

Taking Geoscience Research to the Ends of the Earth

Typically, student learning doesn't include sleeping on the ground or enduring extreme hot and cold temperatures, strong winds, the burning sun, and an earthquake. But Michael Howell and Amy Brock, graduate students working with geoscience associate professor Brenda J. Buck, didn't seem to mind. At the end of their nearly 60-mile hike into the Atacama Desert in Chile, they found what they were looking for: nothing but dry, old land.

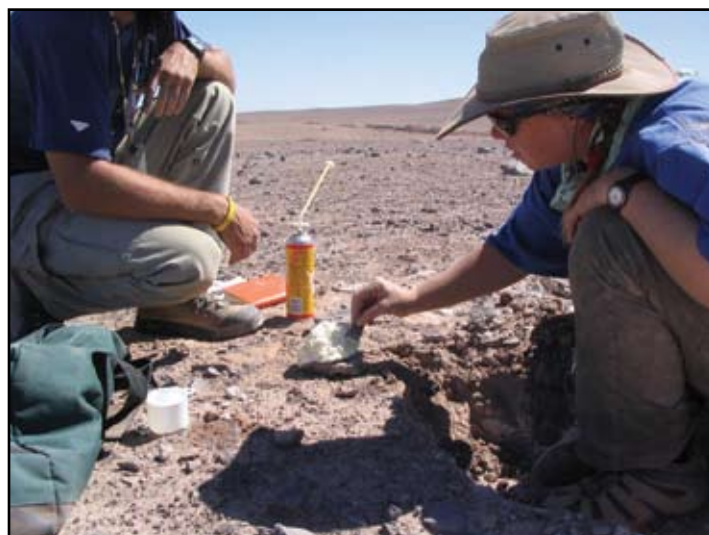
The UNLV contingent, well-prepared with necessary materials and ample drinking water, joined a research team led by Jason Rech, Ph.D. from the University of Miami, Ohio to study some of the oldest landforms on Earth. Void of water, vascular plant life, and surface DNA, the hyperarid conditions and soil offered the researchers samples which would provide terrestrial comparisons for better understanding the possibilities of life on Mars.

Hyperaridity is acute dryness, and the Atacama is the most extreme environment on Earth, having endured waterless conditions for more than 150 million years. While many Nevadans are familiar with the concept of arid lands, consider this: the area of the Mojave Desert around Lake Mead receives about four inches (1000 ml) of rain per year; the average annual precipitation in the Atacama Desert is less than five millimeters. Researchers say that this hyperarid region may have received rain only once in the last 100 years.

This lack of moisture results in the accumulation of highly soluble salt minerals, which cement the soils into hard rock. Many of the salts, including nitrate, originate from chemical reactions with ozone in the atmosphere. Records of past atmospheric processes are then preserved in these soils because of the extreme dryness.

"The trip gave me a better appreciation for geologic time and the natural processes that are at work over long time scales," Howell explained of the research. "The soils we are studying are particularly interesting since precipitation and biological activity are completely absent."

The research that Buck and her students conduct provides insight into these atmospheric conditions and in turn, environmental conditions on other planets, as this discovery parallels



Geoscience associate professor Brenda J. Buck samples soils in the Atacama Desert in Chile.

patterned ground and salt minerals that occur on Mars. The salt minerals may also provide a unique environment for life to exist in extremely arid conditions. UNLV undergraduate student Judy Costa is currently working with Buck and Henry Sun, Ph.D. from the Desert Research Institute to investigate this phenomenon in similar samples from the Mojave Desert, the Badia Desert in Jordan, and Chihuahuan Desert in Mexico.

The group also uncovered a land phenomenon never before documented—the expansion and contraction of salt minerals, called salt heave. In the Atacama Desert, Buck and her colleagues found that salt heave formed patterned ground similar to features found in periglacial environments caused by frost heave.

