Human impact may cause Sierra Nevada to rise, increase seismicity

Like a detective story with twists and turns, University scientists are unfolding a story about the rapid uplift of the 400-mile long Sierra Nevada mountain range in California and Nevada.

The newest chapter of the research was published in the scientific journal *Nature*, and shows that draining of the aquifer for agricultural irrigation in California's Central Valley results in upward flexing of the earth’s surface and the surrounding mountains due to the loss of mass within the valley. The groundwater subsidence was found to also correlate with seismic activity on the San Andreas Fault.

“We first wrote two years ago about the rapid rise of the Sierra, with its 14,000-foot peaks in the south and 10,000-foot peaks at Lake Tahoe, moving as much as 1 to 3 millimeters per year,” said Professor Geoff Blewitt of the Nevada Bureau of Mines and Geology, a division of the College of Science.

“The puzzling results of our earlier research cannot be explained easily by geology alone. We’ve now found that a reason for the rapid uplift may be linked to human activity.”

Over the past 150 years, around 40 trillion gallons of groundwater in California’s Central Valley has been lost through pumping, irrigation and evapotranspiration. That is roughly equal to all the water in Lake Tahoe, the volume of which can cover the entire state of California in 14 inches of water.

“This massive withdrawal of water has relieved pressure on the Earth’s crust, which is now rebounding upwards in response,” Blewitt said. “This is counter-intuitive to most people, even geologists, who tend to only think that water withdrawal causes subsidence, which is only true in the sediments of the valley from which the water is withdrawn. With the weight of the groundwater missing, the hard-rock crust under the valley is actually rising too.”

The rise is quite fast in geologic time, with these mountain ranges rising by a similar amount each year — about the thickness of a dime — and with a cumulative rise over the past 150 years of up to 6 inches, according to calculations by the team of geophysicists.

Blewitt and colleague Bill Hammond, who run the University’s Nevada Geodetic Laboratory, partnered with scientists at the University of Western Washington, University of California, Berkeley and University of Ottawa in the research.

Hammond and Blewitt use data from their lab and its GPS Network, the largest GPS data-processing center in the world, able to continuously process information from about 12,000 stations around the globe, including more than 1,200 stations from the NSF EarthScope Plate Boundary Observatory as well as stations in space. The space-based radar data comes from the European Space Agency with support from NASA.

—Mike Wolterbeek ’02

*Signs on the pole show the approximate altitude of land surface in 1925, 1955 and 1977 in the San Joaquin Valley southwest of Mendota, California. Research now shows that groundwater depletion has contributed to this subsidence and the rapid uplift of the Sierra Nevada mountains and the California Coast Range.*
NevadaFIT boot camp prepares freshmen for success

The transition from high school to college can be daunting, but 400 incoming freshmen are better prepared for the challenge ahead after taking a five-day boot camp that had them studying, taking classes and exams, attending lectures and working in labs from 8 a.m. to 9 p.m.

The boot camp, an intensive academic preparation program named NevadaFIT, was offered the week before the academic year started and extended a glimpse into the University's rigorous academic expectations and the time demands of college life. The optional program may sound grueling, but it is actually designed to help students more easily make the transition.

NevadaFIT, where FIT stands for freshman intensive transition, is not a remedial program meant for students to catch-up to college level. Rather, it is about learning how to be successful in college.

NevadaFIT includes eight separate boot camps spanning the breadth of the University, from atmospheric sciences to veterinary science, from engineering to neuroscience, from biotechnology to journalism. They all use the same basic program concept, although customized for each college. The program was expanded on campus this year after the success of BioFIT conducted for incoming biology majors last year.

“Academic boot camps dramatically increase academic performance and student success rates,” said Kevin Carman, executive vice president and provost, who helped pioneer the nation’s first freshman intensive training program at Louisiana State University. “It’s exciting to see these students recognize and embrace the hard work needed to be successful. Students who go through boot camp are twice as likely to graduate in their major. We give them tools for success.”

A typical day of the program started with 7:30 a.m. breakfast, then a lecture followed by a lab class, lunch, study session and an exam. After a writing study session, the students had dinner, another lecture and exam discussion. Throughout their busy schedules, the students also attended sessions to help them understand note taking and learning styles, how to deal with stress and test anxiety, as well as academic integrity and decision making.

—Mike Wolterbeek '02

Study habits, time management and even financial management were topics introduced to students in the NevadaFIT academic boot camp prior to the start of the semester.
K-12 outreach: Campus camps extend learning and summer fun

They flew mini-copters and explored aeronautics. They learned about computer programming, 3D modeling and computer graphics. They honed athletic skills and musical abilities. They gained familiarity with and confidence in a college setting and classrooms.

