



UNIVERSITY OF NEVADA, LAS VEGAS

Geoscience Department

IN THIS ISSUE

Letter from the Chair	1
Department News & Events	2
Welcome New Faculty!	4
In Memory of David L. Weide	5
4th Annual GeoSymposium	6
Grad Students Unravel Arctic Climate History	8
Spotlight on Faculty Research	9
Spotlight on Students	10
Alumni News	12
Department Scholarships	13
Student Awards	14
Faculty Accomplishments	14
Donors & Donating	15
Update Contact Info	16

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Greetings from the UNLV Geoscience Department!

With the looming budget situation, it is a difficult time to write to you with much ebullience (what a difference a year makes), but there are a number of very encouraging things that have happened, or will shortly happen, that will positively impact our department that I wish to update you on. First, let's dispense with the difficult news.

This past June marked the passing of our long time faculty colleague and friend, David L. Weide (see article within). To those of you who had the benefit of knowing Dave (aka Dr. Doom), he is deeply missed.

We are currently facing some exceptionally challenging times in both our personal and professional lives resulting from the downswing in the economy. We hope you are all doing well and have weathered the storm, and if not, that things improve for you later this year. At UNLV, we still do not know what the future holds with respect to funding for higher education. Nevada has the largest gap in the country between revenue and expenses, 30%. The Governor has proposed a 36% cut in the state budget in Nevada, which translates to a 54% cut for UNLV. Clearly this is untenable, and would essentially unravel the very institutions that are working to ensure Nevada has an educated workforce, is able to make innovative discoveries of resources and technologies to be economically viable in the future, and can address fundamental societal needs. If you consider that the baseline going into this budget cycle is that Nevada's state government spending as a share of total state income is lowest in the nation, even more modest cuts will tip the balance, upsetting the forward momentum the Geoscience Department and UNLV have made over the last decade towards becoming a quality urban research department and university. With that said, the Nevada legislature, together with a Chancellor who is very proactive on the behalf of higher education, spurred by input from proactive faculty, students (see article page 11), and staff, are working hard to develop fiscal solutions that are both acceptable for the short term and sustainable for the long term. As our funding formulas for higher education are more than 30 years old, it is time for a change. Stay tuned for what the future will hold, and I hope to bring you some encouraging news next year! *Continued on Page 2...*



Students, staff, and faculty of the Geoscience Department gather for a group photo

Photo by Tom Muntean

Department News & Events

Letter from the Chair, continued from Page 1

Now on to the good news! The Geoscience Department continues to improve its research facilities, undergraduate and graduate programs, and national reputation. During



Michael Wells, his former student Tonia Arriola (center), and her guest Lauren (left) enjoy the Alumni Reception in Houston, TX
Photo provided by Maria Figueroa (October, 2008)

the course of this year, many of our analytical laboratories, and some of our faculty and graduate students, will be moving into the new Science and Engineering Building (SEB). The SEB is a spectacular, 5 floor, 205,800 ft² interdisciplinary science building with a theme of science on display – LED monitors in the lobby allow a bird's eye view into ongoing research experimentation and analysis, and laboratories are visible through window portals in hallways. The building is designed to promote interdisciplinary research, with flexible laboratory and teaching spaces, many high-tech conference and breakout areas, and will house 7200 ft² of well appointed, state-of-the-art Geoscience laboratories. The new building will be a major improvement in our research and teaching facilities and we are greatly looking forward to use of this modern facility. As a side note, this will give the department the dubious distinction of having space in the newest and oldest buildings on campus!

The Geoscience department has continued to make notable strides in increasing its emphasis and achievements in research with planned growth of its PhD program, while maintaining strong undergraduate and MS programs. I am very pleased to note that this has been achieved while maintaining the esprit de corps among our students and faculty that has long been a hallmark of the department. We had a great year in graduate recruiting of our incoming graduate class and successfully competed against some of the top universities in the country. We are proud of the many achievements of our undergraduate and graduate students; these achievements were well showcased in 41 presentations made at our 4th Annual Geosymposium held last month (see article within). A few specific congratulations are in order (also see page 14): the best thesis and best dissertation awards for the College of Sciences went to Geoscience MS student, Todd Arrowood, and PhD student, Jun Yin; Kelly Robertson was awarded one of three prestigious UNLV President's Fellowships; the Fay and Jack Ross Family Scholarship was awarded to incoming PhD student, Alison Sloat; Matthew Lachniet has been promoted to Associate Professor with tenure, and Zhongbo Yu

has been promoted to Full Professor; congratulations to you all!

As always, we love to hear from our alumni and friends, so please stay in touch. You can update your contact information by using the enclosed form, emailing the department at geodept@unlv.edu, or submitting the online contact form found on our website at <http://geoscience.unlv.edu/AlumniContactForm3.html>. We greatly enjoyed seeing many of you at the UNLV Geoscience alumni reception in Houston last fall, and hope to see some of you in Portland or San Francisco this year.

Michael Wells, May 2009



Left to Right: PhD student Colin Robins, our first Ross Scholar, stands with Michael Wells, Jerry Blut, Wanda Taylor, and Sarah Beck
Photo provided by Michael Wells

Establishment of the
Fay and Jack Ross Family
Graduate Scholarship

Last Fall, the Geoscience Department hosted a very special event in our history, celebrating a major gift that established an endowment to support graduate education. The Fay and Jack Ross Family, represented at the reception by Sarah Beck and Jerry Blut, have established the Fay and Jack Ross Family Graduate Scholarship. This new, prestigious, and highly competitive graduate scholarship will be awarded to outstanding PhD applicants to our program. The scholarship compensation package is very competitive with similar scholarships offered at major research institutions across the nation, and will be used to recruit and retain the best and brightest students to explore critical issues of geoscience in Nevada, and the nation.

What does this gift mean to the Department? This gift is highly significant in the evolution of the UNLV Geoscience Department, and of UNLV, towards the goal of becoming a Tier 1 research university. The scholarship will raise the profile of our now decade-old, and growing, PhD program, and provide critical support for gifted PhD students for years to come. We thank the Fay and Jack Ross Family, and the representatives of the Family, for their philanthropic generosity that will have a major positive impact on our graduate program.

Colin Robins was our first Ross Scholar (2008/2009), and we congratulate him for this distinction!

Michael Wells, March 2009

Department News & Events



Nationally Sponsored Geoscience Academic Workshop to be held at UNLV

The Department is hosting a national workshop, July 16-18, 2009, entitled *Preparing for an Academic Career in the Geosciences: Workshop for Graduate Students and Post-Doctoral Fellows*. The workshop is part of the National Geology Teachers Association's project called *Cutting Edge: Professional Development for the Geosciences*, and is funded in part by the National Science Foundation. Several of these *Cutting Edge* workshops are offered each year and attract participants from across the nation. The venue for this upcoming workshop is the recently opened UNLV Student Union, the same facility the Department used to host last year's successful Geological Society of America Cordilleran-Rocky Mountain Section Meeting. Workshop conveners are Heather MacDonald (Geology Department, College of William and Mary), and Robin Wright Dunbar (Center for Teaching and Learning, Stanford University). The workshop will include faculty panels discussing academic careers and academic job searches, and breakout discussion sessions dealing with how to become both a successful teacher and researcher. Faculty mentors and student/post-doc participants will come from universities across the nation; both faculty and students from UNLV will also be involved in this workshop. *Rod Metcalf, March 2009*



Noted Geologist Returns
to the Department:
Peg Rees to Focus on
Teaching & Public Lands

Dr. Peg Rees has returned to the faculty of the UNLV Department of Geoscience after eight years in university administration. She first joined the faculty in 1985 and previously served as chair of the department. Rees holds the rank of Full Professor.

