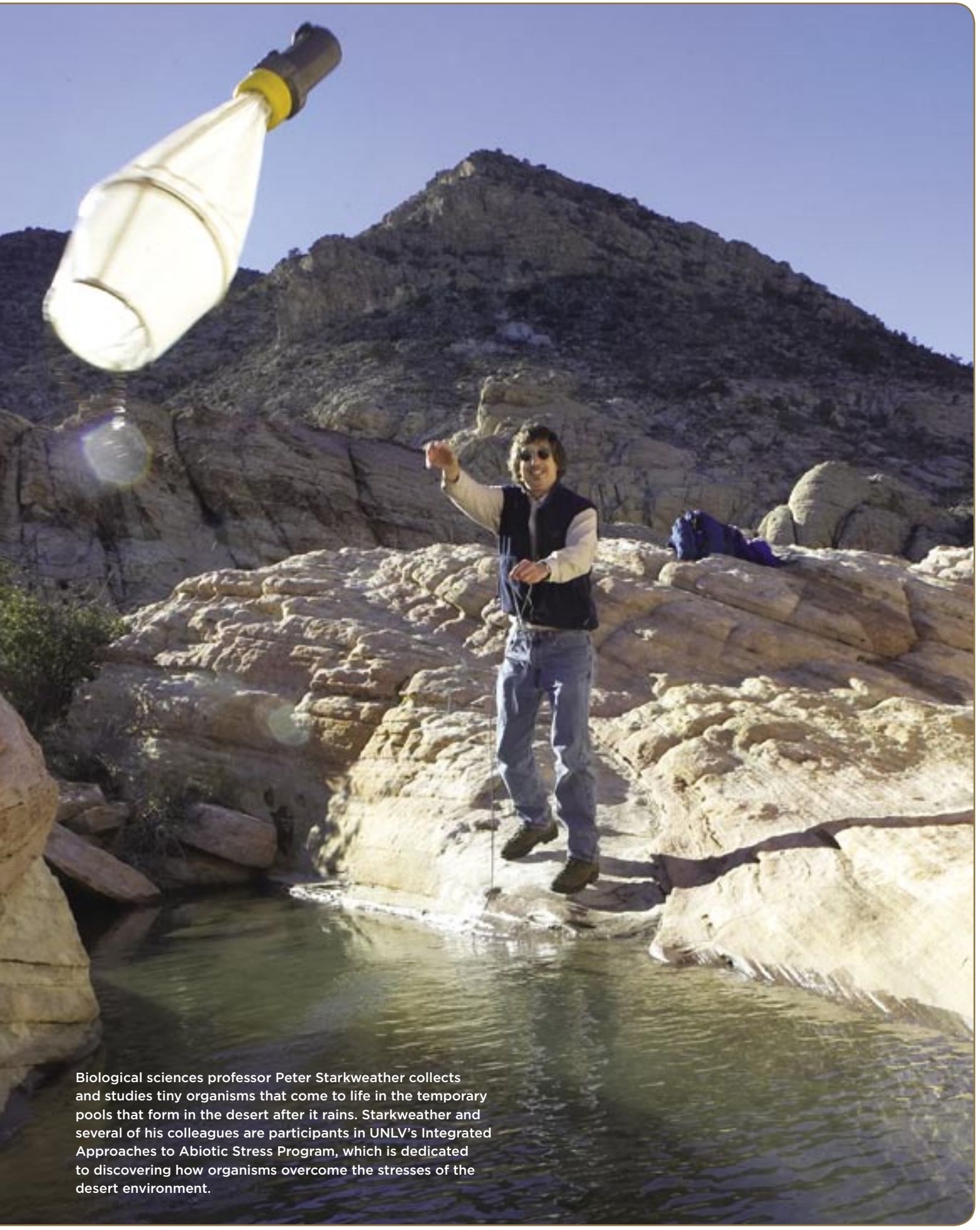
The program seeks to enhance involved states' "academic research infrastructure and research competitiveness," particularly in subject areas that serve the national interest. Ultimately, this is intended to increase the quality of scientific research nationwide as all universities become more equally equipped to compete for federal and private sector support. Several federal funding agencies, such as the Environmental Protection Agency, the National Institutes of Health, and NASA, have adopted their own EPSCoR or EPSCoR-like programs in recent years to stimulate research.

Since 1985 — when UNLV received the state's first EPSCoR award — a total of more than $73 million in the program's funding has been directed to the research enterprise in Nevada.

One example of a successful EPSCoR research project currently under way in Nevada is Ring True II (Research Infrastructure for Nevada Growth: Targeting Research with Uniqueness and Excellence). UNLV has partnered with the University of Nevada, Reno, and the Desert Research Institute for this project; the institutions are currently completing the third year of the three-year $9 million infrastructure-building award from EPSCoR.

Ring True II involves research being conducted in three major areas: Nanostructured Materials and Devices, Advanced Computing for Environmental Science, and Integrated Approaches to Abiotic Stress. UNLV chemistry professor Dennis Lindle serves as the Nevada NSF EPSCoR director for the Ring True II project.

UNLV participates in a number of other EPSCoR-funded projects that build on the state's unique resources and existing strengths and that foster interdisciplinary and interinstitutional collaborations. These collaborations typically lead to sharing of both equipment and expertise, making EPSCoR programs efficient at maximizing resources within a given state.