These geological records help researchers from around the world interpret past climates and environments, and provide insight into the processes that occur among the atmosphere, soils, and life on Earth, and possibly those on other planets. Buck's preliminary findings were presented last December at the

Continued on page 2

Letter from the Dean



**Ronald Yasbin,
Dean,
College of Sciences**

Dear Alumni and Friends,

In this issue of our newsletter, let me take a moment to thank those of you who responded so kindly to our request for updates on your personal and professional activities. We plan to feature reports from our alumni in each issue and I hope these stories will encourage more of you to contact us.

College of Sciences alumni are contributing to academia, business, government, and our society in many important and interesting

ways, and this newsletter is a great mechanism for reconnecting with faculty, friends, and colleagues across the nation and around the world. Please use the printed form available in this publication or, if you prefer, simply e-mail Bill Brown (william.brown@unlv.edu) the college's director of development.

As you read about the many activities and changes underway in the College of Sciences, please remember that none of these advances would be possible without your support. From the construction of the Science, Engineering and Technology (SET) Building, to advances in our Pre-Health Science Professional Program, and the field research of our outstanding faculty and students – each of these initiatives are enhanced with private funds.

I am so pleased that the College of Sciences is expanding its public programs. We will co-sponsor a lecture with the Student Government Association on the evening of March 1, 2006, in the Moyer Student Union. Distinguished UC Berkeley molecular biologist and geneticist Gunther Stent will offer a provocative presentation on the issues of moral philosophy and the human mind in his presentation "Paradoxes and the Limits of Human Reason." The national debate concerning the theory of evolution and "intelligent design" serves as a backdrop for this important talk. The event is free and open to the public.

As a scientist I am at home in the classroom and the laboratory, where careful experimentation including sometimes painstaking, exacting, frustrating but always fascinating research efforts help us unlock the mysteries of the universe. As dean of the College of Sciences I also have the privilege of working with a dedicated group of faculty, staff, and students who share this passion for knowledge. Each and every one of us benefits directly from your philanthropy and we are committed to producing the best science, the finest students, and the greatest university possible. Thank you for your support, your trust, and your belief in UNLV.

Please feel free to contact us at any time. We look forward to hearing from you and seeing you back on the UNLV Campus.

Sincerely,

**Ronald Yasbin
Dean, College of Sciences**

We Want to Hear from You

Send us your personal and career updates.

First Name _____ Last Name _____

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William E. Brown Jr., Director of Development
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Geoscience Research

Continued from page 1

National Science Academy in Washington D.C. Howell will present additional results at the 18th World Congress of Soil Science in Philadelphia this July.

Karen Cash, a longtime friend to the program, funded a portion of this project, which allowed Buck and the students to travel to Chile for the research.

"I can't do much, but what little bit I can contribute can only help the students who are fortunate enough to work with Brenda," says Cash. "She never ceases to amaze me at how much research she can turn out on a small amount of funding."

Brock, whose parents pitched in for expenses, says, "The trip was an amazing opportunity to work on some of the most unique and oldest landforms on the planet. I look forward to going back."

Alumni Profile: Begum Ozel

Alumni responses to our first newsletter last fall were most encouraging, and we hope to hear from many more of you in the future. We caught up with Begum Ozel, who took time from a very hectic schedule to talk about her UNLV years and career plans. Begum Ozel graduated from UNLV in 1994 with a B.S. in mathematics.

Why did you major in mathematics?

I majored in mathematics even though I always intended to apply to medical school. Mathematics was a field I found very intellectually stimulating and enjoyed very much. It was challenging and I wanted to do something a little different than most applicants to medical school. I also thought that having a great analytical background would give me an edge.

What are your favorite memories of UNLV?

I took biochemistry as a senior and that class was my greatest memory. I know that's really nerdy, but it gets worse. My favorite place to be was the biochem lab! I guess that confirmed for me that I was making the right decision going into medicine and research.

Stephen Carper was one of my professors; he was very approachable and I enjoyed working with him. He also gave me some good advice about applying to medical school. The lab group was small, only 12 students, and my lab partner, Mahesh Thapa, also ended up attending the University of Southern California (USC) Medical School, a few years after me.

How has your UNLV education contributed to your personal and professional growth?

