

Department of
GEOSCIENCE

Spring 2012

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ALMOST GO
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We look forward to hearing from you!

GEOSYMPIOSIUM
7th Annual Meeting and Review

GRADUATE RESEARCH
Who's Who in Graduate School

THE DEPARTMENT NEEDS YOUR HELP
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On the Cover:

Dust Storm in Nevada
Photo taken by Geology
undergraduate Mai Sas
during a Geoscience field
trip Fall 2010.

From the Desk of Michael Wells, Department Chair

Greetings to all of our alumni and friends from the UNLV Geoscience Department! I hope that 2012 finds you healthy and happy as we weather these challenging times. Now that the picture has begun to clear, I would like to update you on how UNLV and the Geoscience Department have fared during the financial upheaval throughout the State of Nevada. Although some of the details are depressing, the UNLV Geoscience Department is stronger today than before the start of the 2008 recession. By sticking to our core mission, we have remained committed to building internationally recognized research programs and providing high quality educational experiences for our undergraduate and graduate students. As chair, I am proud of the accomplishments of our students and faculty, some of which are highlighted in this newsletter.

I am sure that you heard alarming news over the past year, and wondered how the Geoscience Department was faring in the midst of Nevada's fiscal turmoil. At the time of writing of the Spring 2011 newsletter, the impact of budget cuts was simply too uncertain and fluid to comment on. In hindsight, I can tell you that we in the Department were very alarmed, as we were targeted for elimination or for a significant downsizing. We were a hair's breadth away from contacting you to ask for your help in advocating for the Department. As you know, the state funding for public education in Nevada is fickle, as the tax base is not only insufficient for a state of this size, it is also narrow, unbalanced and thus vulnerable. Fiscal years 2009, 2010, 2011, and 2012 saw sequential cuts of 4.5%, 24%, 6.9%, and 13% to UNLV's state-funded budget. Why our politicians and policy makers fail to recognize (or at least act upon) knowledge of the role that education and research plays in economic diversification, innovation, and fiscal growth, not to mention environmental and societal health, remains a conundrum. In the face of these extreme budget cuts, the Geoscience department expanded our role within the university by educating more students, revitalizing degree programs, expanding our research and teaching capabilities, and increasing research productivity. Last spring was a very difficult time at UNLV, and after the dust settled, 167 people were let go, another 48 voluntarily took early retirement, and 9 departments and 18 degree programs were eliminated. The immediate impact to our department was to lose 4 positions: our GIS Specialist/Web page/IT support position previously held

Continued, Page 15



Michael Wells, Continued pg. 2

by Rebecca Huntoon, the Research Faculty position to support our Electron Microprobe lab previously held by Sean Mulcahy, an open position in Terrestrial Climatology for which we had an ongoing search, and the position formerly held by Peg Rees, who is now the Vice Provost for Educational Outreach. Additionally, cuts in pay, required furlough days, and significant cuts to medical benefits were implemented across campus and will continue for at least the next fiscal year. Throughout this process, we were actively advocating for the Geoscience Department with the UNLV administration and the Board of Regents, voicing the importance of geoscientists with respect to: the economic diversification of Nevada and our country; addressing challenges in energy, material resources, environmental quality, and public policy; and most importantly, addressing challenges that impact the future viability of life on Planet Earth.

Now on to the positive developments within the Department! Over the previous summer, we received approval to fill a Research Professor position to support our Electron Microscopy and Imaging Lab (EMiL). We were very fortunate to hire Dr. Minghua Ren, who joined us from University of Texas El Paso. In addition to the Electron Microprobe and Scanning Electron Microscope (SEM), Dr. Ren is now overseeing the use of an additional instrument, a Field Emission SEM, which has an imaging resolution down to 10 nanometers, providing an important new research tool to the Department.

We have set some new milestones this past year. In efforts to broaden our participation in science education, we have developed additional distance education (DE) lecture and laboratory courses. This past year we offered new DE courses in Introductory Geology, and in Natural Disasters. We also unveiled DE laboratory classes supporting Introductory Geology and Physical Geography. By all accounts, the online laboratory classes have been very well received, and the number of students introduced to the geological sciences has reached an all-time high. By University edict, we have restructured our 3 undergraduate programs into 2; we now offer BS degrees in Geology and in Earth and Environmental Science. In making these changes, we also restructured the curriculum to provide greater flexibility for students to pursue a wider range of career paths, while maintaining our core strengths in a solid foundation of traditional geology. As a result, we now have more than 100 undergraduate majors. This past year, the department surpassed a major milestone by bringing in 2 million dollars in external funding to support research and graduate education. Our faculty, as a whole, has never been so successful in research.

We are proud of the many achievements of our undergraduate and graduate students; these achievements were well showcased in the 51 presentations made at our 7th Annual Geosymposium held last month at the new venue of the Science and Engineering Building (see pages 4 - 5). A few specific congratulations are in order: the Outstanding Dissertation Award for UNLV went to Geoscience Ph.D. Amanda Williams; Ph.D. candidate Jonathan Baker was awarded a Fulbright Fellowship for study in Russia (see page 10); Andrew Hanson received the College of Sciences 2012 Distinguished Teaching Award; Ganqing Jiang received the Barrick Scholar Award; and two faculty members (Steve Rowland and Zhongbo Yu) have been awarded sabbatical leaves for the 2012-2013 academic years. Congratulations to 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 new online contact form found on our website at <http://geoscience.unlv.edu/AlumniContactForm3.html>. We would love to see you at an upcoming professional meeting, or please consider attending our next Geosymposium in April 2013.

Best Wishes,

Michael Wells
Department Chair

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

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You can also visit the Geoscience Department website for further information: <http://geoscience.unlv.edu/supportgeoscience.htm>

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ALUMNI UPDATE

**AMY BROCK-HON***Ph.D. 2007*

Since earning my PhD at UNLV in 2007 I spent ~3 years as a tenure-track Assistant Professor of Geology at Western Illinois University in Macomb, IL. In Fall of 2010 I started a tenure-track position at the University of Tennessee at Chattanooga. As an Assistant Professor in the Physics, Geology, and Astronomy Department I thoroughly enjoy teaching Physical Geology, Geomorphology, Soil Properties and Genesis, and Mineralogy. I continue to be active in research of the Mormon Mesa surface north of Las Vegas. Colin Robins, Brenda Buck and I recently published a paper on pedogenic barite in the petrocalcic horizons at Mormon Mesa. Whew hew! In the past several years I've introduced two undergraduate students to the desert who had never traveled west of the Mississippi River as part of a project to map the geology and geomorphology around the Overton, Nevada area.

After bouncing around the country a little bit I've landed in Chattanooga and am very happy to be living in a place with so many outdoor activities available. The music scene is fabulous and I am really into bluegrass right now! I am fortunate to have my fellow geo-geek husband Kevin Hon (former student of NMSU's Tim Lawton) with me and based out of Chattanooga as Project Geophysicist for a local Geotechnical Engineering company. Kevin and I were married in 2010 in Yosemite National Park and enjoy being able to get out and explore the many trails around Chattanooga each weekend.

