
Down to Earth

**Newsletter of the Geology and Geophysics Department
University of Utah, Salt Lake City, Utah**

2007-2008 Double Header Issue



**Come Celebrate the Opening of the
Frederick Albert Sutton Building
on April 17, 2009**

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Message from the Chair

Dear Alumni and friends,

Fall greetings and happy reading of our newsletter summarizing the last two years! I thank Dr. Erich Petersen who did a heroic job of acting chair while I was getting refreshed on sabbatical. Now we are both ready to gear up for a really big year.



Recently, on an unusually clear flight I looked down on intricate dendritic river tributaries and uplifted strata of the San Rafael Swell and Upheaval Dome in Canyonlands. It was like reading a book full of intriguing stories. On a spring rafting trip down the Colorado River

through the Grand Canyon, I could imagine John Wesley Powell exploring side canyons, with new discoveries each day.

As Earth scientists, we can connect with the environment around us wherever we go. Our science encompasses fun with the outdoors and has applied relevance. We meet widely traveled comrades who broaden our perspective. You are a part of helping us educate students through your support of our programs and through your success, which speaks well of your training. With the new Sutton building a reality, we will be able to offer more great experiences and new opportunities for our students.

Please reserve time for a Utah vacation on April 17, 2009. We are planning a Utah Geo Alumni & Friends Reunion, with a celebration and the grand opening of our Sutton Building. What a wonderful gift from our major donor- Rev. Marta S. Weeks! We want all of you here for this big event. Reconnect with friends you haven't seen in ages, epochs, or eons. It will be a great time to gather together with Down-to-Earth folks.

I look forward to seeing all of you soon!

With all our best wishes, Marjorie Chan

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If you will be at the GSA meeting this year, please join us for a U of U reunion: Monday, October 6, 2008 from 5:30pm to 7:30 pm in Room 337B at the Hilton Americas Hotel in Houston, Texas on 1800 Lamar Street.

New Era for Geology and Geophysics Department

Sutton Building Grand Opening Set For April 17, 2009

What was only a large hole in the ground only last year has steadily grown into the new home of the Department of Geology and Geophysics. The Frederick Albert Sutton Building will house the department's teaching and research activities, replacing a woefully inadequate eighty-year-old building.



Display spaces under construction in the lobby will showcase beautiful geological specimens presented by generous donors.

The new four-story building provides 91,000 square feet of teaching, laboratory, and administrative spaces featuring state-of-the-art technologies that will allow our students and faculty to collaborate in new and innovative ways that were unimaginable in the past. The lobby of the building will invite the public to explore the world of geology and earth sciences presented in museum-like exhibits.

From the beginning the Sutton Building has aimed to meet a set of guidelines from the U.S. Green Building Council that will give it Leadership in Energy and Environmental Design (LEED™) certification. Even though the cost of constructing a "green building" is higher, the administration, faculty and students fully endorse this commitment to the principles of sustainability. Ours will be the first LEED™ certified building on lower campus and will set an example for future construction projects at the university and within the greater community. (See the following story.)

Most importantly, the Sutton Building will increase our ability to provide the kind of first class research facilities that attract able, enthusiastic students and produce well-prepared, highly motivated professionals. As well as improving the College of Mines and Earth Sciences' vital technological assets, by strengthening the rapidly expanding role of geosciences in the community it will contribute to the University as a whole.

Decorative Elements Feature Geological Themes

Several features that allude to geological themes give the Sutton Building a distinctive character, befitting the new home of the Earth sciences. A symbolic river starts with a dry riverbed on the east side of the building, carrying a river pebble tile pattern through the lobby floor, down one floor, and out the west entry. Large monoliths mark our entryways, including a large quarried slab of garnet staurolite schist. The main entry will feature a large Eocene Green River fish fossil wall that honors the generous donors to our building.



A rock river pours into the building.

Several local companies, including DalTile and Stone, Contempo Ceramic Tile, and North Salt Lake Marble and Granite, have provided some wonderful natural materials that will grace our floors and hallway displays. We have many other outstanding collections and donations that will make our building a highlight for the whole campus.



Eocene Green River formation fish will swim across our donor wall.

Impact of New Displays Reflects Generous Involvement of Local Design Team

The construction of our new quarters continues to attract attention from the greater community. Intrigued by the idea that the new building itself could illustrate geological principles, architect John Diamond and designer Lee Phillips-Diamond of the architecture and design firm diamondphillips in Salt Lake City generously donated over two hundred hours of their time during the fall of 2007 and spring of 2008 to help with Sutton building displays and the coordination of design and finishes.



Architect's view of the donor wall shows a school of fossil fish swimming toward the new auditorium.

They are now officially hired as our Sutton display team for summer of 2008 through to the finish of the building, and you will be impressed with their suggestions for the display of the many wonderful donated pieces, geologic art, departmental collections, and more. We appreciate their imagination and expertise in creating a welcoming as well as educational atmosphere in our public display and meeting areas.

Building Incorporates "Green" Features

As responsible stewards of the environment, the Department of Geology and Geophysics has worked toward obtaining Leadership in Energy and Environmental Design (LEED) certification for the Sutton building.

Newly Developed Cement Transmits Water

The west side of the Sutton building has a new installation of pervious cement, one of only three installed in the state of Utah. This new technology, allows water to percolate into the ground, simulating natural landscape. This demonstration with a fire hose of water going full blast shows how the water soaks straight down into the cement instead of running off in sheets as it does from other hard surfaces. This project, originally proposed by students in the sustainability class, is a distinctive feature that adds to the "green" character of our new building.



Onlookers watch in amazement as water from a full-blast fire hose is absorbed by pervious cement.

Student Practicum Develops Green Features

To implement the LEED standards for our building, the Environmental Studies Program in cooperation with the Departments of Biology, Geology and Geophysics, and Civil and Environmental Engineering offered a Sustainability Practicum in spring 2007 whose purpose was to encourage students to design features that would enhance the Sutton Building's environmental performance. Twenty students guided by Drs. William Johnson of Geology and Geophysics, Steve Burian from Civil and Environmental Engineering, and Fred Montague of Biology produced ten designs, four of which were finally adopted:



Students demonstrate how the storm-water collection system will work.

- A storm-water collection system to avoid contaminant transmission to storm drain overflow and a storm water distribution system to distribute collected water to a roof-top garden and perimeter landscaping, developed by William Flower and Candace Knight. They worked with the Sutton building's supervising architects from Cooper Roberts Simpson Associates (CRSA), Inc., engineers from Psomas, Inc., and the University of Utah's plant operations.

- A xeriscaped “green” roof to provide enhanced surface cooling, developed by Alexandra Parvaz and Elzard Sikkema. They worked with architects from CRSA, Inc., engineers from Psomas, Inc., landscape designers from G. Brown, Inc., and course faculty.
- An energy metering display to demonstrate energy and water use in the Sutton Building relative to other new campus buildings, conceived by Charles Kim. His idea is being developed in partnership with plant operations Chris Atkins as well as consultants from Heath Engineering Inc. and ECE Engineering Inc.
- Tubular skylights to bring natural sunlight into laboratories and other windowless rooms in the interior of the building, the idea of Christopher Strong who worked with consultants from Heath Engineering Inc., ECE Engineering Inc., architects from CRSA, Inc., and building contractors Gramoll, Inc.

All participants acknowledged it was a challenging, frustrating, and rewarding experience. We are grateful to the many professionals from disparate disciplines who provided vital information and reality checks.

The Dean of the College of Mines & Earth Sciences approved funds to allow full design of the accepted projects. The designs, when complete, were forwarded to the building contractors who then developed cost estimates.



Architects and contractors helped make student conception of tubular skylights a reality.

These enhancements were not part of the building’s original budget, and because the Sutton building is being

constructed entirely with funds raised from private donations, funds for implementing these projects needed to be found. Each project will cost from \$10,000 to \$70,000, totaling about \$300,000. We are pleased to be able to report that these extra funds have now been raised.

Spring Celebration Plans Taking Shape

We’re planning a grand opening celebration when our Sutton Building is complete, which we anticipate will take place April 17, 2009. The special activities will begin with a short ceremony including comments from the major donor, the Reverend Marta Sutton Weeks, whose gift is in honor of her father, Frederick Albert Sutton, kicked off the effort in 2003. University President Michael K. Young and Dean Frank Brown will recount memorable events along the way, from the offer of the gift, to development of the plans, and finally the construction.



Developing construction finally gave us an idea how the Sutton building will fit into its campus environment.

Currently, we’re hoping that Marta Weeks will bring with her Donna Shalala who served as President Bill Clinton’s Secretary of Health and Human Services and currently holds the post of President of the University of Miami. Following the ceremony there’ll be a light luncheon and tours in and around the building for four hundred to five hundred of the major donors, dignitaries, and friends and alumni of our Department.

To show off these wonderful facilities, we’re planning a Geology and Geophysics all-alumni reunion. We would like to get as many of our alumni back to campus as we can, for this once-in-a-lifetime event. It will be a great excuse for you to come back, visit your old stomping grounds, renew friendships, see familiar faculty, share old memories and make new ones. We’re trying to plan an optional field trip to showcase some classic Utah geology (but with a new twist of course). You won’t want to miss this celebration! Put April 17, 2009 on your calendar and we will let you know more details as the date gets closer.

Once Upon a Time . . .

As we celebrate our new building, we should not forget to give a nod to our old Mines building, worn out by time and by generations of earth scientists who for eighty years crushed rocks, poured over microscopes, attended lectures, and studied for exams in its halls. It's served a long and useful life.

Someone recently unearthed a newspaper article that recorded the ceremonial laying of the first School of Mines building's cornerstone by Utah's governor in 1927. The article noted that as he "wielded the trowel", he "extolled the position held by mining in the life, wealth and progress of a nation." The cornerstone was a solid granite block from Little Cottonwood Canyon, and bore a copper plate furnished by the Utah Copper Company which read, "Dedicated to the Advancement of the Mining Industry, 1927, George H. Dern, Governor. In a space beneath the stone was placed a copper box containing, among other things, the legislative contract for the building and statistics concerning the mining industry in Utah. In 1926 Utah was one of the major mining states of the union and the new building was meant to nurture students who would continue to exploit her treasures. What would they have to say about the veritable explosion of geological disciplines far removed from mining that are now pursued worldwide by our faculty and students?"



Old Mines Building cornerstone documents a past era.

The Mines building will eventually be demolished because of its irremediable non-compliance with current building codes. (For example, it has no elevator and cannot be made accessible for those with disabilities.)

However, we plan to retrieve the historic cornerstone, examine its contents, and find a way to incorporate this element into our new building. We will blend the old with the new, and history will not be forgotten.

Naming Opportunities Still Available

The construction of the Sutton Building offers a rare opportunity to be a recognizable part of our future. We still need \$800,000 to finish the building and provide state-of-the-art equipment. There are opportunities ranging from \$5,000 to \$150,000 to have your name placed on facilities ranging from meeting rooms to graduate student work space, or from "green" improvements to specialized labs equipped for thermogeophysics, or tomography, or any other of the increasing number of disciplines that now constitute vital parts of the earth sciences.

All donors contributing \$1,000 or more will have their names engraved on our special fish fossil donor wall. Donors at all levels will be recognized in the special printed program at our grand opening.

We are proud of the broad range of donors who have already made substantial commitments. Take a look at the list later in this issue, and if you're not there, consider joining their numbers. Contact the Department soon if you would like to have your name engraved on the donor wall.



(Mn,Fe)₂O₃ Bixbyite on topaz, from the Topaz Mountain area, Juab Co., Utah- courtesy of Dave Richerson.

Around the Department

The past two years have seen the continued expansion of programs that enhance both our focused scientific interests and our wider relevance to the community beyond our corridors.

Round Table Diversifies Its Activities

The Round Table advisory board for our department met in September 2007, spearheaded by Dr. Erich Petersen who was the Department's Acting Chair at the time. Major topics for discussion included suggestions for the Round Table group itself (e.g., diversification, and more frequent meetings), the strength of the WEST and EAST Programs, student needs for financial analysis skills, possible multilingual proficiency, increased connections with the Energy Geosciences Institute (EGI, in research park), and ideas about how to attract the best faculty and

students. The Round Table met with both our students to discuss their educational experiences, "Career Day", computer facilities, programmatic courses, and connections with the alumni. We have already addressed some of these issues and are continuing to explore others. We look forward to the next Round Table meeting that will be held in conjunction with our April 17, 2009, Sutton Building Grand Opening.



Jeff Gentry (B.S. 1984) and David Duke (Ph.D. 1962) talk Geology and Geophysics Department affairs during a break in Round Table meetings.

The 2007 Roundtable members were Chair Chuck Williamson, G. W. Anderson, David Applegate, Dan Barnett, Geoff Bedell, David Duke, Perry Eaton, Tom Fassio, Jeff Gentry, John Lawrence, J. Paul Matheny, Ernie Otto, and Randy White. Attending faculty were Frank Brown, Erich Petersen, Margie Chan, Thure Cerling, Tony Ekdale, Bill Johnson, Barb Nash, Jim Pechmann, Jerry Schuster, Michael Zhdanov, and John Kaloudis, our development officer. Guests were Hanna Duke, Susan Johnson, Nancy Petersen, and Olga Zhdanov.

New Faculty Members Chosen

Michael Thorne Joins Geophysics Program



Michael Thorne brings a wide-ranging computing background to geological projects.

Dr. Michael Thorne arrived in our department in January 2008. He comes from Fairbanks, Alaska, where he held a postdoctoral fellowship with the Arctic Regional Supercomputing Center and Geophysical

Institute at the University of Alaska. Much of his work has specialized in developing numerical techniques to model seismic wave propagation, specifically, model seismic waveforms for comparison with actual seismic records in order to define Earth's structure. While his major interest has been in mapping seismic structure of the deep mantle, his recent research interests include waveform modeling of upper mantle structure, in particular subduction zone structure, and volcanic seismicity. Thorne is currently working on projects with research teams from Arizona State U., Leeds University in the U.K., U.C. Berkeley, E.T.H Zurich, Stanford U., U.C. Santa Cruz, and U. Michigan.

He received his Ph.D. in geophysics from Arizona State University and his B.S. in physics from Indiana University.

Randall Irmis Brings Interdisciplinary Expertise to Paleontology



Randy Irmis studies ancient biological relationships.

We are set to welcome Randall (Randy) Irmis in January, when he finishes up his Ph.D. in Integrative Biology at the University of California at Berkeley. A vertebrate paleontologist, he specializes in early Mesozoic continental vertebrate ecosystems, giving special attention to taphonomic processes and the response of faunas to climate change. His studies of tetrapod biogeography and paleoecology are revealing new information about basal archosaur and dinosaur phylogeny. An integral part of his study is applying high-precision radio isotopic age constraints to the Triassic timescale.

Faculty Retirees Celebrate Diverse Achievements

Robert B. Smith Achieves Emeritus Status

Bob Smith completed a two-year phased retirement at the end of 2007 and is presently both Emeritus Professor and Research Professor. Bob had a highly successful and well-funded academic research program during a thirty-seven year career at the University of Utah. Of his many activities, he takes special pride in the sixty-three graduate students whom he supervised.

His research productivity and leadership brought national and international recognition to Utah. Bob was a prolific author and lecturer as well as serving national scientific leadership roles. He was involved in an early expansion of the University of Utah Seismograph Stations (UUSS),

where he served as Director from 1908 to 1985. Moreover, he built the Yellowstone seismic and GPS network into a modern facility that is the key component of the internationally recognized Yellowstone Volcano Observatory (YVO).

Dr. Scott Sampson Continues His Dinosaur Research

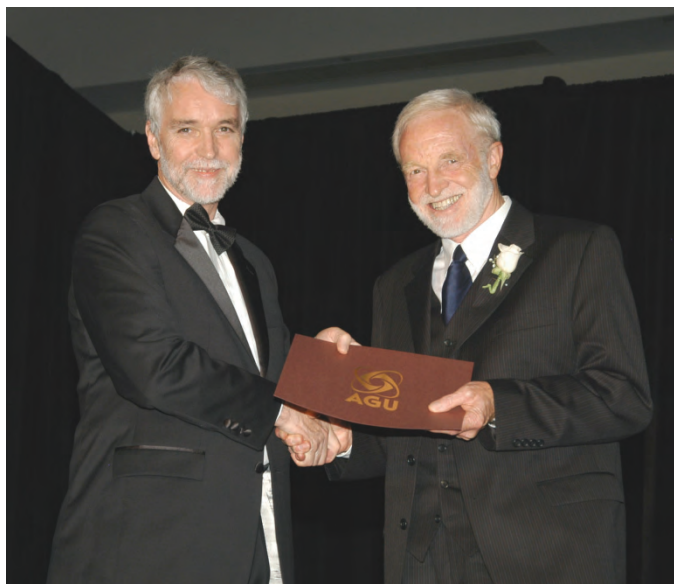
In the summer of 2007, Scott Sampson moved to California, giving up his position as Associate Professor, and shifting his relationship with our department to that of Research Associate Professor. Nevertheless, he is still actively pursuing his dinosaur research. [See "Discovery of New Herbivorous Dinosaurs Announced" in this issue.] Within the next year, Sampson hopes to be able to announce three new giant horned dinosaurs, distant relatives of *Triceratops*, from Grand Staircase – Escalante National Monument. The project is part of a larger collaborative effort aimed at unraveling the evolutionary radiation of horned dinosaurs. This work, conducted in conjunction with the Utah Museum of Natural History and funded by the Bureau of Land Management, the National Science Foundation, and the National Geographic Society, is opening an entirely new window into the world of dinosaurs and changing the way we think about these ancient animals.

Sampson continues to mentor several graduate students who are on track to graduate in 2008 and 2009.

Faculty Members Honored by Peers

We join wholeheartedly in the applause raised by their professional associates for these outstanding members of our faculty.

Dr. David Chapman Elected AGU Fellow



AGU President Tim Killeen presents Dr. Chapman with the formal acknowledgement of his election as a Fellow of the AGU

The American Geophysical Union (AGU) recently announced that Dr. David Chapman has been elected as a 2008 Fellow of the AGU, a recognition for members who have made outstanding contributions to the advancement of the geophysical sciences, to the service of the community, and to the public's understanding. When making the announcement, the Committee of Fellows noted that this honor is conferred upon not more than one tenth of one percent of all AGU members in any given year.

Dr. Chapman's nomination was based on his fundamental contributions to many areas of thermal geophysics. It noted the high impact of his work measured by the number of publications, the quality of journals that he has published in and by a very high citation index. The nomination also noted "David Chapman's most lasting legacy in geophysics may be the graduate students he has mentored and who collectively comprise a cadre of young academics and industry researchers carrying on the tradition of heat flow studies and investigations in thermal geophysics."

The Fellow award was presented to Dr. Chapman at an honors ceremony in May 2008 at the AGU Joint Assembly in Fort Lauderdale, Florida.

Dr. Bob Smith Gathers Two Honors

A professional lifetime dedicated to seismic research has once again resulted in recognition.