"I am happy with this opportunity to be more involved with the geoscience community," said Rees. "By teaching Geology 101, I look forward to opening the eyes and minds of students to the wonders of geology, with the hope that the science of geology will entice some of them to pursue

geology as a profession."

Rees also plans to increase her time spent in the field. She will lead an eight-day raft trip through Marble Canyon and Grand Canyon May 29 - June 5, 2009. For more information, please contact the UNLV Division of Educational Outreach at 895-3394.

Rees continues as executive director of the Public Lands Institute, which she founded in 2005. The historic Walking Box Ranch near Searchlight is among the research endeavors at the institute. The ranch is available to geologists, and other scientists, for overnight stays or longer while working in the field. Please call 895-5165 for more information.

Rees previously served as Associate Vice President of Research and Community Outreach from 2005 to 2008, and Associate Provost of Academic Resources and Senior Vice Provost from 2000 to 2005. She is a recipient of the U.S. Congressional Polar Medal, a Fellow of the Geological Society of America, a member of numerous scientific societies, and co-author of many scholarly papers, as well as a book, book chapter, and geologic map. Recently, Rees was honored by Congresswoman Dina Titus of Nevada's Third District when Titus spoke on the House floor in support of a bill supporting the goals and ideals of National Women's History Month. Titus cited Rees as one of the respected scientists in Nevada who play an important role in protecting the environment.

Rees received a bachelor's degree in geology from Sonoma State University in California, and a master's degree and PhD in geology from the University of Kansas.

LaNelja Rolley, April 2009

The Department Office Welcomes New Staff

Since the last newsletter went out in Spring 2008, the Geoscience Department Office has seen some changes. Our previous student workers, Nuvia Quinonez and Sam San Diego, have left to continue their prospective journeys, but we welcome our new student workers, Joy Martinez and Rainee Tiske to the Department! We also welcome the addition of Kathryn Birgy, our new administrative assistant, who comes to us from the UNLV School of Life Sciences. We are happy to have you all as part of our Geoscience family!

On another Office note, our Accounts Manager, Liz Smith, was nominated for the UNLV Classified Rookie of the Year award for 2008. While she did not receive the award, she is certainly deserving of this recognition, and we are all grateful to have her as part of our team!

Becki Huntoon, May 2009

Welcome New Faculty!

Sean Mulcahy, Assistant Research Professor

August 2008



I received my PhD from UC Davis in 2009, and my BS from Virginia Tech in 2002. I started work in August, 2008 as an Assistant Research Professor in the

UNLV Geoscience Department, in charge of maintaining the Electron Microanalysis and Imaging Laboratory (EMIL). My research broadly aims to address three fundamental aspects of continental deformation: 1) Strain localization and shear zone rheology, 2) Interactions between melting and deformation, and 3) Exhumation of high and ultra-high pressure metamorphic rocks. To address these issues, I use a field and laboratory based approach that combines structural geology, metamorphic petrology, and geochronology.

Scott Nowicki, Assistant Professor in Residence

August 2008

I am coming most recently from a teaching and research position at Colgate University in Hamilton, NY, where I was the Boyce Post-Doctoral Fellow in Geology for the 2007-2008 year. Before that, I taught for a year at the University of Portland in OR. I got my PhD from Arizona State University in 2006, where I worked on a number of active missions on Mars, and developed planetary-scale models to understand the thermal environment.



Now that I'm here at UNLV, I'm excited to be in this "Assistant Professor in Residence" position. My job is to focus on teaching courses at the undergraduate level, and contribute to the Department's efforts in providing a comprehensive undergraduate experience in Geoscience. Unlike most other faculty in the Department, I don't have to worry about developing a research group, running a lab, or attracting graduate students. Instead, I can focus on teaching in innovative ways, developing fun classroom experiences, and spending time interacting with students at all levels.

The courses I teach include Physical Geography, Natural Disasters, and GIS.

My research interests have mostly revolved around Mars, but I've been developing more interest in the planet that we live on, since it's quite a bit easier to do field work on Earth. Currently, undergraduate Erin Orozco is working with me on the project I started developing at Colgate. The goal is to create a link between the types of observations we make on Mars with thermal infrared spectrometers and the geologic observations we typically use on Earth. The whole point is to turn fairly complex modeled data about the climate and radiative environment into geologically interpretable information. I'm into this project because it's a chance to turn what's happening on Mars into something we can investigate and observe on Earth.

Elisabeth (Libby) Hausrath, Assistant Professor

January 2009

I joined the Geoscience Department this January, arriving at UNLV after a postdoc in Houston at NASA Johnson Space Center. My research interests focus on chemical weathering, and how it is affected by factors such as climate, physical erosion, and biology. I use a variety of techniques to analyze these processes, including laboratory experiments, field work, and modeling.



I grew up in Idaho, spending a lot of time hiking and backpacking in the outdoors. When I went to college at Brown University, I intended to be either a chemistry or biology major. Instead, however, I was attracted into the Geology Department by the fun department field trips, the warm interactions with faculty and other students, and the excitement of learning to understand the geological phenomena I had grown up observing.

I then attended graduate school at Penn State, where I studied the kinetics of water-rock and microbe-mineral interactions, focusing particularly on the chemical weathering of basalt. At this time, I also became interested in water-rock interactions involving basalt on Mars, documented by the Mars Exploration Rovers. I did postdoctoral research at NASA Johnson Space Center in Houston, focusing on interpreting phosphate-rich soils and altered rocks on Mars using a variety of experimental techniques.

I am happy to be part of the Geoscience Department at UNLV, and am looking forward to answering interesting questions with students and colleagues.

In Memory of David L. Weide

Geoscience Faculty 1973-2004



Dave celebrates his 50th birthday (1986) Photo provided by Jean Clark

David L. Weide, Professor Emeritus in the UNLV Geoscience Department, passed away on June 25, 2008. David earned his BS degree in geology from CSU, Los Angeles, and his MS degree from UCLA, followed by his PhD from UCLA in 1974.