My education at UNLV provided a great stepping stone for me to attend



Begum Ozel

medical school. My introductory biology and chemistry classes provided all the foundations I needed to succeed in my later coursework. I find that my mathematics background comes in very handy now that I am performing clinical research. Excellent analytical and quantitative skills are essential when designing studies and working with statistics. Although I may have forgotten a few of the actual mathematical methods I learned at UNLV, I still have an advantage over other physicians because I have a better understanding of mathematical principles.

Why did you make a donation to UNLV recently? Why should others?

I was prompted to make a donation to UNLV when I received the college's fall newsletter. The College of Sciences was one of the smaller colleges when I was there, and I suspect it still is. Receiving a newsletter from my own college brought back a lot fond memories and I felt a renewed personal connection. I think UNLV is an extremely important institution in Las Vegas and in all of Nevada. I can see that it is growing rapidly, along with the growth of the city and state, and there is an increasing need for support. There is also an increasing need to train scientists in Nevada and that is why I wanted to support UNLV and the College of Sciences in particular.

What are your future goals?

Currently I am an assistant professor in clinical obstetrics and gynecology at USC, and I sub-specialize in an area called female pelvic medicine and reconstructive surgery, with a focus on gynecologic surgery. This is a very new field and a difficult one to describe even to other physicians, but it offers exciting opportunities for clinical research, and I hope to pursue an active career in this research at USC. My future goals are to make an impact on women's lives on a daily basis through direct patient care, and also on a broader basis through medical research and innovation.

Pre-Health Advising: What Is It?

Assistant professor-in-residence Joseph “Nik” Nika coordinates Pre-Health Advising for the College of Sciences. Nika works with all UNLV undergraduates who aspire to attend medical, dental, or veterinary school and advises students on necessary coursework and non-curricular requirements for admission to these schools. Under his leadership, UNLV recently resurrected the Nevada Beta Chapter of Alpha Epsilon Delta (AED), the Pre-Health Honor Society. Membership currently numbers 53 UNLV students. Admission to AED requires a minimum 3.2 cumulative GPA and 3.2 science GPA. AED members participate in a number of clinical and humanitarian activities. Students have organized a toy drive for Opportunity Village and volunteered to build a house for Habitat for Humanity. Students also work with local doctors and dentists who accept students for clinical volunteer work, and the group also organizes

recruiting visits from nationally renowned health science professional schools. Representatives from Duke University, Washington University in St. Louis, and Creighton University are recent visitors.

Nika finds his extensive “one-on-one” counseling sessions with UNLV undergraduates to be among his most rewarding experiences. “The enthusiasm and dedication of UNLV undergraduates is amazing,” he said, “and my opinion is verified by every medical school recruiter I know.” A recruiter from Duke University described UNLV students as “clearly among the most outstanding I’ve had the pleasure to meet since I’ve been with Duke’s Medical School... I was overwhelmed by the level of humility of even your most accomplished students; their warmth, their maturity, and their ability to connect with me on a professional as well as personal level. This isn’t always easy to do for our young people today.”

Nika also recruits prospective students to UNLV and the College of Sciences. His recruiting program currently encompasses twelve local high schools including Clark High School Science Magnet, Rancho High School Science Magnet, Las Vegas, Del Sol, Green Valley, Foothill High School, Palo Verde, Bonanza, Bishop Gorman, and Silverado High Schools. In the past year he spoke to approximately 500 high school students, with the intention of attracting the most serious and motivated students.

The JoAnn DeLee Memorial Endowment Fund and a gift from Mrs. Bernice Philpott currently provide private support to assist UNLV’s Pre-Health Advising activities. If you are interested in supporting student scholarships, AED activities, the Association of Pre-Health Professionals (APHP) and other programs related to UNLV College of Sciences undergraduates, please contact Bill Brown, director of development, (702) 895-2079, william.brown@unlv.edu.



College of Sciences students in the pre-health program volunteered to build a house for Habitat for Humanity as a community service and to help build their resume of non-curricular requirements for admission to attend medical, dental, or veterinary schools.