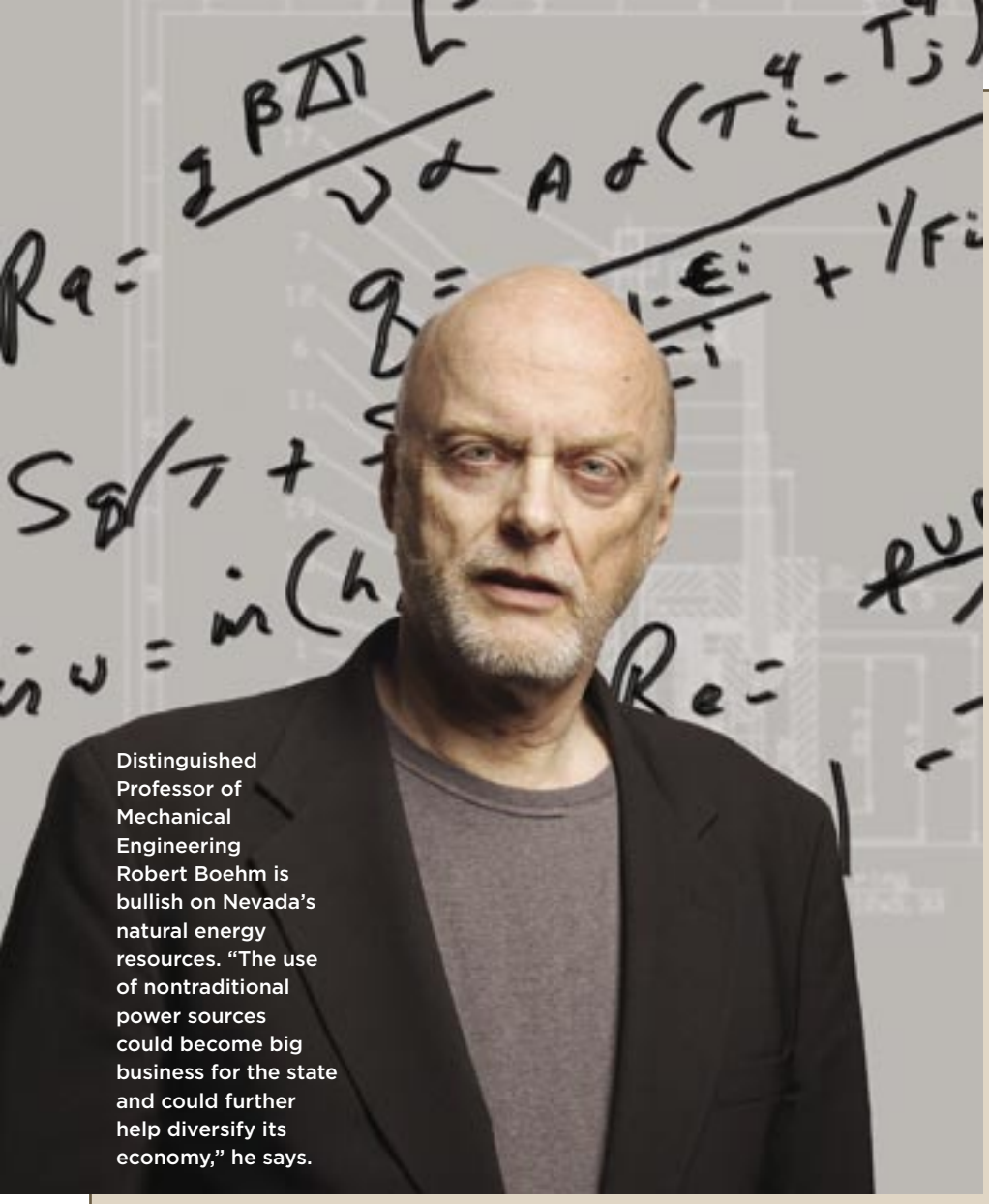
Biological sciences professor Peter Starkweather collects and studies tiny organisms that come to life in the temporary pools that form in the desert after it rains. Starkweather and several of his colleagues are participants in UNLV's Integrated Approaches to Abiotic Stress Program, which is dedicated to discovering how organisms overcome the stresses of the desert environment.

Prestigious Professors

The Harry Reid Silver State Research Award winners share a passion for research, but on distinctly different aspects of the state and region

UNLV's most distinguished research award — the Harry Reid Silver State Research Award — was created in 2001 with two goals in mind: honoring the U.S. senator who has been an outstanding supporter of UNLV, and recognizing faculty who have performed research that is both highly regarded and responsive to the needs of the community and state. In the following pages, *Fusion* profiles the first three recipients of this honor — Robert Boehm, Stanley Smith, and Hal Rothman — who represent the exceptional research and scholarship being performed at UNLV.

PRESTIGIOUS PROFESSORS: From left, mechanical engineering professor Robert Boehm, biological sciences professor Stanley Smith, and history professor Hal Rothman



Distinguished Professor of Mechanical Engineering Robert Boehm is bullish on Nevada's natural energy resources. "The use of nontraditional power sources could become big business for the state and could further help diversify its economy," he says.

PHOTO BY AARON MAYES

Robert F. Boehm [2002 Recipient]

Distinguished Professor, Department of Mechanical Engineering
Director, UNLV Center for Energy Research

Many believe that by tapping into Nevada's plentiful solar, wind, and geothermal resources, the state could become a major supplier of the nation's energy.

UNLV Distinguished Professor of Mechanical Engineering Robert Boehm not only believes this is possible, but is working to make it happen.

Boehm, the university's first recipient of the Harry Reid Silver State Research Award, maintains that in the not-too-distant future, he and his UNLV colleagues could help provide ecologically sound power sources that will also help stimulate new jobs and tax revenue for this region.

"The use of nontraditional power sources could become big business for the state and could further help diversify its economy," Boehm says. "We have the ability to solve the country's energy problems within Nevada's borders."