Invited to Capitol Hill to Brief Lawmakers



Bob Smith received a prestigious invitation to present his career-long research and ideas on national science funding to the U.S. Senate and House Committees on Science, Research and Technology in June 2008. The subject of the special congressional

meeting was "The Path to Innovation: Scientific Discovery and Learning". Dr. Smith gave a summary of his research career on earthquake and other geophysical studies and his findings at Yellowstone, then answered questions on the general topic of the future and opportunities for national science and research.

Received 2007 Lehi Hintze Award from UGA

Dr. Robert B. Smith received the 2007 Lehi Hintze Award for Outstanding Contributions to the Geology of Utah from the Utah Geological Association (UGA) and the Utah Geological Survey (UGS) at the UGA's

November 2007 meeting. The award recognized Dr. Smith's contributions over the last forty years to the understanding of the geology of Utah by interpreting the seismicity, crustal structure and seismo-tectonics of

Western North America, and extrapolating from this knowledge to educate the public about earthquake hazards.

The citation noted that he has been a remarkably productive and distinguished earth scientist, an educator, and a popularizer of geology and geophysics.

The Lehi Hintze Award was established by the UGS and UGA to recognize outstanding contributions to the understanding of Utah geology. This award was established in 2003, and named for its first recipient – Dr. Lehi F. Hintze of Brigham University. Recipients can be from academia, government, the private sector, or the general public.

Dr. Walter Arabasz Given USGS and WSSPC Awards for His Lifetime Commitment to Seismic Monitoring

John Wesley Powell Award Marks Contributions to USGS

Dr. Walter Arabasz was selected as the recipient of the 2007 John Wesley Powell Award, presented in September at the USGS in Reston, Virginia. This award is given to organizations and individuals who have made significant contributions to the advancement of the U.S. Geological Survey (USGS) mission. The citation noted Dr. Arabasz's twenty years working with the USGS to promote a national approach to earthquake monitoring,



in which regional and national interests and State and Federal programs worked together for increased public safety in earthquakes nationwide. He led the way in bringing together the many regional seismic networks that now belong to the Advanced National Seismic System (ANSS). As a leader in both the concept and

implementation of ANSS, he has been a strong contributor to all aspects of this effort by serving on ANSS committees and speaking to government and elected officials in support of the ANSS, as well as providing steadfast advice and encouragement to keep the effort on course.

WSSPC Award Recognizes Leaders in Earthquake Risk Reduction

In April 2008 the Western States Seismic Policy Council (WSSPC) also recognized Dr. Arabasz's long-time commitment both to seismology and public awareness when they awarded him the 2008 WSSPC Life time Achievement Award in Earthquake Risk Reduction. WSSPC created the award to recognize outstanding leaders in earthquake risk reduction. Dr. Arabasz demonstrated throughout his career an extraordinary commitment, level of service, and contribution to the application of earthquake risk reduction to public policy. The award was made at the National Earthquake Conference in Excellence in Seattle, Washington.

Dr. Cari Johnson Receives College's Teaching Award

At the 2007 Awards Picnic, the College of Mines and Earth Sciences presented its annual teaching award to Cari Johnson, citing her skill and dedication in presenting both general education courses and advanced courses in sedimentary geology, such as basin analysis and seismic stratigraphy.



Dr. Cari Johnson points to dramatic sand volcanoes in Ireland.

She has also broadened the scope of her Petroleum Industry Career Path (PICP) course by adding field trips co-led by oil company geologists. Both undergraduate and graduate students praise her support. She extends her enthusiasm to the AAPG Student chapter as their faculty advisor.

Department Research Attracts International Interest

Our Department's research activities continue to excite interest around the world. Both research projects initiated by faculty and their students as well as professional societies headquartered within our walls are increasing our visibility in the broader scientific community.

Ingenious Aerial Surveys by Kite Bring Geology Into Focus

Dr. Ron Bruhn has developed a type of kite aerial photography for low-altitude imaging called RAVENS (Radio-controlled Aircraft for Environmental Surveying). When he is out using his radio-controlled airplane mounted with airborne video and still camera systems, this is work, not just all fun!



Dr. Ron Bruhn is readying his kite-mounted camera to get close-ups of geological features.

This system allows quick and efficient collection of high-resolution images in the field using radio-controlled aircraft and kite-mounted cameras. Single or stereo-pair images from high-resolution images can complement those available from satellite sensors and standard aircraft photography. We can now get closer aerial views of undulating topography, faults, inaccessible cliffs and more, with automatic GPS coordinates – neat stuff!

Without Hot Rock, Much of North America Would be Underwater

A study by Dr. David Chapman and doctoral student Derrick Hasterok shows how various regions of North America are kept afloat by heat within Earth's rocky crust, and how much of the continent would sink beneath sea level if not for the heat that makes rock buoyant. "We found a good explanation for the elevation of continents," says Hasterok. "It's not just what the rocks are made of; it's also how hot they are." Scientists usually attribute the buoyancy and elevation of various

continental areas to variations in the thickness and mineral composition (and thus density) of crustal rocks. But Chapman says researchers have failed to appreciate how heat makes rocks expand and become more buoyant as they become less dense, a phenomenon termed "thermal isostasy".

The study, published in the June 2007 issue of *Journal of Geophysical Research*, shows for the first time that temperature differences within the Earth's crust and upper mantle explain about half of the elevation of any given place in North America, while most of the rest is due to differences in rock composition. "If you subtracted the heat that keeps North American elevations high, most of the continent would be below sea level, except the high Rocky Mountains, the Sierra Nevada and the Pacific Northwest west of the Cascade Range," says Hasterok. Chapman suggests it will take billions of years for North American rock to cool to the point it becomes denser, sinks and puts much of the continent underwater.

Huge Volcanic Hotspot Beneath Yellowstone National Park Causes Unexpected Ground Movement

A seventeen-year study by University of Utah scientists under the leadership of Dr. Bob Smith has shown that the power of the 70 km wide volcanic hotspot under Yellowstone National Park is greater than previously thought. Ph.D. candidate Christine Puskas, post-doctoral fellow Wu-Lung Chang, and Chuck Meertens of the University NAVstar Consortium (UNAVCO) report that the plume expends ten times more energy by gradually deforming the Earth's crust than it does by producing earthquakes.

The GPS equipment monitoring ground movements produces very precise data that allows triangulation of the receiver stations to within a few millimeters. The floor of the Yellowstone Caldera sank 11.2 cm between 1987 and 1995. From 1995 to 2000 an area just outside the caldera rose by 8.4 cm, and from 2000 to 2003 the floor of the caldera sank another 2.8 cm. Data collected between 2004 and 2006 showed sinking of the northwest caldera by 8.1 cm and a rise of the central caldera floor by 17.0 cm. The bulging of the Yellowstone Hotspot also explains motion along the Teton Fault. One would expect the Jackson Valley to move down with respect to the Teton Mountains, but the Jackson Valley has moved upwards by 4.3 cm between 1987 and 2004.

Discovery of New Herbivorous Dinosaurs Announced

Dr. Scott Sampson and Terry (Bucky) Gates (Ph.D. 2008) in the fall of 2007 made public the discovery of two new Late Cretaceous duck-billed dinosaurs from the Late Cretaceous. Both were giant herbivores, about thirty feet long, and were among the dominant plant-eaters in warm, swampy coastal environments. The first,

Gryposaurus monumentensis, was announced to the general public at the Big Water Visitor Center in Grand Staircase – Escalante National Monument, where crews have discovered one of two separate specimens of the dinosaur. The skull and partial skeleton of a third *Gryposaurus* were found in Kane County's Kaiparowits Plateau. Sampson and Gates co-authored an article describing the dinosaur in the October 2007 issue of the *Zoological Journal of the Linnean Society*. (*G. monumentensis* is the second new species of dinosaur identified from the fossil-rich southern Utah area.)

The second new discovery, *Velafrons coahuilensis*, was found in Coahuila, north-central Mexico, and represents the first named dinosaur from that country.



Here is the skull of Scott Sampson and Bucky Gates recent new dinosaur discovery, *Velafrons coahuilensis*.

The paleontologists believe they have extracted a dozen or so other new species – including relatives of the velociraptors, tyrannosaurs and horned dinosaurs – from the gray and red Late Cretaceous formations of southern Utah that at the time were warm, swampy coastal areas. These still await description and announcement.

Departmental Geophysicists Receive International Accolade

The European Association of Geologists and Engineers (EAGE) presents the Loránd Eötvös Award to the author(s) of the best paper published in *Geophysical Prospecting* (or in *First Break* magazine in a related topic) in the calendar year preceding the award. For 2008 the award will be presented to Dr. Zhiyong Jiang (Ph.D. 2006), Jianhua Yu (Postdoc 2000-2004) now at BP, Brian Hornby, a senior researcher at BP, and Dr. Gerald (Jerry) Schuster for their paper "Migration methods for imaging different orders of multiples" Vol. 55, No. 1, which appeared in 2007 in *Geophysical Prospecting*, the premier European journal in applied geophysics. The award was presented to Zhiyong Jiang by the President of the organization during the opening session of the 70th EAGE Conference and Exhibition held in Nuova Fiera di Roma, Italy, in June 2008. The paper is a distillation of Jiang's Ph.D. dissertation.

UTAM Interest Expands



Gerald Schuster (left) presides at UTAM meeting. Brian Hornby of BP is seated at right.

In February 2007, the Utah Tomography and Modeling/Migration (UTAM) consortium, headed by Dr. Jerry Schuster, held its 2007 annual meeting in February. Over forty representatives from twenty-one sponsoring companies attended the meeting or viewed the internet-televised proceedings.

The 2007 annual book with more than twenty reports was given to the sponsors. An electronic version, available on the internet, is enabled with codes and downloadable shell scripts to compile and execute them so that many important figures and results are reproducible. This is the first year that UTAM has provided the sponsors with reproducible reports so they can better understand the nuances of new algorithms.

The 2008 UTAM meeting was again held in February with thirty-five representatives from nineteen companies and organizations arriving for the two days of meetings. UTAM speakers included Sam Brown, Weiping Cao, Dr. Sherif Hanafy, Yanwei Xue, Dr. Yibo Wang, Ge Zhan, Chaiwoot Boonyasiriwat, Xiang Xiao, Aoki Naoishi, Shuqian Dong, and Dr. Jerry Schuster. Shengdong Liu helped out with the poster and speaker presentations. The meeting was videotaped and the talks are online for viewing by the member companies.

The sponsors got a preview of Schuster's book "Seismic Interferometry", which will be published by Cambridge Press in fall 2008 or spring 2009. It is the first textbook on seismic interferometry, a field which has grown rapidly since 2000, partly pioneered by the efforts of UTAM researchers.

CEMI Growth Reflects Industry Interest

The Consortium for Electromagnetic Modeling and Inversion (CEMI) under the direction of Professor Michael Zhdanov has been steadily expanding during the last years, reflecting the growing interest in electro-magnetic geophysical exploration methods. The consortium now has twenty-six members representing major petroleum, mining, and engineering corporations and agencies from around the globe. BP, Halliburton, and Science Applications International Corporation joined the consortium in 2007. At the last consortium meeting in spring 2008, representatives from about ten countries participated, including U.S., Australia, Brazil, Canada, China, Italy, Japan, Norway, Russia, and the U.K.

During 2007 and 2008, researchers Dr. Shuming Wang, Dr. Vladimir Burtman, Dr. Le Wan and Masashi Endo have joined the CEMI consortium. Drs. QuingYun Di and Ruo Wang arrived in August 2007 to join as visiting researchers. Currently, eight graduate students, five research scientists and two visiting scientists participate in research projects conducted by CEMI. The consortium is the largest source for funding these graduate students and researchers.

The major new area of the research for the consortium lies in developing effective methods for modeling and interpretation of the marine magnetotelluric and controlled source electromagnetic data for offshore petroleum exploration. This area of electro-magnetic geophysics represents a significant interest for the petroleum industry and provides an avenue for very challenging research projects.



Dr. Michael Zhdanov (far right) hosted the annual CEMI meeting.

The Annual CEMI Meeting in 2008 included two days of scientific sessions with more than a dozen papers presented by CEMI students and researchers. The meeting was concluded by a private dinner party at the Alta Club, where the visitors had a chance to meet and socialize with the CEMI students and departmental researchers and faculty members.

Seismographic Station Celebrates Centennial

In June 2007 the Seismograph Stations commemorated the centennial of the installation of the first seismographs in Utah by Dr. James E. Talmage and celebrated 100 years of continuous earthquake recording on the University of Utah campus. A formal program, attended by more than 130 guests, was held in the James E. Talmage Building on Presidents' Circle. This is the same building where Talmage, then Deseret Professor of Geology and past president of the University, originally installed on June 29, 1907, two Bosch-Omori seismographs imported from Strassberg, Germany.



Gathering commemorates centennial of first seismograph station in Utah.

Those who attended the program was greatly enjoyed the remarks by Dr. David W. Pershing, the U's Senior Vice-President for Academic Affairs, a declaration of "Utah Seismograph Centennial Day" by Utah Lieutenant Governor Gary R. Herbert, a special tribute to Talmage by Elder Gary J. Coleman, a General Authority of the Church of Jesus Christ of Latter-day Saints, stories by Suzanne B. Winston, a granddaughter of Talmage, and a presentation by Dr. Walter J. Arabasz on "Earthquake Recording in Utah: The Past 100 Years, the Present, and the Future." The day's festivities also included an outdoor luncheon and an Open House in the earthquake seismology labs in the Browning Building.

Joint Efforts with Industry Extend Students' Range of Experience

We deeply appreciate the willingness of industry to further our students' professional preparation. By exposing them to the latest in technical knowledge it stimulates their curiosity and propels them to explore realms of which they may have been unaware. In addition, it gives them a better idea of what employers may expect of them on the job.

Old Lake Bonneville Research Leads to Inter-Departmental Collaboration

Since arriving in the Department of Geography in 2006, Assistant Professor Kathleen Nicholl has worked to reinvigorate Lake Bonneville research initiatives, thus continuing the University of Utah's traditional position at the forefront of this field. Her research interests have centered on process geomorphology and stratigraphy in a variety of localities throughout the world. She has been reviewing research issues with several members of the Geology and Geophysics faculty including Marjorie Chan, Thure Cerling, Ron Bruhn, and Paul Jewell. In addition to her Geography faculty post, she was appointed Adjunct Assistant Professor in our Department in 2007.

PICP Participants Benefit from Petroleum Industry Involvement

Field trips and guest speakers highlighted 2007's Petroleum Industry Career Path (PICP) courses. John Byrd (Ph.D. 1995) and Lee Shannon from Anadarko Petroleum led an excellent three-day field trip through the Sevier thrust belt in northeast Utah and Wyoming in the fall. Students were exposed to spectacular views of fold and thrust belt structures and synorogenic sedimentary deposits. The Department also had another very active recruiting season with visits from Chevron, ExxonMobil, Anadarko, BP, and ConocoPhillips. Mark Turner (Ph.D. 1990) taught the very popular seismic interpretations course, as he has for several years. Unfortunately for us, he is moving on to other things – we will miss him. PICP wishes to thank him wholeheartedly for his expertise and time.



PICP field trip participants enjoyed Utah's spectacular Mesozoic section in Capitol Reef National Park.

In Spring 2007, PICP V, Prospect Evaluation, approached the origination and development of petroleum prospects through a series of guest lecturers. These professionals clearly demonstrated that many integrated scientific disciplines are key to prospect

development. This year studies focus on aspects of 1) reservoir and mechanical engineering, 2) land and legal issues, 3) economics and entrepreneurship, and 4) geology and geophysics. Risk analyses were discussed by knowledgeable industry veterans as well as by representatives of Chevron/Texaco. We extend profound thanks to our valued guest speakers; class participants benefited from their valuable efforts and insights.

In spring of 2007, the Prospect Evaluation class members also evaluated a limited region in Utah for prospect potential. Teams of three individuals scoured the available electronic and printed literature in order to justify a prospect in the assigned region, then constructed a detailed report. Sponsor Cari Johnson reports that students reacted to this project with creative enthusiasm. A subsequent field trip along the Utah Hingeline showed students how surface geology can be combined with subsurface information to develop petroleum leads.



John Byrd (Ph.D. 1995) explains prospect evaluation out in the field with PICP class.

Thanks to Fred Schroeder from ExxonMobil for giving an excellent half-day short course in seismic interpretation in January 2008. About twenty graduate and undergraduate students wrestled with subsurface datasets to make predictions that could impact petroleum exploration.

In September 2008, EGI sponsored a lecture by Dr. Jonathan Craig of ENI-Italy titled "How to Find Oil and Gas", about petroleum systems, technology and the role of the geoscientist in developing our world's limited petroleum resources.

Joint Projects with EGI

The Department of Geology and Geophysics is building new collaborations with the Energy and Geosciences Institute (EGI) in Research Park, with the help of EGI director Dr. Ray Levey. EGI is a University of Utah not-for-profit research organization with a twenty-five-year record of conducting multidisciplinary projects worldwide. Through cooperative agreements with universities and research institutes, government agencies and laboratories, and national energy companies worldwide, the Institute undertakes a broad range of fossil fuel, geothermal, and environmental engineering projects on all seven continents.

Many students have been involved in EGI projects, Undergraduate students Lee Barnett, Michelle Cotton, Katie Gasser, Thomas Pozzi, Brian Reilly, Camerob Sheya, Daniel Smith, Stan Smith, and Kada Topham worked with Michael Nemcok. Erika Gleim, Hassoun Mazen, and Abigail Rudd, also undergraduate students, worked with Rasoul Sorkhabi. Emily Jackson and Brian Sparks worked for Joseph Moore.

Joseph Moore also supported M.S. student Mark Gwynn's work. Derrick Hasterock and Virginie Maris, two Ph.D. students, were supported by Phil Wannamaker. M.S. student Clay Jones received support from Michael Nemcok. Kristie McLin, a Ph.D. student, was supported by Joseph Moore, and Vaughn Thomas, an M.S. student received support by Raymond Levey, the director of EGI. The total student support reached \$118,316 during 2007. We are very grateful for this financial support and the research experience our students have received.

Two other EGI research staff members taught in the department in fall 2007. Royhan Gani taught stratigraphy while Dr. Marjorie Chan was on sabbatical leave, and Rasoul Sorbkhabi co-taught a part of PICP with Dr. Ron Bruhn. EGI members Joseph Moore, Phil Wannamaker, and Michael Nemcok, are now among our Adjunct Professors.



Students discuss their research projects with their EGI mentors.

EGI sponsored a fall 2008 mini workshop on "How to Find Oil and Gas – Petroleum Systems, Technology and the Role of the Geoscientist in Developing our World's Limited Petroleum Resources" presented by Jonathan Craig, Vice-President, Regional Geosciences Studies and new Opportunities Selection, ENI Exploration & Production Division. We appreciate these new collaborations that open up new learning opportunities for our students, from professionals who have traveled worldwide and have vast expertise in the industry.

