



# *Down to Earth*

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

Fall 2006

## Geology and Geophysics: Building Partnerships

### *Forging New Links and Strengthening Old Ones Builds a Stronger Department*

Universities provide a critical link between the research and education objectives of the academic world and the private and public sectors that need to apply the results of our research. The Geology and Geophysics Department at the University of Utah has a long history of successful partnerships with geoscience-related industries, and we are seeking to strengthen existing relationships and develop new initiatives.

Now is a unique time for us to strengthen partnerships that can have a long-lasting impact. Our department is particularly well positioned because of the following factors.

- *The new Sutton Building* will provide state-of-the-art teaching and research facilities and will also accommodate visiting research scientists, visiting industry scientists, post-doctoral students, and more. The potential to host visitors will help infuse new blood and new ideas into our department and will allow us to develop more collaborations and mutually beneficial partnerships. We want to ally this exciting physical facility with an atmosphere of intellectual opportunity, to produce a center of excellence based on the strengths of our Department. In addition, the building will provide opportunities to showcase industry partners prominently and permanently.
- *Expected retirement of faculty and the advent of new members* in the next decade can take us in new directions and truly build program strengths, providing a lot of energy and momentum for a vibrant future.
- *Existing strengths* include internationally recognized programs in solid earth geophysics, tectonics, field geology, surface processes, water-earth interactions, and much more. We plan to bolster these strengths with new initiatives.
- *We are geographically located* in an area that often attracts students with a "green" sense of the environment, yet we have strong industry programs and ties, for example, course-work tracks that equip students for roles in industry, geological engineering,

oil and mineral company consortia, also alliances with industry groups such as the Energy and Geosciences Institute, and a record of producing excellent graduates who continue to provide balanced perspectives of resources and the environment. Our strengths and current position offer the opportunity to showcase partnerships in an energy-conscious state in the Intermountain West.

- *The GEO Roundtable* is a group of friends and alumni that acts in an advisory role to the department. The Roundtable gives us an outside perspective to help keep our department competitive, and to help guide new initiatives. A number of our Roundtable participants are in various industries across the country. [See "New GEO Roundtable Sets Our Sights on Excellence" in this issue.]



*Dean Frank Brown, Frank Joklik, and Dr. Bill Parry discuss the department's goals. That's Chuck Williamson (M.S. 1973) in the background*

Partnerships already underway include those with oil businesses, the mining industry, environmental companies, and public service organizations.

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**Message from the Chair**

Dear Alumni and Friends,

Fall greetings! Each year our newsletter gets bigger and better, due to your participation and associations with the University of Utah.. Please be sure to read through this newsletter because you will be impressed with the breadth and depth of accomplishments and activities.



Our new Sutton building is really making great progress. In anticipation of its construction and to make room for heavy equipment coming onto the site, the old core storage building attached to the south side of the Mines building came down this summer. It was amazing how fast it happened! New construction, slated to begin in

2007-2008, is an exciting step to lead us into the next half century. We still are a little short on the funds to complete the building even though we have permission to start construction. You can help support our efforts and have your name immortalized as well, as described in "Donor Opportunities Abound for New Sutton Building" later in this issue.

For me, some of the most enjoyable aspects about our science are serendipitous discoveries, meeting new and neat people, and the occasional surprises. One such surprise occurred this summer while I was leading a field trip in Big Cottonwood Canyon for a "Teaching Sedimentary Geology" workshop attended by professors from around the country. As we climbed out of our dusty vans, a bright yellow Ferrari pulled up alongside. A voice called out "Margie!". Out jumped a friendly face from the past – a 1980's Utah undergraduate alumnus. He gave me a big hug. Such a wonderful surprise really made my day! I turned to the waiting field trippers and said, "This is the kind of car Utah graduates drive!" Once again I was impressed with the personality, motivation, imagination, drive, ingenuity, intelligence, and education of our students. I am proud of all that our students and alumni accomplish.

This is a year to celebrate milestones among our faculty – awards, a phased retirement, and a new member. Yet even as we change, we still focus on excellence in teaching and research, striving to make our science relevant.

Please continue to stay in touch. Look for our Utah alumni events at the annual SEG and GSA meetings. Feel free to drop us an e-mail, give us a call, come to our alumni events, or stop in and visit.