Since joining the UNLV faculty in 1990, Boehm continues to both teach and explore the potential of solar energy utilization, radiation heat transfer, and the design of thermal systems. In 1995, he established the Center for Energy Research, an interdisciplinary entity that focuses on the application of solar and renewable energy and the development of energy-efficient technologies. Currently, 10 graduate students, five faculty members, and numerous research partners are actively involved in a number of major projects, including:

- Developing energy conservation design criteria for buildings constructed in the desert Southwest.
- Constructing a zero-energy home with numerous energy-conserving features.
- Developing a remote monitoring system for the new 50 megawatt solar-power system being constructed near Boulder City.
- Analyzing the effects of adding thermal storage to trough-type solar thermal power plants.
- Monitoring environmental conditions in remote locations at the Nevada Test Site using a photovoltaic power generation system.
- Evaluating the economic viability of solar-powered water heaters.
- Building a renewable hydrogen refueling station to install and analyze the performance of a hydrogen fueling system powered by the sun's energy.
- Working with developers of concentrating photovoltaic solar power systems.

Boehm has authored several books on the design of thermal systems and heat transfer, has written more than 400 articles in a variety of publications, and has been a featured presenter at conferences and workshops around the nation and the world. He currently serves as associate editor for several international journals and is a member of the American Society of Mechanical Engineers International Energy Committee, which is charged with making recommendations on energy issues to Congress.

Boehm received his bachelor's and master's degrees in mechanical engineering from Washington State University and his doctorate from the University of California, Berkeley. He has been the principal investigator or co-principal investigator on more than 40 research projects during his 14 years at UNLV. Over the past five years, his grants and contracts have totaled nearly $4.5 million.

Biological sciences professor Stanley Smith has spent the last 20 years at UNLV researching the unique plant life of the Mojave Desert. "Global climate change is of imminent concern worldwide, and I am gratified to contribute to a greater understanding of its impact on arid regions," he says.

PHOTO BY GERI KODEY

Stanley D. Smith [2003 Recipient]

Professor, Department of Biological Sciences
Coordinator of UNLV's Arid Lands Macrotheme

Arid land ecosystems cover up to 30 percent of the Earth's terrestrial surface and affect nearly 20 percent of the world's population. These regions are growing faster than any other part of the United States. A lack of water and low plant productivity make arid lands among the most environmentally sensitive areas on the globe, and with climatic change and encroaching population centers, they are also becoming increasingly threatened.

Of critical importance to the world's ecological future is discovering how the Earth's ecosystems will respond to elevated carbon dioxide concentrations as well as other global-change phenomena expected to occur in the next century. Biological sciences professor Stanley Smith has spent the last 20 years at UNLV researching the unique plant life of Nevada's deserts in order to help society better prepare for the impending effects of changing climate conditions.

"Global climate change is of imminent concern worldwide, and I am gratified to contribute to a greater understanding of its impact on arid regions, which are increasing in importance to the human enterprise," Smith says.

Currently, Smith is working as UNLV's lead principal investigator with the Nevada Desert Research Center (NDRC), located at the Nevada Test Site some 65 miles north of Las Vegas. The NDRC is an EPSCoR-supported collaborative effort between UNLV, the Desert Research Institute, and the »»»

University of Nevada, Reno; it includes two major research units: the Nevada Desert Free-Air CO_2 Enrichment Facility and the Mojave Global Change Facility. The NDRC has earned a reputation as a leading contributor to both the National Science Foundation and the Department of Energy's global change research programs.

Recognized as an international authority on the ecology of the Mojave Desert, Smith has produced a body of work that includes more than 90 publications in the fields of plant water use, photosynthesis, high temperature responses, invasive species, and global change. He has several recent publications in *Nature*, one of the most prestigious scientific journals in the world. In addition, he serves on the editorial boards of *Ecology* and *Ecological Monographs* and is the author of a book on the physiological ecology of North American desert plants.

Smith received his bachelor's and master's degrees in biology from New Mexico State University and his doctorate in ecology from Arizona State University. He was awarded a two-year post-doctoral fellowship at UCLA. He has also been a visiting fellow at the Australian National University in Canberra. Since 1998, Smith has brought more than $5 million in research funding to UNLV and has directed the work of five Ph.D. candidates, eight master's degree students, and seven postdoctoral associates.

Hal Rothman [2004 Recipient]

Professor and Chair, Department of History

Not only is Las Vegas one of the world's premier resort destinations but, for the last two decades, it has also been part of the fastest-growing metropolitan area in the country. The town's unique history and continuing explosive growth make it an extremely interesting location for social historians to study and observe, according to UNLV history professor Hal Rothman, who is also department chair, author, editor, and resident expert on the history and culture of Las Vegas.

Rothman is perhaps the city's most quoted source on the people, infrastructure, and politics of what *Time Magazine* recently called the "new American city." To date, Rothman has authored several books about tourism and related culture, including *Neon Metropolis: How Las Vegas Started the Twenty-First Century* as well as *Devil's Bargains: Tourism in the Twentieth Century West,* which received a starred review in *Publishers Weekly* and also won the Spur Award for Best Contemporary Nonfiction from the Western Writers of America. He is also co-editor of a recent collection of essays entitled *The Grit Beneath the Glitter: Tales from the Real Las Vegas*, which offers additional insights and original analysis of the Southern Nevada experience.

While Rothman has compiled an impressive record of scholarly works, his writings are well received by general audiences; three of his books on western environmental and tourism history are being reissued in paperback. His public appeal can be traced to a populist orientation.

"I don't believe you write history for your fellow scholars," Rothman says. "You write it for people so they will know, understand, and care about the issues affecting their lives."

In addition to his many public talks, Rothman has written for several nationally syndicated outlets, has consulted on major television network programs, and has been featured on National Public Radio, the Arts & Entertainment Network, and, most recently, CNN's "NewsNight" with Aaron Brown. He is increasingly a favorite of the international media and has narrated feature films in France and Germany.

Prior to coming to Southern Nevada in 1992 to help UNLV build a Ph.D. program in western history, Rothman's primary areas of research focused on national parks and social/cultural environmentalism. Although his writings about Southern Nevada have garnered the most public attention, Rothman continues to produce important works in other fields and recently completed a book about new urban parks using the Golden Gate National Recreation Area as a model.