**COLIN ROBINS - Ph.D. 2010**

Since graduating from UNLV in May, 2010, I've completed an externally funded post-doctoral project with Brenda Buck on edaphic controls of the Las Vegas buckwheat, and taught for two years as a visiting assistant professor in the Macalester College Geology Department in Saint Paul, MN. Beginning in the 2012-2013 academic year, I will start as an assistant professor (tenure-track) in the Keck Sciences Department (Environmental Analysis program) of the Claremont McKenna, Pitzer, and Scripps Colleges in Claremont, CA.

**KELLY ROBERTSON - Ph.D. 2011**

I finished my PhD in December, 2011 and then decided to take a little time off. I went to Calgary, AB to enjoy some (real) winter weather and do a little work on publications. In April of this year I started my job with ExxonMobil in Houston, TX, where I am part of the Exploration Company. I work in the South America New Opportunities group where I am investigating the potential for petroleum recovery in offshore Argentina and Uruguay.

**AARON BELL - Ph.D. 2010**

I finished my PhD in 2010 and have worked for the past two years as a postdoctoral fellow in Department of Earth and Planetary Science at the American Museum of Natural History in New York City. My work here involves mostly involves experiments designed to explore the chemical link between the oxidation state of iron in silicate magmas and their dissolved halogen (Cl and F) contents. In September of 2012 I will begin a new position as a Research Scientist at the Institute of Meteoritics at the University of New Mexico where I will be involved in multiple analytical and experimental studies of volatile-rich accessory minerals in martian, lunar, and chondritic meteorites. My wife Meghan (MS Geoscience, 2009) and I will be celebrating our first wedding anniversary in June 2012.

FUNDRAISING DRIVE

Support the next generation of UNLV Geoscience. Donate today!

The Geoscience Department is excited to announce the start of a new, ambitious fund-raising campaign! Our goal is to raise \$50,000 over the next year in order to provide support for graduate students who need funding during the summer months or for a final semester in their degree program. In order to reach our goal we will rely upon the generosity of our alumni, friends, industry supporters, faculty members, staff and anyone else who wishes to donate. Although our goal may be difficult to reach, we believe it is attainable for the following reasons: Aera Energy just donated \$2500 to support Geosymposium, ExxonMobil has been donating \$5000 to one of our outstanding PhD candidates for the past several years, and several individual donors have routinely been donating to our Graduate Student Fund.

Given that we have about 20 alumni at ExxonMobil and given that ExxonMobil provides a 3:1 match for every dollar that our alums donate to the department, a bit of simple math illustrates why we think this goal is attainable. If each alumni at ExxonMobil donated \$250 and we get the 3:1 match, then those donations turn into \$20,000 (\$250/alumni + \$750 employer match * 20 alumni) and we are already 40% towards reaching our goal just with 20 donors! We hope all of our alums will be able to make a donation. Donors who work for companies with matches (be it 3:1 or 1:1) are especially valuable because your employer is contributing at least as much as you are, if not more. Please realize that every donation is welcome, no matter how large, how small, or whether it comes with a employer match. In fact, most successful campaigns reach there goal because they receive many, many small donations that all add up. In order to donate, please go to the College of Sciences website (<http://geoscience.unlv.edu/supportgeoscience.htm>) and click on the "Donate Online" button. On the ensuing page you can enter the amount you want to donate and then use the pull down menu to select "Geoscience - Graduate Students". Alternatively, you can submit a donation using the provided donation envelope.

All donations are channeled through the UNLV Foundation and are thus tax deductible. A "thermometer" that tracks our progress will be visible on the department web page in the near future - be sure to look for it and to help us reach our goal! Thank you all in advance for your support of our outstanding graduate students!

**SUPPORT
GEOSCIENCE
TODAY!**

About Our Graduate Students*A Note from the Graduate Coordinator*

I am finishing my first year as the Graduate Coordinator and have had the privilege of getting to know all of our graduate students and becoming more familiar with UNLV's graduate student life. This year I asked our graduate students to tell you, our readers, about their research. Our students are involved in an incredibly diverse range of research topics that continue to draw positive praise from the UNLV administration and the larger scientific community. We are proud of the hard work and dedication that our graduate students put into their research and to enhancing the quality of our department.

-Adam Simon

Brittany Myers - MS

I am studying the effect of creosote bush (*Larrea tridentata*) and biological soil crust on exchangeable calcium and CaCO₃ content in desert soils. My field work was completed just outside of Las Vegas in the Mojave Desert at low elevations, an area at which the creosote bush is the dominant vegetative species. The purpose of this project is to see if a calcium biosignature can be found in the soil from the biota.

Carla Eichler - MS

My research focuses on the most recent volcanism in the Valles caldera, represented by the El Cajete Pyroclastic Beds, Battleship Rock Ignimbrite, and Banco Bonito Flow as well as the VC-1 rhyolite lava. The triggering event that caused these recent eruptions at 55 to 40 ka (after a 460 ka lull in volcanism) has been suggested to be the intrusion of mafic magma at depth, thus causing the re-melting of a silicic intrusive body.

Josh Bonde - Ph. D.

I study the remains of Mesozoic organisms as well as their sedimentological and tectonic contexts, to extrapolate prehistoric ecosystems. On the side I dabble in the Cenozoic.

See following pages for more graduates!

Graduate Students Continued

Seth Gainey - Ph. D.



I am investigating nontronite dissolution kinetics. The Mars Express and the Mars Reconnaissance Orbiter spacecrafts detected nontronite at Mawrth Vallis and at Gale Crater, the future landing site of the MSL. Nontronite requires water rock interactions to form. Therefore, nontronite dissolution kinetics and alteration products will provide scientists rates to further elucidate to the duration of liquid water on Mars.

Michael Giallorenzo - Ph. D.



My research applies thermochronologic constraints to the timing and rate of uplift of mountain chains, specifically in the Sevier Fold and Thrust Belt. Two radiometric system-mineral pairs, (U-Th)/He in Zircon and K/Ar in muscovite, record the time since their host rocks have cooled below a certain temperature, known as their closure temperature. Since U & Th decay to He, and K decays to Ar at known rates, we are able to measure the ratio of parent to daughter concentrations and calculate the time since those rocks have cooled below their respective closure temperatures, hence the time since those mountains were uplifted to Earth's surface.

Michelle Stropky - MS



My research focuses on using U-Pb isotopic data of zircon to date two plutonic units and an anatectic migmatite sample from the central Santa Fe Range, northern New Mexico. Uranium-Pb ages from each unit provide supporting evidence for intense metamorphism, deformation and tectonism at ~1.4 Ga within the study area and the regional southwest. In addition, measured increases of U-element and soluble cation concentrations, paired with low (<0.1) Th/U values, of migmatite zircon document a coupled dissolution-precipitation process operating in the solid-state during anatexis. Understanding the behavior of zircon during partial melting of anatectic migmatites is important for proper interpretation of ages, where hydrothermal alteration of zircon resulting from late-stage fluid/melt interactions yields "mixed" ages, affecting the U-Pb isotopic system.