Most recently at the autumn 2008 EGI annual affiliates meeting, five graduate students from Geology and Geophysics participated in the first student poster session during evening social. Jessica Allen, Shuqian Dong, Will Gallin, Jared Gooley, and Ian Semple all presented their research at the Sunday night reception, and were awarded certificates by Ray Levey of EGI. Ron Bruhn also led a field trip for the EGI meeting, taking participants to see important structures of the Wasatch Mountains near Salt Lake City. Cari Johnson also presented a short lecture on expanded EGI-GG collaborations.



Dr. Cari Johnson (center) and students who received EGI recognition for their posters shared with EGI affiliates.

Cooperation between EGI and Geology & Geophysics via faculty interactions, research projects, seminars, lectures and fellowships will be an asset to the University. Watch for the announcement of new collaborations developing with EGI in 2009.

Career Day 2008 Greeted Enthusiastically

The department's 2008 Career Seminar was quite a success with many undergraduates as well as graduate students attending. The information session was led by Drs. Cari Johnson and John Bartley, who gave both general overviews of professional opportunities in geology and geophysics and also talked about academic career paths. Alumni and department friends stopped by to give invaluable advice, including John Byrd (Ph.D. 1995), working for Amerada Hess, a prominent player in the petroleum industry, Ricardo Presnell with Rio Tinto in economic geology, Gary Colgan (B.S. 1984) who is employed by CH2M Hill, a company providing hydrogeological and environmental consulting, and

Genevieve Atwood who is active in science and public policy, geosciences education, and much more.



Genevieve Atwood (right), John Byrd, Ricardo Presnell, and John Bartley (far left) answer questions about geoscience careers.

Noticed in the Corridors

Energy and Mining Company Recruiters Return

In the fall of 2007 the department again welcomed oil company recruiters. We appreciate their value to our students who contemplate careers in the petroleum industry, and we benefit from the insider perspectives they bring us. We look forward to learning how we need to change our program to accommodate advances in the industry.

We were happy to host Mark Vandergon and Elena Shoshitaishvili of BP, Jaime Buitrago and Sam Sorber of ExxonMobil, Jake Umbriaco (B.S. 2002, M.S. 2004), Jessica Moore Ali-Adeeb (B.S. 2003, M.S. 2005), and Aksel Quintus-Bosz (M.S. 1992) of Chevron, and David Shelley (B.S. 1999, M.S. 2001) of ConocoPhillips. represented include Rio Tinto Zinc (RTZ), Barrick North America, Free Port McMoran (Phelps Dodge), and Newmont Gold.



Dan Shelley and Betsy Torrez talked to students about working for an oil company.

Natural resources companies also return to recruit in the college and on campus. This fall the companies

In fall 2008 we expect the following companies:

- Petroleum Geo-Services information session on September 9
- ExxonMobil on September 15-16
- Chevron on September 22-24
- ConocoPhillips on September 29 - October 1
- BP on October 1-3

Staff Faces Changes

After thirteen years of dedicated service as our academic coordinator, Kim Atwater moved to part time work in Dr. Michael Zhdanov's group. Her replacement, Judy Martinez, who started in March 2008, has been with the University as an academic advisor for seven years and administrative assistant for eight years.



Kim Atwater will be remembered for her cheerful smile and her help to our students.

In early 2007, we said fond farewells to Norma Haas who served as the Executive Secretary to the Department Chair for two years. Norma fit in seamlessly and was the friendly face who handled the 140-plus payroll. She moved with her family to Portland, Oregon where she now works for a biomedical professor with an endowed Howard Hughes Investigator chair.

Kristin Christensen who arrived February 19, 2008, is the new Executive Secretary to the Chair. She has been with the University of Utah for eighteen years, helping manage various aspects of administration and accounting. She's been instrumental in improving our web page and alumni database too.

Continuing staff are Chris Carver, Thea Hatfield and Jake Cefalo. Some staff duties have been reorganized as a result of all these changes. We now have a complete and competent team running our program, and we deeply appreciate their contributions to the smooth operation of the Department.



Staff members Thea, Chris, and Kristin working hard figuring out what will go into the new building.

Guy Atkinson Lectures Draw Attention to Advances in our Science

We are pleased to be able to present new developments in our field through the Guy Atkinson Distinguished Lecture Series which present current insights into geoscience problems. The lectures are open to the public as well as the University community. At these events lecture-goers have an opportunity to meet the visitor and have a bit to eat before the talk begins. Once again, the range of topics is enormously diverse and always interesting. For details of time and place, contact the Geology and Geophysics department at 801-581-8767. Some of the topics scheduled for the fall of 2008 from our world-wide collaborators are:

- Mihail Popescu: Landslide Risk Assessment and Management Strategies: Some European and Japanese Examples
- Christoph Heinrich, Inst. Isotopengeologie und Mineralische Rohstoffe, ETH Zurich, Switzerland: The Bingham Canyon Cu-Mo-Au Deposit: A Not-Quite-Exploded, Giant Volcanic Fumarole?
- Paul Mainwaring of Gatan, Inc.: Cathodoluminescence Imaging and Spectroscopy in Electron Beam Instruments - Applications from Mineralogy
- James Pechmann, University of Utah Seismograph Station: Seismological Report on the 6 August 2007 Crandall Canyon Mine Collapse in Utah
- Debbie Thomas, Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES), Texas A&M University: Deep Ocean Circulation During Extremely Warm Climates

- Brian J. McPherson, University of Utah Energy & Geosciences Institute: Dynamic Earthquake Triggering
- Kristine Pankow, University of Utah, Seismograph Station: From Earth to Stars: Minerals and Melts at Extreme Conditions

Faculty Focus

Our faculty continues to exercise their widely diverse interests around the globe. Their highly successful efforts to find support are providing amazing opportunities for them and their students as they continue to contribute to Earth science understanding.

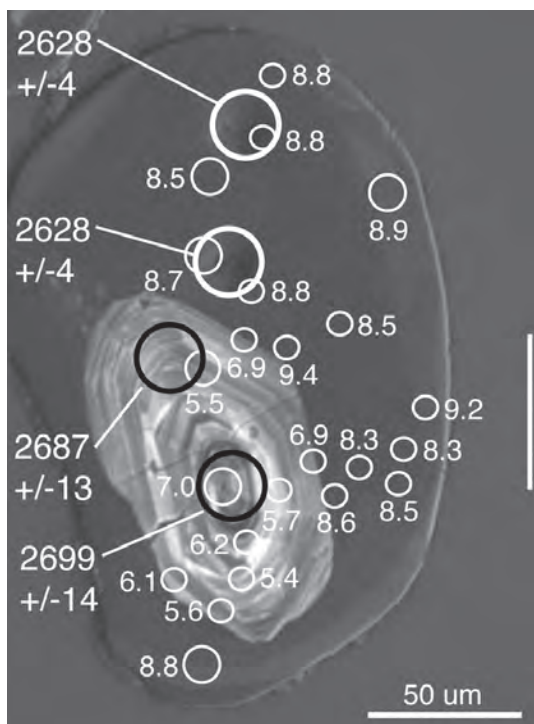
Walter Arabasz has been widely honored for his career-long commitment to increasing public awareness of earthquake safety. [See related stories in *Faculty Members Saluted by Peers* and *Research Programs Attract International Attention*.]

He also notes two recent landmark events for the University of Utah Seismograph Stations (UUSS). The first was a special \$1 million appropriation from the 2007 Utah State Legislature. The funding success, which came after more than two years of effort, was facilitated by the Utah League of Cities and Towns and the Utah Seismic Safety Commission; it provides funding to bolster state-wide seismic monitoring. The second event was UUSS involvement in post-event response and studies of the tragic August 2007 Crandall Canyon Mine accident. UUSS recordings and studies of the mine collapse played an important role in post-event investigations by regulators and public officials. New studies of mining-induced seismicity, funded by the National Institute for Occupational Safety and Health and aimed at improving mine safety, are now being jointly carried out by the UUSS and the University's Department of Mining Engineering.

John Bartley continues to focus his research on incremental growth of granitic plutons and its relationship to regional tectonics, including field projects in the Sierra Nevada, California, and in the Wasatch Range. Ph.D. student Kit Clemons and M.S. student Mike Stearns currently are working on research projects in the John Muir Intrusive Suite of the Sierra Nevada, which was incrementally emplaced into a regionally extensive, intra-arc shear zone. His group's overall goals in the Sierra Nevada are to find new ways to recognize and to map subtle or cryptic internal contacts that record slow incremental growth of plutons, and to work out the relationships, in time and space and in terms of processes, between the displacement history of the shear zone and the addition of intrusive increments to the plutons. The project in the Wasatch focuses on the Alta and Cottonwood stocks, where they seek to confirm that the intrusions are subtly composite and were emplaced over protracted time intervals (about 1 million years) and to determine the processes that made space for the plutons.

John Bowman feels fortunate to have had a good group of motivated students in his Introduction to Earth Systems, Earth Materials II, and in Isotope Tracers classes, making them enjoyable and satisfying to teach. He presented papers at the AGU meeting in San Francisco and the Goldschmidt Conference in Vancouver, B.C, as well as making trips to use the ion microprobes at the Stanford University/USGS and the University of Wisconsin laboratories.

John and Des Moser continue to have fun measuring lead and oxygen isotopes, and trace elements *in situ* within Archean zircon grains from high-grade paragneisses within the Kapuskasing block, Ontario. Their initial results, published in the March issue of *Geology*, document that there has been very little diffusion of either lead or oxygen between the igneous cores and metamorphic rims of composite zircon grains, suggesting that these geochemical signatures in zircons are remarkably complete and reliable micro-records that document geodynamic events involved in the formation, evolution, and destruction of early continental crust. John continues to use the Alta stock thermal aureole as a natural laboratory for the study of metamorphic processes. He has a paper coming out this fall in *Contributions to Mineralogy and Petrology* dealing with ion microprobe analyses of oxygen isotope compositions of calcite in the aureole.



Cathodoluminescence image of a composite zircon grain. The zircon consists of a bright detrital (igneous) core and a younger, dark metamorphic rim overgrowth. Locations and results of U-Pb (large circles) and oxygen (smaller circles) isotope spot analyses shown.

Kristie McLin is doing part of her Ph.D. thesis studying the impact of salinity on the phase equilibria of

metamorphic reactions and the possible role of fluid immiscibility in the outer aureole. In a new project, M.S. student Ben Johnson, in collaboration with John Bartley and Barbara Nash, will be measuring oxygen isotope compositions and titanium concentrations in quartz within the Alta stock. M.S. student Clay Jones is studying the alteration mineralogy of several drill cores in a part of the Salton Sea geothermal system.

In late June, Beth and John enjoyed a delightful long-distance walk along the coast of Brittany in France. The scenery and people were wonderful, and as they were walking about twenty kilometers each day, they indulged without guilt in the fine food and wine of the region.

Frank Brown and Ph.D. candidate Patrick Gathogo worked with seven researchers to determine that two species of early humans coexisted rather than evolved from each other. The team, which included famed paleontologist Meave Leakey and her daughter, Louise Leakey, published their study in *Nature* in 2007. Brown and Gathogo dated feldspars from layers of volcanic ash above and below the fossils. The first fossil is a 1.44 million-year-old jawbone of *Homo habilis*, the earliest species of our genus, *Homo*; the other fossil is a 1.55 million-year-old skull of *Homo erectus*. The relationship showed that for at least a half-million years the two hominids lived along side each other in east Africa, contrary to the popular view that *erectus* evolved from *habilis*.

During summer of 2008, Frank introduced two students, Orion Rogers and Michael Buchanan to the Koobi Fora region, where both have begun projects that will lead to their M.S. degrees. In addition, he accompanied Ian McDougall of Australian National University to the Shungura Formation in southern Ethiopia to collect suitable material to improve the geochronology of that formation. Accompanying them were Thure Cerling, who worked on completing the stratigraphic record of paleosol carbonates from the Shungura Formation, Tesfaye Kidane who is investigating the paleomagnetic record there, and Balemwat Atnafu, who is interested in the lacustrine sequences; the two latter are from Addis Ababa University. Later in the season, Frank was joined by Ron Bruhn, who has keen interest in interpreting satellite imagery in the region with an eye to working out the structural history. As ever (42 years now!), Brown retains his interest in the overall geology of the Omo-Turkana Basin, which is a world class example of deposits by a large fluvial system in a rift setting.

Ron Bruhn continues to work on research projects in Alaska and in Kenya. Sorting out the history of great earthquakes in Alaska is evolving into new areas of work, including coastal processes and sea level change. In Africa his work with Frank Brown is to use remote sensing to extend mapping of rocks and structures over a vast area. He is also planning a new class in Applied and Engineering Geomorphology that is an outgrowth of his work in the last decade. His graduate students are a

diverse group. Julie Willis will finish her Ph.D. this fall and is currently teaching at BYU Idaho. Bandar Ghassil is working on Red Sea petroleum systems, Anastasia Mironova is studying the seismic attributes of an oil field in Alaska, and Keith Beisner will study earthquake faulting this fall. They are working under a new NASA grant. Ron also has a new hobby in addition to his radio-controlled airplanes – he just bought a sailboat and now he has to learn how to sail it!

Thure Cerling and his students Scott Hynek, Naomi Levin, and Kevin Uno joined Frank Brown on the east side of Lake Turkana, Kenya, in 2007. Kevin went on to work at Nakali, Kenya, with a group of Japanese scientists from Kyoto University. Jared Singer also worked in Kenya on a project involving elephant ivory that will show how isotopes can be interpreted in the fossil record. Naomi Levin finished her thesis in 2008 and will be going on to a post-doc at Cal Tech. His group also continues to work on isotopes with forensics applications. Thure continues to be involved with the U.S. Nuclear Waste Technical Review Board, which reports on the science and technical issues related to the proposed nuclear waste site at Yucca Mountain. The Isotope Ecology course continues in the summer; this year forty students and faculty from thirty different universities are taking the class which is co-taught with Jim Ehleringer in the Biology Department.

Margie Chan appreciated a year-long sabbatical. It provided a needed mental break and time for a research trip to Wisconsin, as well as for a number of other short visits from coast to coast. The summer of 2008 included filming stints with National Geographic and Discovery Channel.



Dr. Margie Chan enjoyed the sandstones along the Oregon coast.

Red and white are still her favorite colors as sandstone diagenesis work progresses. M.S. student Sally Potter received two travel awards to international NASA

workshops and is working hard on the NASA-funded concretion characterization. Winston Seiler finished his M.S. and headed to Chevron in Bakersfield. He misses the spectacular Coyote Buttes area. Ph.D. students Greg Nielsen and Holly Godsey are busy writing up dissertation results. As an outgrowth of NSF-funded work on geoaquifers several years ago with Don Currey (of the Geography Department, and now deceased), GSA is developing a position statement on geoconservation. Chan plays a major role in a steering committee to implement geoconservation on a national scale.

Most of Margie's time is consumed with the Sutton Building, but she enjoyed giving several talks, including one at Purdue, hosted by Brenda Beitler Bowen (Ph.D. 2005). She also enjoyed a fine visit with alumnus Peter Stifel (Ph.D. 1964) at his home on Chesapeake Bay.

David Chapman's group continues to work, publish, and travel. Mike Davis is now running the geothermal climate-change observatory Emigrant Pass Observatory (EPO) in northwest Utah. A new NSF grant to Chapman starting August 2008 on the "Geothermics of Climate Change" will fund the operation of EPO for the next three years and allow them to work with Rob Harris (Ph.D. 1996), now a professor at Oregon State University, studying the effects of land use change on ground temperature and providing links between ground temperature change and borehole temperatures.

Derrick Hasterok's two recent *JGR* papers on thermal isostasy on continents created a media stir; Derrick appeared on TV and on radio interview shows. Melissa Masbruch is making good progress working on a joint heat and fluids project with Professors Chapman and Solomon, to study ground temperatures throughout the year, in particular when the ground thaws and spring infiltration of snowmelt occurs. Paul Gettings and Eric Sahn both have papers accepted for a special *Geophysics* issue on 4-D gravity. Together with Bryce Johnson, they are using repeat precision gravity surveys to study the extraction and injection of water into reservoir. In August we welcomed back from Indonesia Imam Raharjo (M.S. 2002) who will do a Ph.D. on volcano-hosted geothermal systems.

David is on sabbatical leave this semester, spending time in France and then India. In India he has been appointed as a Distinguished Foreign Scientist and will work at the National Geophysical Research Institute in Hyderabad with Dr. Sukanta Roy, a two time visitor to the University of Utah, on the geothermics of climate change. David is serving his last year as Dean of the Graduate School before returning to the department and starting a period of phased retirement.

David Dinter teaches Geologic Field Methods and Summer Field Camp, both core courses for Earth Science majors. During spring semester, Field Methods students mapped and analyzed segments of the Wasatch Front, from Permian carbonates exposed in old

quarries behind the block U south to the faulted glacial moraines of Bell's Canyon. David also teaches two popular large-enrollment courses that fulfill the University's science foundation requirement for non-majors, *Natural Disasters: Hollywood vs. Reality*, and *Earthquakes and Volcanoes*, and is the faculty coordinator of the Geology and Geophysics Department's educational outreach initiatives.

Dinter's primary research focus is the seismic hazard posed by active faults submerged beneath the Great Salt Lake and Utah Lake. He and seismologist Jim Pechmann have collected about 800 kilometers of high-resolution seismic reflection data in the Great Salt Lake. Dinter is also engaged in field-based studies of late Sevier orogenic deformation in southern Utah, metamorphic core complex evolution in northern Utah, and the geologic record of shallow marine meteorite impacts. This year he participated in meteorite impact symposia in Norway, Germany, and Moab, Utah.

Tony Ekdale began work in 2008 on a collaborative research project in eastern Spain with Jordi Maria de Gibert (who spent two and a half years in the late 1990s in our Department on a postdoctoral appointment). They are investigating various paleoecological and paleoethological aspects of trace fossil associations in shallow marine Miocene sequences of the western Mediterranean, a project funded by the Spanish National Science Foundation. He also initiated new research projects with students Michelle Mary, who is working on a master's thesis involving bioerosion of Pleistocene coral reefs in the Florida Keys, and Sherie Harding, who is working on a Ph.D. dissertation on the characteristic ichnofabrics and ichnofacies in glauconitic greensands in Texas and Wisconsin.

He presented the keynote address at the Seventh International Bioerosion Workshop at the University of Erlangen in Germany which led to his co-hosting the Eighth Annual International Bioerosion Workshop in Utah with Leif Tapanila (Ph.D. 2005). Later in the fall of 2007, at the national GSA convention in Philadelphia, Tony convened an international symposium on "Fossil Behavior" in honor of the legacy of Adolph Seilacher (who some of our alumni will remember visited our Department in the late 70s and early 80s).

Tony had the pleasure of leading two extended field trips to the ocean in 2007 – first to the Florida Keys with his Advanced Sedimentology class, and then to the Gulf of California with his Paleocology class. He has been making the later trip on a semi-regular basis for the past 33 years.