National Science Foundation Research Experience for Undergraduates Program Grant

Professor John Farley and Associate Professor Andrew Cornelius are recipients of a three-year, \$258,000 National Science Foundation (NSF) Research Experience for Undergraduates (REU) Program grant. The grant supports 10 undergraduates, recruited nationally, to participate in advanced physics research projects at UNLV during summer sessions in 2006, 2007, and 2008. The undergraduate students will contribute to UNLV physics research initiatives as members of research teams in a single laboratory, and also receive an introduction to "Big Science," through exposure to Department of Energy (DOE) facilities during their 10-week program. Each

summer session will conclude with a research poster session, attended by UNLV faculty members, graduate students, and undergraduate student researchers, supported by the REU grant and other grants, from a variety of different science departments. In August 2005, two dozen undergraduate students participated in the poster session, supported by NSF, the Department of Energy (DOE), and the Department of Defense (DOD). This grant recognizes our ongoing commitment to undergraduate teaching and research and offers outstanding undergraduates a substantive and exciting introduction to UNLV's cutting edge research in physics.

U.S. Department of Energy NERI Grant

UNLV faculty members Ken Czerwinski (associate professor of Radiochemistry) and Thomas Hartmann (research scientist and director for structure and solid phase analysis (S-SPA) at the Harry Reid Center for Environmental Studies) in collaboration with Los Alamos National Laboratory colleagues Gordon Jarvinen, David Clark, and Al Sattelberger (visiting faculty member at UNLV) are leading a three-year, \$687,288 grant called "Solution-Based Synthesis of Nitride Fuels."

This grant is one of only 24 research awards totaling \$ 12 million recently announced by the U.S. Department of Energy (DOE) and provides support for universities to engage students and faculty

in advanced nuclear energy research and development programs. The awards allow selected universities to participate directly in efforts to develop advanced nuclear technologies that will enhance our environment and support an economy that is less reliant upon fossil fuels. The universities will also be directly involved in an integrated team relationship with the department and its national laboratories.

The 24 projects were selected on the basis of a rigorous peer review of 144 proposals from universities across the United States. Additional information on these awards is available at the Office of Nuclear Energy, Science and Technology's website: www.nuclear.gov

New Centers Approved by the NSHE Board of Regents

The Center for Atmospheric, Oceanic & Space Sciences (CAOS) was approved at the December 2005 Nevada System of Higher Education (NSHE) Board of Regents meeting. Most of the center's efforts will focus on participating and collaborating in funded research. The center will also compete for external funding; provide a platform for all interested and qualified NSHE faculty to start new research, nurture and sustain existing research, and/or be able to participate in Atmospheric, Oceanic & Space Science activities supported by NASA, NOAA, DOD, DOE, and NSF; build firm and equitable relations with industries doing business with NASA, NOAA, DOD, and DOE; help the State of Nevada reach its goals as an additional U.S. Space Port; and, implement NASA, NOAA, DOD, and DOE work force development programs.

The center and its members will report to the deans of Science and Engineering and the vice president for research and graduate studies. For information, please contact Dieudonne Phanor, Ph.D. at (702) 895-0361.

Name Change

Please note the NSHE Academic Affairs Council approved the following name change at their December 2005 meeting. This is the final approval.

The Center for Urban Water Conservation, profiled in the Fall 2005 College of Sciences Newsletter, is now known as the Center for Urban Horticulture and Water Conservation.

For further information, please contact Dale Devitt, Ph.D. at (702) 895-4699 or dev50@clark.nscce.edu.

Applied Geophysics Center (AGC)

The Applied Geophysics Center (AGC) was approved at the January 2006 Nevada System of Higher Education (NSHE) Board of Regents meeting. The center will conduct research in applied geophysics for southern Nevada and beyond. Applications span from the near-surface geotechnical/geoenvironmental to the lithospheric-scale (200 km depth in the Earth). Housed in the Department of Geoscience in the College of Sciences, the center will also promote awareness of natural hazards issues to the community. For information, please contact Catherine Snelson, Ph.D. at (702) 895-2916 or at catherine.snelson@unlv.edu.