The UNLV Department of Geoscience hosted the 7th Annual GeoSymposium on April 13-14th, at the Science and Engineering Building (SEB) Auditorium and the Lobby at the UNLV campus, with keynote addresses, student oral and poster presentations, industry booths and a field trip to the Lake Mead National Park on the final day. The symposium was entirely organized by the students and created an opportunity to present their original research to the industry professionals, as well as academic experts.

The generosity in contributions of financial support from many organizations, including the Department of Geoscience and individuals greatly contributed to the success of the event. This year, the entire event was fully funded by all the donations we received. Diamond Donations were made by Barrick Gold of North America, Aera Energy LLC and ExxonMobil Foundation. A Corundum Donation was made by Marathon Oil Corporation. Topaz Donations were made by the UNLV Science and Engineering Building, (special thanks to Dene Charlet and Eric Knight), Sterling Gold-Imperial Metals, Nevada Water Resource Association, Robert J. Klein, Maureen Wruck Development Consultants LLC and funds raised during Silent Auctions. Quartz Donations were made by Nikolas Taranik, David M. Ely, Andrew D. Hanson, Jean S. Cline, Mandy Williams, David J. Eisenstein, R.P. Bowen, Wende S. Lestelle, Jim O'Donnell, James G. Mills and Judith S. Costa. This year, a total of \$9715 was raised from all our proud sponsors and generous donors.

The day started with addresses from the GeoSymposium Coordinator Swapan Kr. Sahoo, Department of Geoscience Chair Dr. Michael Wells and from the Dean of Advancement Dr. William Boldt. Keynote speaker Dr. Kevin Peterson of Dartmouth College gave a spectacular presentation on "Cambrian Exploration on Animal Life" to start the morning session. This was followed by some of the brilliant exhibits of student's research which showcased the department's recent academic success. Students were also encouraged by the evening keynote speaker, Timothy Garfield, Senior Technical Officer from ExxonMobil Exploration Company, whose talk was entitled "Reservoir Development on the Distal Basin Floor: Controls and Implications for Deep-water Exploration and Development".

The day was filled with eight oral presentations which included six UNLV graduate and one undergraduate student as well as one graduate student from University of California, Riverside. We also had a wide variety of posters this year. A total of forty-two posters were presented by graduate and undergraduate students in various topics; ranging from deep-earth to for-closure geospatial analysis. A complimentary continental breakfast, sponsored by Marathon Oil Corporation and an Italian lunch, sponsored by ExxonMobil was also a highlight of the day. A second round of oral presentations succeeded the luncheon. Afterwards participants and presenters resumed poster discussions.

at the Lunar and Planetary Science Conference in Houston.

Steven McDonnell received an NSF EPScOR scholarship to study the effect of biota on calcium carbonate in soils, and presented his research at the UNLV Geosymposium, as well as at the NSF EPScOR Symposium in Reno.

Kirellos Sefein (UNLV class of 2012) is doing an independent study synthesizing phosphate minerals relevant to Mars, presented his research at the UNLV Geosymposium, received a departmental scholarship in the spring and will be starting graduate school at the University of Oklahoma in the fall.

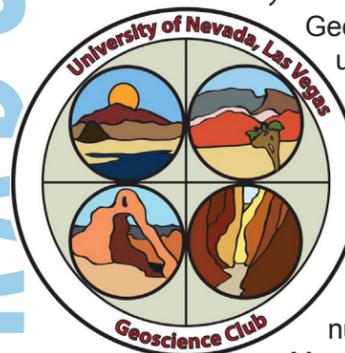
Michael Steiner has received a microbiology REU from UNLV to study phosphate mobility with implications for prebiotic chemistry.

Jason Cornell (UNLV class of 2010) will be starting graduate school at Western Washington University in the fall.

The Las Vegas Valley professional chapter of the Association of Environmental and Engineering Geologists (AEG) hosted a Student Presentation Night, where graduate and undergraduate students were able to present their research and top presenters were awarded cash prizes. This year three UNLV Geoscience students presented their research. **Mai Sas** won the prize for best poster and **Dawn Reynoso** won second prize in the talk competition.

GeoClub is Going Strong & Getting Stronger

By Dr. Scott Nowicki - GeoClub Advisor



GeoClub is the student organization run by and for undergraduates interested in all things Geoscience. Organized by senior geology majors, the club has been working to provide opportunities for social and scientific interaction on and off campus. From day hikes to weekend field trips to picnic events, the club has been engaging students of all majors.

Considering how much work organizing can be, a number of majors have been sharing the responsibilities. Margarita Rodriguez served as president for the fall term, and

Renee Schofield has been commanding the ship for spring term, but a number of people are dedicated to making the club work and expanding the numbers of participants. In the beginning of the fall term, GeoClub manned a booth for the first week of classes and registered the interest of more than 70 students, many of which were enrolled in introductory classes. Since that time, representatives have been making appearances in 100-level classrooms to let more students know what is going on.

The first big trip of the year occurred in November, when twelve students ventured into the Mojave National Preserve for the weekend. The trip was a smorgasbord of geologic features: dunes, cinder cones, lava tubes, alluvial fans, and everything in-between. The energy of the group was contagious, with senior students sharing their experiences and field stories with the new recruits, perpetuating the enthusiasm that is the trademark of our department. In fact, some of those new members are now active organizers in GeoClub. There are more plans for activities in the future, including a multi-day trip to Zion in the fall, and day hikes closer to home.

For more information about the group's activities, check out the blog at <http://unlvgeoclub.org/>.

Graduate Students Continued

Valerie Tu - MS



My project focuses on measuring dissolution rates of amorphous Al- and Fe-phosphates, and using them to help constrain the availability of phosphorus for life on Mars. Phosphate is an essential element for life on Earth, found in DNA, RNA, and ATP and therefore, if life has ever existed on Mars it may have required phosphate. Few dissolution rates exist for amorphous Al- and Fe-phosphates, and my research will help shed light on the behavior of these important phases.

Sarah Evans - Ph. D.



My research focuses on the timing of displacement in the Southern Snake Range décollement (SSRD), located in east-central Nevada, prior to the Miocene. This research will integrate structural, sedimentological, and thermochronologic data from a presumed syn-extensional conglomerate and a pluton exposed in the footwall of the Southern Snake Range to better understand the timing of movement along the SSRD. Ultimately this study will contribute to other known constraints on the timing and magnitude of exhumation within the northern Basin and Range province.

Jonathan Baker - Ph. D.