David L. Weide joined the faculty of the UNLV Department of Geoscience in 1973, when there were only four other faculty members. His leadership, knowledge, commitment, and unique style of spirited and overt enthusiasm helped to create an internationally recognized department of twenty cohesive full-time faculty that continues to demonstrate a commitment to excellence in teaching, research, and service. Dave had many positive impacts on the Department, and a particularly appreciated one, was his generosity in sharing all his teaching and research resources with beginning faculty to help them get started in their new careers. His genuine curiosity and interest in the work of others helped to make new faculty and students feel welcome. He served the Department in innumerable ways, including as Chair from 1989-1993, and at some point served as chair or member of nearly every standing committee. He was a very active participant in creating the Master's program in the Department, beginning in 1984, and later the Doctoral program. He helped build camaraderie, particularly amongst faculty, students, and staff in the Department, and celebrated that effort by holding one or more barbeques at his house, and at his expense, every year.

Dave taught geology and geography at all levels, but was renowned for his teaching style in the introductory classes, where he engaged students in learning and drew upon his background in theater to keep their attention. His acting ability, as well as his knowledge, garnered him the spokesperson for the University on radio and television whenever an earthquake occurred or a flood event hit the area. During his 31 years at UNLV, he taught some 5,279 students, including 4,022 in Geography 101; 748 in Geology 101; 306 in Geomorphology; and many more in 15 other courses. David Weide was the recipient of the UNLV College of Sciences' Distinguished Teaching Award for the



Overton, Nevada (1979) Photo provided by Jean Clark

1997/98 academic year. But his contributions to his students, colleagues, the University, and community reached far beyond mere numbers alone. He was a vital part of those academic pioneers who worked diligently to establish UNLV as a fixture in our community and a major entity in higher education.

Dr. Weide's research interests included urban geologic hazards, including flood hazards, unstable soils, tectonic-seismic hazards, and mass movement. He authored many peer-reviewed scholarly articles, government and consulting reports, and over twenty-five geologic maps. These maps provide primary research data across much of the United States, and many are used currently here in southern Nevada. Dave brought a breadth of knowledge and experience to UNLV by serving as a geologist with the U.S. Geological Survey, as Senior Museum Scientist at the UCLA Department of Geology, as a geologist with the University of California Archaeological Survey Office, and with the National Science Foundation European Projects. He was a consultant to the State of Nevada Governor's Office and served on the State of Nevada Earthquake Safety Council.

Among David's many passions was folk music. This interest was kindled in 1951, when, at the age of 15, he attended a Los Angeles concert by the legendary Pete Seeger. He soon began collecting the (then) new 33 1/3 rpm recordings of American and British folk music. Some 53 years later, he donated his collection to his alma mater, UCLA, and its Ethnomusicology Archive. His collection included some 3,535 LPs (vinyl), 2,426 compact discs, and 1,690 cassettes. In 1984, he was invited to produce and host a radio program on KNPR, the Las Vegas public radio station. On September 10, 1989, he moved the program to KUNV, the FM radio station operated by UNLV.

On July 1, 2004, Dave Weide, older, grayer, somewhat wiser, but in no way more subdued, retired from the Geoscience Department. What a long, strange, but wonderful trip it has been.

The Department has set up a Memorial Fund in Dave's honor, to support the establishment of a memorial lecture series, and memorial bench to be placed in our new xeriscape garden, a cooperative turf reduction project between Geoscience and Robert Lynn of UNLV Landscape, Grounds, and Arboretum. If you would like to make a donation, please visit the Department website (<http://geoscience.unlv.edu/support/geoscience.htm>) and follow the instructions to donate online, or through William Brown in the College of Sciences. Peg Rees, Michael Wells, & Becki Huntoon, February 2009

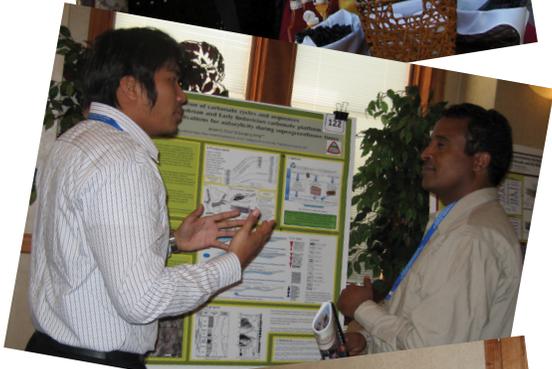


Trip to the Sierra Nevada Range, California Photo provided by Jean Clark



GeoSymposium 2009

Showcases Student Research



In today's economy, new ideas and approaches to understanding our planet have become increasingly important. Scientific research is essential for developing solutions to many of the issues facing the world, such as climate change, seismic and volcanic hazards, contaminate mobility, and water sustainability. UNLV Geoscience student researchers addressed these topics, and many more, at the 4th Annual GeoSymposium held April 16-18, 2009. The symposium was an entirely student organized event designed to provide undergraduate, MS, and PhD researchers with the opportunity to present their work to academic, government, and industry professionals.

The symposium began at 4:00 p.m. Thursday evening in the Lilly Fong Geoscience Building with a presentation by geophysicist Clint Conrad from the University of Hawaii entitled *Deep Earth Controls on Sea Level, Plate Tectonics, and Volcanism*. The following morning, the technical sessions began in the Blasco Event Wing of the UNLV Foundation Building on campus. The event got off to a great start with keynote speaker, Dr. M. Stephen Enders, an honorary lecturer from the Society of Economic Geologists. Dr. Enders' talk, *So You Want to be a Geologist – Careers in the Gold Mining Business*, provided a beacon of hope that shined a light on an industry that is still going strong, and that depends heavily on continuing research into resource exploration and development.

Twelve oral presentations filled the remainder of the morning, discussing topics related to hydrogeology, economic geology, volcanology, soils, paleoclimatology, paleontology, structural geology, and planetary geology. The talks included scientific projects that represented some of the latest research to have been produced by the UNLV Department of Geoscience over the past academic year.

Immediately following the oral presentations, ExxonMobil sponsored an inviting barbeque-style picnic lunch on the Foundation Building terrace. This luncheon preceded an afternoon poster session offering visitors the opportunity to review thirty additional research projects. Much like the talks, these scientific posters also included a diverse range of geologic disciplines.

A confidential review panel of judges awarded cash, courtesy of Barrick Gold Corporation, and SEM or microprobe time, courtesy of EMIL, to students with the best oral and poster presentations. Graduate awards included Colin Robins (*Extraction of Authigenic Palygorskite and Sepiolite from Petrocalcic Soil Horizons: Implications for Isotopic Dating*) for Outstanding Oral Presentation; Jonathan Baker (*Paired $\delta^{13}\text{C}$ Carb and $\delta^{13}\text{C}$ Org Analysis and Chemostratigraphy across a Late Cambrian Carbonate Platform in the Great Basin, Western United States*) for Best Graduate Preliminary Research Poster; and, Joseph Asante (*Evaluating Groundwater Recharge and Flow Dynamic using Coupled Interpretation of Water Quality, Stable Isotopes, and Numerical Modeling Techniques*) for Best Graduate Research and Results Poster. Jonathan Carter (*Structural and Sedimentological Development of Pahrump Basin, Southern Nevada with Implications for Seismic Hazards*) received the award for Best Undergraduate Research Poster.