Each summer the University of Nevada, Reno hosts thousands of K-12 students in a wide variety of summer camps, from sports camps hosted by Wolf Pack Athletics, to academically oriented camps hosted by many of the colleges, to Kids U, a series of week-long sessions of programs and activities to energize kids’ minds and bodies.

Two programs in particular create an experience that helps low-income, first-generation middle- and high-school students stay on the path to higher education and career readiness. The Upward Bound and Dean’s Future Scholars programs have year-round program elements, and both programs expand to include comprehensive summer camps.

“This program provides kids who don’t otherwise have the resources to attend summer camps with the opportunity to live on a college campus and get a summer-camp experience,” Ellen Houston ‘96 (journalism), ‘05 M.A. (counseling and education), director of Upward Bound programs, said of the rigorous, five-week summer academy for 14- to 17-year-old high school sophomores, juniors and seniors from six target high schools in Washoe and Lyon counties. “Our students get ahead of the curve, do well in school, graduate and matriculate to higher education.”

An outreach program of the University’s College of Education, Dean’s Future Scholars (DFS) is in its 14th year of serving the goal to increase the number of low-income, first-generation students graduating from high school, gaining access to higher education, and entering a career in education.

“Math is a big focus for us because we know a lot of these kids need help in this area, and research indicates that math-course-taking patterns are a major predictor of college enrollment and persistence,” said Mariluz Garcia, DFS director. “Our goal is to get them ahead and show them what they can achieve with a solid support system in place.”

—Jane Tors ’83

Exposure to books at home is key to academic performance

A 42-nation University of Nevada, Reno research study shows the number of books in a child’s home is a key factor in academic performance.

Mariah Evans, professor of sociology in the University’s College of Liberal Arts and Nevada Agricultural Experiment Station, along with colleagues Jonathan Kelley and Joanna Sikora, examined the relationship of standardized reading-test scores to the number of books a family has in their home library.

For years, educators have thought the strongest predictor of attaining high levels of education was having parents who were highly educated. Evans, also a faculty member of the Interdisciplinary Program in Social Psychology, and coordinator of the Applied Statistics Program, released a study in 2010, which statistically analyzed 27 nations and found “home library size has a very substantial effect on educational attainment.” Moreover, the effect was strongest for children whose parents had very little education.

In the newly released article in the social research journal Social Forces, “Scholarly Culture and Academic Performance in 42 Nations,” (published by Oxford University Press), Evans and her colleagues, who are with the International Survey Center and the Australian National University, find a key aspect of scholarly culture, the number of books in the family home, exerts a strong influence on academic performance.

“Regardless of how many books the family already has, each addition to the home library helps children do better (on the standardized test),” Evans said.

—Natalie Savidge ’04
Much more than just an illusion

Before a crowd of more than a thousand, graduate psychology student Christopher Blair represented the University and presented the Dynamic Ebbinghaus illusion at the 10th annual Best Illusion of the Year Contest hosted by the Neural Correlate Society in St. Petersburg, Fla. His illusion took the top prize.

Visual illusions contribute to the understanding of the basic mechanisms of sensory perception. The Dynamic Ebbinghaus illusion begins with a static image of a circle surrounded by a set of circles. The image is transformed into a moving display and, as it moves, it appears the center circle changes size, though it does not. Blair worked on this illusion for more than a year under the guidance of Assistant Professor of Psychology Gideon Caplovitz and Faculty Research Scientist Ryan Mruczek in the Department of Psychology. Caplovitz helped earn a top-10 spot for University-submitted illusions in three of the last four years and earned third place in 2006.

“The mission of the contest is to highlight the role of illusions in the study of visual perception and the visual brain, and to create a bridge from our research to the general public,” Caplovitz said.

—Annie Conway, Class of 2015

The Department of Psychology team of Ryan Mruczek, Christopher Blair and Gideon Caplovitz won Best Illusion of the Year at the 10th annual international contest. Caplovitz, an associate professor, has helped earn a top-10 spot for a University-submitted illusion in three of the last four years.

LOOK ONLINE
To view the illusion: visit http://www.unr.edu/silverandblue

Why choose the Online Executive MBA from the University of Nevada, Reno?

- Faculty from one of the top part-time MBAs in the U.S.
- Convenient online format
- Competitively priced

Business knowledge is market power.
Designed by business leaders for working professionals like you, the Online Executive MBA is one of the best values among EMBA programs today.

Find out more at www.emba.unr.edu
International mountain-ecosystem scientists convene at University

More than 170 scientists from Asia, Europe, Africa, South America and the United States came to Reno in July to discuss mountain environments, with the goal to move toward a more comprehensive global mountain observation network. The University was selected to host the conference because of its tradition of field work and research, innovative observation systems established by faculty, and the region’s variety of ecological and social interactions.