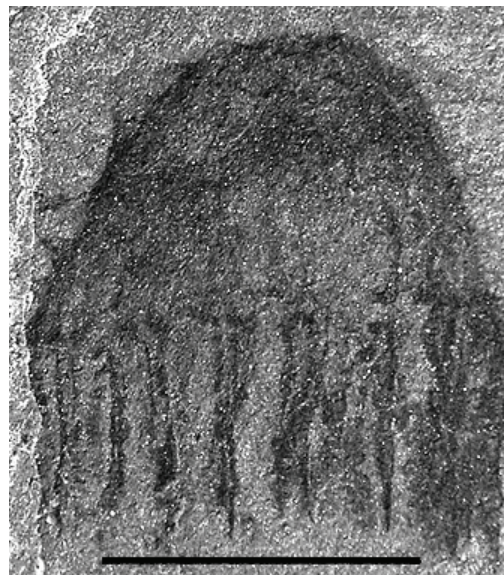
Diego Fernandez is using his skills as a physical and analytical chemist to run the inductively coupled plasma mass spectrometer (ICP-MS) in our department. In addition to being used for a wide variety of trace element measurements from across campus, the instrument is the heart of a number of projects in the department, including selenium and other trace metal cycling in the

Great Salt Lake; volcanic glass elemental composition and geochemical signals in soil carbonates crusts. With the help of an internal seed grant, Diego is developing a U/Th disequilibrium/dating method for carbonates, volcanic material and natural waters.

Sue Halgedahl continues research on rock magnetism, focusing on the physical mechanisms which control magnetic domains and their contributions to paleomagnetism. In 2008, her invited paper on "Magnetic Domains" was published in the *Encyclopedia of Geomagnetism and Paleomagnetism*. She also continues research with faculty member Richard Jarrard and graduate students using outcrop geophysical measurements to map sea level signatures in Middle Cambrian rocks in west-central Utah.

Since such sea level changes have been linked to exceptional preservation of fossils, they have also focused searches for soft-bodied fossils in the Wheeler and Marjum Formations, which have yielded many of the soft-bodied fossils found in Utah Cambrian rock successions.

She and colleagues recently published their discovery of a cnidarian medusae (jellyfish!) from the Middle Cambrian Marjum Formation in this area. It is notable for being a soft-bodied animal only rarely fossilized and is the oldest yet recorded. The specimen exhibits tentacles and various organ structures, soft body parts not often preserved.



Soft-bodied fossil (jellyfish) from the Middle Cambrian Marjum of central Utah. Scale line is 5 mm.

Some of their spectacular finds have been published recently in *Journal of Paleontology*, in *PLoS One*, and in the journal *Palaeogeography, Palaeoclimatology, Palaeoecology*.

PLoSOne sent them feedback about their article, indicating it had engendered more than 3,000 views. Furthermore, the New York Times, the San Francisco

Chronicle, and National Geographic generated articles about it.

Randy Irmis is excited to be finishing up his dissertation so that he can join the Department of Geology & Geophysics in January. He's just spent another successful field season at Ghost Ranch, New Mexico, excavating many new specimens of early dinosaurs and their relatives.



Randy Irmis takes a break in the field.

Randy is anxious to start working with our students, staff, and faculty. He hopes to begin next year with new research projects in Utah as well as continuing existing projects in New Mexico, Arizona, and Ethiopia. [See related story in *New Faculty Members Arrive*.]

Richard Jarrard continues his current research on marine geology and geophysics, including projects in Utah and Antarctica. Sue Halgedahl and he are using outcrop geophysical measurements on Cambrian sedimentary rocks of Utah to explore the relationships among sequence stratigraphy, sea-level change, and exceptional fossil preservation. [See *cnidarin* picture].

The international Antarctic Drilling Project (ANDRILL) drilled their first two scientific drill holes in late 2006 and 2007. Using data from well logs and a hydrofracture experiment, he is studying the intraplate stress pattern and Late Tertiary tectonics of rifting between East and West Antarctica.

Paul Jewell spent the past year working on projects centered mostly on the surficial geology, paleoclimate, and modern meteorology of the eastern Great Basin. He and his Ph.D. student Daren Nelson completed mapping of the surficial geology south of the Stockton bar in Tooele County; Nelson is now mapping and dating a series of complex Lake Bonneville shorelines near the Hogup Mountains of northwestern Utah. Collaboration with Bill Johnson and USGS colleagues doing fundamental research on the geochemistry of the Great Salt Lake produced a numerical model of circulation that will eventually aid in understanding dissolved and suspended sediment loads in the lake. A joint project with Aurelian Trandafir produced detailed images of landslides and stream channels along the Wasatch front

using ground-based LiDAR. New M.S. student Krysia Skorko will use these data as the basis for her M.S. thesis. Initial work on the fate of atmospheric mercury in the eastern Great Basin has begun in collaboration with Kevin Perry of the meteorology department. And of course, as chair of the geological engineering committee, Jewell is attempting to keep body and soul of this struggling program together.

Cari Johnson was honored to receive the College Teaching Award in 2007. As always, she has had many petroleum industry visitors. John Byrd and Lee Shannon of Anadarko, who led an excellent field trip to the Overthrust Belt in Utah and Wyoming for the PICP II class in 2006, are scheduled to return in 2008. Ron Bruhn and Rassoul Sorkhabi of EGI taught the 2007 PICP II class and led a field trip to central Utah. The Sedimentary Basin Analysis class enjoyed visits from Robert Tscherny from the Hydrocarbon Charge Basin-Modeling group at Chevron, Ben Sheets of ExxonMobil, and Gus Gustason from El Paso EPC.

Sam Hudson's geochemical characterization of the Maikop Series in Azerbaijan wrapped up in spring 2008, with four articles submitted for publication before he headed for ConocoPhillips in Houston. Jessica Allen and Matt Heumann continue their Ph.D. research in southern Utah and Mongolia, respectively. Cari's group also welcomed Vaughn Thompson who is working on an M.S. project with EGI and BHP Billiton on subsurface data from the Orange Basin. Ian Semple and Jared Gooley, coming in the fall of 2008, will be working in the Escalante region.

Another big "project" has been raising daughter Gabriella, born in June 2007. Gabriella has already been on several geology trips and should be an excellent field assistant, once she figures out how to walk.

William P. Johnson had five students successfully defend their theses this spring. Their research yielded eight publication submissions characterizing the results of the Great Salt Lake selenium project. Ph.D. recipient Ximena Diaz returns to Quito, Ecuador to assume a professorship; and Ph.D. conferee Rino Dicaldo signed up with Secor Environmental in SLC. M.S. conferee Kim Beisner will continue working with the USGS in SLC, M.S. recipient Wade Oliver will work with a state water authority in Texas, and M.S. recipient Mary Ellen Potter is enjoying a little free time before committing to a career move. Continuing students include Ph.D. candidate Greg Carling who is studying mercury cycling in the Wasatch and Great Salt Lake, Ph.D. candidate Wenjie Huang working on engineered nanoparticle tracking in aquatic systems, Ph.D. candidate Vishal Gupta doing research on surface characteristics governing colloid transport in porous media, and Post-Doctoral student Huilian Ma who is developing new theory to predict colloidal transport distances in porous media under environmental conditions.

A Sustainability Practicum taught in spring 2007 with Drs. Steve Burian of Civil Engineering and Fred Montague of Biology resulted in the implementation of three environmental performance enhancement projects for the Sutton Building: tubular skylights, energy and water use metering and real-time display, and a "green" roof. Spring 2008 brought a new set of cross-campus projects concerning storm water runoff collection and re-distribution, alternative wastewater treatment technologies, and environmental performance enhancement ranking protocols for existing buildings.

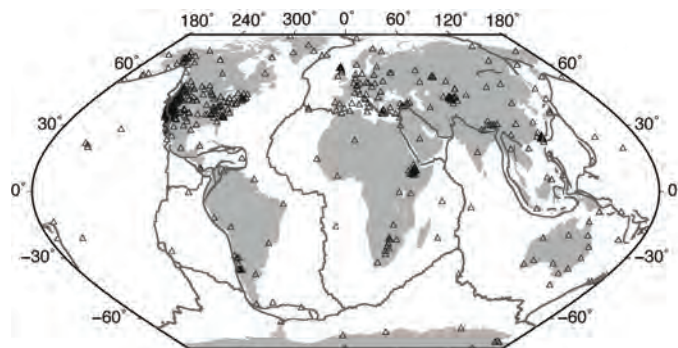
Barbara Nash continues her search for lost volcanoes of the ancestral Yellowstone hotspot. She and her post-doctoral student, Henny Cathey, are working on defining the conditions in magma reservoirs prior to super eruptions. Much of the current research focuses on zircons with emphasis on their oxygen isotopic ratios measured with the Wisconsin ion probe and crystallization ages determined by U-Pb dating using laser ablation ICPMS at ANU. Barb has also been refining the microprobe procedure to measure trace amounts of titanium in quartz which serves as a powerful geothermometer. This technique makes it possible to reconstruct the thermal history of single quartz crystals as they grow in a magma.

Barb is on sabbatical this academic year and so has stepped down as chair of the Department's Undergraduate Affairs Committee. On the recreational side, she continues to compete in masters' swimming and is looking forward to swimming in the Pan-Pacific Games in Australia while on sabbatical there in November. Later in the year she will spend time at the University of Hanover in Germany, and checking out volcanoes and culture in Italy.

Kristine Pankow continues her work with the Utah Regional Seismic Network, including development and maintenance of ShakeMap in Utah, using the data collected by the network to analyze small ($M < 3$) earthquake seismicity of the Great Basin and the Range/Colorado Plateau Transition in central Utah. She also continues her study of the occurrence and mechanisms of remotely triggered earthquakes with colleagues from the University of Texas, El Paso and the U.S. Geological Survey (USGS). In addition, she is still exploring the generation of infrasound and seismo-acoustic coupling and propagation with colleagues at UUSS and Southern Methodist University.

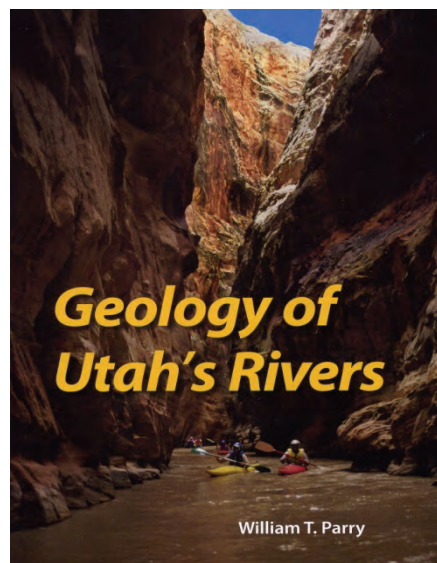
Kris was also involved this past year in analysis of two significant events: the Crandall Canyon Mine collapse and the M 6.0 Wells, Nevada earthquake. She worked with colleagues at UUSS, the University of Utah Mining Engineering Department, and the University of California, Berkeley, to provide a forensic analysis of the collapse. That work has led to new research into mining-induced seismic events which she presented at a mining engineering conference on ground control this past summer. Immediately following the Wells earthquake,

UUSS together with the University of Nevada at Reno (UNR), and the USGS deployed a portable array of seismometers to better locate aftershocks and to capture strong-ground motion. An analysis of that data will be presented at the Fall AGU meeting by Kris and colleagues from the USGS and UNR.



This map shows seismic stations that detected more than twice the normal number of small, nearby earthquakes after the passage of what are known as "surface waves" from major quakes in 1992 - 2006. Kris Pankow's study found that at least 12 of the 15 major earthquakes (magnitude 7+) triggered small quakes in distant parts of the world. (Image credit- A. Velasco)

Bill Parry's most recent book, *Geology of Utah's Rivers*, was published by the University of Utah Press in May, 2008. The book describes how rivers function, Utah's ancient, modern, and mythical rivers, drainage reversals, diversions, and barrier crossing.



One of Utah's spectacular river canyons is featured on the cover of Dr. Bill Parry's latest book.

Bill is working on three Navajo Sandstone coloration projects with colleagues: iron diagenesis in the Navajo Sandstone reservoir rock in the recently discovered Covenant oil field in the Central Utah thrust belt; hydrocarbon bearing fluids on the Uinta fault, north flank of the Uinta Mountains; and genesis of iron concretions in the Navajo Sandstone that are earth analogues to Martian blueberries.

He is at work on a fourth book, *Geology of Utah's Mountains, Peaks, and Plateaus*.

Jim Pechmann spent considerable time during the past year working on the seismic events associated with the fatal collapses at the Crandall Canyon coal mine in August 2007. With four co-authors from the University of Utah, he presented a poster on this work at the Fall 2007 AGU meeting and wrote a paper about it which is currently in press. Another significant local seismic event during the past year was the February 21, 2008, M 6.0 Wells, Nevada, earthquake. Following this earthquake, Jim and Kris Pankow supervised the installation of a nine-station temporary seismic network in the area by the University of Utah Seismograph Stations (UUSS), in coordination with two other groups deploying instruments in the area.

Other research projects that occupied Jim during the past two years include the construction and testing of a "community velocity model" for the Wasatch Front region and constraining the seismic velocity structure of the Salt Lake Basin. He also worked on evaluating instrumentation options for a state-funded expansion of the University's seismic network in southwestern Utah and on some new software for triggered recording of the seismic network data (with other UUSS staff). Jim presented a poster on the Salt Lake Basin study at the 2007 Seismological Society of America meeting, authored papers on magnitude determinations and on analyses of small earthquakes using data from "strong-motion" instruments.

Erich Petersen notes that one of the highlights of the past two years was the privilege of leading the first four Society of Economic Geologists Foundation (SEGF) international student-dedicated field trips with colleague Dr. William X. Chávez, Jr. of New Mexico Tech. The first trip examined the porphyry copper deposits of northern Chile and the second trip focused on the Carlin-type



mineralization in northern Nevada. In total, 32 students from 24 universities in twelve countries participated. [See related story, "SEGF Inaugural Field Trips Attract World-Wide Participation" in this newsletter.]

The next trips will be the iron-oxide-copper-gold (IOCG) deposits of Chile in January 2008 and volcanogenic massive sulfide deposits of the Iberian pyrite belt, proposed for May 2008. Erich spent some time with Ph.D. candidate John Porter in the Sierras west of Bishop, California, where John is working on emplacement of the Morgan Creek pluton and the associated Pine Creek tungsten mineralization. M.S.

candidate Amber Rheubottom is working in northern Nevada on a project involving various styles of mineralization in a region between the Carlin Trend and the Battle Mountain Trend. Before assuming duties as Acting Chair of the Department he was able to squeeze in a trip to Ireland that combined vacation and geological stops such as the Giants Causeway and the Cliffs of Mohor.

Duke Picard's paper, "Comparison of River and Beach Sand Composition with Source Rocks, Dolomite Alps Drainage Basin, Northeastern Italy," was the lead article in *the GSA Volume Special Paper 420*. A few days later, his article "W.H. Bradley, Premier Paleo Limnologist" appeared in *Rocky Mountain Geology*. The long awaited review of "The Rock from Mars" finally arrived on the *Journal of Sedimentary Petrology* website a few months ago. There may have been and continue to be life on our favorite planet, excluding our own Earth. For lovers of the Henry Mountains and Lake Bonneville, the *Journal of Rocky Mountain Geology* published "Grove Karl Gilbert, Master of Lacollihs and Lakes" in their May 2008 issue. Less than a year ago his book, "Late Roundup-Poetry and Essays", was published by Vestal Press.



Flat pebbles on the Olympic Peninsula, WA.

Peter Roth continues developing web-based activity for teaching stratigraphy. Evolutionary Trends in the Cenozoic was developed, tested, and made available for teachers on serc.carleton.edu. The web-based version of Understanding Earth has been developed also and will be offered starting fall semester 2008. He continued his studies of Jurassic and Lower Cretaceous nanno-fossils.

Peter spent time with Ph.D. candidate Sam Hudson, helping him with studies of sediment samples. Roth has been serving on the University Press Faculty Editorial Advisory committee and the Library Policy Advisory Committee, as well as departmental committees on Library/Public Inquiries; Undergraduate Internship; and Undergraduate Programs in Geology.

Gerard Schuster returned in the last week of June from a four and a half month sabbatical in Dhahran, Saudi Arabia. He completed a three month conversational Arabic course, as well as working with experts in seismic imaging at SaudiAramco. This was followed in late July by teaching a ten-day short course in Houston on

seismic wave theory. Schuster's book "Seismic Interferometry" is in the galley proof stage, and should be published by Cambridge Press this autumn or early in 2009. He presented a poster at a seismic inversion workshop at EAGE in Rome in June 2008 and received, along with his co-authors Zhiyong Jiang, Jianhua Yu, and Brian Hornby, the Eotvos Prize at the EAGE Rome award ceremonies at that time. Gerry also taught a one-week seismic interferometry course in Rio in late June and a two-week seismology course in Houston in May 2008, and attended a three-day interferometry workshop in Dhahran, Saudi Arabia in August 2008.



Jerry Schuster (seated center) and his UTAM students.

Bob Smith continues his academic endeavors with zest this last couple of years. He has supervised his 66th graduate student, Katrina Settles, to completion. His research team has been heavily involved in planning and implementation of EarthScope GPS, borehole strain meters and implementation of the USArray for Yellowstone and the Wasatch Front. Along with Ph.D. student Jamie Farrell, they have completed the analysis of the frequency of occurrence of Yellowstone's earthquake swarms and their relation to volcanic features. Katrina Settles completed her thesis on studies of gravity and lithospheric strength of the Yellowstone – Snake River Plain and has taken a job with ConocoPhillips. Christine Puskas is completing the analysis of GPS data for the entire western U.S. and plans to defend her Ph.D. thesis in fall 2008. Wu-Lung Chang received a geophysics faculty position at the National Taiwan University but still works at the University of Utah during summer semester to continue his research on Yellowstone. Dr. Chang and other colleagues in the group published a paper on the unprecedented uplift of the Yellowstone caldera that has been rising at up to 7.5 cm/yr. Dr. Taka Takaaki, another of Bob's Post Doctoral students, conducted research on the unusual prosperities of volcano-induced earthquakes in the Yellowstone. He is leaving for a fulltime research position at U.C. Berkeley Seismology Lab, but will continue to work part time on Yellowstone earthquake studies.

Bob continues to serve as the Coordinating Scientist of the Yellowstone Volcano Observatory and has received research grants to study the Yellowstone uplift and its

relation to the crustal magma chamber and Yellowstone mantle plume. His group gave invited presentations at the 2007 AGU Fall Meetings, the 2007 EarthScope National Science meetings, and the UNAVCO Science workshop. Bob also was honored by his participation on Capitol Hill where he gave a presentation on his science career before the House and Senate Science and Technology Coalition for National Science Funding exhibition.