Photos from top:

Dr. Stephen Enders presents the morning keynote address to GeoSymposium attendees

GeoSymposium attendees enjoy a buffet lunch sponsored by ExxonMobil

MS student, Adam Zeiza, explains his research to PhD student, Mengesha Beyene, during the poster session

Award winners (from left), Colin Robins, Jonathan Carter, Jonathan Baker, and Joseph Asante

Photos (pages 6-7) provided by Maria Figueroa, Lora Griffin, Valerie Tu, Aubrey Shirk, and Aaron Mayes (UNLV Photographer)

The day's presentations concluded with a keynote address by Bill Rinne, Director of Surface Water for the Southern Nevada Water Authority (SNWA). Mr. Rinne's talk, *Meeting Current and Future Water Demands in the Las Vegas Valley*, discussed strategies for the sustainability of the valley's water supply now and in the future. After the closing ceremonies that immediately followed, guests and presenters moved to the Lilly Fong Geoscience Building for a reception and silent auction. This event provided an opportunity for guests and student researchers to network while dining and bidding on their favorite rock, mineral, and fossil specimens, as well as some unique pottery and jewelry. This event was a fun way to build relationships between students and professionals, and the money raised from the sale of these donated items will help make next year's GeoSymposium possible.

The last day of the symposium, Saturday, April 18, offered a field trip, sponsored by SNWA, to explore some of the more outstanding geologic features located at the Valley of Fire State Park just north of Las Vegas. Student tour guides took guests to sites at Atlatl Rock to observe Jurassic Sandstone and ancient petroglyphs; Rainbow Vista to observe the Jurassic – Cretaceous unconformity exposed there; Gibraltar Rock for a hike to observe and discuss the importance of the many types of biological soil crusts and other interesting features of the Willow Tank Formation; the Muddy Creek Formation to discuss its possible deposition by the paleo-Colorado River; and Overton Beach to discuss the implications of the falling water levels at Lake Mead.

The field trip and presentation sessions would not have been possible without the dedication and collective efforts of the many volunteers who pitched in to make these events successful. The generous contributions of time, effort, silent auction donations, and/or financial support, provided by the many sponsors who participated, were also critical. The Geoscience Department extends a heartfelt thanks to all who contributed to the success of the 4th Annual GeoSymposium!

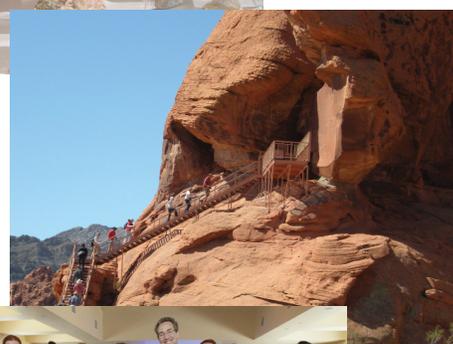
Planning for next year's GeoSymposium has already begun and organizers are now accepting donations. For information on how you can donate gifts of goods, services, and/or financial support, please contact the UNLV Geoscience Department at 702-895-3262. *Lora Griffin & Valerie Tu, April 2009*

From left: GeoSymposium Chair, Aubrey Shirk, Afternoon keynote speaker, Bill Rinne (SNWA), and COS Interim Dean, Wanda Taylor



From left: Graduate students, Jeevan Jayakody, Vicki Meyers, and Carla Eichler participate in the Silent Auction to raise proceeds for next year's GeoSymposium events

Participants from Saturday's field trip explore the Jurassic sandstone and ancient petroglyphs at Atlatl Rock



GeoSymposium committee members and volunteers make all the difference!

Committee Members

Aubrey Shirk
Geosymposium Chair

Ganqing Jiang
Geosymposium Faculty Advisor

Valerie Tu (chair), Seth Pages, Lora Griffin
Abstracts with Programs

Aubrey Shirk (chair), Christi Emery, Josh Bonde
Correspondence and Fundraising

Mandy Williams (chair), Jeremy Koonce
Facilities & Catering

Aubrey Shirk (chair), Josh Bonde
Field Trip

Kelly Robertson (chair), Vicki Meyers, Jeevan Jayakody
Symposium Set-up

Steve Maglio (chair), Becki Huntoon
Web Page

Brian Aillaud (chair)
Guest Speaker Search

Steven Forrester (chair), Corinne Griffing
Silent Auction

Volunteers

Thomas Adams, Hugo Belmontes, Jaelyn Carrington, Lindsey Clark, Christi Emery, Lora Griffin, Lisa Hancock, Denise Honn, Jeevan Jayakody, Chris Kopietz, Meg Magill, Steve Maglio, Vicki Meyers, Andrew Miller, Stephen Paplinski, Brita Purvis, Colin Robins...if you should be on this list, our apologies for the oversight, but your help is appreciated all the same!

Geoscience Graduate Students Unravel Arctic Climate History

In a new project, UNLV Geoscience graduate students are studying past climate and temperature histories in the Alaskan Arctic. Corinne Griffing, a second-year MS student, is leading the charge on the isotopic investigation of Pleistocene ice wedges contained within the permafrost of central Alaska. A new PhD student, Alison Sloat, will continue the investigations with more detailed sampling and study of the ice wedges. Alison will begin at UNLV in the Fall semester of 2009, and is also the recent recipient of the Fay and Jack Ross Family Graduate Scholarship, which will be used to facilitate time in Alaska to complete her doctoral research.



Corinne Griffing, right, and Dr. Dan Lawson, left, explore the main tunnel of the CRREL permafrost tunnel outside of Fairbanks, Alaska. Photo provided by Matt Lachniet

Some of the ice wedges have been dated to a relatively warm interstadial period within the last ice age, ~35,000 years before present. This time interval is important because several abrupt and pronounced climate variations – known as Dansgaard-Oeschger events – are evident in other northern hemisphere paleoclimate records from ice and marine sediment cores. The magnitude of these events, as constrained by oxygen isotopic variations, can be used to constrain climate sensitivity and will help with projections of future climate in the arctic. However, few to no usable records are available from interior arctic Alaska to test whether this region also experienced the pronounced warming and coolings associated with the Dansgaard-Oeschger events. Further, the arctic region is thought to be highly sensitive to variations in global climate through the feedback processes that operate there. For example, warming temperatures result in melting of high-latitude ice cover, which exposes more dark land surfaces that can absorb more of the sun's radiation than the highly reflective ice cover, with the result being a positive feedback that amplifies the original warming.

The ice wedges are a form of ground ice that are found with zones of permafrost. A unique natural laboratory is present in the form of a tunnel that was excavated into the permafrost, in which numerous exposures of ice wedges are present within the organic- and silt-rich permafrost soils



Melting permafrost in an exposure outside of Fairbanks, Alaska
Photo provided by Matt Lachniet

and sediments. The objective of the study is to date the ice wedges with radiocarbon, and to measure the stable oxygen and hydrogen isotopic composition of the ice contained along the ice wedge growth axis to constrain paleotemperatures. The ice wedges have a regular growth pattern, whereby thermal contraction results in cracking of the permafrost into an ice wedge polygon, into which snow, ice, and surface meltwater from the winter's snow falls, and 'welding' when thermal expansion takes place. The repeated process of cracking/welding results in a wedge of ice, with the youngest material in the center, and nearly symmetric 'folia' of vertical ice layers roughly parallel to the wedges center axis.