My research will seek to constrain the response of the hydrological cycle to climatic warming during the Early and Middle Holocene. I have chosen to focus on continental Eurasia (modern European Russia) in light of the sensitivity of its agricultural production to climatic variability and extreme weather events. To characterize regional paleoclimatic trends, I plan to utilize stable isotopes in stalagmites and shallow lake sediments as proxies for past temperature and rainfall.

Graduate Students Continued

Julie Baumeister - MS



I have studied the chemical weathering, or dissolution, of mafic minerals in natural environments. As part of my research, I characterized incipient weathering of serpentinite to serpentine soil in the Klamath Mountains of northern California. In addition, I examined olivine weathering in an arid environment at Black Rock Flow, Nevada and calculated a surface area-normalized dissolution rate for olivine using etch pit geometries and the exposure age of the basalt flow that contained the olivine.

Knut Mehler - Ph. D.

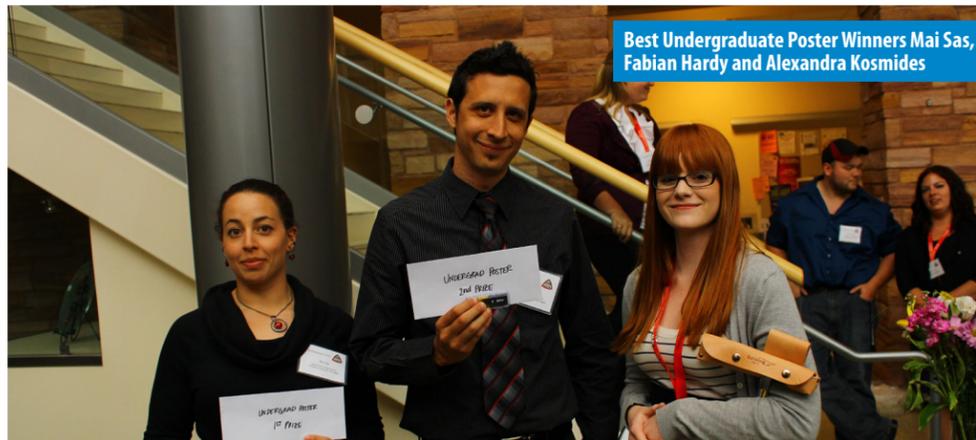


In my dissertation I am investigating the spatial and temporal distribution of key elements, such as C, N, and P within trophic interactions in the Walker River, NV and diverse springs ecosystems throughout the Great Basin and the Mojave Desert to examine consequences of elemental imbalances between benthic macroinvertebrates (BMI) and their food source on ecosystems processes, such as consumer-driven nutrient recycling. A major focus is put on the effects of anthropogenic disturbances on the spatial and temporal distribution of C, N, and P concentration (e.g. nutrient input due to agricultural activities in streams) and in consequently their impact on trophic interactions.

Leon Taufani - MS



My research is focused on sedimentological study of high resolution late Cambrian (Furongian) carbonate exposure in Central Nevada. The purpose of the study is to better understand depositional characteristics of detrital carbonate in slope-to-basin environments within a stratigraphy and sedimentological framework. Results of this study will help to provide new insight into carbonate depositional models in this particular environment, which has recently been considered an important target of hydrocarbon exploration.



Best Undergraduate Poster Winners Mai Sas, Fabian Hardy and Alexandra Kosmides

UNDERGRADUATE Awards & Activities

Largely through the generosity of friends and alumni of the Department, we were able to provide financial assistance to eleven undergraduate geology majors during the spring semester. Scholarship recipients were: **Chris Cline, Mai Sas, Brett Perry, Tim Howell, Dana Olsen, Nick Wong, Erika Lomeli, Steven McDonnell, Tim Bright, and Kirellos Sefein.** In addition, two of these students, **Mai Sas and Margarita Rodriguez,** received AAPG L. Austin Weeks awards, which is a \$500 cash award. Margarita was a recipient of this award in 2011, and Mai was a recipient this year.

Gene Smith had three undergrads present at Geosymposium. **Mai Sas** presented results of a crystal-size distribution study in the Lunar Crater volcanic field of central Nevada; **Hugo Belmontes** presented his geologic map of a previously unrecognized, caldera-like feature in the Pliocene of the Greenwater Range, near Death Valley; and **Eli Drechsel** presented his map of complex Miocene volcanic rocks in the Lucy Grey Range south of Las Vegas.

Andrew Hanson's strat-sed class presented a Geosymposium poster on the results of their study of diagenesis in samples from the Paradox Basin of Utah; they were testing for the influence of diagenetic change due to the proximity of mobile salt. Graduating senior **Brett Perry** has also been working with Andrew on a study of Paradox Basin salt-

related phenomena. Brett, who has been accepted into the UNLV graduate program for the fall, was a speaker at the first annual meeting of the Thermal-Anomalies-Around-Salt consortium.

Steve Rowland had seven undergraduate research students present posters at Geosymposium, **Alexandra Kosmidis** and **Margarita Rodriguez** reported on a study of an assemblage of Holocene bison (Bison bison) from Cathedral Gorge State Park in Lincoln County, Nevada; **Fabian Hardy** and **Margarita Rodriguez** reported the results of a study of a Pleistocene long-horned bison (Bison latifrons) from a site near Panaca, Nevada; **Daniel Haber** and **David Bloomfield** reported the results of a study in which they used provinciality data in Cambrian reef-building archaeocyaths to constrain the configuration of the Proterozoic supercontinent Rodinia; biology major **Sadaf Fakhra** reported the results of a study in which she tested the hypothesis that stability in the number of cervical vertebrae in certain groups of vertebrates over geological time can be used as a proxy for high metabolic rate; and biology major **Michael Salcido** reported the results of his study on the use of the morphology of Cambrian trace fossils as a proxy for neurobiological complexity and searching behavior in the early history of multicellular animals.

Valerie Tu (UNLV class of 2011) received a scholarship from Marathon Oil to attend UNLV, where she is studying phosphate mobility on Mars, and presented her work

UNDERGRADUATE



Photos by Leon Taufani, Swapan Sahoo and Scott Nowicki

The day's events closed with student awards and a silent auction. Awards were selected by a panel of confidential judges in five categories: graduate oral, graduate poster, graduate 795 poster, undergraduate poster, and group poster. Graduate student awards were supported by the generous donations from EMIL and LVIS laboratory and funds raised for the event. Cash prizes were given to first place winners for each category (\$100 for the oral presentations and \$75 for the poster presentations). Second place winners received 500 GB external hard drives. Third place winners received 16 GB flash drives and Estwing Rock Hammers. The 2012 GeoSymposium award winners were Megan Rohrsen for best oral presentation, Seth Gainey was awarded second place; Brittany Myers for best Graduate Poster, and Alison Sloat was awarded the second prize; Maile Sweigart for best Graduate 795 Poster presenter, and Ember Flagg was awarded second place, Mai Sas was awarded the best Undergraduate Poster presenter and tied for second place were Alexandra Kosmides and Fabian Hardy; the best Group poster was awarded to Timothy Howell and Garrett Wake, second place was taken by Erika Lomeli and Jocelyn Sporcic, and third place was awarded to Moira O'Donnell, Nichole Malichky and John Dougherty.