Kip Solomon is on sabbatical this year, continuing his research using tracers to understand groundwater flow systems. In 2007, he gave an invited presentation at the International Symposium on Advances in Isotope Hydrology held in Vienna. The conference included a boat excursion down the Danube River and he gave his well received talk on Age Dating of Baseflow on the boat. Bert Stolp injected helium and krypton into an Austrian stream and his analysis of the results lead to the conclusion that we can use dissolved gas tracers to date baseflow in streams. Payton Gardner continues to sample in Yellowstone National Park and his results show that at a minimum a large fraction of the geothermal flow system is derived from locally recharged waters (big change from previous studies.) Melissa Masbruch, jointly supervised by David Chapman and Kip, started working with the USGS on regional flow in the Great Basin (i.e. the great Nevada water grab!) She also has some interesting results from a noble gas and temperature study near Brighton Ski Resort. Jasmin Caton is looking at the paleohydrology record preserved in tufa deposits, which is a big deal for climate change. She received a Geological Society of America grant to help fund the Carbon 14 chronology part of the project. Grant Hurst sampled wells at the White Mesa Uranium Mill near Blanding nonstop for twelve days for a project that will evaluate low flow sampling, vertical age gradients, and the integrity of liners on the tailings cells. Tom Marston has been baking the water out of clays and looking for tritium in a project at the Moly Corp. mine in New Mexico that is investigating the long-term stability of rock piles. Hugh Klein is crossing the Ts on his noble gas study done near Snyderville, Utah.

Michael Thorne is currently continuing his research in theoretical seismology with the development of software for simulating earthquakes on the global scale. He reached a milestone this summer with the public release of wave propagation code which can simulate SH motions for earthquakes in a 2.5D geometry and viscoelastic rheology. Michael is currently finishing similar code for P-/SV wave motions, and is building a twelve node computing cluster which will be capable of performing these types of computations and will also be a resource available to the department for general high performance computing needs. Current application of these tools is being carried out with a diverse group of researchers around the world.

Because of the wealth of seismic data made available through the Earthscope program, including additional

seismic sensors currently in Utah, another recent research focus has been aimed at applying the techniques of seismic imaging formerly only available to the exploration seismology community toward deciphering the Earth's deep interior. Along with Jerry Schuster, Thorne and grad student Sam Brown are developing new techniques at imaging the Earth's 410 and 660 km discontinuities. Michael's student, Kevin Jensen, recently wrote an undergraduate research proposal which won the Universities Bamberger Memorial Foundation Scholar award. (See related story in *New Faculty Members Arrive*.)

Aurelian Trandafir developed a new course for graduate students on Landslides and Slope Stability Engineering, and continues teaching Introduction to Geological Engineering, and Geological Engineering Design.



An earthquake-induced landslide in Japan.

His current research focuses on field, laboratory and numerical investigations concerning the mechanism of shallow landslides on cut slopes in northern Utah. Other research efforts include laboratory investigations on the mechanism of prehistoric liquefaction flow-slides at the Farmington Siding landslide complex in Davis County, Utah, numerical studies on the seismic behavior of slopes and earth retaining systems, and analysis of infiltration patterns in unsaturated soil slopes. The results of this work are scheduled to appear in four journal papers and three papers at international conferences. This summer, Aurel participated in the 4th Decennial Geotechnical Earthquake Engineering and Soil Dynamics Conference in Sacramento, California, and the 10th International Symposium on Landslides and Engineered Slopes in Xi'an, China. Both of these are major international events for geo science professionals in the field of geotechnical earthquake engineering and landslides.

Michael Zhdanov spent the summer attending an SEG meeting in Rome, and then was in Moscow, Russia, participating in the meetings of the Russian Academy of

Sciences. He has eight graduate students, six research scientists (Dr. Shuming Wang, Dr. Vladimir Burtman, Dr. Le Wan, Dr. Masashi Endo, Dr. Alex Gribenko, and Dr. Noel Black) and two visiting scientists (Drs. QuingYun Di and Ruo Wang) currently working in his group.

Dr. Zhdanov's Consortium for Electromagnetic Modeling and Inversion (CEMI) has been steadily expanding during the last years, reflecting the growing interest in electromagnetic (EM) geophysical exploration methods. The consortium now has twenty-six members representing major petroleum, mining, engineering firms, and agencies from around the globe.

Michael's new area of the research in the consortium is developing effective methods for modeling and interpretation of the marine magnetotelluric and controlled source EM data for offshore petroleum exploration.

During this summer, Michael completed his new book "Geophysical Electromagnetic Theory and Methods." This new book brings together fundamental theory of EM field and practical aspects of EM exploration for mineral and energy resources. It will be published by Elsevier by the end of 2008 or early 2009.

Teaching Contributions

We thank our auxiliary faculty and part-time instructors that often help us teach classes. **Bob Bereskin** and **Bill Keach** bring enthusiasm and practical industry expertise to our Petroleum Industry Career Path (PICP) modules. **David Naftz** teaches aqueous geochemistry, and **Mark Loewen** has Jurassic-sized classes in "World of Dinosaurs". **Tom Oesleby** stepped in at the last moment to teach a introductory class. We value the fantastic support and breath these folks provide!



Left: Utaspis marjumensis from the Cambrian Marjum Formation - courtesy of Jim McEwen. Right: Elrathia kingi from the Cambrian Wheeler Formation - courtesy of Quintin Sahratian. Both are from the House Range, Millard Co. UT.

Welcome to the GG Gallery!



AAPG Student Chapter officer Tom Vaughn (left) receives National AAPG Outstanding Student Chapter award, and a check!



John Byrd (Ph.D. 1995) of Amerada Hess gives career day talk as students ponder his question.

Right: Round Table participants view 3D images in the Energy Geoscience Institute (EG) visualization room.



Below: Here is an artist's representation of recent new dinosaur discovery, *Velafrons coahuilensis* documented by Scott Sampson and Bucky Gates.



Left: Our curator Quintin Sahratian has done an incredible job of organizing our collections in anticipation of our move.





Above: Polygon weathering patterns in the Jurassic Navajo Sandstone near the Burr Trail, Boulder, UT.



Precambrian Hakatai Shale and diabase dike on the Colorado River in the Grand Canyon at Hance Rapids. Geology by river rafting is a fun way to go!



Dr. David Dinter and field camp students relax at Cedar Canyon.



Above: Michelle Cotton creates a delicious supper for hungry field camp students.



Geologists may happen upon these spectacular uses made of the Navajo Sandstone!

Right: Utah geology is renowned around the world! The AAPG field trip makes a stop in Big Cottonwood Canyon on a spectacular fall day.



The field camp crew poses during a break from mapping a fold in the Raft River Range, under the leadership of Dr. David Dinter.



WEST Fellows prepare for their teaching outreach program at Great Salt Lake.



The Robert Smithson earthwork sculpture- Spiral Jetty on the northeast shore of the Great Salt Lake.



Architect John Diamond positions sandstone monoliths near the east entrance of the new Sutton building.



View from the top of the Sutton building looking down at the newly installed monoliths seen at left. Large rounded cobbles define the stylized dry river bed pattern in the landscape.

The east entrance to the new Frederick Albert Sutton Building extends a warm welcome to members and friends of the Earth sciences.



We are grateful to our major donor, Rev. Marta Sutton Weeks (left), who has given us this tremendous gift of a new building. It honors her father, Frederick Albert Sutton, an exploration geologist who received his degree from the University. This wonderful facility will be a teaching, learning, and outreach tool that will take Geology & Geophysics into the next century. Dean Frank Brown and Geology & Geophysics chair Marjorie Chan have enjoyed working with Rev. Weeks to bring this project to fruition.



Out in the Field

SEGF Inaugural Field Trips Attract World-Wide participation

The Society of Economic Geologist Foundation (SEGF) commitment to sponsor field trips dedicated to students internationally got off to a wonderful start late in 2006. Dr. Erich Petersen and his colleague Dr. William X. Chaves, Jr., of New Mexico Tech organized and co-led the first two trips.

In the January 2007 trip to Chile, thirty students and six professionals from fourteen countries visited the porphyry copper deposits of northern Chile. While the emphasis was on hydrothermal and supergene processes, and provided views of some very exotic mineralization, the participants also learned about social and economic aspects of mineral exploration and mine development.



SEGF participants examine porphyry copper deposits in Chile.

The theme of the May 2007 trip to northern Nevada was Carlin-type gold mineralization. The students were also able to experience drill core and outcrop examination techniques and participate in a mapping exercise. Visiting an underground mine, many students were able to find samples of native gold, a real feat in this area where gold is normally encapsulated in pyrite as atomic-size inclusions.

In March 2008 the SEGF sponsored a trip to a different collection of mines in Chile. Twenty-nine students and eleven professionals from fifteen countries participated in this trip. The industry mentors shared their experience in global mineral exploration, iron deposits, and careers in the minerals industry. Although the mines the group visited provided only a partial sampling of the diversity of deposits classified by researchers as IOCG-type, students were able to make key observations in the field to construct a comprehensive genetic model. SEG Newsletter articles and more photos of the field trips can be seen at www.mines.utah.edu/pyrite/childe2008.



M.S. student Amber Rheubottom examining recently harvested Grade A copper plates at the Ivan SX-EW tank house.

The enthusiasm for this trip can't be conveyed any better than by quoting Anita Brown who writes, "I was exposed to exploration practices, industry methods, and technology. Words cannot accurately describe the sheer sense of adventure inspired by a bus full of geologists traveling on rough graded roads 700 meters below the surface of the earth in utter darkness with the radio blaring Chilean music. The professional geologists on the tour had an enormous impact on my future as an economic geologist."

The field trips planned for 2009 will focus on zinc deposits in Ireland. Because worldwide interest for participation in these trips is intense, it is essential that students be actively involved in their local SEG student chapters to qualify for the opportunity.

Field Camp Remains a Rite of Passage for Geology Students

Seven women and one fortunate young man attended Summer Field Camp (GEO 4510) in May, 2008, completing two challenging projects, one each in southern and northern Utah. Project 1 focused on Parowan Gap northwest of Cedar City, where students mapped Sevier thrusts and foreland fluvial deposits, Oligocene pyroclastics, and Basin-and-Range normal faults. Veteran USGS mapper, Dr. Peter Rowley, UU Prof. Erich Petersen, and UU geology graduate student Amber Rheubottom hosted a day-long tour of regional structures and ore deposits.

For Project Two, the class moved to the Raft River Mountains in Utah's northwest corner. The metamorphic core of this range, exhumed from mid-crustal depths in Miocene time by low-angle normal faulting, exposes the oldest rocks in Utah. Typically for this exercise, students camp beside Clear Creek in the northern part of the range, but this year they lived in luxury at the BLM Rosebud Field Station, with real beds in air-conditioned rooms, hot showers, a kitchen, and a carpeted common room with two plush sofas. Camper Michelle Cotton led

a yoga session most evenings after dinner on the helipad, joined by her "fellow" students Leigh Anderson, Elizabeth Hardwick, Courtney Neuffer, Alysén Pedersen, Stan Smith, Lindsay Tingey, and Kada Topham, instructor David Dinter, and incomparable field managers Page Anderson and John Muir. Field camp may never be the same again.



It was a cold and rainy day, but students kept right on mapping in the Raft River Mountains in northern Utah.

Florida Carbonates Exemplify Geo Principal, 'The Present is Key to the Past'

In spring 2007, Dr. Tony Ekdale taught a special topics class on "Carbonate Facies and Reef Ecosystems", followed by a one-week field trip to the Florida Keys to study incipient limestones in the process of forming. The field trip group enjoyed spending half of their time on land examining Pleistocene reef rock and the other half under water chasing snails and sharks through the turtle grass meadows and modern coral reefs.



Paleoecology students examine Pleistocene beach rock.

New Graduate Students Tour Wasatch

Will Gallin, Michelle Mary, Anita Brown, and Mike Stearns organized a fall field trip welcome for the new incoming graduate students. The group of fourteen did some local stops along the Wasatch front including a look at tidal rhythmites in the Precambrian Big Cottonwood Formation, igneous petrology in the Alta Stock, glacial geomorphology at Silver Lake near Brighton, and economic geology at the Kennecott mine in Bingham Canyon. They capped off the day with nine more geology faculty, friends, and family for a BBQ in Big Cottonwood Canyon.



New graduate students enjoyed a beautiful fall day in the Wasatch.

SEG Student Chapter Views Local Ore Deposits

Under the leadership of John Porter, SEG student chapter president, members took part in field trips to the iron and copper deposits of Utah in fall 2007 and gold deposits of Nevada in spring 2008 with Dr. Erich Petersen. On a rain-soaked day the group visited the Lisbon copper mine south of Moab where the latest technology is used to recover copper from malachite and chalcocite ores in sandstone. Then, through an early snowstorm in the Cedar Breaks pass, they crossed to the iron deposits in Iron County. Students saw the historic operations and learned about the transformation to come as the mine reopens and a new mill constructed in 2007 begins operation.

The four-day spring 2008 field trip featured the gold deposits of northern Nevada. At Meikle, a very hot underground mine, hydrothermal alteration of the rocks has resulted in the formation of jasperoid (silicified limestone), decarbonated silty limestone, and ribbon dolostone. Gold is submicroscopic in Carlin-type deposits. At Turquoise Ridge, students collected samples of realgar and examined drill core containing remarkable examples of soft-sediment deformation.

Newmont's Phoenix project hosts both copper and gold ores in skarn and is being greatly expanded. The Cortez district was most notable for magnificent exposure of thrust faults and folding in the mine walls. The participants agreed that this was an ideal place to study sequence stratigraphy in a complexly deformed area.

For more picture and in-depth information, visit the chapter web page at www.mines.utah.edu/pyrite/cmcs-seg/.

Student News

Inaugural Poster Session Highlights Student Research Interests

In spring 2008, the Geology and Geophysics Student Advisory Committee (SAC), the AAPG student chapter and the SEG student chapter invited alumni, friends and family to a student poster session that they intend to make an annual event. The display of thirty posters was hosted on the fifth and sixth floors of the Browning Building in conjunction with the annual department picnic. Students discussed their posters with visitors before lunch and the posters remained available for inspection through the afternoon. The object of this effort is to keep both alumni and those within the department up to date on current graduate and undergraduate research projects. Next year, the student organization plan to hold the event in the Sutton Building.

AAPG Student Chapter Honored With National Award

Our University of Utah AAPG Student Chapter was awarded the 2008 Outstanding Student Chapter Award at the National AAPG meeting in San Antonio! We were chosen from over 160 chapters as being the most outstanding in the USA.



Vaughn Thompson proudly displays AAPG Outstanding Student Chapter citation.

Well done to the AAPG student chapter and officers for all your hard work! Special thanks to advisor Dr. Cari

Johnson, 2007-2008 president Vaughn Thompson, and the students and faculty who helped our chapter win this prestigious award.

Work done in 2006 and 2007 was what set the stage for this stunning accomplishment. Past and present chapter officers include: Jessica Allen, Deanna Brandau, Vaughn Thomson, Toshiko Furukawa, Will Gallin, Cameron Sheya, Deanna Brandau, Crystal Hammer, Jared Gooley, and Keith Christiansen.

Throughout the year, students gave talks about their internship experiences and their research projects. These included Abraham Emond, Sean Xi, Katrina Settles, Xiang Xiao and Matt Heumann. Undergraduate John Moore received the L. Austin Weeks Undergraduate Grant from the AAPG Foundation. This foundation also provides support for our chapter.

The student chapter has grown to approximately thirty-two graduate and undergraduate members. Our annual report was once again posted on the national website. The chapter invites you to visit it at www.aapg.org (then follow student chapter links).

SEG Student Chapter Presentations Spark Excitement

A revitalization of the minerals industry in the last few years has also raised the visibility of the Society of Economic Geologists (SEG) student chapter, now in its twelfth year. Chapter John Porter (president 2006-2007), president Anita Brown (president 2007-2008), vice president Alex Moyes, treasurer Danielle Fox, and secretary Amber Rheubottom have been extremely active in organizing field trips and inviting speakers. Monthly chapter meetings now average twelve students in attendance, but many times it's standing room only.

They organized a uranium symposium at which Dave Naftz of the Utah Geological Survey was the keynote speaker. He gave a presentation on leading edge remediation techniques for uranium contaminated groundwater that was attended by twenty-five chapter members and other interested individuals including one meteorology student. The talk was highly anticipated and well worth the wait.

One of the highlights was the visit by alumnus Dr. Perry Eaton (Ph.D. 1987), now of Newmont Mining, who in March 2008 gave a presentation on the company's gold exploration strategy to an overflow audience. The membership was enthusiastic about his presentation, many calling it the chapter event of the year.

Several chapter members have received SEG McKinstry Student Research grants, and attended a professional short course in nickel sulfides. By coordinating with SEG mentor Thomas Waggoner, Amber was able to join an expedition to visit the world famous El Laco magnetite deposit on the Chilean – Argentinian border. Read about their participation in other field trips to Nevada and Chile in this issue's *Out in the Field* stories.

We are looking forward to an even better year with more events and fieldtrips already scheduled for 2008-2009. All students are encouraged and welcome to attend meetings and activities. Don't miss out on all the fun at the opening social, the fieldtrip to the Stillwater Mine, or the many speakers coming up. We thank the Society of Economic Geologists and our industry sponsors for their generous support of our field trips.

Student Exchange to the Alps Contemplated

Prof. Dr. Anke Friedrich (M.S. 1993) of Ludwig-Maximilians-Universität München, has instigated a student exchange between Munich and the U of U Geology & Geophysics Department- great idea! She regularly brings students on a western USA field trip, doing a loop through central Utah, Las Vegas, Grand Canyon, and Owens Valley, CA. In the fall of 2008 they will meet up with Utah students. In the not too distant future we hope that there can be an exchange field trip to the Alps next year for Utah students.

Department Welcomes New Graduate Students

In 2007, the following students joined us:

Zahra Amini, M.S. candidate in Geological Engineering;
B.S. University of Tehran

Naoshi Aoki, M.S. candidate in Geophysics;
B.S. Chiba University

Olga Brusova, M.S. candidate in Geophysics;
B.S. Herzen State Pedagogical University of Russia,
Ph.D. University of Utah (IP)

Keith Christianson, M.S. candidate in Geology;
B.A. Carleton College

Will Gallin, M.S. candidate in Geology;
B.A. Carleton College

Rebecca Gustin, M.S. candidate in Geological Engineering;
B.S. New Mexico Tech, M.S. New Mexico Tech

Melinda Hilber, M.S., candidate in Geology;
B.S. Illinois State University

Benjamin Johnson, M.S. candidate in Geology;
B.S. University of Puget Sound

Shengdong Liu, M.S. candidate in Geophysics;
B.S. University of Science & Technology

Eric Lund, M.S. candidate in Geology;
B.S. University of Utah

Tom Marston, M.S. candidate in Geology;
B.S. University of Utah

Anastasia Mironova, M.S. candidate in Geophysics;
B.S. University of Alaska, Ph.D. University of Utah (IP)

Wade Oliver, M.S. candidate in Geology;
B.S. Texas A&M University

Jared Singer, M.S. candidate in Geology;
B.S. University of Utah

Alisa Green, Ph.D. candidate in Geophysics;
B.S. Southern Utah University, M.S. Colorado School of Mines

Sam Brown, Ph.D. candidate in Geophysics;
B.S. University of Utah, M.S. University of Utah

Ge Zhan, Ph.D. candidate in Geophysics;
B.S. Anhui University of Science and Technology,
M.S. China University of Mining & Technology



New students gather for orientation in the rock garden.