University Forum Lecture on Intelligent Design

Distinguished UC Berkeley molecular biologist and geneticist Gunther Stent will offer a provocative presentation in the Moyer Student Union on Wed., March 1. The national debate concerning the theory of evolution and “intelligent design” serves as a backdrop for this important talk.

Stent, who fled Nazi Germany as a teenager, is credited with fundamental contributions in three distinct fields: molecular biology, neurobiology, and the history and philosophy of science. Today, Stent is most interested in moral philosophy and the paradoxes of the human mind.

In his presentation, Stent will discuss

the recent revival in the United States of the religious doctrine known as Intelligent Design. In a globalized society Stent notes that no other countries that have adopted western ideas and lifestyles have experienced a significant revival of this idea. He also suggests that, while the doctrine of Natural Selection continues to prevail, its long-term viability may be in question and that science may have already outrun its Darwinian epistemology.

Sponsored by the College of Sciences and the Consolidated Student Government Association (CSUN), the event is free and open to the public.

“How Can I Help the College of Sciences?”

Alumni and other friends support the College of Sciences through attendance at special events, gifts to specific programs, and undesignated gifts for Dean Ronald Yasbin to use as “venture capital” to support emerging needs.

These undesignated gifts are part of our annual giving program—an ongoing effort to increase yearly donations to support the College of Sciences directly. We invite you to support this vital effort through:

Membership in the Dean’s Associates Program. The College of Sciences recently launched a new giving club to encourage and recognize donors of the college. The Dean’s Associates gift club recognizes donors who give \$1,000 or more to support Dean Ronald Yasbin’s priorities. Members will stay current on college and campus news through special correspondence campus leadership, invitations to campus and community events, as well as updates through campus communications such as *UNLV Magazine* and individual college and program publications.

Pledges through the Rebel Ring Phonathon. Next spring, students will phone our alumni and other friends to share college and department news, and ask for support specifically for these programs. Last spring’s Phonathon, in only its second year, garnered 44 new alumni donors. Thanks for showing your Rebel Pride.

Year-End Gifts Using the Reply Envelope. Your gift to the College of Sciences may benefit your 2005 tax return. Reply with your donation using the envelope included in this mailing, and along with your thank you letter, we will mail you a receipt suitable for your tax records. UNLV and the UNLV Foundation are federally-recognized 501(c)(3) organizations.

We will be pleased to recognize you for your gift through any of these programs in the spring newsletter’s Donor Honor Roll. For more specific information on how your gift helps the College of Sciences, please contact William Brown at (702) 895-2079 or william.brown@cmail.nevada.edu.

Donor Honor Roll

The College of Sciences wishes to thank the following individuals, corporations, and foundations for their generous support between July 1, 2005 and Feb. 1, 2006. Every gift to UNLV is important and valued. It is our wish to recognize all donors correctly. Please notify the UNLV Foundation at (702) 895-3641 of any discrepancies. Thank you for your support.

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CAMPAIGN UPDATE:

College Plans New Math and Science Education Building

College of Sciences Dean Ron Yasbin begins demurely as he describes the proposed math and sciences education building. "It will be a permanent home for mathematical sciences," he tells.

But unexpectedly, his storytelling skills emerge. He envisions a planetarium that would bring research, education, and entertainment value to campus and community. He tells of interactive space that will invite learners of all ages to experience science at work in extreme environments such as deserts or rainforests. He details how students will interact with the latest software to simulate the physical effects of earthquakes, tornadoes, and hurricanes.

"It will bring excitement into all the elements of science," he says, and "we are committed to providing Nevada's next generation with the science and math skills necessary to contribute and succeed in our technology-driven society."

As extraordinary as the new center seems, the building is, at heart, the answer to the challenges of a burgeoning college. Yasbin says the plans focus on student-centered learning, with the flexibility to change to students' coursework needs and strong collaborations between the College of Sciences and the Colleges of Fine Arts, Hotel Administration, Business, and Engineering.