On behalf of the department and with all our best wishes,  
Marjorie A. Chan, Professor and Department Chair

The *Down to Earth* newsletter is published by:  
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*(Forging New Links, continued from p. 1)*

- *We maintain direct dialogues with industry* in order to be aware of what industry needs, so that we can provide well-prepared students – especially for the energy industry – which often needs to acquire new recruits rapidly. This includes our faculty (for example, M. Chan, C. Johnson, G. Schuster) visiting major companies in Houston approximately every other year to touch base on their own territory and give the faculty a sense of what is happening on industry campuses. Events here at our institution include:
  - Industry representatives meeting with faculty to talk about ongoing research, trends in the industry, and so forth.
  - Career seminars, wherein representatives (for example earth scientists, geological engineers, and consultants) come on campus to talk about career choices. [See “Recruiting Schedule” in this issue.]
  - Informal talks with students throughout the fall recruiting season [reference article]
  - Internships and summer-hire programs which provide “real-world” experience for our students as no other situations can. [See “Summer Internships” in this issue.]
  - Field trips. This year Anadarko sent representatives to help sponsor one of the PICP (Petroleum Industry Career Path) course field trips which will focus on a structural transect through the Wyoming Overthrust Belt to look at petroleum systems. Chevron has helped with similar trips to the Book Cliffs in the recent past.
  - Providing industry-generated data sets for use in our classes. An example is a BP north slope (Alaska) dataset for use in PICP and Basin Analysis courses. Some data was also incorporated into exercises for the undergraduate sedimentology and stratigraphy class.
  - Guest lectures and talks in classes. Almost weekly, visiting industry speakers and the Department’s Distinguished Lecture Series bring experts from science and industry to present new finds. These visitors often present technical talks as guest lectures in our existing courses while they are here. (See “Atkinson Distinguished Lecture Series” and “Faculty Members Inform Public Through Lectures” in this issue.)
  - Participation on thesis committees gives industry partners direct involvement in student and faculty research.
  - Direct support of the student chapters of professional societies such as AAPG and SEG.
- Fellowships and grants, as well as software grants, for example, the Kingdom Suite and Landmark seismic interpretation software.
- Equipment grants that can be used for analyses and mineral resource evaluation studies.
- *Specialized consortia* inaugurated by our faculty members concentrate and apply research gains in their specialized spheres to new and unexpected applications. Our Department currently hosts Utah Tomography and Migration/Modeling (UTAM) and the Consortium for ElectroMagnetic Modeling and Inversion (CEMI), and these have remained strong and well respected consortia for more than a decade. [See “CEMI Expands Its Research Interests” and “UTAM Continues to Expand” in this issue.]
- *Energy Geosciences Institute (EGI) connections.*
  - Help setting up a curriculum that confers a certificate in Interdisciplinary Petroleum and Environmental Geosystems.
  - Sharing software and expertise (Landmark computer software).
  - Related or collaborative research (e.g., the Caspian Sea region).
  - Advising students supported through EGI or EGI’s partners.
- *We continue to partner with various public organizations* such as the Utah Museum of Natural History and the NSF-funded Water, the Environment, Science, and Teaching (WEST) education project by providing materials and instructors. The Department’s programs of WEST and the K-12 education certificates serve as an important benchmark in recognizing the importance of outreach in our science, and educating the next generations of earth scientists.

We are anxious to explore more options for building mutually beneficial relationships that can improve our student training and contribute to advancing technology. Thus, new initiatives and potential partnerships loom large on our horizon. Partnerships are an important facet of our Department; they affect our mission in teaching, research, and outreach.

### ***New GEO Roundtable Sets Our Sights on Excellence***

Many of our Geology and Geophysics graduates have expressed an interest in our future growth and the direction our department is moving. We deeply appreciate this interest, and are eager for perspective from beyond our walls. To this end we have organized our GEO Roundtable, an annual meeting geared to a group of select alumni and friends who, because of their distinguished positions and careers, can provide

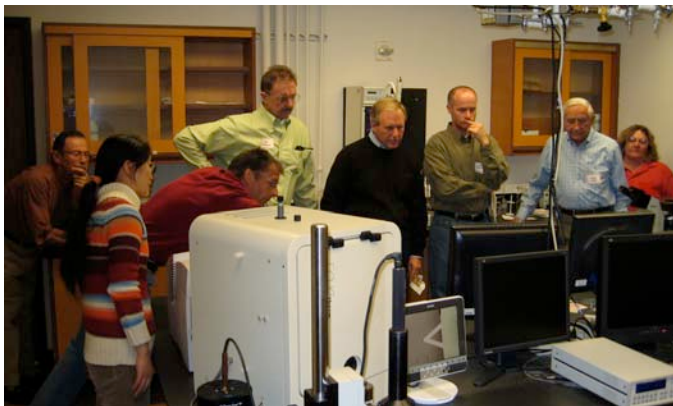


leadership and direction. The Roundtable discussions will launch our long-term strategic planning involving initiatives to raise funds and increase endowments, to attract and retain excellent faculty, and to increase enrollment of quality students. This is a long-term planning project and we want to begin by initiating a dialog with people who can bring different and realistic perspectives.