In 2008, the following students joined us:

Anita Brown, M.S. candidate in Geology;
B.S. University of Utah

Michael Buchanan, M.S. candidate in Geology;
B.S. University of Utah

Greg Carling, Ph.D. candidate in Geology, M.S. Brigham Young University

Wei Dai, Ph.D. candidate in Geophysics;
M.S. University of IL; B.S. Univ. of Science & Technology of China

Ben Erickson, M.S. candidate in Geological Engineering,
B.S. Utah Valley State University

Jared Gooley, M.S. candidate in Geology;
B.S. Miami University

Crystal Hammer, M.S. candidate in Geology;
B.S. University of Texas at El Paso

Sherie Harding, Ph.D. candidate in Geology, M.S. North Carolina

Simin Huang, Ph.D. candidate in Geophysics;
M.S. University of Science & Technology, Hefei, China

Charles R. Phillips, Ph.D. candidate in Geophysics;
B.S. Brigham Young University

Imam Baru Raharjo, Ph.D. candidate in Geophysics;
M.S. Univ of Utah; B.S. Univ. of Auckland

Orion Rogers, M.S. candidate in Geology;
B.S. University of Utah

Abigail Rudd, M.S. candidate in Geological Engineering;
B.S. University of Utah

Ian Semple, M.S. candidate in Geology;
B.S. University of UT

Krystin Skorko, M.S. candidate in Geology, B.S. Vassar
College

Xin Wang, Ph.D. candidate in Geophysics;
B.S. and M.S. Chinese University of Geosciences,
Beijing

Quiong Wu, Ph.D. candidate in Geophysics;
B.S. and M.S. Chinese University of Geosciences,
Beijing

Annual Awards Salute Exceptional Achievements

2007 Celebrations

The 2007 annual awards luncheon was held on a beautiful spring day on the patio and lawn outside the Alumni House. Over one hundred students, faculty and staff participated. After a luncheon catered by Red Iguana, the following honors, recognitions and awards were given to our students and faculty.



The annual awards luncheon is always a festive occasion.

Honors

Outstanding Faculty Teaching: David Dinter
Outstanding Faculty Research: Robert Smith
Outstanding Teaching Assistant: Bryce Johnson
Outstanding Ph.D. Student: Ben Passey
Outstanding M.S. Student: W Payton Gardner
Outstanding Geology Student: John Moore
Outstanding Geophysics Student: Paul Seal
Outstanding Geoscience Student: Darrah Appelfeller
Outstanding Geological Engineering Student: Dan Seely
Outstanding Environmental Earth Science Student: Jamie Steffensen

Outstanding Earth Science Composite Teaching Students: Donald Crandall, Marianne Cannon, and Anna Hunter

Scholarships, Fellowships and Awards

AWG Scholar: Deanna Brandau

AWG Susan Ekdale Field Camp: Anita Brown

Thomas Parry Billings Scholarship: Madson Thomson

Bullock – Keller Scholarship: Alex Moyes, Kada Topham

Orlo Childs Field Camp: Lee Barnett, Scott Boyd, Michael Buchanan, Megan Frederick, Deweylene Friesen, Orion Rogers, Cameron Sheya

CMES: Joshua Bailey, Chase Stralight, Traci Maughn

Comstock: Deweylene Friesen

Ken Cook Memorial Fund: Paul Seal

Cooper-Hansen Graduate Scholarships: Greg Carling, Jasmine Caton

Cooper Hansen Undergraduate Scholarships:

Amanda Barrett, A. Kristine Goe, Aaron Geery, Paul Gaia, Ashley Messina, Chris Jensen, Kassie Ziebarth, Sean Conner, Joshua Kabat, Lee Barnett, Leigh Anderson, Jeennifer Eutsler, Spencer Lindsley

Frischknecht Scholarship: Elisabeth Hardwick

Geology and Geophysics Departmental

Scholarships: Cody Rock, Deweylene Friesen, Orion Rogers, Chase Straight

Dean's Office: Madison Vandenberghe, Michelle Cotton

PICP BP Fellowships: Sam Hudson, Jessica Allen

PICP ConocoPhillips Fellowship: Leona Page

PICP Chevron Exploration Fellowship: Sam Brown

Dorothy Rice Good: Lee Aderson, Jennifer Eutsler

Norma Eardley: Michelle Cotton, Cassandra Ziebart, Steffani Whittaker

Gerald Hohmann: Chris Bradbury

Charles B. Hunt: Dan Seely

Kennecott Scholars: Anita Brown, Chris Jensen Lee Barnett, Deanna Brandau

Kennecott Merit: A. Kristine Goe, Chris Bradbury, Deanna Brandau, Stephanie Whittaker.

Matt Mikulich Award: Kevin Jensen

Mineralogical Society of Utah: A. Kristine Goe, Cameron Sheya, Aaron Geery, Paul Gaia, Madison Vandenberghe, Spencer Linsley

John Price: Lindsay Tingey

Eardley Graduate Fellowship: Keith Christiansen

Frank H. Brown – Rosenblatt: Cody Rock, Michael Buchanan

Stokes Graduate Fellowship: Will Gallin

Merrill Terrill Award: Justin Wreidt

Univ. of Utah Experiment Station "Team of Excellence" Award: Deanne Brandau

University Continuing and Department: Lars Petersen, William Weyland, Stan Smith

University Graduate Research Fellowship: Ximena Diaz

University Teaching Assistant: Rick Urash

WEST Fellow Awards: Kit Clemons, Eli Jarrell, Colby Newman, Leigh Jones, Kim Beisner, Emily Gaines, Wade Oliver, Christy Wall, Jason Whittington

2008 Celebrations

The 2008 Awards Luncheon took place on a snowy spring day. Following the student posters session, faculty, students and friends met at Alumni House for the presentation of honors, awards and scholarships.

Honors

Outstanding Faculty Teaching: Tony Ekdale

Outstanding Faculty Research: John Bowman

Outstanding Teaching Assistant: Mark Loewen

Outstanding Ph.D. Students: Naomi Levi, Sam Hudson

Outstanding M.S. Student: Winston Seiler

Outstanding Geology Student: Anita Brown

Outstanding Geophysics Student: Paul Seal

Outstanding Geological Engineering Student ;
Elizabeth Hardwick

Outstanding Earth Science Composite Teaching Student: Sean Connor

Outstanding Environmental Earth Science Student:
Stan Smith

College Outstanding Teaching Assistant: Daren Nelson



Dr. Tony Ekdale, recipient of the Outstanding Faculty Teaching Award, presents the Outstanding Ph.D. Award to Naomi Levin

Scholarships, Fellowships and Awards

AWG Susan Ekdale Field Camp: Alysen Pederson

Thomas Parry Billings Scholarship: Brittany Dame

Frank H. Brown – Rosenblatt Scholarships: Adam Hiscock, Abbey Smith

Bullock – Keller Scholarship: Nora Nimiski, Rebecca Gage, Courtney Neuffer

Chevron Exploration Scholarship: Chris Bradley

Orlo Childs Award: Lindsey Tingey, Kristen Leigh Anderson

Dean's Alumni Office Scholarship: Joshua Kabat

Dean's Office Scholarships: Christian Gray, Alex Moyes, Rachel Shurdha

Eardly Graduate Fellowship: Jared Singer

Norma Eardly Scholarship – Rachel Shurdha, Brittany Dame

Earls Family Endowment Scholarship: Elizabeth Hardwick, Kada Topham, Michelle Cotton

Geology and Geophysics Departmental Scholarships: John Muir, April Rigby, Ashley Teare, Sean Conner, Arin Goe, Danielle Fox, Stanley Smith, Chanelle Meriwether, Kada Topham, Margaret Thompson

Dorothy Goode Scholarship: Jennifer Eustler

Honda Sedimentary Scholarship: Elizabeth Barrett

Frank and Pam Joklik Scholarship : Luke Dow

Kennecott Scholarship: Cameron Fredrickson

Matt Mikulich Award: Kevin Jensen

Minerological Society Scholarships: Alex Moyes, Joshua Kabat, Christian Gray, Richard Anderson, Stefanie Whittaker, Katherine Clayton

Earl Johnson Scholarship: Richard Anderson, Elizabeth Barrett, Ruthann Shurtleff

PICP BP Fellowship: Crystal Hammer

PICP ConocoPhillips Fellowship: Jared Gooley

PICP Chevron Exploration Fellowship: Alisa Green

Cooper-Hansen Foundation Scholarship: Katherine Clayton, Danielle Fox, Arin Goe, John Muir, April Rigby, Ashley Teare, Kada Topham, Stefanie Whittaker

Stokes Graduate Fellowship: Daren Nelson

Ron Terri Memorial Award. in Geological Engineering: Elizabeth Hardwick

Univ. of Utah Experiment Station "Team of Excellence" Award: Deanne Brandau

Univ. of Utah Continuing Education Scholarship: Ted Balling, Jesse Moyles, Stacy Rector

Utah Geological Association Scholarship" Stanley Smith, Courtney Neuffer

Austin Weeks Foundation Scholarship: Cameron Sheya

WEST Fellows Award: Keith Christenson, Kit Clemons, Kiysla Skarko, Seth Arens, Greg Carling, Melinda Hilber, Maura Hahnenberger, Alexandra Parvaz, James S. Ruff, Eric Smith



Significant endowments enable the Department to award undergraduate scholarships to all of our students who have a 3.0 (B) average or higher.

Student Research Grants Awarded

Many of our students write proposals and compete for a variety of national grants targeted at supporting student projects and research. We are proud of their funding success.

Jessica Allen spent the summer in California as a paid intern for Chevron. Her project consisted of investigating ephemeral stream deposits within a mixed siliciclastic-carbonate environment using static and dynamic data (pressure data from well holes). The goal was to constrain the shapes and sizes of these sand sheets in order to better predict reservoir quality. She will be spending much of the fall doing fieldwork in Grand Staircase – Escalante National Monument.

Anita Brown received a grant from Newmont Gold Company to study “Paired Metallogenic Belts”. Demonstration of the common existence of paired magmatic and mineralized systems could be useful in development of aggressive mineral exploration strategies. Anita also did an internship with Newmont Gold at their Twin Creeks mine near Elko, Nevada and will return in the fall to begin her M.S. program with a graduate student fellowship from the Society of Economic Geologists Foundation.

Jasmin Caton received a grant from the Geological Society of America (GSA) to investigate the record of past climates including groundwater hydrology contained in tufa (fresh water, ambient temperature carbonates.) She has found that stream temperatures are preserved in the oxygen isotopic composition of these deposits, and that changes in atmospheric carbon dioxide are recorded, but the signature is complex.

Will Gallin received grants from the GSA and AAPG for documenting changes in fluvial architecture in a marginal marine environment and changes in allogenic and autogenic sedimentary processes in the Late Cretaceous John Henry Member of the Straight Cliffs Formation in Grand Staircase – Escalante National Monument in southern Utah

Sherie Harding is using a grant from the Petroleum Research Fund of the ACS to further her Ph.D. dissertation in ichnology, paleoecology and sedimentology of shallow marine sequences that contain

glauconite, in hopes of deciphering the precise timing and mode of formation of the glauconite by means of trace fossil analysis, an approach that has not been attempted before now. She has begun her field work in the Eocene of Texas, Cambrian of Texas and Cambrian of Wisconsin.

Ben Johnson, working with Dr. John Bowman, received a GSA grant for his project “Oxygen Isotopes and Ti in Quartz Analyses: Possible Geochemical Proxies for Magma Increments in the Alta Stock, Utah”. The traditional “Big Tank” model of pluton emplacement has recently come under scrutiny; this project aims to provide geochemical evidence for the evidence of discrete magma increments. To evaluate these increments, Ben is examining Ti in quartz as a geothermometry technique, and oxygen isotopes that reflect subtle difference in a magma’s source.

Michelle Mary has embarked on an M.S. thesis project in the warm and sunny Florida Keys, where she is investigating the trace fossil record of bioerosion in Pleistocene coral reefs. Her project is funded by a student grant from the Geological Society of America. During the 2008-09 school year, Michelle will serve as a University Teaching Assistant to develop “virtual” paleontological field trips to exceptional fossil localities that students can access on the web, and also design educational fossil displays in the Sutton Building.

Daren Nelson, with the help of a GSA grant, is unraveling the shoreline history, dynamics, and geomorphology of the Hogup Bar area in northwestern Utah. He will be using either radiocarbon or optically stimulated luminescence (OSL) methodology to determine what climatic factors contributed to the lacustrine features of the region.

Greg Nielsen and Dr. Marjorie Chan received a second year of funding from the Utah Geological Survey (UGS) to continue investigation of diagenetic features of the Jurassic Navajo Sandstone. Greg led the director of the UGS and several state geologists on a field trip to the area. Preliminary results of this research are published as UGS and AAPG abstracts and were presented during a UGA luncheon talk in fall 2007.

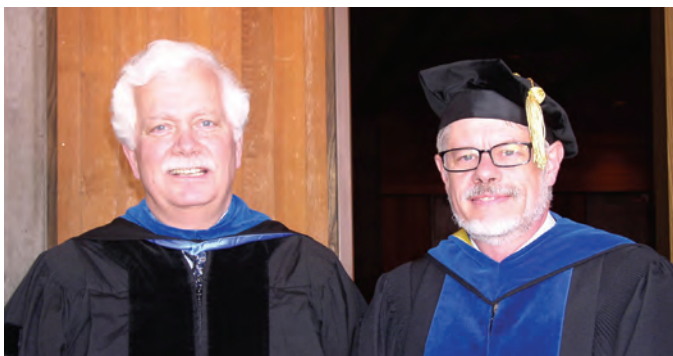


Greg Nielsen overlooking his field area of Snow Canyon State Park, UT.

John Porter has sponsorships for two aspects of the same problem. The first is the "History and Emplacement Style of the Morgan Creek Pluton" from the Society of Economic Geologists, and the second is "Effects on Formation of the Pine Creek Tungsten Skarn" from the Geological Society of America. His project is aimed at understanding the emplacement history of the Morgan Creek Pluton and the timing of the associated tungsten mineralization. He presented his initial results at a conference in Italy in July.

Amber Rheubottom, through a grant from the Society of Economic Geologists, is using fluid inclusion and oxygen isotopic measurements on magnetite to unravel the thermal history of the iron deposits of Three Peaks, Granite Mountain and Iron Mountain iron deposits, Iron Springs District, Utah.

Winston Seiler continued his investigation of the diagenetic coloration of the Coyote Buttes along the Utah-Arizona border. This past spring he led a BBC film crew into his study area to illustrate wind driven erosion for upcoming BBC Television and National Geographic Channel programs. (As thanks, they gave him a small grant to help support his research.) In summer 2007 he was an Earth science intern with Chevron in Houston where he was attached to the South Texas Asset Development Team.



Drs. Tony Ekdale and Erich Petersen in regalia.

Department Awards Degrees

Doctoral Dissertations Defended in 2005 Through 2008

Marshall G. Bartlett, Geophysics, "Grand and Air Temperature Tracking; Applications in Climate Change"

Brenda B. Bowen, Geology, "Sandstone Bleaching and Iron Concretions: An index to Fluid Pathways and Diagenetic History of the Jurassic Navajo Sandstone, Southern Utah"

Henrietta E. Cathey, Geology, "Evolution of High-temperature, Large-Volume Silicic Magmas of the Miocene Yellowstone Hotspot: The Record of the Bruneau-Jarbidge Eruptive Center"

Leif Harrington Cox, Geophysics, "Three-Dimensional Inversion of Frequency Domain Airborne Electromagnetic Data"

Ximena Diaz, Environmental Engineering, "Study of Selenium and Trace Metals in the Great Salt Lake: Volatile Se Flux; Physical and Chemical Characterization of Particulates and Se Mass Balance"

Terry 'Bucky' Gates, Geology, "Taxonomy, Biogeography, and Paleoecology of North American Hadrosaurid (Ornithopoda) Dinosaurs"

Alexander V. Gribenko, Geophysics, "Methods of Interpretation of Tensor Induction Well-Logging data in Three Dimensional Inhomogeneous Geological Formation"

Samuel M. Hudson, Geology, "Deciphering the Early Evolution of the Caspian Sea: Chemical Characterization of Cenozoic Mudstones of Azerbaijan"

Naomi E. Levin, Geology, "Isotope Records of Plio-Pleistocene Climate and Environment in East Africa"

Ruiqing He, Geophysics, "Wave-Equation Interferometric Migration of VSP Data"

Zhiyong Jiang, Geophysics, "Migration of Attenuation of Surface Related and Interbed Multiples"

Xiqing Li, Environmental Engineering, "Colloid Transport in Porous Media: Experiment vs. Theory"

David William Marchetti, Geology, "Quaternary Geology of the Fremont River Drainage Basin, Utah"

Benjamin H. Passey, Geology, "Stable Isotope Paleoecology: Methodological Advances and Applications to the Late Neogene Environmental History of China"

Eric M. Roberts, Geology, "Stratigraphic, Taphonomic and Paleoenvironmental Analysis of the Upper Cretaceous Kaiparowitz Formation, Grand Staircase Escalante National Monument, Southern Utah"

Leif M. Tapanila, Geology, "Paleocology and Evolutionary Significance of Hard Substrate Trace Fossils"

Takumi Ueda, Geophysics, "Fast Electromagnetic Modeling and Imaging Based on Multigrid Quasi-Linear Approximation and Electromagnetic Migration"

Lindsay E. Zanno, Geology, "A Taxonomic and Phylogenetic Reevaluation of Therizinosauria (Dinosauria: Theropoda): Implications for the Evolution of Maniraptora"

Min Zhou, Geophysics, "New Imaging and Filtering Methods: Primary only Image Condition and Interferometric Migration"

Masters of Science, 2005-2008

Alexandra Kaputerko, Geophysics, "Sensitivity Analysis and Resolution of Marine Controlled Source Electromagnetic Data"