“The importance of mountain environment systems drives our economy from Lake Tahoe to Pyramid Lake, just like it does in communities around the world,” said University Executive Vice President and Provost Kevin Carman at the conference. “Monitoring the snowpack, for example, is imperative to knowing how much water we have, which is true in all mountain areas around the world.”

One could say environmental monitoring on a large scale started in 1905, on the flanks of the 10,700-foot elevation Mt. Rose, with the first snow survey system created by University Professor James Edward Church to determine how much water the snow run-off would supply to Reno and northern Nevada. Because his survey method extended across the Sierra, it helped forecast water for domestic uses and the important agricultural industry in California’s Central Valley. Today, use of his survey method continues across the Sierra and around the world.

“Mountain Observatories—A Global Fair and Workshop on Long-Term Observing Systems of Mountain Social-Ecological Systems”

This tower is part of the NevCAN system operated by the University with partners University of Nevada, Las Vegas and Desert Research Institute. The network includes a dozen monitoring stations in Nevada with the capability to detect, analyze and model effects of climate change on landscapes, ecosystems and water resources. INSET: James Edward Church, University professor, 1892 - 1948.

was organized by the Mountain Research Initiative at the Institute of Geography in Switzerland, in partnership with the University’s Extended Studies program and the DendroLab run by Franco Biondi, professor of geography at the University and conference co-organizer.

—Mike Wolterbeek ’02
One of the most interesting makerspaces in America

The University’s DeLaMare Science and Engineering Library is leading the way in creating a new example of the makerspace, an area that appeals to the spirit of invention by providing tools and resources for people to discover, create, design, model, engineer and learn. DeLaMare’s makerspace was recently named one of the most interesting in America by Make Magazine.

“To be recognized alongside other pioneering and forward-thinking makerspaces at some of the nation’s most innovative institutions and communities is truly commendable,” Mridul Gautam, the University’s vice president for research and innovation, said. “The DeLaMare has become a model for others to follow.”

This summer, the staff at DeLaMare rearranged the ground floor of the library in the Mackay School of Mines building to make the space even more functional as a makerspace. It offers zones of self-directed learning and offers a variety of software and 3D printing technology to inspire creativity and engineering. Google Glass and Lego kits are available, as are Arduinos, tools that develop interactive objects and are open-source physical computing platforms, and Raspberry Pi, a small computer that allows people to learn how to program in languages such as Scratch and Python.

Two student 3D “wranglers” are available by appointment to assist with the 3D printers or to trouble-shoot problems.

—Annie Conway, Class of 2015

**Faces on the Quad**

**Gemma Beltran** was one of 28 GEAR UP alumni selected from across the country to participate in the national GEAR UP Alumni Leadership Academy this past summer. The group traveled to Washington, D.C. where they experienced Capitol Hill and received leadership training. Beltran graduated from Wooster High School in 2012 and earned more than $30,000 in scholarships, including a Nevada State GEAR UP scholarship. A first-generation student and biology major who seeks ways to give back to her schools and community, Beltran said, “GEAR UP gave me an opportunity; it has helped me pursue my dream of going to college.”

**Jake Pereira** is president of the Associated Students of the University of Nevada (ASUN) for 2014-15. Originally from northern Idaho, Pereira has found a passion for all-things Nevada since moving to Reno. He has fulfilled various student-leadership roles, including serving as the director of traditions for ASUN and president of Sigma Phi Epsilon, and has represented students on various committees. Pereira believes a strong connection between the University and the City of Reno is crucial to an enriched college experience. In his free time, Pereira loves to hike, snowboard and spend time at Lake Tahoe.

**RJ Boyajian ’14** M.A. (political science) is continuing as president of the Graduate Student Association (GSA) for 2014-15. This second term as president marks her fourth year as a representative on the GSA council. Boyajian is a doctoral candidate in the Department of Political Science where she recently earned a master’s degree. Her research explores the relationship between education policy and democratic stability in the developing world. Additionally, she has a master’s degree in international business administration and a master’s degree in global leadership from the University of San Diego. Before graduate school, Boyajian ran her own consulting company and specialized in marketing, strategy and program management. Her business took her all over the United States and to three other continents.