Throughout the day, students were involved with three Industry booths; Barrick Gold of North America, Sterling Gold-Imperial Metals and Nevada Water Resource Association. Sharing resumes and discussing job prospects was inspiring for the students. Barrick Gold of

North America sponsored the Evening Reception and Silent Auction and which were well attended by all the guests and the students. This event provided an opportunity for guests and students to network while bidding on rock, mineral and fossil specimens, as well as enjoy some refreshments. The auction was a fun way to build relationships between students and professionals.

A field trip coupled with boat ride was offered to Rainbow Gardens and Lake Mead National Park on Saturday, April 14. Dr. Steve Rowland and Dr. Gene Smith offered their valuable time to show the attendants some great exposures of 'The Great Unconformity', a rock outcrop equivalent to the Grand Canyon Formations. Dr. Rowland also showed the group some unique Rapakivi Granite exposures and discussed their formation and geomorphology. Dr. Smith discussed many volcanic and geomorphological features in and around the Lake Mead and shared humorous stories about underground tunnels in the Lake Mead area. Despite an initially chilly morning, the day became brighter and was ideal for the Lake Mead Boat Ride. Dr. Smith talked about the geology of the faults and formations around the lake area and saddle island. An early breakfast, picnic lunch with refreshments throughout the day was provided and sponsored by Aera Energy LLC.

The GeoSymposium committee extends a heartfelt thanks to all who contributed to the success of the 7th Annual GeoSymposium!

Graduate Students Continued

Laura Bilenker - Ph. D.



I am conducting high-temperature (400-800°C) experiments to quantify non-traditional stable isotope (NTSI) (i.e., Fe, Mg, Si) fractionation in magmatic systems. I heat and pressurize welded gold capsules containing mineral (e.g., magnetite) and fluid or mineral (e.g., magnetite, amphibole), melt, and fluid assemblages in a cold seal René vessel. The isotopic compositions of the quenched run products are then analyzed on a Multi-Collector Plasma Mass Spectrometer (MC-ICPMS). This work will contribute to our overall understanding of igneous processes by elucidating NTSI fingerprints observed in the field as well as develop the laboratory techniques needed to study NTSI fractionation in magmatic systems to build a reliable dataset.

Lindsey Clark - MS



I am researching the timing of mineralization and brecciation of the Cortez Hill Carlin-type Gold Deposit (CTGD), located in northern Nevada. Nevada is the type locality for CTGDs, making the state the fourth largest gold producing region in the world. More knowledge of ore-stage mineralization and alteration associated with gold deposition, as well as the processes responsible for mineralization, will aid in exploration for other similar deposits in Nevada.

Paul Pribyl - MS



My research focuses on reconstructing the moisture source of precipitation occurring in the Great Basin during the past 2 millennia by using the stable isotope ratios oxygen and carbon contained in the CaCO₃ of a speleothem collected from central Nevada. Variations in moisture source reflect changes in atmospheric circulation patterns, which are largely controlled by oceanic processes such as El Niño and the Southern Oscillation and the Pacific Decadal Oscillation. Understanding the contribution of these systems in producing the observed droughts of previous paleoclimate records aids in understanding the climate system and provides greater context for making future hydrologic predictions related to climate change.

Graduate Students Continued

Aubrey (Shirk) Bonde - Ph. D.



I am writing up my discoveries on the paleoecologies of Late Pleistocene megaherbivore assemblages from the southwest. This includes eight different fossil localities ranging from northern California to southern Nevada which are approximately 30-11.5ka. Each of these localities contains similar assemblages of herbivorous megafauna which I've analyzed for carbon and oxygen isotopes to identify diet and behavior. By doing this I am able to observe how communities of extinct large mammals were utilizing food/water resources in their environment and were partitioning to accommodate certain ecological factors, such as competition. This has also allowed me insight into the amount of environmental plasticity a species can handle, contributing towards a better understanding of what environmental conditions these large herbivores were able to tolerate before their extinction in the end Pleistocene.

Heather Stoller - MS



I am studying trace fossils of Early-Middle Jurassic animals found within the Aztec Sandstone located in Las Vegas and the surrounding area. With the conclusion of my research, the first complete list of tracks and trackways will be created for the Aztec Sandstone. The autecology of each trace-fossil-making taxon will be studied, and research will be conducted to determine whether the tracks and trackways occur in distinct intervals. A reconstruction of the local Jurassic environment is an overall goal of this research.

Dawn Reynoso - MS



For my research I will be working on Oligocene-Miocene aged fossils in the West Turkana District of Kenya, which is located in the East African Rift Basin. Just before the Oligocene-Miocene boundary, Africa made geological contact with Eurasia. My study will attempt to establish the faunal assemblage of the West Turkana District during the Oligocene-Miocene epochs. To enrich the paleontological analysis I will be using 40Ar/39Ar dating to constrain the ages of the fossils.

Society of Vertebrate Paleontologists' Las Vegas Meeting



Last November the Society of Vertebrate Paleontologists held a very successful meeting at the Paris Las Vegas Hotel. Steve Rowland, along with grad students Aubrey Bonde and Josh Bonde formed the core of the host committee. Fourteen hundred vertebrate paleontologists and students attended, which set a new attendance record for the annual SVP meeting. Several UNLV students and alumni (including May Sas, Fabian Hardy, Heather Stoller, Margarita Rodriguez, Dawn Reynoso, Vicki Meyers and Rhonda Fairchild) served as volunteers in various capacities. (Sorry if we inadvertently left out the names of others who helped.) Hosting this high-profile meeting was a big boost for the vertebrate paleontology program at UNLV.



I graduated with a Ph.D. from Baylor University at Waco, central Texas and worked at UT El Paso, in the far-west point of Texas. UNLV is the first place I have lived outside of Texas since I came to the US. Friends in El Paso told me, "You are moving from a hot plate to a sizzling plate!" So far the weather here is not too much different from El Paso, except that the wind here is not as dusty as an El Paso breeze. I have yet to go through summer here, so I may change my statement.

My new position at UNLV is that of Assistant Research Professor and a major part of my duty is supervising our Geoscience EMiL suite located in the new Science and Engineering Building. I mainly utilize three JEOL tools, a Scanning Electron Microscope (SEM), a Field Emission Scanning Electron Microscope, and an Electron Microprobe, so that the lab can produce sample analysis for geoscience and other related areas. The SEM has a magnification range from x35 to x20,000 (2 millimeter to 1 micrometer), with the ability to collect a variety of images and qualitative chemical compositions. The Field Emission SEM has a magnification range from x500 to x430,000 (5 micrometers to 10 nanometers), with excellent resolution at 5 nanometers. It is amazing how much detail we can see when the magnification of the image reaches the nanometer range. The Electron Microprobe (EMP) quantitatively analyzes all elements heavier than nitrogen.