- Arun Kumar, Geophysics, "Three-Dimensional (3D) Inversion of Marine Magnetotelluric (MMT) Data in Offshore Hydrocarbon Exploration"
- Jessica Ali-Adeeb, Geology, "Three Dimensional Stratigraphic Architecture and Sequence Stratigraphy of Marginal Lacustrine Strata in the Eocene Green River Formation, Utah".
- Zhara Amini, Geophysics, – "Post-liquefaction Shear Behavior of Bonneville Silty-Sand"
- Jason Daniel Babcock, Geology, "Comparative Study of Tourmaline Composition as a Potential Exploration Guide to Porphyry Copper Deposits; South American Cordillera, Chile and Peru"
- Kimberly R. Beisner, Geology, "Selenium and Trace Element Mobility Affected by Periodic Interruption of Meromixis in the Great Salt Lake, Utah"
- Brian Keith Bollin, Geophysics, "The Relationship among Bitter, Patterns, Local Energy Minimum Domain States, Remanence, and Paleomagnetic Stability"
- Erick Jason Cline, Geology, "The Structural Geology of Sevier Valley, Utah"
- Travis Cole Crosby, Geophysics, "Detection and Delineation of a Salt Diapir Near Redmond, Utah Using Seismic Tomography"
- Abraham M. Emond, Geophysics, "Geophysical Modeling of Porphyry Systems from the rain-Scale to the Deposit-Scale Using the Generalized Effective Medium Theory of Induced Polarization"
- Jamie M. Farrell, Geophysics, "Space time Seismicity and Development of a Geographical Information System Database with Interactive Graphics for the Yellowstone Region"
- Toshiko Furukawa, Geophysics, – "Two-Dimensional Time Domain Electromagnetic Migration Using Integral Transformation"
- W. Payton Gardner, Geology, "The Hydrologic Anomaly of the Yellowstone Hotspot Track"
- Patrick N. Gathogo, Geology, "Stratigraphy and Paleoenvironments of the Koobi Fora Formation of the Ileret Area, Northern Kenya"
- Paul E. Gettings, Geophysics, "Repeated High Precision Gravity Surveys in the Salt Lake Valley, Utah"
- Jonathan W. Goold, Geophysics, "Spectral Complex Conductivity Inversion of Airborne Electromagnetic Data"
- Derrick Hasterok, Geophysics, "Thermal Isostasy on Continents: Applications to North America"
- Sonja Heuscher, Geology, "Pennsylvanian Depositional Systems and Geology of the Pecos River Canyon, Northern New Mexico".
- Stephen Scott Hill, Geology, "A Groundwater Flow Path Delineation and an Analysis of the Stable Isotopic Climate Response of a Layered Tufa in Red Butte Canyon, Utah"
- Michael L. Jessop, Geophysics, "Three Dimensional Modeling and Inversion of Gravity and Gravity Gradient Data on an Arbitrary Surface"
- Katherine M. Kovac, Geology, "Geologic framework and paragenesis of the East Flank, Coso Geothermal Field, California"
- Aaron L. Norton, Geology, "Evaluation of an Ephemeral Wash for Spring Runoff Storage: Washington County, Utah"
- Wade Oliver, Geology, "Selenium Removal Processes From Great Salt Lake: Estimating Sedimentation and Verifying Volatilization Fluxes"
- Pichet, Puahengsup Geophysics "Digital Filters for Electromagnetic Migration of Marine Electromagnetic Data"
- Sergio Enrique Rodriguez Tapia, Geology, "Geology, Mineralization and Alteration in the El Real Prospect"
- Joseph Sertich, Geology, "Geology and Vertebrate Fauna of the Cretaceous Lubur Sandstone (Turkana Grits) Northern Kenya"
- Lori Chadwell Tapanila, Geology, "Crystallization Kinetics of Forsterite in the Alta Contact Aureole, Utah: Insights from Quantitative Textural Analysis"
- Sergio Enrique Rodriguez Tapia, Geology, "Mineralization and Alteration in the El Real Prospect, Guerrero, Mexico".
- Winston M. Seiler, Geology, "Jurassic Navajo Sandstone of Coyote Buttes, Utah/Arizona: Coloration and Diagenetic History, Preservation of a Dinosaur Trample Surface and Terrestrial Analogs to Mars"
- Katrina Settles, Geophysics "Crustal Structure and Tectonomagmatic Processes of the Yellowstone-Snake River Plain Volcanic System from Gravity-Density and Strength Modeling with Seismic Constraints"
- Xiwen Sun, Geology, "Thermal History of the Prince of Wales Mine"
- Junyoung Sung, Geology, "Geology, Mineralogy and Geochemistry of Gold Mineralization in the Gold Field District, Nevada"
- Xiang Xiao, Geophysics, "Salt Flank Delineation by P-to-S Converted Waves Interferometric Imaging".
- Bonnie Jean Pickering White, Geophysics, "Seismicity, Seismotectonics and Preliminary Earthquake Hazard Analysis of the Teton Region, Wyoming"
- Anastasia Yatsenko, Geology, "Core Orientation and Bedding Dips Determination for the MIS Well in Antarctic"

Bachelors of Science, 2006-2008

Geological Engineering:

Tyson Richard Addy, Steven P. Clausen, Patrick Ryan Emery, Robert Hernandez, Bradley Johnson, Abigail Rudd, Justin Scott Seal, Adam S. Williams, Justin A. Wriedt

Geology:

Page Anderson, Lee A. Barnett, Michael J. Buchanan, Steven Burgeon, Scott S. Boyd, Emily Yeager Jackson, Jeremy Jackson, Clay Jones, Tom Marston, John Moore, Alysen Pedersen, Anthony Pollington, Lisa Evans Santon, Rachel Sappington, Brian Sparks

Geophysics:

Toshiko Furukawa, John Mark Hale, John Carl Naranjo, Laura Russon, Paul C. Seal, Daniel Ryan Smith

Geoscience:

Darrah Appelfeller, Deanna L. Brandau, Anita L. Brown, Michelle M. Cotton, Deweylene R. Friesen, Aaron B. Geery, Erika Gleim, Jillian Colleen Ries, Orion M. Rogers, Cameron Sheya, Lindsay M. Tingey

Earth Science Composite Teaching:

Julie Ann Robertson, Marianne Elizabeth Cannon, Donald C. Crandall, Anna Elizabeth Hunter

Environmental Earth Science:

Kristen L. Anderson, David Harnsberger, Jamie Steffensen Stevens,

Popular Departmental Outreach Programs Expand

Our outreach efforts help establish a dialogue between the geosciences, the rest of the university, and beyond that to the non-scientific community. We aim to provide insight into the interests that engage our faculty, and students as well as friends of the department. In addition, we hope to promote interest among young people that may bring them into our department as new geoscience majors.

Science Day

Over one thousand high school students visit the University of Utah campus in fall 2007 as part of Science Day sponsored by the College of Science and the College of Mines and Earth Sciences.



Anita Brown tells student audience about what's going on in our Department.

Anita Brown (B.S. 2008) and Dr. Erich Petersen presented their popular interactive "Crystals and Lasers" demonstration to over 150 curious students. Students also visited the seismology station to learn about why Utah and Yellowstone are "earthquake country, how the university of Utah monitors earthquakes, see real earthquake data, and how to prepare for a large earthquake.

Avenues Street Fair Goes Once Again Flock to Geoscience Displays

On Saturday, September 8, 2007 the Geology and Geophysics department made what has become its annual appearance at the Avenues Street Fair with an information and outreach booth. Dr. David Dinter, who usually oversees the effort, wasn't able to attend the event so he gave the Geology and Geophysics students the opportunity to take responsibility for the booth. Dr. Erich Petersen helped graduate student Amber Rheubottom and undergraduate Anita Brown set up the booth. Undergraduate Deanna Brandau, and graduate students Will Gallin and Melinda Hilber put in time talking to people and giving out rocks. The display stimulated earthquake awareness with a 3-D map of the Wasatch Fault. There were mineral specimens, fossil specimens, and a cast of an *Allosaurus* skull to touch (the *Allosaurus* has a small stuffed BYU cougar in its jaws....). Pictures of field trips gave people some idea of what geoscientists do in the field. The always-popular bin of "free rocks" has become an annual draw for many fair goers; over 300 rocks were given away to children and adults alike. A favorite showstopper is a large brain coral with label "this is your brain on geology". This community is always receptive to our exhibits, and it was clear they enjoyed talking with us about a variety of geoscience topics.



Anita Brown Amber Rheubottom are ready to greet Street Fair goers.

WEST Program Flourishes in Local Schools

The University of Utah's Water, the Environment, Science, and Teaching (WEST) program, coordinated by Holly Godsey, links our department to the larger community by partnering graduate students in the geological, biological, and meteorological sciences with teachers in K-12 education for an entire academic year to help with science content, lesson planning and hands-on activities. The WEST program began with three years of National Science Foundation support and is now sustained by several University entities and private donors. Since 2004, WEST has funded over fifty-one graduate students, worked with over sixty schools and served thousands of students.



WEST program participants are off to sample the waters of Great Salt Lake.

From 2006-8, WEST has involved over 2,000 students in a research experience on a boat on Great Salt Lake. Students sampled water for sulfide and chlorophyll, measured lake depth, netted brine shrimp and observed wildlife. The data that the students collected became part of a larger study that is underway by the Utah Dept. of Environmental Quality (DEQ). The DEQ contributed \$10,000 to help keep the field trips going through the 2007-2008 academic year. Other contributors to the project include the University of Utah Bennion Center, the U.S. Geological Survey, Friends of Great Salt Lake, Lewis Stages, and Salt Island Adventures.

Another major project was the restoration of a wetland on the grounds of the Tracy Aviary in Salt Lake City and the introduction of a threatened species, the "Least chub", to a small wetland that WEST helped develop at Escalante Elementary School. That school recently received national recognition for innovation in science teaching by winning the 2006-2007 Intel School of Distinction award. Another project produced a teaching module, "Natural History of the Wasatch Mountains", to its repertoire, complete with lesson plans, field trips, and virtual teaching materials.



Through the WEST program, Earth science students take their expertise into elementary schools.

WEST is actively seeking contributions for fellowships and field trip support. If you are interested in helping support WEST or for more information on the program, please see our website at www.earth.utah.edu/west.

New EAST Program Builds on WEST Successes

EAST (Embedded Alliance Science Teaching), the new extension of our highly successful WEST (Water, Environment, Science Teaching) program, coordinated by Holly Godsey, pairs our undergraduates with graduate students in science education in the Salt Lake School District. These teams are then partnered with K-12 students and their teachers across Utah. The National Science Foundation Math and Science Partnership program has funded EAST for 2008. Undergraduate student participants are from the geology, geophysics, engineering, biology, meteorology, chemistry, math and physics departments. EAST fellows will be partnered with WEST fellows to help carry out hands-on activities and provide another resource for teachers.

Benefits are far-ranging: Young people have real scientists to answer their questions and to look to as role models. Their teachers have a resource for content and observe new ways of teaching science. Graduate student fellows have the opportunity to refine their teaching and communication skills and to work with peers across disciplines. Our department benefits by having dozens of energetic graduate students instilling an interest in earth science in thousands of young people. The University of Utah gains dozens of ambassadors to the community at large, as well as to a significant portion of typically underserved populations. Finally, the community becomes aware of the importance of science education and environmental stewardship for maintaining our quality of life. The number and range of donor organizations listed below who made gifts to the program show how well the

greater community understands and appreciates the EAST-WEST efforts.

George S. and Dolores Doré Eccles Foundation
U.S. Geological Survey
Office of the Vice President of Academic Affairs
College of Mines and Earth Sciences
Dept. of Meteorology
The Lowell Bennion Center
Utah Dept. of Environmental Quality
Friends of Great Salt Lake
Ensign Elementary PTA



Bill Johnson teaches a density lesson on GSL to fourth graders.

Blast From the Past

In our “Blast From the Past” series, we once again take pleasure in giving our Geology and Geophysics community a look at an alumnus whose education was the prelude to a remarkable and personally satisfying career. When we sent out a query asking Chuck Williamson (M.S. 1972), to tell us about how his education had figured in his life, it landed in his e-mailbox while he was kayaking in the Pacific Ocean near Point Reyes.

Chuck Williamson Believes Character and Vision Are Paramount

Chuck rose to the position of Chairman and CEO of Unocal, then shepherded his company through a tortuous and hotly protested sale which culminated in 2005 in the company’s acquisition by Chevron. He has moved on into a plethora of activities, from serving on multiple corporate boards to advising academic institutions – including chairing our Round Table – and also to making a little wine from his own vineyard in Sonoma, California. He still spends a great deal of time traveling globally in association with his board responsibilities. He’s clearly as involved as ever (his wife says he’s “failing retirement”) but now he has the

remarkable privilege of being able to choose that which gives him the most satisfaction. So what are the principles he has found most valuable in his career, and how have they affected his life?



Chuck Williamson spends a little time in his vineyard, here with some beautiful zinfandel grapes that escaped harvest.

He emphasizes that his educational foundation in geology, first at Wittenberg University, then at the University of Utah (with Duke Picard) and finally at the University of Texas, equipped him for a very good career. Though he prospered academically and thought he wanted to pursue a teaching career at a research university, he decided he was better suited for industry research.

He joined Unocal, working in Research and Development, and found the experience very gratifying, working with a great group of people including some of his old University of Utah friends. He got lots of exposure to global geoscience and field work around the world. He found, however, that he was frustrated by being only a small piece of any situation; he wanted to be part of an integrated solution that included not only the science but the politics, business, economics, and human factors. He recognized that his greatest interests lay in linking both the geosciences and international business. Looking within Unocal he found the necessary shift in career direction, into the Operations arena. He served in various overseas operations positions including England, the Netherlands and Thailand. Living overseas was interesting, a great family experience and helped him to grow as a leader. He returned to a series of corporate Vice President jobs in Los Angeles, including Upstream Technology, Planning and Economics, Information Technology, and finally International Vice President. He didn’t aspire to be a CEO, but accepted the position as CEO and Chairman in 2000, serving until the transition was made to Chevron in 2005. Later in his career he also served as Chairman of the US-ASEAN Business Council, the leading U.S. trade association for ASEAN business and considers this one of his best

accomplishments. It was “out of my comfort zone, but a real growth experience.” His foundation in science remained important all the way. He says, “The appreciation of complexity, the understanding of uncertainty, and the analytical discipline have served me well in business.”

Chuck believes there are indeed certain qualities that make some people more able than others to assume positions of responsibility and leadership. He sums them up as character and vision. Discussing the makeup of character he touches on honesty, commitment, dependability, integrity, and respect for others. Vision he sees as constant striving for excellence and an ability to think long-term, placing your “bets” on your vision for the future.

The current chairman of our Round Table, Chuck brings his experience and vision to bear on two facets: bridging the academic and business worlds, and, and helping young people build rewarding careers. He believes that, “When you are being the best at whatever you’re doing, then good things happen.” To do that, you need to find a good match for yourself and your aspirations. Remembering that the best part of his job as a CEO was listening and recognizing employees around the world who talked proudly of their accomplishments,, he’s still listening to what people have to say and trying to facilitate the making of more good matches.

Alumni and Friends

We look forward to hearing from our alumni and friends and want to encourage all of you to visit the department when you have a chance. Try to join us for the Sutton Building opening festivities on April 17, 2009!

Grads Send News

Here’s what the folks who’ve written, visited the department, or talked with us at meetings have had to say. We love it! Keep the news coming. If you send e-mail, let us know if you’d like to be added to our e-mail list of events and news that occur between issues of the *Newsletter*.

1960s Grads

Helmut Doelling (Ph.D. 1964) actively spends many of his days in the field, mapping many remote areas of Utah to complete the series of geologic quadrangle maps. He often leads field trips to the areas upon completion of the mapping project.

Tomohide Nohara (M.S. 1966) is an Emeritus Prof. of Geology at the University of the Ryukyus in Japan. He fondly remembers his days at Utah working with Dr. Lee Stokes and hopes to see some of his classmates at the all-alumni reunion on April 17, 2009 when he returns for the Sutton grand opening.

Jack F. Shroder (Ph.D. 1967) is an expert in the geography and geology of Afghanistan and actively worked with U.S. counterterrorism agencies to use geographic information system (GIS) technology to map cave systems used as hideouts by al Qaeda operatives. He is the GSA Chair of the Quaternary Geology and Geomorphology Division, and is working with Marjorie Chan on promoting geoconservation in the U.S.

Peter Stifel (Ph.D. 1967) retired from the University of Maryland, but is keeping busy with his historic 1765 Hope House on the Chesapeake Bay, along with gardening, keeping animals, turning wood bowls, making hay, collecting art, traveling, sailing, and more.

1970s Grads

W. Dan Hausel (B.S. 1972, M.S.1974) published a new book, *Minerals & Rocks of Wyoming – A Guide for Collectors, Prospectors, Rock Hounds and the Layman*, which was nominated for best publication at the 2006 Geoscience Editors Conference. His expertise exploring in the U.S. for diamonds and colored gemstones has led him to leave his 29-year career with the Wyoming Geological Survey. He currently does diamond and gold consulting and teaches karate.

Matt Mikulich (Ph.D. 1971) is doing some teaching and giving a seminar in Dubrovnik, Croatia. He has added playing the autoharp to his musical interests.

Chuck Williamson (M.S. 1973) has been trying his hand at wine making in Sonoma, California. He has served on the GG Roundtable Chair for the last few years. [See “Blast From the Past” in this issue.]

Edith Allison (M.S. 1979) works in the Office of Natural Gas and Petroleum Technology- Department of Energy in Washington D.C. She is very active in AAPG and is one of the AAPG Visiting Geoscientists, who offers talks about basin-centered gas, gas hydrates, sub-salt reservoirs, and the role of economics and politics in shaping our energy use.

Doug Hollett (M.S. 1979) has been trekking to Southeast Asia, including Indonesia and Singapore, while Pam has been traveling to Florida for NASA flight proficiency. Together they traveled to New England and to Stowe Mountain in Vermont. Pam was the Commander of the STS-120 mission, which was the October 23rd 2007 launch of the shuttle to the International Space Station. She retired from the Air Force in January after more than twenty-three years of service.

1980s Grads

Sue Abott (B.S. 1983) has moved to Winnemucca with her horses and is now a geologist at Newmont’s Twin Creek mine. She introduced the Society of Economic Geologists Foundation international field trip students to western food with a wonderful barbeque.

Brian Bracken (Ph.D. 1987) is a reservoir geologist for Chevron. He has shared his expertise in the field with Dr. Cari Johnson's P1CP students.

Harrison Crecraft (Ph.D. 1984) works for Bowman Consulting in Chantilly, Virginia. He enjoys being back east, and finds his work offers a lot of variety in planning and engineering services.

Susan Fisher (M.S. 1983) traveled through Korea and New Zealand with King Tut the First.



King Tut I gets a taste of glacial flour in New Zealand.

Jeff Gentry (B.S. 1984) had an adventurous trip to Africa in fall 2006. He is still putting together a number of deals and has been quite successful in his endeavors. He also collected fast and fun cars.

Nancy Fox (B.S. 1985) received an M.S.P.H. in Public Health and now works in occupational health.

James Hollis (M.S. 1988) works for GX Technology.

Jerry Knaus (B.S. 1980) works in information technology specializing in the acquisition and integration of companies for a subsidiary of Boeing.

Michael A. Manship (B.S. 1980s) enjoys ranch life in Bozeman, Montana. He is active with the GSA Foundation, and looks forward to seeing familiar faces when he is out for the 2009 Round Table event and Sutton grand opening.

Bethany Bye Naumann (M.S. 1984) has two daughters in college and is contemplating a move back to Salt Lake City.

Katherine Roxlo (M.S. 1980) does mineral exploration in the Phoenix, Arizona area.

Ralph F. Stearley (M.S., 1988), is Professor and Dept. Chair of Geology, Geography, & Environmental Studies at Calvin College in Grand Rapids, Michigan. He is the author of a newly released book (with Davis A. Young)

"The Bible, Rocks and Time: Geological Evidence for the Age of the Earth". After getting this major work off to press, Ralph actually got a bit of break to head west.