Rothman, who was elected to the Nevada Writer's Hall of Fame in 2004, received his bachelor's degree in history from the University of Illinois at Urbana-Champaign, and his master's and doctoral degrees from the University of Texas at Austin. He also served a 10-year term as the editor of *Environmental History*, a leading international journal for scholars, scientists, and historians.

About Senator Harry Reid The highest-ranking Democrat in the U.S. Senate and Nevada's senior senator, Senate Minority Leader Harry Reid has worked actively through the years to support many of UNLV's major research projects. He has been instrumental in identifying significant resources to allow faculty to engage in a variety of investigative studies, particularly those related to the efficient use of alternative energy and the management of spent nuclear fuel. His support of the scholarly pursuits of UNLV faculty, especially as they relate to environmental studies, has been substantive. The Harry Reid Center for Environmental Studies and the Harry Reid Silver State Research Award have been named to honor his long-standing commitment to the university. Plans are also under way to develop the Harry Reid UNLV Research and Technology Park, expected to begin construction soon.

History professor Hal Rothman seeks to make history accessible. "I don't believe you write history for your fellow scholars; you write it for people so they will know, understand, and care about the issues affecting their lives," he says.

PHOTO BY GERI KODEY

In the next issue of *Fusion* ... Readers will meet Dr. Shashi Nambisan, the 2005 recipient of the Harry Reid Silver State Research Award. Nambisan, a civil and environmental engineering professor, is the director of UNLV's Transportation Research Center, a highly regarded research entity that examines critical local, regional, and national transportation issues. (He received this year's award just before *Fusion* went to press.) Please join us in congratulating him on receiving this prestigious award, and look for more details on his work in the next issue of *Fusion*.

Recollections of Nevada's Nuclear Past

The Nevada Test Site Oral History Project is documenting, preserving, and disseminating the stories of those involved in one of the most technologically sophisticated yet controversial endeavors in Nevada's history

by Mary Palevsky, Robert Futrell, and Andrew Kirk

Photographs by Geri Kodey

If you drive 65 miles north of Las Vegas along Highway 95, past the Paiute Reservation, the town of Indian Springs, and the vast alluvial plain abutting the nearby mountains, you will come to a sign that reads, "Mercury."

Like many exits between Las Vegas and Reno, the road appears to lead deep into the empty desert. A closer look reveals a small airstrip and control tower, a complex of buildings, and a guarded entry gate. Behind this entrance is one of the most important and controversial landmarks of American techno-scientific ingenuity and Cold War politics: the Nevada Test Site, the United States' 1,375-square-mile nuclear weapons proving ground.

Today, there are few travelers on the road to Mercury. The Nevada Test Site (NTS) operations have been drastically reduced since the height of the Cold War, when thousands migrated to the state for jobs with the nuclear testing program. During the 1950s and 1960s, every morning before dawn, a continuous stream of headlights stretched from Las Vegas to Mercury. Commuting test site workers dubbed the treacherous two-lane highway "The Widowmaker." In Las Vegas, residents and tourists gathered to watch the spectacle of atmospheric tests light up the sky. The mushroom cloud became an icon of the nuclear age.

COMMUNITIES OF VOICES

The Nevada Test Site Oral History Project is a multiyear, multidisciplinary program in UNLV's College of Liberal Arts dedicated to documenting, preserving, and disseminating the stories of those affiliated with and impacted by the NTS during more than 40 years of nuclear testing.

The goal of the project is to contribute to the understanding of the multifaceted social, cultural, organizational, scientific, and environmental history of nuclear testing. The research team is led by the authors of this article (project director Mary Palevsky and principal investigators Robert Futrell, a UNLV sociology professor, and Andrew Kirk, a UNLV history professor). The team is collecting stories from the diverse communities of voices, offering valuable insights into the many complex test site cultures.

The project will enable scholars from many fields to use these rich archives to research the history and sociology of nuclear testing in order to more fully understand the

impact it has had on our country's past, as well as what it means to the future of society in general.

Project participants range from national laboratory weapons designers to electricians, miners, welders, carpenters, and other trade workers who built the test site infrastructure; also included are public officials, military officers, corporate executives, and support personnel who made this highly complex organization run. Also integral to the project are the individuals and organizations that fervently opposed the test site's mission, with concern for its impact on Nevada, surrounding states, and world affairs. Radiation survivors, American-Indian tribal organizations, anti-nuclear peace groups, local ranchers, families and communities living downwind of the site, and arms control and disarmament advocates comprise this important group.

PUBLIC RELEVANCE OF UNLV RESEARCH

Major research projects are often highly specialized efforts aimed at academic audiences. In contrast, the NTS Oral History Project demonstrates the relevance of UNLV research to the larger community. As researchers contribute to the historical record, they are also forging links with a broad cross-section of Southern Nevadans dedicated to preserving the test site's historical and cultural legacy. In addition to the archive in UNLV Lied Library's department of special collections, the NTS oral history collection — along with related documents and photographs — will be accessible to the public through museum exhibits, presentations, and print and Web-based media.

The development and testing of nuclear weapons played a critical role in 20th century history. In the summer of 1945 in the New Mexico desert, American scientists conducted "Trinity," humankind's first atomic test, marking the dawn of the nuclear age. The atomic bombings of Hiroshima and Nagasaki and the end of World War II quickly followed. The world's nuclear arsenal grew from a handful of warheads at the end of 1945 to tens of thousands during the height of the Cold War. The NTS Oral History project is bringing to light the early days of humankind's nuclear history by gathering firsthand accounts of the ways in which weapons development and testing, fueled by the U.S./Soviet arms race, fundamentally altered Nevada's demographics, economy, ecology, and culture.