In addition to training and helping users for the EMiL suite, I collaborate with other researchers on campus. My research interests are geochemistry and igneous petrology and my favorite rocks are granite and rhyolite. My work involves both field and laboratory analyses for select samples. In addition to high temperature geochemistry, I also collaborate on other geochemistry problems including low temperature and environmental geochemistry.

Graduate Students Continued

Liz Tanis - Ph. D.



My research focuses on quantifying the solubility of rare earth and high field strength elements in aqueous fluids as a function of pressure and temperature at conditions appropriate for the prograde devolatilization of subducted sediments. I use a hydrothermal diamond anvil cell to generate high pressures and temperatures and synchrotron x-ray fluorescence to determine the solubility in situ.

Swapan Sahoo - Ph. D.



In my current project I plan to address the molybdenum, uranium and vanadium concentrations and their associated paleo-environmental implications; sulfate and sulfide isotope and its perspectives on Earth system evolution; high-resolution, parallel carbon and sulfur isotope chemo-stratigraphy across organic-carbon rich black shale intervals and comparisons of Proterozoic successions globally. I use several biologically mediated geochemical proxies such as cycling of carbon, sulfur, and trace metals which are preserved in ancient sedimentary rocks. Currently, I am excited to study the patterns of early atmospheric oxygenation expressed in trace sulfate and in redox-sensitive metals within black shales.

Dev Maharjan - Ph. D.



My research is about the climate change in the early Mississippian (Kinderhookian-Osagean) across the positive carbon isotope excursion which is one of the largest excursions in the Phanerozoic. This excursion has been interpreted as enhanced organic carbon burial. If so, I would expect to see sea-surface temperature change, oceanic redox change and sea level change across the positive carbon excursion. This research will find the link between carbon excursion and climate change.

DID HUMANS ALMOST GO EXTINCT? CONTINUED FROM PAGE 7

global climate and may have caused the near extinction of humans in Africa. A major problem with this theory is that no volcanic products from Toba have been discovered in Africa. The nearest occurrence of Toba ash to Pinnacle Point was recovered from the mid-Indian Ocean several thousand miles from southern Africa. If shards that Smith identified in the sand ramps at Pinnacle Point are related to the Toba eruption, this would be a major discovery and might be the proof needed that a large volcanic eruption nearly caused our extinction. But how will Smith and his colleagues positively correlate the shards to a specific volcanic eruption? Of the candidate volcanic eruptions, only Toba produced a distinct amount of high silica rhyolites. This provides a tool to positively fingerprint Toba ash. Moreover, if the shards from Pinnacle Point are identical to the chemistry of Toba ash, then they might be able to establish the link between the eruption and near human extinction.

to sample the sand ramp in great detail. Samples must be collected every centimeter using a spoon to carefully remove the loose material.

The locations of the samples are recorded using a laser GPS system that allows the construction of a 3-D image of the outcrop and of the entire excavation. Smith will carry about 200 samples back to UNLV where he and

his colleagues will carefully separate any shards from other material in the sand ramps (including Ostrich egg shells) from the potential Toba ash deposit. Using UNLV's EMIL lab, they will carefully analyze the shards for major and trace elements. Professor Smith and others will have their fingers crossed that the shards have not been chemically altered and that they can obtain reasonable analyses. In the next Geoscience newsletter Dr. Smith will reveal the results of the study and whether the shards are the key to understanding the conditions that caused the catastrophic decrease in human population 70,000 years ago.

This June, Dr. Smith will be taking the 30-hour trip back to Pinnacle Point



ABOVE: Active excavation of a cave at Pinnacle Point, South Africa.



ABOVE: Professor Jean Cline and Dr. John Muntean (Nevada Bureau of Mines and Geology) and Chinese colleagues collect drill core samples at the Zimudong gold deposit in southwest China.

Professor Jean Cline and Dr. John Muntean (Nevada Bureau of Mines and Geology) traveled to China to establish a collaborative research project on potential Carlin-type gold mineralization in China. They visited the Chinese University of Geoscience in Beijing to meet collaborators and then travelled to southwestern China, which contains gold deposits in terrain analogous to that in northern Nevada, and which might be the first recognized Carlin-type deposits outside of Nevada. The group spent a week collecting samples in Guizhou Province in southwest China that are currently being analyzed. A reciprocal visit by the Chinese collaborators in the fall of 2012 will include a tour of Nevada's Carlin trend.

Graduate Students Continued

Katrina Sauer - MS



My research will be focusing on the kinematics and timing of intra-core shear zones in the Funeral Mountains metamorphic core complex (FMMCC) along the eastern boundary of Death Valley National Park, in southeastern California. Metamorphic core complexes in the North American Cordillera pose an interesting problem in that it is controversial whether their exhumation is strictly due to Cenozoic extension, or if instead it is due to polystage Mesozoic and Cenozoic extension. The FMMCC is exposed in the footwall of the Boundary Canyon detachment, which exposes high-grade metamorphic rocks that record multiple deformational events, with the dominant Miocene fabric showing top-northwest movement. The intra-core shear zones are an important aspect of the overall story, as they potentially accommodated a large amount of Late Cretaceous extension that has since been overprinted by Cenozoic extension. By determining the kinematic history and timing of these intra-core shear zones, the timing of exhumation of the Funeral Mountains can be better constrained to potentially include an earlier, Late Cretaceous extensional episode.

Inessa Yurchenko - MS



The goal of my research project is to determine if viable source rocks other than the Chainman Shale and Sheep Pass Formation exist in northern Nye County. I collected outcrop samples from several Paleozoic units and used organic geochemistry to test them for quantity, quality and thermal maturity of organic matter. This knowledge will help to estimate the petroleum potential of northern Nye County for future exploration and development in Nevada.

Christopher Adcock - Ph. D.



I am currently studying phosphate mineral dissolution and the impact of phosphate mobility on the habitability of early Earth and Mars. Phosphorus is a bio-essential element and my research may help to determine future landing sites for Mars exploration missions as well as yield insights into the origins and development of life on Earth.