Michelle Weis (M.S. 1988) had a successful back operation and is back in the groove again. When she isn't working for the state, she is often welding sculptures or is busy with her son Josh.

1990s Grads

Geoff Bodell (B.S. 1987, MS 1990) serves on several advisory boards, including our Geological Engineering program and our Round Table.

John Byrd (Ph.D. 1995) joined Amerada Hess.

Andrew Ross (M.S. 1997) has worked for the Colorado Department of Public Health and Environment for the past seven years working with Colorado-specific legacy mining issues. He authored a study that precipitated legislation under the Clean Water Act to clean up legacy mining sites.

Med Bennett (M.S. 1991) lives in Boulder Colorado and works at a small environmental consulting firm. He enjoys traveling with his family.

David Braxton (M.S. 1997) and Alicia Groeger (M.S. 1997) have been living in Australia. Alicia visited Salt Lake City with their two children in fall 2006 after spending a summer in the west visiting family and places. Dave completed his Ph.D. at Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) and now works for AngloAmerican in Perth, Australia.

Todd Ehlers (M.S. 1996, 1997; Ph.D. 2003) has been promoted to Associate Professor with tenure at the University of Michigan. He thanks the alumni and university for stimulating conversation, collaborations, mentoring, support and advice over the years.

Michel Ybarrondo (B.S. 1999) says that Dr. Bill Johnson's classes make most of the stuff he does now seem easy. The computer modeling and thought processes he taught really have helped Michel in the stream restoration field.

Michel has worked on 'before' culverts which were a real fish barrier and the 'after' free-flowing Targhee River which contributes prime spawning and rearing habitat. They now have fish going upstream unimpeded and lots more little guys coming back down where you can see them resting in the pools and behind the boulders. Michel says, "I really don't think there is a prettier fish than a Yellowstone Cutthroat wearing its spawning colors".

2000s Grads

Jessica Moore Ali-Adeeb (B.S. 2002, M.S. 2005) and **Riyad Ali-Adeeb** (B.S. 2005) recently accepted permanent positions with Chevron. Jessica is currently serving as national president of the Association for

Women Geoscientists. They have been transferred to Houston, where they just closed on their first home purchase. We're glad to have Jessica back on campus from time to time to recruit for Chevron.

Brenda Beitler Bowen (Ph.D. 2005) is a new professor at Purdue University and enjoying her new research programs on acid lakes of Western Australia funded by NSF, and playa deposits in the Jurassic of Utah funded by ACS-PRF.

Noel Carreon (M.S. 2003) and family are moving back to Mexico after three years of mineral exploration in Peru. Noel continues to explore for copper deposits in Northern Mexico.

Chris DuRoss (M.S. 2004) and Greg McDonald of the Utah Geological Survey have published a paper on the Nephi Segment of the Wasatch Fault.

Alisa Felton (M.S. 2003) enjoys teaching in Park City, Utah. She is also serving on the board of directors for Friends of the Great Salt Lake.

Sonya Heuscher (M.S. 2006) is now working with GIS at the Utah Geological Survey.

Tekla Lake (King) Taylor (B.S. 1994) is a VP for Brown and Caldwell in Houston.

Tony Lowry (Ph.D. 2007) is a new faculty member at Utah State University.

Ann Mattson (M.S. 1997, Ph.D. 2003) is recently engaged and reports that she is still biking, and enjoys being up in Jackson, Wyoming, where she has been a seasonal interpreter for Grand Teton National Park, and interacts with the Teton Science Schools.

John Moore (B.S. 2007) entered graduate school last fall at the University of California at Santa Barbara, where he will work on a paleontological topic for his M.S. thesis.

Jeanne Ritcher (B.S. 2003) continues to work at Barrick's Cortez gold mines.

Eric Roberts (Ph.D. 2005) just accepted a new faculty position at Southern Utah University. Eric received recognition for his teaching and research at University of the Witwatersrand, but he and Dana are looking forward to living in a small town with new challenges.

Shane Spor (B.S. 2001) is working at Barrick Gold Strike in Ely, Nevada.

Leif Tapanila (Ph.D. 2005) and Lori Chadwell had a baby boy. Congratulations! Leif is now an assistant professor of geoscience at Idaho State University. Leif and Dr. Tony Ekdale hosted a successful bioerosion workshop in Salt Lake City in the summer of 2008. [See more in "Faculty Focus: Tony Ekdale".]

Ben Passey (Ph.D. 2006) and **Naomi Levin** (Ph.D. 2007) are excited to have two positions awaiting them at Johns Hopkins University, starting there in fall 2009 after

they finish their postdoctoral work at California Institute of Technology.



Naomi Levin and Ben Passey at graduation.

... And Friends of the Department

Dan Barnett (Research Assistant Professor 1997) has been practicing environmental law and is still an avid runner.

Scott Starrett (at the department in late 1980s) is at the USGS in Menlo Park, where he enjoys work in the Pacific Climate group.

In Memoriam

Raymond M. Lambert passed away February 26, 2007, surrounded by family. Ray acquired a Bachelor of Science degree in mathematics and chemistry from the University of Utah. He loved science, and spent much of his life delving into its wonders. After military service, he spent 20 years working at the University of Utah. Some of you will remember how his abilities in science along with his tinkering nature were a perfect fit for his job as laboratory chemist and general fix-everything man. He kept many of the labs of the Earth Science departments running and our instruments humming for those two decades.

Ernie Otto (M.S. 1973), passed away from a heart attack while mountain biking in Boulder, Colorado, this past summer. He was 59. Ernie was friendly, easy to talk to, enthusiastic about geology, and above all willing to help. He did lots of volunteering with a variety of groups, and enjoyed teaching classes at Colorado Mountain College. Ernie was genuinely interested in the goals of this Department and gave us good ideas about how to reach potential students. He became an integral part of our Geology and Geophysics Round Table advisory board, and was instrumental in bringing other alumni to the table. We will miss him.

GSA Meetings Offer Chances to Renew Ties to Department

Utah Alumni Gathered at 2006 Meeting

Our alumni party at the Geological Society of America (GSA) meeting in Philadelphia in October 2006 provided a chance for alumni, faculty and students to get together and talk about the old student days and changes in careers and private lives. An enthusiastic group of faculty, alumni and friends met at the University of Utah sign for the Geological Society of America Philadelphia meeting, including: Sarah Hanson, Michael Manship, John Schroder, Devin Castendyke, Tony Ekdale, Bert Stolp, Dave Norman, Riyad Ali Adeeb, Jessica Ali Adeeb, Bill Phelps, Sally Potter, Ericka Glynn, Lee Barnett, Cameron Sheya, Andy and Cheryl Manning, Leif Tapanila, and Jordy Gibert. We noticed many other former Utah alumni and friends around the meetings; all report they are doing well.

2007 Events in Denver Drew Many Alumni and Friends

Two events at the fall 2007 Geological Society of America (GSA) meetings brought faculty and old friends of the department together. The first was a luncheon, held on the Saturday preceding the meetings. It was sponsored by the department for all alumni in the Denver area.

Matt Mikulich, the keynote speaker, discussed the timely topic of "Will we run out of oil?" The presentation was very animated as were the questions that followed. The following faculty and alumni attended: Ernie Otto, Richard K. Glanzman, Med Bennett, Rip Langford, Jacqui Whitman, Andrew H. Manning, Erich Petersen, John Kloudis, James Gaiser, Russel Knight, Ron Bruhn, Bill DiGuseppi, Bill Hammond, Michael Manship, Lauren Burgin (& husband Jor Eneboer)

The second was the traditional GSA Monday night Alumni Night event where all meeting attendees and friends were invited to gather around their own school's sign. Geology and Geophysics Acting Chair Erich Petersen greeted Roger Congdon, Cristine Puskas, Matt Affolter, Allen Denniss, Sha Chapman, Austin Belsche, Erin Tainer, Pete Koesar, Rip Longford, Rick Ford, Devin Castendyke, Becky Flowers, Lori and Lief Tapanila, Steve Vanderhorn, Anita Brown, Janae Wallace, John Shervais, Alan Gunnell, Paul Inkenbrandt, and Michelle Summa. You can find out more about what they're doing in *Alumni and Friends* later in this issue.

Successful GSA 2007 Luncheon Inspires a 2008 Repeat

Inspired by the success of last fall's luncheon meeting during the GSA meetings, University of Utah grads gathered again at Maggiano's Restaurant in May 2008 in Denver. Dean Frank Brown gave a presentation about his work on early man sites in the Turkana region of

Ethiopia as well as updating the participants on the progress of each of the four departments in the college. Most of the participants were from the Geology and Geophysics Department with one metallurgical engineer and one mining engineer. Overall this was a great opportunity for Utah graduates to catch up with everyone's personal and professional interests. Thanks to Ernie Otto and Bob Garvin for making phone calls to some of our grads informing them about the event.

We hope to make this an annual event. The participants seemed to like the venue and the idea of a lunch meeting. If you have any ideas or suggestions as to how this activity can be made more successful or a particular topic you would like addressed please forward the ideas to John Kaloudis.

We'd Like to See You at GSA in 2008!

If you will be at the GSA meeting this year, please join us for a U of U reunion:

Monday, October 6, 2008 from 5:30pm to 7:30 pm in Room 337B at the Hilton Americas Hotel in Houston, Texas on 1800 Lamar Street.

(Note: the GSA program has a different time listed on the original printing, but the correct time of 5:30 should be on the addendum sheet).

Come visit and renew friendships!

Donors' Generosity Is Vital to Our Mission

We appreciate the generosity of our donors who help us build the quality of our department. We couldn't do it without you.

Rio Tinto Earthquake Information Center Is New Home for Seismograph Station

In June 2007, Kennecott Utah Copper (a member of Rio Tinto Group) donated \$200,000 as a first installment of a gift of \$600,000 to the College of Mines and Earth Sciences. These funds will be used to establish the Rio Tinto Earthquake Information Center, to be housed on the first floor of the Sutton Building.

The Center will be used to communicate with emergency managers and the media in the event of an earthquake, as well as for education and research. It will be part of the facilities of the University of Utah Seismograph Stations (UUSS) in the new Frederick A. Sutton Building.

Dean Frank Brown received the check and the further commitment on behalf of the University, thanking Kennecott Copper for their continued and faithful support of the University of Utah, and of the College of Mines and Earth Sciences in particular.

Association for Women Geoscientists Continues Popular Fundraisers

Members and friends of our Department have for nineteen years now looked forward to the annual wine tasting and silent auction put on each spring by the local chapter of the Association for Women Geoscientists (AWG). This group, many of whose members are former students of the department, get together with their old professors, other members of the geological community, and other family and friends for a delightful evening whose purpose is to raise money for awards to women students in geology attending a Utah university. This has become the social event of the year for the whole geologic community.

In 2007, Anita Brown from the University of Utah and Sarah Rowley from Brigham Young University shared the \$1500 Susan Ekdale Memorial Field Camp Scholarship. In addition, the chapter presented Deanna Brandau of the University of Utah a \$500 Outstanding Geoscience Award. In 2008, the Susan Ekdale Memorial Field Camp Scholarship went to Alysen Pedersen of the University of Utah. An \$800 Spring Research Scholarship was awarded to Erin Tainer, a Utah State University graduate student. Courtney Neuffer, a University of Utah undergraduate, won the \$500 Outstanding Female Geoscience Student scholarship.

Be watching for announcements of the 2009 event and plan for a great evening!



Alysen Pedersen, Courtney Neuffer, and Erin Tainer happily accepted awards from AWG.

AAPG Digital Data Base Subscription Donated in Honor of Dean Frank Brown

The Reverend Marta S. Weeks provided a American Association of Petroleum Geologists (AAPG) digital database subscription for our University in honor of Dean Frank Brown. This AAPG Foundation digital product is a very welcome addition and an important resource for us.

In-Kind Donations Fill Empty Niches

It's the nature of geology that its professionals, and interested amateurs too, collect fascinating artifacts. The department has received many items from alumni, friends, and interested scientists who understand that a successful teaching institution must build its scientific and historical collections. Some have recently come to us in response to our requests for interesting items to enhance the Sutton building.

Professors Sue Halgedahl and Richard Jarrard donated fifteen new Middle Cambrian fossils from the Wheeler and Marjum Formations. of Utah to the department research collections. These specimens exhibit soft parts; they include jellyfish (cnidarians), non-trilobite arthropods, and one trilobite (*E. Kingii*) with vestiges of appendages, the first to be reported from Utah showing soft parts. Overall, these specimens represent several new genres and species. These finds have been published recently in the journals PLoSOne and the Journal of Paleontology.

We also recently just received a large and diverse collection of complementary Green River plant fossils from Lonnie Paulos, M.D., that will be shared with the Utah Museum of Natural History. Dr. Paulos was first inspired by Dr. Lee Stokes classes in paleontology, and wanted this plant fossil donation to honor the contributions of Carl Ulrich and Hardy Jenkinson, who brought so many important fossils to light.



Eocene palm frond that once waved in our skies will now grace our hallways, thanks to donor.

Architect John Diamond Designer and Lee Phillips-Diamond of the architecture and design firm diamond phillips gave amply of their time and professional expertise to the design of the Sutton Building entry.

Myrna Duncan, of the College of Mines and Earth Sciences Dean's Office, donated a well preserved Devonian fossil fish, *Osteolepis*.

DaTile and Stone generously donated five large polished display slabs of rock in addition to the dark gray multicolor Brazilian slate floor tiling for the lobby entrance of our Sutton building.

Contempo Ceramic Tile donated several slabs of unusual and striking polished stone that will be incorporated into the building's public areas. These are works of art in themselves as well as subjects to pique the professional interests of the geoscientists who will pass them every day.



Large end piece of garnet staurolite schist with crystals 2-5 cm long (donated by Contempo Ceramic Tile) will be at the east entry to the new building.

Solistone, Inc. of Los Angeles, through Executive Vice President Josiah Damery, generously donated the colorful pebble tile for our lobby floor to complete the river design element of our new building.

The O.C. Tanner Company (established jewelry firm of Salt Lake City), generously offered some of their custom display cabinetry for use in the Sutton Building. We acknowledge the assistance of Dave Peterson, President and COO of O.C. Tanner for bringing the donation to fruition and also Paul Fetzer of Fetzer Architectural Woodwork for retrofitting some of the displays. We also hope to co-sponsor a special gemstone event and lecture with O.C. Tanner. We are excited about forging a new partnership with O.C. Tanner and are grateful for their in-kind donation.

Don Fratto (B.S. Geology 1959) volunteered 3-4 hours every Sunday assisting the department's curator, and his help over the past year has been immense!

Terrence and Andrea Chatwin donated a Karl Thomas painting of Mt. Moran, Grand Teton National Park, Wyoming. Terrence is the Director of the University of Utah Engineering Experiment Station.

Keith Chojnacki donated mineral specimens from his sister Linda Chojnacki (B.S. Geology and Geological Engineering 1992). He also donated mineral specimens his father collected while he worked as a geologist for the railroad.

Doug Hensala donated his uncle's rock collection that included petrified wood, polished rock, mineral samples including Utah variscite.

The Hunt family donated eleven boxes of books, several wall maps, and a barbed wire collection from the library of Charles B. Hunt. Charley Hunt was one of the seminal figures in the geology of the western United States. His study of the Henry Mountains during the 1930s remains a landmark.

Jeff Gentry (B.S. 1984) in 2008 donated a 200 pound aluminum cast of a thirty-inch *Allosaurus* Skull. Our picture can't do it justice, so you'll have to come see for yourself when it's displayed in the Sutton building.



This brilliant Allosaurus skull cast will be an eye-catcher in the Sutton building.

Butterfield Gardens of Sandy, UT donated a micaceous rock from Little Cottonwood till. Bob Butterfield patiently and expertly helped us maneuver and place large rock monoliths for the outside dry river beds. We love the look these monoliths add to the Sutton xeriscaping.



University personnel help move boulders & monoliths.

Green River Stone Company has given the department special pricing on Eocene fish fossils that will comprise

of our donor wall. It will be a spectacular display with "schools" of fish "swimming" towards the lecture hall. We appreciate the support of company president Gregory Laco in helping make this special wall happen for our new building.

North Salt Lake Marble and Granite donated "black granite" anorthosite rock slabs that will form the "sill" of display windows off the lobby area of our Sutton building.

Dennis McMerdie (M.S. Geology 1967) gave invaluable help clearing the Mines Building of seventy-five years of accumulated rock samples, geology books, journals, reprints, supplies, and miscellaneous equipment. He has found willing takers for almost everything!

Craig L. Shafe donated nine boxes of mining law and land management books from his father's estate

Susan Fisher (M.S. 1983) donates a lot of time every fall to put together this newsletter. This issue is her last effort. If any of you are willing to do it next year, please contact the Department Chair!

We hope we haven't gotten any items or donors that should have been included. We appreciate all these gifts that add to our teaching and displays!

Gifts Benefit AAPG Student Chapter

Some of our donors have special interests, and take pleasure in knowing how their contributions are put to use. The following contributed to the AAPG Student Chapter. If you, too, would like to direct your gift to a special program, please let us know.

- | | |
|-------------------------------------|-----------------------|
| Anita Brown | Einstein's |
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King Tut Reincarnated



King Tut returns! The King TUT (Traveling Utah Trilobite) mug has new colors and is available now as red on white, which will complement the first generation white

on red mug. For new donations of \$200 or more, we will send you one of these special mugs. We hope you will send us your pictures of you and the mug to go in our newsletter. King TUT the Second looks forward to visiting every continent.

We're Still Looking for Petroleum Industry Nostalgia

We're still looking for a few high quality petroleum collectibles from bygone eras to display in the new building. In particular, we are looking for a neat old gasoline pump from the 1940s or earlier in very good condition (or restored) that can be displayed in the Department office or lounge and gathering areas, plus a few old signs or gas cans, again in good condition. Anything specifically from Utah would be even better. If you have any of these types of items you would like to donate, please send a picture to the Department Chair.



Dr. Margie Chan found a "keeper" for the Sutton building on one of her treasure hunts.



A beautiful waterfall awaits the hikers up Bells Canyon, just south of Little Cottonwood Canyon.

Your Contributions Take Us a Long Way

Some of the following folks contributed to the Sutton Building, while others made unrestricted gifts to help us carry out activities and programs that otherwise might never make it. We appreciate them all deeply. If you want to join their growing numbers, fill out the form on the last page of the *Newsletter*, or use the contact information in the masthead box inside the front cover of this *Newsletter* to phone or send e-mail.

Anonymous	Peter Franklin and Nancy B. Bryant	El Paso Corporate Foundation
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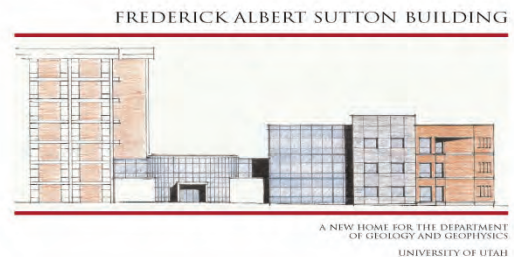
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