Recently, controversies have dominated regional politics regarding the federal government's plan to develop a nuclear waste repository at Yucca Mountain, which sits on the test site's western edge. The NTS Oral History Project's research provides a meaningful context for these debates by documenting the memories of the many individuals affiliated with the test site who still call Nevada home.

CONTESTED MEMORY

Even before the Trinity test, national leaders debated nuclear weapons' impact on domestic policy and international relations. The NTS Oral History Project explores myriad views on the fundamental problems that

UNLV's Nevada Test Site Oral History Project has recorded the different perspectives of (from left) Troy Wade, former assistant secretary of energy for defense programs and longtime Nevada Test Site official; Franciscan Sister Rosemary Lynch, a test site protestor; and atomic veteran George Maynard. The photographs they hold reflect their roles at the test site.

From left, UNLV history professor Andrew Kirk, project director Mary Palevsky, and sociology professor Robert Futrell are leading the Nevada Test Site Oral History Project.

remain relevant today. Many retired NTS workers see the site's landscape, pockmarked with craters from 100 atmospheric and 804 underground tests, as a primary battlefield of the Cold War. They conceive of themselves as unsung combatants who, faced with the threat of all-out nuclear war with the Soviets, achieved peace. Many are eager to tell their stories. (Some information remains classified; secrecy shrouds memory, and tension often exists between what participants know and what they say.)

Troy Wade, former assistant secretary of energy for defense programs and a longtime Nevada Test Site official, explains this perspective in his interview.

"I believe that the use of nuclear weapons ended World War II. The nuclear deterrent, designed at Livermore and Los Alamos and Sandia [National Laboratories], perfected in nuclear tests at the Nevada Test Site, kept us out of another major world conflagration like a World War III. The fact that we had nuclear weapons, sometimes massive numbers, caused the Soviet Union to realize that we could wipe them out if we chose to do so. That simple fact kept them from doing anything crazy. That's called deterrence."

Other policymakers insist that the pace of U.S.

nuclear weapons development fueled the arms race and contributed to worldwide stockpiles and proliferation, thus weakening national security. Critics passionately question the safety and ethics of experimental nuclear weapons testing, as well as its social, environmental, and geopolitical implications.

In 1977, inspired by the nonviolent teachings of St. Francis of Assisi, Franciscan Sister Rosemary Lynch began holding vigils near the NTS. In 1982, to honor the 800th anniversary of St. Francis' birth, she and like-minded people decided to promote the peace he taught not through a church celebration but by spending the Lenten season in the desert near the test site.

"We cannot defeat evil with more evil or power with more power," Lynch observes in her interview. "People don't need bombs; they need bread, they need food, they need medicine, they need care, they need help. We tried in the very beginning [of the protests] to make friends with the guards, with the police.... They're victims of the bomb just as much as we are. Any bomb that falls is going to hurt indiscriminately. It's not going to say, 'Well, I'm not going to hurt a test site worker.' We have to understand that. Martin Luther King used the beautiful expression, 'The building up of the beloved community.' We have to do it together."

The range of experiences and opinions are valuable pieces of the larger historical and sociological puzzle. Atomic veteran George Maynard, a retired master sergeant from the U.S. Air Force, was exposed to high levels of radiation while serving in the U.S. Army at the NTS during the 1950s. He is convinced of the site's importance to the American nuclear deterrent. He also believes the nation has yet to recognize the risks troops faced during their atomic missions. "Well, you know, a guy in a Purple Heart situation is either a rifleman or a machine gunner … and knows that he's going to take that chance on getting shot," Maynard says in his interview. "And when you go out and get involved in the weapons testing program, you're not made aware of all of the hazards.... And I think that if the government creates the Atomic Veterans Medal and awards it to the remaining survivors, it will serve justice like the World War II memorial that was recently dedicated."

Contrasts among participants' testimonies reveal profound tensions, even contradictions. The purpose of the research is not to reconcile them, but to contribute to our understanding of the complex and contested memories of the nuclear age.

A STUDENT-CENTERED ENDEAVOR

The NTS Oral History Project provides firsthand research opportunities to graduate students in history and sociology. To date, 30 students have been involved in the project. During the pre-interview phase, students conduct research for the project's bibliographic database of primary and secondary sources. They work on research design and learn to use state-of-the-art digital audiovisual equipment.

During the interview phase, students receive training in qualitative, narrative, and oral history theory and methods. They study the counterarguments that arise from the interviews and work to ground their research in larger historical and social contexts. Students are also involved in the Southern Nevada community, attending NTS retiree gatherings, as well as meetings with faith-based, tribal, and other activist organizations.

During the post-interview phase, students learn about managing the large quantities of data generated by oral historical research. They edit, index, analyze, and interpret research findings and then develop strategies to present them in a variety of forums. They present papers at academic conferences, submit articles to scholarly journals, and create digital and Web-based audiovisual materials for dissemination of the research.

The NTS Oral History Project has been funded by grants directed to UNLV by Congress from the U.S. Department of Energy ($582,000) and the U.S. Department of Education ($248,525). The project demonstrates that federal research support can be utilized to make significant contributions to the historical record, provide remarkable opportunities to graduate students, and build meaningful bridges between institutions of higher learning and the larger community.