**Distance Education
The next great step in Geoscience**

In Fall 2010, the Geoscience Department was approached by the UNLV Office of Online Education to develop distance education (DE) laboratory courses for use in the general education (100-level) curriculum. Since then, the department has become the first academic unit at UNLV to offer DE science laboratory courses. As a department, we quickly recognized the opportunity to reach more students, and to engage them by using scientifically and pedagogically robust modes of instruction for an online environment. Two courses that reach broad, but differing student populations were identified for development: Introduction to Physical Geography Lab (GEOG 104) and Introductory Geology: Exploring Planet Earth Lab (GEOL 101). These efforts have come to fruition during the 2011-2012 academic year with the successful rollout of GEOG 104 and GEOL 101. The GEOL 104 lab is a standalone 1-credit course, while students enrolled in the DE version of GEOL 101 take both the lecture and lab on-line for a total of 4 credits. Strong enrollment in these courses confirms the interest of undergraduates in DE course offerings, while continued demand for our traditional on-campus laboratories illustrates their desire for instructional options. Given the positive enrollment numbers, we anticipate that the DE versions of these courses will continue to be offered every semester to supplement our traditional laboratory sections. The DE format also facilitates offering Geoscience laboratories during the shortened summer sessions, so we will offer the GEOG 104 and GEOL 101 courses during summer 2012 to explore student demand.



JOHNATHAN BAKER RECEIVES FULBRIGHT AWARD

Over the next academic year, UNLV student Jonathan Baker (Ph.D.) will pursue collaborative research with Dr. Mikhail Nikitin of Herzen State Pedagogical University in St. Petersburg, Russia. Integral to his doctoral dissertation, this work will focus on the Holocene climate evolution of the Izhora Plateau (northwestern Russia) and Volga River watershed. While in St. Petersburg, Jonathan hopes also to engage the Russian language through university courses designed for English speakers. Most importantly, with respect to the goals of the Fulbright program, he plans to understand better Russian culture and the current state of science and education in Russia to explore future opportunities for exchange and collaboration.

**GRADUATE
Awards and Activities**

Ember Flagg has been accepted to participate in the SEG Iberian Pyrite Belt field trip in Spain and Portugal in May 2012.

Maile Swaggart is doing an internship with ExxonMobil this summer, and afterwards will be going to China for 2 weeks for a hydrology project researching different aspects of the watershed that includes Lake Taihu. She will be working with Zhongbo Yu and another student, **Melissa Thaw**, from the Water Resrouce Management program.

Swapan Kr. Sahoo presented a talk at the Goldschmidt Conference in Prague. He received an international program student grant as well as GPSA grant to perform a field trip in India to study some biological aspects of the Proterozoic Vindhyan basin.

Michael Giallorenzo, Valerie Tu, Dev Maharjan, Jonathan Baker, Jeevan Jayakody, Christopher Adcock, and Sarah Evans received departmental scholarships in the spring semester.

Graduate Students Continued

Alison Sloat - Ph. D.



I am studying Late Pleistocene Alaskan climate shifts using stable isotopes in 30,000 year old ice wedges from the Cold Regions Research and Engineering Laboratory's Permafrost Tunnel near Fairbanks, Alaska. These ice wedges tell us information about climate shifts during the Last Glacial Maximum, carbon cycling in permafrost, and the potential impacts of future climate warming on permafrost in the Arctic.

Jeevan Jayakody - Ph. D.



I study characteristics of water flow in media that is made up of uncemented coarse porous rock fragments. My research involves meter-scale laboratory experiments to study the spatial and temporal variability of unsaturated flow structure in this type of media, as well as bench-scale experiments to study water flow between multiple rock fragments. The objective of the research is to improve existing conceptual models that are used to predict liquid flow in heap leach piles, mine wastes, rock drains, engineered capillary barrier systems and natural gravel deposits, where uncemented coarse granular media are present.

Jeremy Koonce - Ph. D.



The focus of my research is the understanding and quantifying of the physical processes governing water and energy flux in arid soils (experimental lysimeter facility in Boulder City, Nevada) and semi-arid soils (natural environment within the Great Basin, Nevada).

Bryan Eleogram - MS



I will be conducting a thermochronology study of the Willard thrust sheet, Utah. The Willard is a dominant thrust sheet in the Sevier fold-thrust belt.



**DID HUMANS
ALMOST GO
EXTINCT?**

*DID VOLCANIC ERUPTIONS CAUSE THE NEAR EXTINCTION OF HUMANS 70,000 YEARS AGO?
BY DR. GENE SMITH*

Did humans almost go extinct? If so, was a major volcanic eruption at least in part responsible? These questions are the basis for new research project at the southern tip of Africa, recently started by Dr. Eugene Smith. Gene is working with Dr. Curtis Marean at Arizona State University's Institute for Human Origins to answer these questions. Marean formulated the unique hypothesis that sometime between 195,000 and 70,000 years ago the population of Homo sapiens fell drastically to just hundreds of breeding individuals due to climatic change that left most of Africa previously occupied by humans uninhabitable. These few individuals retreated to the southern tip of Africa near Pinnacle Point where they survived this climatic change by eating shellfish and edible plants. Marean further suggests that all humans on earth today descended from this small group of people. These survivors used limestone caves to prepare food and take shelter. Numerous artifacts including abundant heat-treated silcrete tools and shell fragments have been excavated from the caves.



ABOVE: View of the Indian Ocean from a cave near Pinnacle Point, South Africa inhabited by early Humans.

Last summer Dr. Gene Smith, along with his wife, Diane, visited the caves at Pinnacle Point, South Africa as part of a National Geographic Expedition to visit sites of early human habitation in Africa. While giving them a tour of one of the caves, Curtis Marean mentioned that one of his scientific staff, Dr. Panagiotis Karkanas, an archaeologist at the Ephoreia of Palaeoanthropology-Speleology in Athens, Greece, had discovered "volcanic material" in sand ramps that barricaded the mouth of one of the caves about 70,000 years ago.

Curtis showed Dr. Smith photos of the suspected volcanic material and he immediately recognized several very well formed glass shards (broken bubble walls formed by the explosive disruption of frothy magma). Immediately this spurred interest in Smith. Not only had volcanic material of this age never been observed in any archeological site in South Africa but the discovery of shards raised the possibility that at the time of near human extinction there was a major volcanic eruption. Unfortunately there are no volcanoes of that age and composition in southern Africa. Smith did a quick survey and found that major explosive eruptions occurred about 70,000 years ago in Antarctica and also at Toba Volcano in Indonesia. Toba Volcano erupted between 69,000 and 77,000 years ago and is the largest volcanic eruption on earth in the last 1 million years. Previous work suggested that the Toba eruption changed the

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Graduate Students Continued

Andrew Miller - MS



My research focuses on examining the carbonate platforms of central Nevada to western Utah, deposited during the late Devonian to early Mississippian, and creating a series of stratigraphic columns to show the progradational nature of the aforementioned carbonate platforms in response to the Antler Orogeny. The purpose of these stratigraphic columns is to better understand tectonically altered sedimentary basins, with a secondary focus on determining the diachronous versus synchronous deposition of the carbonate platforms.

Angel Ventrelli - MS



I am working on the sedimentological response to climate change across a major Mississippian isotope excursion. My focus is to integrate the sedimentological evidence with the isotope record to create a comprehensive evaluation on the coupling of the deep-time global carbon cycle and climate-driven sea-level changes during the Early Mississippian.