**Miwako Schlageter** and **Nolan Nicholson**, both honors students and seniors, were awarded a U.S. Department of State Critical Language Scholarship to study critical-needs languages this past summer. Schlageter spent nearly 10 weeks in Japan and Nicholson spent the same amount of time in China. Schlageter is pursuing dual degrees in international business and marketing with a minor in Japanese studies. She has worked as a career mentor for the University’s Nevada Career Studio and is an Honors Program ambassador. She previously worked for Circle K International, promoting leadership development, education and community service. She hopes to align her interests in global marketing and the Japanese culture. Nicholson will graduate in May with a degree in chemical engineering and a minor in business administration. The Douglas High School graduate was awarded a full-tuition scholarship to the University as a National Merit Scholar. Nicholson is an intern for the University’s Technology Transfer Office and is a University Innovation Fellow, studying the innovation and entrepreneurship landscape of the University. Nicholson wants to gain experience in chemical engineering, explore the applications of nanotechnology and one day start a high-tech company.
Grad-student team has winning plan for battery business

There are more and more uses for lithium-ion batteries, and a University graduate-student team’s winning business plan focuses on this emerging business trend. The team behind Dragonfly Energy won first place and $30,000 in the graduate level of the annual Donald W. Reynolds Tri-State Governor’s Cup.

The Tri-State Governor’s Cup, funded largely by the Donald W. Reynolds Foundation, is a collegiate business-plan competition that brings together Nevada, Arkansas and Oklahoma graduate and undergraduate business students to compete.

The team of College of Business Executive MBA students Denis Phares and Sean Nichols ’10, along with mechanical engineering doctoral student Justin Ferranto ’06 M.S. and faculty mentor Matt Westfield, was the first team from Nevada to win the tri-state competition. They earned an additional $2,000 for winning the 90-second elevator pitch.

The business plan for Dragonfly Energy, an active Reno-based company, concentrates on the process to streamline the manufacturing of lithium-ion batteries to reduce manufacturing costs by 50 percent. The team was a finalist in the University’s Sontag Entrepreneurship Competition in March and came in second in the Nevada’s Governor’s Cup Graduate School competition in April, qualifying them to move on to the Tri-State Governor’s Cup.

—Annie Conway, Class of 2015
Caring for our iconic campus trees

The Quad has long been considered the historic heart of the University of Nevada, Reno campus, and its tree canopy is one of the landmark’s most distinguishing characteristics.

With an eye toward preserving the beauty of the Quad and its tree canopy for future generations, a committee with representatives from faculty, staff, students and the Alumni Association joined with the Facilities Services Department last year to explore key questions. What is the projected lifespan of the Quad’s iconic elm trees? What actions should be taken today to extend their health? Should long-term planning for the next generation of trees begin?

The central finding of the effort was good news: Many of the Quad’s trees have the potential to live another 100 years with proper management.

The Quad-tree assessment and planning project was completed with Design Workshop, a landscape architecture and urban design firm in Stateline, Nev., and involved James Urban, one of the country’s leading urban foresters. All involved were understandably happy to learn the elms, on the Quad in particular, are doing well and are expected to continue to live for decades with the right care and management. Throughout the entire campus, only eight trees were noted as being in precarious health.

The foresight of the original designers in understanding soil and drainage needs of the trees and turf has contributed to the continued health of the trees.

“Apparently, they brought in pretty good soil in the beginning,” said Raymond Needham ’05 (general studies), coordinator of the Scheduling Services Department who has served on the University’s Arboretum Board for 13 years and as the board’s chair for six. “They planted cottonwoods, which are native and fast-growing, then a few years later they interplanted elms, which are longer lived and look better in older age. The cottonwoods were eventually removed to give more growing space to the elms since it would have been far too crowded with all those trees.”

Efforts to augment and improve the soil conditions on the Quad have been renewed in recent years with the annual application of an organic solution to reseed and fertilize. Newer, environmentally sensitive pruning practices and equipment are now being utilized as well.

The Arboretum Board and Facilities Services partnered on another tree-friendly initiative this year. As part of the demolition of the Getchell Building, many trees originally planted around the building were removed and saved. In April, five Columnar Maples from the Getchell site—each roughly 40-feet tall—were replanted on the southeast side of Lawlor Events Center.

—Deanna Hearn ’75

Top tier, record enrollment for University of Nevada

The University of Nevada, Reno entered its fourth week of the fall semester with some very good news: Enrollment is at all-time high and the University is again ranked in the top tier of “best national universities” by U.S. News and World Report.

Of the nation’s thousands of universities and colleges, U.S. News surveys more than 1,600 through its ranking process. Schools in U.S. News’ “best national universities” category offer a full range of undergraduate majors, masters and doctoral degrees and are committed to a productive research program.

The University of Nevada, Reno ranks No. 110 among the “top public schools.” In addition to the University’s overall ranking, the College of Engineering and the College of Business are again ranked among the “best colleges” in this year’s survey of undergraduate programs.

In addition to the positive national rankings, overall student enrollment is 19,954, up 6.2 percent from last fall’s 18,776. New freshman enrollment is up almost 10 percent, and the University has seen a more than 14 percent increase in students of color.

Overall student enrollment is 19,954, up 6.2 percent from last fall’s 18,776.