Corinne Griffing samples an ice wedge in the Butcher-Boy cold room in Alaska
Photo provided by Matt Lachniet

The summer of 2009 will see a "flurry" of activity on the project, when the science team spends the months of July and August at the tunnel outside of Fairbanks, Alaska. Blocks of ice from the wedges are removed from the tunnel with an electric chainsaw, and subsampled at a fine detail in a Butcher-Boy cold room – kept at a balmy 10°F – to produce the samples for isotopic analysis.

The project is a result of a collaboration between the two graduate students, Dr. Matthew Lachniet at UNLV, and Dr. Dan Lawson of the Cold Regions Research and Engineering Laboratory (CRREL) based out of New Hampshire and Alaska. The permafrost tunnel was excavated by CRREL personnel in the 1960s. The project is partially funded by a National Science Foundation grant from the Arctic program, and will utilize the new Las Vegas Isotope Science (LVIS) Laboratory in the Department of Geoscience at UNLV. *Matt Lachniet, March 2009*

Spotlight on Faculty Research

Michael Wells, Terry Spell, & Kathy Zanetti

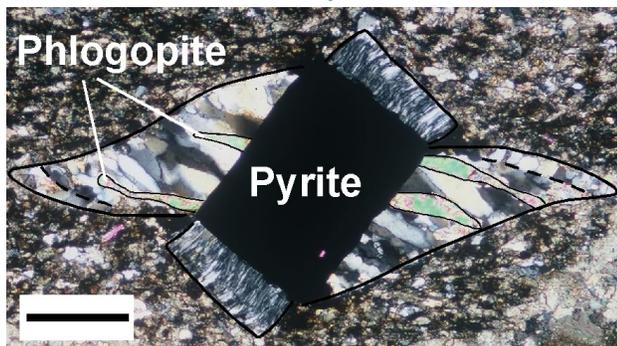


Photo provided by Michael Wells

Geoscience faculty Michael Wells and Terry Spell, former graduate student Tonia Arriola, and research scientist Kathleen Zanetti, in a recent paper in *Tectonics*, presented the first successful applications of the UV and CO₂ laser-probes to ⁴⁰Ar/³⁹Ar *in situ* dating of fibrous strain fringes. These results demonstrate feasibility of the method for future application, and document a previously unrecognized episode of mid-Cretaceous synconvergent gravitational spreading parallel to the Mesozoic Sevier orogenic belt, with implications toward understanding the driving forces for orogen-parallel extension in mountain belts worldwide.

Michael Wells, November 2008



Convection clouds hover over Panama City, Panama

Photo provided by Matt Lachniet

Matt Lachniet,
Associate Professor

In a paper released in *Geophysical Research Letters* (Lachniet, 2009), Associate Professor, Matthew Lachniet, has shown how climate dynamics – including the El Niño/Southern Oscillation – affect rainfall over the isthmus of Panama. Lachniet looked at the stable oxygen isotope values of rainfall from Panama City, Panama over the period 1968-1999, and found that the variations are related to departures from normal of sea surface temperatures in both the Caribbean Sea and the Pacific Ocean. In most tropical environments, the usual relationship is that wetter periods result in lower ¹⁸O/¹⁶O ratios. One of the most interesting findings of the study is that the stable isotopes in rainfall responded in opposite ways to a warming of the Caribbean Sea and the Pacific Ocean. When the Caribbean was warm, ¹⁸O/¹⁶O ratios decreased, whereas when the Pacific Ocean was warm, as in an El Niño event, ¹⁸O/¹⁶O ratios increased. This result is somewhat surprising because the response of rainfall to a warmer sea surface should be increased rainfall. Rather than a direct sea surface temperature control, the rainfall isotopes are related to the effects of anomalous atmospheric circulation that is set up during the warm and dry El Niño events of the Pacific Ocean. The results have implications for both modern climate dynamics, and for the interpretation of proxy records for past rainfall from Central America.

Matt Lachniet, January 2009

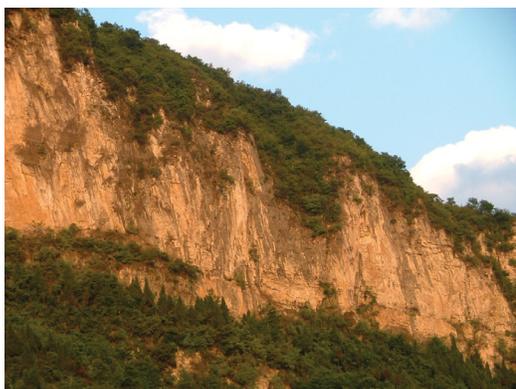
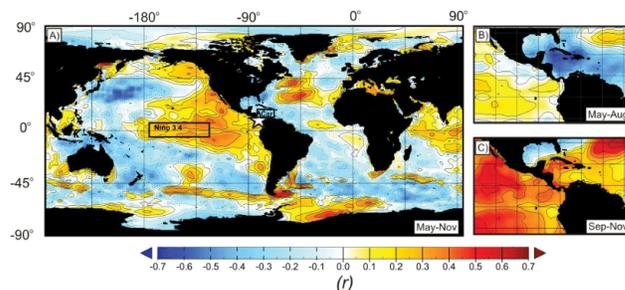


Photo provided by Ganqing Jiang

Ganqing Jiang,
Assistant Professor

In a recent paper in the *Proceedings of the National Academy of Sciences*, Geoscience Assistant Professor, Ganqing Jiang, and colleagues, test the proposed linkages between redox changes in the oceans and biological evolution. Their study shows that pulsed oxidation is coupled with the development and diversification of multicellular life, in a transitional period between regimes in which carbon in the world's oceans was dominated by dissolved organic carbon, then dominated by dissolved inorganic carbon. The research has important implications for the relationships between oxygenation of the world's oceans and biological evolution.