A BRIEF HISTORY OF NUCLEAR TESTING **JULY 1945:** U.S. conducts Trinity, humankind's first nuclear explosion. **AUGUST 1945:** U.S. atomic bombings of Hiroshima and Nagasaki. **1946:** U.S. Atomic Energy Commission established. **1946 & 1948:** U.S conducts atomic tests in Pacific. **1949:** First Soviet atomic test. **1951:** Continental test site established at NTS. **1951:** First atomic tests at NTS/Frenchman Flat. **1951:** First U.S. thermonuclear test (Pacific). **1953:** First Soviet thermonuclear test. **1958:** Nuclear testing moratorium. **1961:** U.S.S.R. breaks testing moratorium. **1963:** Limited Test Ban Treaty. **1967:** U.S. Nuclear stockpile at maximum (33,000 warheads). **1970:** Nuclear Nonproliferation Treaty. **1986:** U.S.S.R. stockpile at maximum (45,000 warheads). **1988:** Largest demonstration at NTS draws 8,000 protestors. **1988:** Joint U.S./U.S.S.R. test verification series. **1990:** Threshold Test Ban and Peaceful Nuclear Explosions Treaties. **1992:** Testing moratorium begins. **1996:** U.S. signs Comprehensive Test Ban Treaty (to date not ratified).

CLIMAX, part of Operation Upshot/ Knothole, was a 61-kiloton device fired June 4, 1953, at the Nevada Test Site. U.S. Department of Energy photograph.

Ancient Cultures In Arid Lands

Anthropology professor Alan Simmons explores how the social and economic changes that occurred 10,000 years ago in the Middle East forever altered the human experience

About 10,000 years ago, humankind experienced a dramatic transformation known as the Neolithic Revolution. It was during this time that the peoples of the Middle East began to cultivate and produce their own food rather than hunt and gather it. Consequently, nomadic existence gave way to the development of village life, and farming and domestication of animals became common.

For UNLV anthropology professor Alan Simmons, the Neolithic Revolution remains the single-most fascinating period in human history — so fascinating, in fact, that he has spent his life's work devoted to its study.

"The Neolithic Revolution truly changed the social fabric of life," says Dr. Simmons, who joined the UNLV faculty in 1993 and now chairs the department of anthropology and ethnic studies. "For literally millions of years, we had been hunters and gatherers. But when we settled down into village life and started producing food, we set the stage for the present world. Without the Neolithic Revolution — without the security provided by domestic plants and animals, without the population growth that results from village living — we never would have developed complex urban societies."

Simmons points out that the Neolithic Revolution was born in the Middle East (or the Near East, as anthropologists tend to refer to it). In this region where so much political and religious strife exists today, he notes, the Neolithic Age took hold, establishing the foundations of some of the world's most sophisticated ancient societies, including those of the Babylonians and Sumerians. Thus, he says, it is widely acknowledged that the aptly labeled "cradle of civilization" produced the roots of Western culture.

Achieving a better understanding of how and why the Neolithic phenomena occurred has taken Simmons to this region repeatedly during the course of his career. Over the last 25 years, he has actively studied the period from a variety of perspectives and has participated in excavations in Jordan, Egypt, the Sinai Peninsula, Cyprus, Lebanon, and Israel's Negev Desert.

With the help of his students, Simmons has investigated sites in the arid areas on the Near Eastern mainland, most recently at Ghwair I, a small Neolithic village located about 150 miles south of Amman, Jordan. He has also studied how and when the Mediterranean islands were first colonized, focusing on Cyprus.

His excavations at Ghwair I, a joint UNLV-Jordanian Department of Antiquities project, have contributed to an ongoing debate among archaeologists about the nature and complexity of Neolithic communities, focusing specifically on whether they maintained egalitarian social systems. Simmons and his colleague, Dr. Mohammad Najjar, the project's co-director, have made compelling arguments that the social hierarchy of these ancient people was much more elaborate than originally believed.

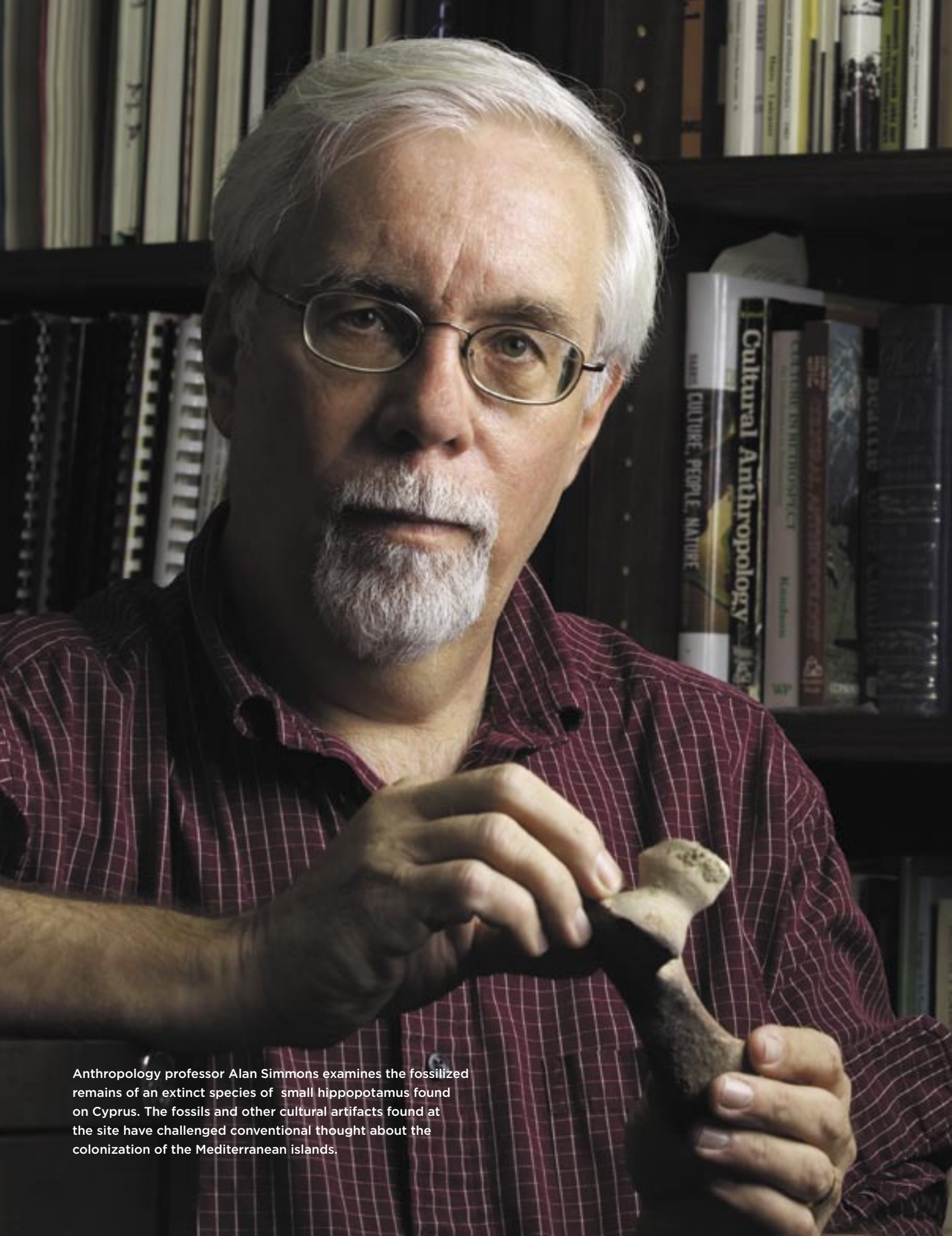
"Hints of social inequality are reflected in architecture there that is much more complex than what we would expect to find in a small village," Simmons says. "This includes spectacularly preserved structures standing up to three meters tall and a complex that may have functioned as a communal theater-like facility or public gathering place."