The interdisciplinary facility will also bring many central services, such as common laboratory prep areas and a student advising center with a developmental approach, to one building. This facility will do for teaching what the Science, Engineering and Technology Building will do for research – provide the infrastructure needed for UNLV faculty and students to improve the quality of life for all Nevadans.

"Currently, the college is spread out over five buildings," Yasbin says. "We desperately need to update our aging labs with state-of-the-art facilities, but more importantly, this will create a central point for science majors."

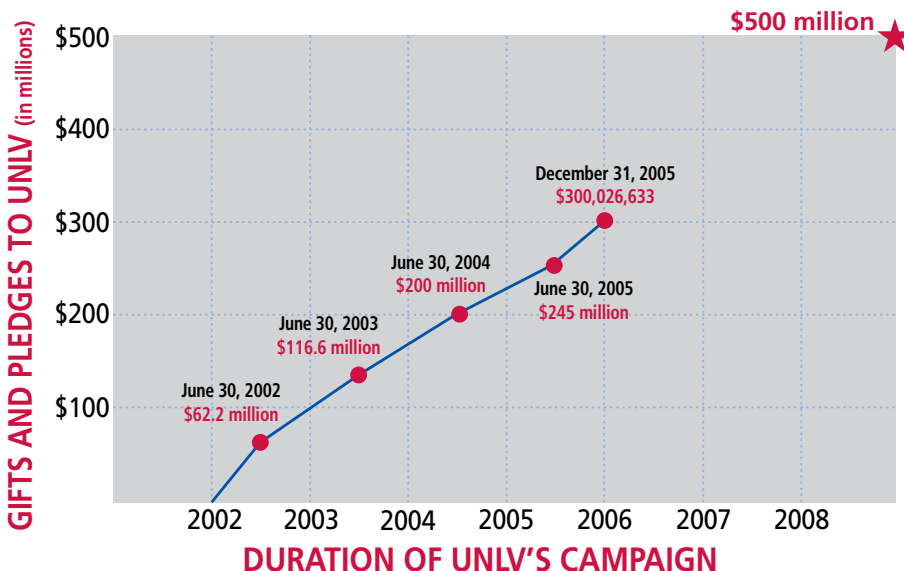
"Renovations of existing lab space would be more costly than building new ones," Yasbin says, "and the new facility will allow integrated technologies to be built directly into the common areas, classrooms, and laboratories."

Rod Metcalf, the college's associate dean for planning and construction, says that the building is only in the earliest planning stages and that these points will be considered as programming develops.

"The way we teach has changed," he says. "The spaces we have aren't adequate and the new facility will allow us to bring innovative and cooperative efforts into the classroom and beyond."

College of Sciences Campaign Funding Priorities

- Science, Engineering and Technology (SET) Building
- **Math and Science Education Building**
- Center for Urban Agriculture and Water Conservation
- History of Soils Exhibit at the Smithsonian Institution, Washington DC
- Endowed Chairs and Professorships
- Undergraduate Scholarships and Graduate Student Fellowships



Invent the Future is UNLV's first comprehensive effort to secure the promises of tomorrow through a \$500 million fundraising initiative. With your help, private funding for students, faculty, research, facilities, and programs will map a course for Las Vegas' next decade.

**College of Sciences
 Newsletter Spring 2006**

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Science, Engineering and Technology (SET) Building Update



Construction continues on the Science, Engineering and Technology, slated for completion in 2008.

The Science, Engineering and Technology (SET) Building construction project is certainly making its presence felt across campus – literally. Since breaking ground last August, Sletten Construction has focused its efforts on the project’s structural foundation and underground site utilities. Work is also in progress to interconnect the Satellite Energy Plant (SEP) and the SET Building, such as the telecommunications ductbank, which was competed in January. Installation of the structural steel began this spring.

The building will offer approximately 190,000 square feet of laboratories and teaching space, “smart” conference rooms, and integrated research space that can be easily converted from one use to another. And it will allow UNLV to recruit Nevada’s best students and continue attracting the nation’s top faculty by offering them the opportunities, resources and research environment required to be successful in their fields.