Michael Wells, September 2008



Map of the correlation field between sea surface temperatures and the ¹⁸O/¹⁶O ratios in Panama rainfall. In the Caribbean, an inverse correlation is noted (blue), whereas in the Pacific Ocean, a positive correlation is seen (red). Photo provided by Matt Lachniet

Spotlight on Students

Meghan Magill, MS Candidate

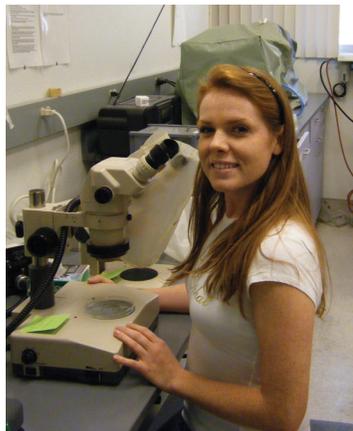


Meghan Magill is a second year graduate student (MS) in the UNLV Geoscience Department working with Dr. Dave Kreamer, in conjunction with the US Environmental Protection Agency (EPA). Meghan's research uses geoelectrical measurements to determine the feasibility of using surface geophysical methods such as resistivity, induced polarization, or ground penetrating radar (GPR) to monitor surfactants in the subsurface. Surfactant-enhanced aquifer remediation (SEAR) is a promising groundwater clean-up method to remove dense non-aqueous phase liquids (DNAPL), including tetrachloroethylene (PCE), but is not widely used due to unknown distribution and possible problematic behavior in the subsurface. The ability to monitor the surfactants from above the ground would allow scientists to "see" where the surfactants are going, perhaps increasing their use and resulting in cleaner groundwater. Meghan has measured the resistivity, phase, and dielectric permittivity of surfactants in silica sand and will publish her results in the near future. *Meghan Magill, March 2009*

Second year PhD student, Kelly Robertson, and faculty member Adam Simon are mentoring undergraduate student Lindsey Clark in a project designed to quantify the temporal variation of volatile emissions at Mutnovsky Volcano, an active stratovolcano in Kamchatka, Russia. The goal of the project is to constrain the volatile history of the volcano and relate the temporal variations in emissions to input at the base of the volcano plumbing system in terms of recycling of greenhouse gases and how such recycling may effect climate. Lindsey was ranked as the top UNLV Geoscience undergraduate student in academic year 2007-2008, and with ambitions for graduate school next year, this project is helping her understand the relationship between subduction zones, arc

Lindsey Clark, Undergraduate

Second year PhD student, Kelly Robertson, and faculty member Adam Simon are mentoring undergraduate student Lindsey Clark in a project designed to quantify the temporal variation of volatile emissions at Mutnovsky Volcano, an active stratovolcano in Kamchatka, Russia. The goal of the project is to constrain the volatile history of the volcano and relate the temporal variations in emissions to input at the base of the volcano plumbing system in terms of recycling of greenhouse gases and how such recycling may effect climate. Lindsey was ranked as the top UNLV Geoscience undergraduate student in academic year 2007-2008, and with ambitions for graduate school next year, this project is helping her understand the relationship between subduction zones, arc



volcanism, and climate change, and also the fundamental application of the scientific method. Mutnovsky is driving a high energy (850 MW) hydrothermal system which is currently being tapped via a proximal geothermal field to produce 65 MWe, enough power for approximately one-quarter of the peninsula. Mutnovsky has been active for 100 ka and has experienced four caldera-forming events, with significant chemical variation attending each eruptive cycle. The chemical diversity is most likely a function of variation of input to the base of the volcanic plumbing system. Considering the great ability of volatiles to advect heat from the volcano to the geothermal field, constraining the volatile history of Mutnovsky is an important step toward modeling the future geothermal resource. Lindsey is characterizing the volatile composition (H_2O , CO_2 , SO_2) of melt inclusions, small time capsules that preserve the temporal variability of the silicate melt within the magmatic system. Lindsey hopes to attain knowledge and experience on how to create and follow through with successful research projects for her future graduate level education, as well as learn about the chemistry of melt inclusion compositions. Clark and Simon have applied for an NSF EPSCoR undergraduate research fellowship that will allow her to dedicate full-time energy to this project during summer 2009.

Adam Simon & Kelly Robertson, March 2009

Mandy Williams & Colin Robins PhD Candidates

Few things in life transcend culture, race, and ethnicity – laughter, a smile, and the beauty of nature. On our trip to Inner Mongolia, we had the chance to share all with our incredible Chinese hosts. Inner Mongolia, located in northern China, is an autonomous region that has a northern border with Mongolia and Russia.

Our trip (September 6-10, 2008) began in Hohhot, Inner Mongolia as part of an intellectual exchange program sponsored by the National Science Foundation. The program was designed to promote research exchange and international collaboration on desertification, with particular emphasis on the interactions among soils, geomorphology, and grassland ecology. Our group included Dr. Curtis Monger (New Mexico State University), Dr. Brenda Buck (University of Nevada, Las Vegas), Colin Robins (UNLV), and Mandy Williams (UNLV).

We traveled to the University's long-term ecological research station, located in the beautiful grasslands of the Inner Mongolian Plateau. Along the way, we stopped at every soil exposure we could find. We were pleased to discuss pedology and soil genesis with scientists from

Spotlight on Students



another country. Perhaps pedology also transcends culture, because we quickly found common ground while discussing each profile. When we finally reached the research station, we were pleased to learn more about our colleagues' current studies on grassland ecology. We were especially impressed with their artificial warming experiments investigating the effects of future climate change.

Our final days were spent on the IMAU campus in Hohhot with our hosts, Drs. Guodong Han, Mengli Zhao, Mei Hong, & Fei Li. The four of us had the opportunity to give lectures on our respective soil and ecology research.



The group poses next to an impressive example of soil cryoturbation
Photo provided by Mandy Williams

Colin and I also led a discussion with undergraduate students on the United States educational system and graduate school. We were encouraged to see their passion for soil science and grassland ecology, and such desire to use their expertise to solve pressing social and environmental issues.

While international travel is exciting and life changing, it can be an exhausting process. However, our time in Hohhot felt more like a visit with family. The next day we got on a plane to Chengdu to participate in the 13th Annual International Conference on Soil Micromorphology, but we each took a little piece of Inner Mongolia with us.

We would like to thank the National Science Foundation for sponsoring this incredible experience. We also want to express our deepest gratitude to our hosts and dear friends, Drs. Guodong Han, Mengli Zhao, Mei Hong, & Fei Li.
Mandy Williams, March 2009

Let Your Voices be Heard!

Mandy Williams, Ph.D. Candidate, Speaks on Behalf of Graduate Students at the UNLV Budget Cut Rally

Two years ago, I came to UNLV as a Master's student in the Geoscience Department; since that time I have come to see the incredible contributions graduate and professional students make across our campus and within our community.

First, graduate and professional students comprise nearly one quarter of UNLV's enrollment. And of those 6,000 students, 1,000 are graduate assistants who carry significant teaching and research loads for our university. While many GAs are supported by outside sources, 78% percent are funded by the state.

However, graduate and professional students do more than

just service our university. They play important roles in our community both before and after graduation.

Our graduate and professional students will...

Provide healthcare to our community and state, run local businesses, engineer new frontiers in industry, manage government agencies, develop policies that will reset our state's future trajectory, defend our rights as citizens, educate our young people, and enrich our lives through art and culture.

I also want to stress the importance of graduate research to our community. While our faculty and students conduct cutting-edge research around the world, many of us have focused our investigative efforts on issues that matter to Nevadans. And though at times we are addressing very basic research questions, we are asking those questions because they have DIRECT applications to our region.

We have graduate students investigating...

Our limited water and mineral resources, renewable energy, local sociological issues resulting from recent environmental and economic crises, how to provide health care to our citizens, how to best educate our children, how environmental policies will affect our local economy, how to sustainably manage our public lands, how Nevada's climate has and will continue to change, and how that climate change will affect our fragile desert ecosystems.