Simmons notes that an elaborate child burial site found there suggests that people were born into status, which is unexpected for small Neolithic settlements.

"While such sophistication might be somewhat anticipated in the large Neolithic 'towns' such as Jericho, it is surprising to see such complexity in a small settlement like Ghwair I," Simmons says, adding that its location in the extremely arid region near the Dead Sea makes it unusual as well. "Gwhair I is situated in a marginal environment where there are fairly limited resources. It would have been difficult for a village to prosper there."

Funded by the National Science Foundation, the National Geographic Society, the Brennan Foundation, and UNLV's International Program, research at Ghwair I has actively involved many UNLV students, including several who have completed or are working on master's theses or doctoral dissertations. »»»

PHOTOGRAPH BY GERI KODEY



Anthropology professor Alan Simmons examines the fossilized remains of an extinct species of small hippopotamus found on Cyprus. The fossils and other cultural artifacts found at the site have challenged conventional thought about the colonization of the Mediterranean islands.

"The research at Ghwair I contributes substantially to a better understanding of early village life and significantly aids Jordan in the preservation of its past," says Simmons, who hopes to help develop an archaeological park at the site. "We would like to continue excavating Ghwair and then preserve it for future generations to observe and enjoy."

IN ADDITION TO CHALLENGING CONVENTIONAL thought about the complexity of Neolithic societies, Simmons' work offers fresh insight into the colonization of the Mediterranean islands during this period.

Once the Neolithic Revolution became established on the Near Eastern mainland, he says, it was inevitable that the radical changes it brought would spread to surrounding areas. Neolithic economies ultimately reached Europe, but the exact trajectory of this is unclear. Along the way, it appears that several Mediterranean islands were colonized; conventional wisdom has suggested that this occurred relatively late in the Neolithic sequence.

At *Ais Yiorkis*, a small site in the foothills of Cyprus, Simmons and his research team have excavated a large circular stone structure that is unlike anything discovered in the area.

This assumption, however, has been questioned by Simmons and his research team since they discovered that the first occupants on the island of Cyprus appeared around 12,000 years ago and were actually pre-Neolithic hunter-gatherers.

"Our excavations at *Akrotiri Aetokremnos* on Cyprus generated considerable controversy," Simmons says, noting that his findings implicate humans in the extinction of a native species of pygmy hippopotamus on the island. "We found the fossilized remains of several hundred of the small hippopotami, as well as cultural artifacts indicating that humans had hunted the animals." These materials predated the Neolithic Revolution and challenged the assumption that colonization of the Mediterranean islands occurred much later.

Simmons' discovery there also established a chronological benchmark from which researchers would go on to investigate subsequent Neolithic developments. Since *Akrotiri Aetokremnos*, new research by British and French investigators has shortened the gap between the "Akrotiri Phase" and the traditional Neolithic period, establishing a previously unknown, earlier Neolithic period. In addition, the French research group also documented the presence of cattle on the island during this earlier period; previous research had indicated the presence of cattle much later in the Bronze Age (around 2,500 B.C.).

Simmons continues his research on Cyprus in a different location; he and a group of student researchers are currently involved in multidisciplinary excavations at *Ais Yiorkis*, a small site in the foothills of Cyprus that is quite distinct in terrain from others on the island. Significantly, he says, cattle remains also have been discovered there and a formerly unobserved economic practice involving an early form of cattle "ranching" has been discovered.

Simmons' team has been at work at *Ais Yiorkis* for the past three summers with funding from UNLV and private sources. They have assembled an enormous assortment of artifacts and animal remains and have also excavated a large circular stone structure unlike anything discovered in this area. While the function of this structure is as yet unclear, Simmons hopes additional excavation will clarify its nature. He was recently awarded funding from the National Science Foundation to extend his work on the island for two additional years.

As a result of his extensive research, Simmons has authored more than 80 articles, reviews, book chapters, technical reports, and monographs that have appeared in such prestigious publications as *Science, Nature, American Antiquity, Journal of Field Archaeology, Antiquity, Archaeology,* and *L'Anthropologie*. In addition, he has presented many papers to both academic and lay organizations and has been an invited lecturer at the Archaeological Institute of America and the Explorer's Club. In 2004, Simmons received UNLV's Barrick Distinguished Scholar Award.