Maile Sweigart - MS



My research involves utilizing data from NASA's GRACE (Gravity Recovery and Climate Experiment) twin satellites to look at water storage change over time for Southern Nevada. I will be comparing that information against historical hydrogeological data from the area, inferring trends between the GRACE data and the declining levels of recharge and groundwater storage, as well as climatic changes in temperature and solar radiation. These observations may be indicators of the impact of drought and short-term climate change in Southern Nevada. The research results will not only help predict future water storage decreases, but it will also show any adverse effects that climate change may be having on the area, including the impact it has on the groundwater in aquifers, and the impact it has on Southern Nevada's water supply in general.

FACULTY NEWS



Professor Brenda J. Buck is an invited member of a John Wesley Powell Grant to study the distribution of erionite and other fibrous minerals in the United States and the implications for human health. She is the only soil scientist on a team of 15 scientists from the Centers for Disease Control and Prevention (CDC), National Institutes of Health (NIH), United States Geological Survey (USGS), National Institute of Environmental Health Sciences (NIEHS), The National Institute for Occupational Safety and Health (NIOSH), Agency for Toxic Substances and Disease Registry (ATSDR), and participants from three other Universities. This 2-yr project was one of several "Big Data" projects recently announced by John Holdren, assistant to the President and director, White House Office of Science and Technology Policy.

Associate Professor Adam Simon collaborated with curriculum planners from the Clark County School District to develop a weeklong earth science boot camp that focused on energy through a geologic lens. This joint UNLV-CCSD program hosted 58 elementary school teachers in June of 2011. Later in the summer, he served as a lecturer for a workshop in Goslar, Germany that was directed at graduate students and postdoctoral researchers. The workshop was sponsored by the European Union and National Science Foundation, and coincided with a special issue of *Reviews in Mineralogy and Geochemistry* entitled "Sulfur in Magmas and Melts and Its Importance for Natural and Technical Processes".

Steve Rowland will be on sabbatical leave during the 2012-2013 academic year, working on a couple of book projects. He and his former grad student Slava Korolev (M.S. 1967) recently completed a Russian-to-English translation of a historically significant eighteenth-century book titled *On the Strata of the Earth*, by Mikhail Lomonosov, published in 1763. Their translation will be published later this year by the Geological Society of America. Steve will be attending the International Geological Congress this summer in Brisbane, Australia, presenting two papers, one on Mikhail Lomonosov's *On the Strata of the Earth* and the other on a recently discovered Ediacaran fauna from Esmeralda County, Nevada. The Ediacaran presentation will be co-authored by undergrad Margarita Rodriguez. While Steve is on sabbatical leave, his recently graduated PhD student Josh Bonde will be filling in for him as a Visiting Assistant Professor.

Dave Kreamer recently returned from Ghana where he was working with his graduate student Melanie Krautstrunk over the Spring break on groundwater recharge, water quality, and water supply in the north central part of the country. Melanie is working on determining whether expansion of the number of wells in the region is sustainable for her Master's thesis.

BELOW: Melanie Krautstrunk (MS) is performing a digital titration at a hand pumped well near the town of Savelugu.

A LETTER FROM AN EMERITUS PROFESSOR
LIFE, 25 YEARS AFTER RETIREMENT - BILL FIERO

One has to be fortunate to be writing under such a heading. To explain, my wife, El and I left UNLV 15 years before 'normal' retirement age. We loved our research and teaching, but with the last kid off to college, we could see down the trail into the future – and there was a fork in the trail – either leaving jobs early and having time and less money, or, down the other fork, working on to age 65 and perhaps have more money but

less time. We shared the experience of a parent who hoped to continue to age 65 for retirement and didn't make it, so we opted for leaving our jobs at age 50, to hopefully have more time together but less money.

Consequently, we sold our house and most of our belongings, hopped unencumbered, without 'things' to anchor us, into a 20-foot RV. After traveling the country by road, we purchased a 20-foot sailboat and eventually a 22-foot powerboat to give us the ability to go up rivers and currents. In almost ten years living aboard, we cruised all of the rivers designated as navigable by the Corps of Engineers, all the Great Lakes and many other great lakes throughout the country, cruised all three coasts and

north up the Inside Passage to Alaska several times.

We traveled across Europe on the water last spring, through the Panama Canal last winter, and head back for more water travel in Europe this spring.

As a former geology and environmental science professor at UNLV, my eyes are well equipped to appreciate the beauty we have experienced. We have shared this knowledge on boating websites and with those with whom we have traveled. Retirement has been a joy for us. Best wishes to all who remember us.



Nick Downs (M.S. spring 2012) overlooking the Bay of Biscay on the northern coast of Spain where he investigated the thermal impact of salt diapirs on adjacent strata.

Associate Professor Andrew Hanson initiated the first ever industry supported research consortium at UNLV. The consortium, named "Thermal Anomalies around Salt", focuses on thermal issues adjacent to salt features in sedimentary basins. Member companies, currently Anadarko, ConocoPhillips and Apache Energy each contribute \$22K for a 2-year membership. Our field areas include the La Popa basin in Mexico, the Western Pyrenees in Spain, and the Paradox basin near Moab, UT. As part of this project, undergraduate students in the Spring 2012 Sed/Strat course are working with sandstone samples from the Paradox basin in order to explore the relationship between diagenetic change and proximity to salt features.

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Graduate Students Continued

Ember Flagg - MS



For my project, I will constrain the nature of gold mineralization at the Millrock-owned Estelle Property, located in the South Central Alaska Range, by characterizing hand samples and performing thin-section petrography as well as chemical analyses. The data generated in this study will determine if the mineralogy is consistent with a preexisting genetic deposit model such as a gold-only porphyry deposit or a reduced intrusion-related gold system and lead to an overall better understanding of gold-only ore deposits.

Nikolas Taranik - MS



My thesis research is investigating the hydrogeologic characteristics of groundwater recharge, movement, aquifer permeability, travel times, and aquifer residence times in northeast Ivanpah Valley. This work of evaluating northeast Ivanpah Valley is also to determine if the area is a hydrologically isolated and a distinct sub-basin within the Ivanpah Hydrographic Basin (IHB). The results of this research may have implications for southern Nevada water supply in that the Sub-basin will be evaluated as a area for future artificial recharge and storage.

Peng Jiang - Ph. D.



I am studying both observed records and current climate models which show a near-surface warming trend that has important consequences for the hydrological cycle. My research focuses on the impacts of climate changes on the hydrologic processes and water resources in the western United States including Colorado River Basin (CRB) and Las Vegas Metro Area (LVMA). For this purpose, spatial and multi-scale temporal variability in precipitation extremes and the spatial characterization of the ENSO-extreme precipitation response pattern will be explored. Current downscaling methods for precipitation will be evaluated based on their ability to simulate multi-scale temporal variability and incorporate the non-stationary characters of precipitation time series. With the simulated results, I will assess the impacts of climate changes on the hydrological processes and the uncertainty of water sustainability in LVMA.