These critical research questions are what drew many of us to this university, but they also keep us here. We have extraordinary faculty doing cutting-edge research on real-world problems; this University also fosters collaborative and interdisciplinary research that doesn't happen everywhere. In fact, a recent NSF study ranked UNLV fourth among all universities in our increase in research productivity in the fields of Science and Engineering.

And while much of this research is funded by external money coming into Nevada, we depend on partial state support of lab facilities and technicians to keep equipment up and running, as well as the hiring and retention of excellent faculty who are (quite amazingly) able to balance graduate/undergraduate teaching, research, grant-writing, and graduate student mentorship.

I would like to leave you with one thought - UNLV is NOT a university of last resort. Many of us had opportunities to seek graduate and professional degrees from other top schools; however, we chose UNLV because it is an up-and-coming research and teaching institution. If we want to continue on this track, it is critical we continue to strongly support graduate education and research.
Mandy Williams, March 26, 2009

Alumni News



Left to Right: Rosa Poch (Chair of Award Committee), Amy Brock, Adrienne Ryan, and Brenda Buck (Chair, Commission 1.1 and Assoc. Professor, UNLV Geoscience Department)
Photo provided by Brenda Buck

Amy Brock 2007 Graduate, PhD (Brenda Buck, Advisor)

Former graduate student, Amy Brock, was one of two scientists awarded the first ever "Young Micromorphologist Publication Award" by the International Union of Soil Science for her publication, *A New Formation Process for Calcic Pendants from Pahrnagat Valley, Nevada, USA, and Implications for Dating Quaternary Landforms* (Quaternary Research, 2005, 63:359-367). She was recognized for this honor in September, 2008, while attending the 13th International Conference on Soil Micromorphology, held in Chengdu, China. Amy's former advisor, Dr. Brenda Buck (Associate Professor, UNLV Geoscience Department), was also present at the conference to see her acknowledged for this enormous achievement. Congratulations, Amy!

Amy received her MS and PhD degrees from the UNLV Geoscience Department, and is currently employed as an assistant professor at Western Illinois University.
Brenda Buck, February 2009

Tammy Diaz-Martinez 2004 Graduate, MS (Gene Smith, Advisor)

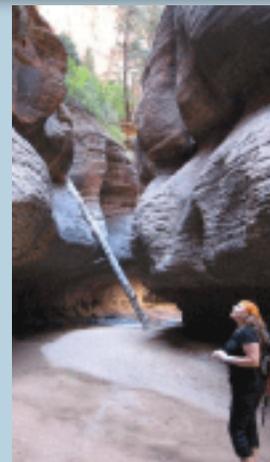
I graduated from the UNLV Geoscience Department in 2004 with my MS degree. I moved back to New Mexico shortly after I graduated, and was hired on with the New Mexico State Environment Department, Hazardous Waste Bureau. I am the project leader for the cleanup efforts and environmental restoration project at Fort Wingate Depot Activity which is located in Gallup, NM. I married my husband, Matthew Martinez, in June 2006; he is a detective with the City of Santa Fe Police Department. In August 2007, we had Lilitiana Martinez. Currently, I own two dogs, Zeus and Simon; I lost my Mason in September. We live in Santa Fe, NM, where we both work.

Tammy Diaz-Martinez, December 2008

Anna Draa 2004 Graduate, MS (Richard Orndorff, Advisor)

I earned my MS in Geology, hydrology concentration, from the UNLV Geoscience Department in 2004. Since then, for nearly 5 years, I have worked as a Project Geologist for Converse Consultants in Las Vegas, playing a major role in developing and applying geologic and hydrogeologic interpretations to address, and fulfill, various study needs throughout Nevada. I have been extensively involved in groundwater analyses throughout southern Nevada. My work has included several shallow groundwater evaluations supported by complex recharge, water balance, and groundwater contamination studies, as well as oversight of the siting, designing, construction management, testing, and analysis of numerous hydrogeologic projects.

Anna Draa, January 2009



Chris Henkelman 2004 Graduate, MS (Jean Cline, Advisor)

Upon graduating from UNLV in 2004, I moved back to Virginia. I am back to four seasons, bugs, humidity, mowing, scraping windows on winter mornings. I currently work in the mining section of an engineering company, Appalachian Technical Services, Inc. I am the only geologist in the company surrounded by mining engineers. We work in the coal industry, I spend most of my time writing permits. Although I love gold mining, and all other types of ore deposits, I am in the coal industry. By moving back to Virginia, I am closer to family, and I have been fortunate enough to be able to afford a home. The house is great and has kept me busy in my spare time. I have everything I have ever wanted: a professional job, a wonderful dog, and a beautiful house.

Chris Henkelman, March 2009

Stephanie Mrozek
2005 Graduate, BS

Hello everyone! I've been enjoying life as a geologist since I graduated from UNLV in 2005. As of fall 2008, I am a full-time graduate student at the University of Alaska Fairbanks, where I am working towards an M.S. in Economic Geology in the heart of gold-rush country. As it turns out, my project is related to gold; I am studying the Mike Lake Au-Cu skarn deposit in the Yukon Territory, Canada. I began my research last summer, which involved living and working in a remote (helicopter access) exploration camp from June-August while collecting data for my thesis. It was a great experience and I hope to spend this summer back in the field at Mike Lake. You can find out more about my project at: www.dynamiteresources.com.



From 2005 to May 2008, I was employed by Kinross Gold Corporation at the Fort Knox open-pit gold mine, just about 30 miles north of Fairbanks. I worked in Metallurgy for two years, then transferred to Geology where I was responsible for production and ore control. My job as Mine Geologist allowed me to play with rocks for a living and experience the joy of mapping at -40F. Two of my most thrilling experiences at the mine were assisting with a gold pour, and triggering a 200,000-ton blast. I also served on the mine rescue team for one year.

Although grad school is quite tame compared to working at a mine, I am very happy with my decision to become a student again. I expect to graduate in 2010. Some of my non-work or school related adventures from the past few years include escaping lava in Hawaii, earning my Rescue Diver certification in Curacao, hiking the Grand Canyon from North to South, and summiting volcanoes in Russia and Nicaragua. Oh yeah, and Alaska is great too!

Stephanie Mrozek, February 2009



April Azouz (MS 2006) and Joe Kula (PhD 2007), Department Alumni, have a little fun at the Alumni Reception in Houston, TX, October 2008. Photo provided by Maria Figueroa

Department Awards Student Scholarships

Our undergraduate and graduate students have benefited over the years from a number of scholarship opportunities available through the Geoscience Department, and this year was no different. For Summer 2008, a total of \$33,800 in scholarship awards were distributed to 21 graduate students, primarily for support of summer research activities. For the 2008-2009 academic year, a total of \$20,250 in scholarships were distributed to 10 undergraduate students. The bulk of these scholarship funds are generated by endowments made to the Department by generous benefactors, and we are truly grateful for their support of our best students.