Because of his activities in Cyprus, Simmons has been accepted into the Fulbright Commission's Senior Specialist Program, which he hopes to use as a vehicle to share his findings about the Near East with those studying human cultural development.

"So many wondrous events have occurred in this land," he says. "It is truly one of the most amazing places to study the history of humankind."

Dr. Alan Simmons received his Ph.D. in anthropological archaeology from Southern Methodist University. He holds master's degrees in anthropology from Southern Methodist as well as from the University of Toronto. His undergraduate work was completed at the University of Colorado, Boulder.

Research Report

UNLV Highlights

UNLV is a doctoral-degree-granting institution with more than 27,000 students, 5,500 of whom are graduate/professional students. The university is ranked in the category of Doctoral/Research Universities-Intensive by the Carnegie Foundation for the Advancement of Teaching. More than 100 graduate degree programs are offered, including 34 doctoral and professional degrees. Widely known for its prestigious William F. Harrah College of Hotel Administration, its research programs in energy and materials science, and its International Institute of Modern Letters, UNLV offers a broad range of respected academic programs and is increasingly recognized as a premier metropolitan research university.

In FY2004, UNLV received more than $73 million in external funding with nearly $47 million supporting research, including significant support from a number of federal agencies:

- Dept. of Energy – $24.2 million
- Dept. of Interior – $3 million
- National Science Foundation – $2.1 million
- Dept. of Agriculture – $1.9 million
- Dept. of Defense – $1.7 million

Top Five Academic Areas Receiving Research-Related Support

- Engineering – $12.9 million
- Harry Reid Center for Environmental Studies – $11.2 million
- Sciences – $7.5 million
- Education – $2.6 million
- Liberal Arts – $1.7 million

FY2004 Funding By Sponsor

- Federal – $58.6 million
- Federal Pass Through – $9.6 million
- State – $2.4 million
- Local – $1.2 million
- Foundation/Corporate – $1.5 million

SPONSORED FUNDING AND RESEARCH DOLLARS AWARDED

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End Notes

Several early faculty were committed to research at a relatively unlikely time in UNLV's history. What can we learn from them? by Suzan DiBella

To hear Jim Deacon tell it, he was not a visionary. He was just acting on the values he had acquired in graduate school.

It was 1960, and Deacon, fresh from a biology Ph.D. program at the University of Kansas, had just arrived at the small patch of desert on Maryland Parkway that was destined to become UNLV. The campus may not have been much to look at in those days, but it was an ideal spot for a young field biologist interested in conducting research on desert animals. Deacon couldn't wait to get started on his research, and it wasn't long before he had integrated it into his teaching.

"I was just expressing the values I'd learned in graduate school," says Deacon, now emeritus distinguished professor of environmental sciences. "A scientist had to do research and publish. It was just that simple. It was necessary to build a credible university."

It was just that simple. And, then again, it wasn't.

In the earliest days of the Southern Regional Division of the University of Nevada, resources were scarce, and teaching, not research, was the priority. Emeritus professor of theatre arts Jerry Crawford, who arrived on campus in 1962 and later served as dean of faculty, saw the situation from an administrative perspective.

"The attitude toward research in the '50s and '60s was that it had very little applicability to our situation because we were engrossed in large teaching loads and the considerable efforts of trying to build a new campus — all the while struggling for emancipation from the north," says Crawford, himself a playwright and advocate for research and creative activity through the years. "Only a few select professors had interest in research, let alone time to do any."

Today, Deacon recognizes that his particular field-research orientation helped bolster his scholarly productivity; he could literally step outside his door into the surrounding desert (or travel a short distance) to pursue his passion for acquiring knowledge. Had he been laboratory-bound, he concedes, his research might have suffered early on for lack of space or equipment. As it was, his trademark sunny enthusiasm for discovery, coupled with his belief that students learn best when participating in research, made him one of the longest-serving and popular researchers on campus. He retired in 2002 with 82 scholarly publications to his credit and has published four more since then.

Since the early days, research at UNLV has, of course, become a thriving and ubiquitous endeavor, considered critical to our institutional success and aspirations, and actively pursued in virtually all quarters of the campus. As Deacon notes, many of his colleagues — too many to list by name here — have been likewise committed to research and creative/scholarly activity through the years and can be credited with the steady improvement in UNLV's academic reputation.

As we approach our institution's 50th anniversary, however, we still have our challenges, several of which have not dramatically changed since Crawford's days as dean of faculty: Resources are tight, teaching remains a high priority, and building the campus will be a critical concern as long as our surrounding community continues to grow at such an extraordinary rate. Thus, the need for research support remains with us. The volume of research being conducted on campus may have grown considerably, but the fundamental need to encourage its achievement has not changed since the days when Jim Deacon was catching rattlesnake specimens in the desert not far from his office door.

> "I was just expressing the values I'd learned in graduate school. A scientist had to do research and publish. It was just that simple. It was necessary to build a credible university."
>
> —Jim Deacon, emeritus distinguished professor of environmental sciences

Thus, we introduce *UNLV Fusion*, and with it we applaud the work of the people behind the research, scholarship, and creative activity — then and now, and all along the way.

Suzan DiBella is director of communication for the Office of Research and Graduate Studies at UNLV.

We're finding jellyfish in the desert.

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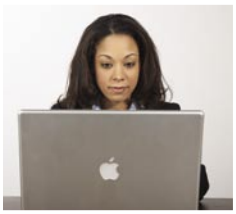


Engaging Personalities at Work

UNLV researchers view the needs of the community, state, and region as challenges that provide them with the motivation to apply their knowledge and sophisticated skills in constructive, meaningful ways. They use their expertise and creativity to conduct research that improves quality of life and transforms the community, all the while sharing their insights with students. It's really what an engaged research university seeks to accomplish — expanding understanding while serving the greater good.

UNLV – An Engaged Research University

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