This year, we saw the endowment of the new Fay and Jack Ross Family Graduate Scholarship, providing funding to a deserving PhD student. Our first Ross Scholar, Colin Robins, will be graduating soon and the Department has offered the second Ross Scholarship to incoming PhD student, Alison Sloat. The Department and its students are indeed fortunate to enjoy the wonderful support of the Ross Family.

The 2008 Geological Society of Nevada recipient for southern Nevada was Sam Siebenaler, who is doing a field based research project here in Nevada. *Rod Metcalf, March 2009*

Department Scholarships

Jack and Fay Ross Family
Anne Fenton Wyman
Bernarda French
Desert Space Foundation
Douglas Orr Memorial
Edwards and Olswang
Geological Society of Nevada
Lilly Fong
Southern Nevada Gem and Mineral Society
Nate Stout Memorial

Summer 2008 Graduate Recipients

Brian Aillaud	Mike Howell	Audrey Rager
Joseph Asante	Meg Magill	Kelly Robertson
Josh Bonde	Steve Maglio	Angela Russo
Christi Emery	Jan Morton	Aubrey Shirk
Steven Forrester	Tom Muntean	Sam Siebenaler
Lisa Hancock	Wenming Nie	Mandy Williams
Denise Honn	Feng Pan	Greg Zellner

2008-2009 Undergraduate Recipients

Brett Wagers	Shereena Dyer
Andrew Miller	Carl Swenberg
Amanda Meugnit	Seth Pages
Gina McClain	Pasquale Delvecchio
Valerie Tu	Jonathan Carter

Selected Student Awards & Honors



Selected Faculty Accomplishments

Todd Arrowood, MS Recipient (Zhongbo Yu, Advisor)

Awarded the College of Sciences Best Thesis Award for the 2008-2009 academic year.

Joseph Asante, PhD Candidate (Dave Kreamer, Advisor)

Awarded the Best Graduate Poster Presentation for Advanced Research at the 2009 GeoSymposium.

Jonathan Baker, MS Candidate (Ganqing Jiang, Advisor)

Awarded the Best Graduate Poster Presentation for Preliminary Research at the 2009 GeoSymposium.

Jonathan Carter, Undergraduate

Awarded the Best Undergraduate Poster Presentation at the 2009 GeoSymposium.

Lindsey Clark, Undergraduate

Recipient of this year's *L. Austin Weeks Memorial Undergraduate Grant* award. The American Association of Petroleum Geologists (AAPG) Foundation administers the L. Austin Weeks Memorial Undergraduate Grant Program to benefit and support undergraduate geoscience students and their departments with educational expenses. *Modified from the College of Sciences E-Newsletter, William Brown, January 2009*

Vicki Meyers, MS Candidate (Steve Rowland, Advisor)

Recipient of the Adams/GPSA Scholarship, 2009-2010.

Kelly Robertson, PhD Candidate (Adam Simon, Advisor)

Recipient of the President's Graduate Fellowship.

Colin Robins, PhD Candidate (Brenda Buck, Advisor)

Awarded the Best Oral Presentation at the 2009 GeoSymposium.

Mandy Williams, PhD Candidate (Brenda Buck, Advisor)

Winner of the *Farouk El-Baz GSA Student Research Award* for her work on Biological Soil Crusts in the Mojave Desert.

Recipient of an ExxonMobil Research Grant, 2008.

Recipient of the UNLV Urban Sustainability Fellowship, 2008-2011.

Awarded the NASA-Nevada Space Grant Fellowship, 2008 (declined due to funding conflicts).

Recipient of the Adams/GPSA Scholarship, 2008-2009.

Awarded a UNLV Graduate College Summer Session Scholarship, 2009.

Jun Yin, PhD Recipient (Zhongbo Yu, Advisor)

Awarded the College of Sciences Best Dissertation Award for the 2008-2009 academic year.

Brenda Buck, Associate Professor

Elected Geological Society of America Fellow, 2008.

Co-author on International Union of Soil Science, Young Micromorphologist Publication Award, with former MS and PHD advisee Amy Brock : *New Formation Process for Calcic Pendants from Pahrnagat Valley, Nevada, USA, and Implication for Dating Quaternary Landforms*; Quaternary Research, 2005, 63:359-367.

Jean Cline, Professor; Andrew Hanson, Associate Professor; Adam Simon, Assistant Professor

Awarded funding to conduct a Nye County Mineral Assessment, \$650K, 2009 (in collaboration with the Nevada Bureau of Mines and Geology and the US Geological Survey).

Matt Lachniet, Associate Professor

Awarded tenure and promoted to Associate Professor.

David Kreamer, Professor

Elected Director of the Association of Ground Water Scientists and Engineers, National Ground Water Association (NGWA).

Elected Secretary of the US National Chapter of the International Association of Hydrogeologists (also serves as Editor for the USNC IAH Newsletter).

Steve Rowland, Professor

Recipient of the College of Sciences Distinguished Teaching Award for the 2008-2009 academic year.

Zhongbo Yu, Professor

Promoted to Full Professor.

Please note: This is a listing of awards and accomplishments that were personally submitted by students and faculty upon a Department wide request. If you have awards or accomplishments that you would like to share for the next newsletter in Spring 2010, please submit your content to Jean Cline (jean.cline@unlv.edu) and Becki Huntoon (rebecca.huntoon@unlv.edu), Department Newsletter Committee.



Donors & Donating

Thank You Donors! January, 2008 - April, 2009

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Carmel Valley Seed Company
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Wanda J. Taylor
Laurie J. Thake

Dear Alumni and Friends:

We would like to take this opportunity to thank those of you who have supported the Geoscience Department since our last newsletter, and in previous years. In these difficult budgetary times, the UNLV Geoscience Department is, more than ever, reliant on our alumni and friends to help us sustain our strong teaching and research activities, and embrace emerging opportunities.

Alumni, parents, employees, and friends have supported the Geoscience Department through gifts to specific scholarships, attendance at campus events, and contributions to building funds. Your gifts to academic and student-centered programs have made the difference in transforming the Geoscience Department into a top rate institution of geological research and advancement; students and scholars from around the world come to the UNLV Geoscience Department to discover the past, shape the present, and create the future.

Our Department values the ongoing relationships we have with many of you and we will continue to provide you with opportunities to be interconnected. Please write or email and tell us about your latest accomplishments and adventures. We also invite you to visit us here on campus as we would love to see you, find out what you have been up to, and show you what is new in the Department. While many of the faces here have changed, you would find some recognizable denizens of the Lilly Fong Geoscience building, and certainly, a recognizable community of colleagues.

**Many thanks for your past
and continuing support!**

Michael Wells
Professor and Department Chair

For more information on how your gift can help the Department, please contact:

Michael Wells, Department Chair
(702)895-3262 or email michael.wells@unlv.edu

Jean Cline, Fundraising Chair
(702)895-3262 or email jean.cline@unlv.edu

You can also visit the Department website at
<http://geoscience.unlv.edu/supportgeoscience.htm>

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Any News to Share?

Please submit this form by mail, email the Department at geodept@unlv.edu,
or use the online Contact Form at <http://geoscience.unlv.edu/AlumniContactForm3.html>
We look forward to hearing from you!

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