Our 2005 Roundtable participants enjoyed a casual dinner at the Cucina restaurant, followed the next day by an introduction to the department, discussions of goals, a tour of the facilities, and some selected laboratories – the seismograph station, microprobe, and environmental geochemistry – and some research presentations by students. A few folks were able to stay for an afternoon football game.

Among the participants in the Roundtable were Chuck Williamson, David Duke, Ambassador John Price, Dan Barnett, Margaret Kerr, Bill Champion, Frank Joklik, Geoff Bedell, and Randy White. Some of the major discussions and conclusions coming out of the 2005 Roundtable included:

- Formalizing the Roundtable,
- Sharing our Departmental plan and vision,
- Recruiting students, and
- Community, that is, creating stronger links from the University to industry partners.



*Dr. Bill Johnson shows Roundtable participants nano-scale imaging and applications of colloid transport.*

The 2006 Roundtable, to be held in Salt Lake City on September 29-30, will look at some follow-up of these items and address new issues that can help the Department advance. The Roundtable participation will rotate every few years, and if you have an interest in helping out with the Roundtable efforts, please be sure to contact the Department chair.

At our second annual meeting, Dr. Chuck Williamson (M.S. 1973, and former CEO of Unocal) will chair the discussions. One topic already on the table is to discuss uses planned for the new Sutton building, which will be

our nucleus for research and learning for the next several decades.

## ***Oil and Gas Consortium (UTAM) Continues to Expand***

The Utah Tomography and Modeling/Migration (UTAM) consortium began its twentieth year of research in 2006 with nineteen sponsors from the oil and gas industry. This consortium, put together by Dr. Jerry Schuster, is considered a leading research group in the new field of seismic interferometry. JAPEX (Japan Petroleum Exploration), a proposed sponsor for 2007, is considering the possibility of sending one of their researchers, Naoshi Aoki, to work with UTAM researchers in 2007-2008.



*Dr. Jerry Schuster (center left) UTAM participants continue discussions at Cucina.*

Tim Fassio (M.S. 1984) gave the UTAM group a series of two-dimensional data sets from Central Utah. Guoan Luo is attempting to process these data with some advanced processing algorithms. Researchers hope that the results will provide a clearer image of the reflectors at this site which is currently a hot area for oil prospecting.

## ***Consortium for Electromagnetic Modeling and Inversion (CEMI) Expands Its Research Interests***

The Consortium for Electromagnetic Modeling and Inversion (CEMI) under the direction of Dr. Michael Zhdanov has been steadily expanding during the last years, reflecting the growing interest in electromagnetic geophysical exploration methods. CEMI now has twenty-three members representing major petroleum, mining, and engineering corporations and agencies from around the globe. At the last Consortium meeting in Spring 2006, participants included representatives from Australia, Brazil, Canada, China, Italy, Japan, Norway, Russia, the United Kingdom, and the United States.

The major new area of research in the Consortium is developing effective methods for modeling and interpretation of the marine magneto-telluric and

controlled-source electromagnetic data for offshore petroleum exploration. This area of electromagnetic geophysics represents a significant interest for petroleum industry and provides an avenue for very challenging research projects. During spring and summer 2006, two new research scientists joined the CEMI consortium: Dr. Zhenyu Li from China and Dr. Masashi Endo from Japan. Currently, ten graduate students and five post-doctoral and research scientists participate in research projects conducted by CEMI. This Consortium is the major source for funding these graduate students and researchers.

The Annual CEMI Meeting in 2006 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.

## Departmental Development

### *Functional Details Develop for Sutton Building*

The plans for the new Sutton Building are progressing well. It has taken many months of program planning and design, but the plans are now drawn, and we are going through several tweaking iterations before the ground-breaking takes place. A number of the laboratories have been combined to suit common laboratory space needs, for example, one main large wet chemical lab instead of several small labs belonging to individual faculty, and the laboratories will be centralized toward the core of the building where there is the best access to plumbing, gas, and water. Faculty offices will be placed along the outside walls where there will be plenty of light. We will have state-of-the-art classroom and teaching facilities equipped to handle some of the latest computer technology. It will be wonderful to have our own lecture hall and even the conference room space we currently lack. One exciting component of our new Sutton Building will be some of the common areas and gathering spaces for students and faculty which we hope will facilitate collegial interaction. We plan to have a large foyer with exciting displays, a plasma screen headlining important Earth news and science, and – wouldn't it be nice to have a coffee bar, too! The University of Utah Seismograph Stations (JUSS) will have prominent space to facilitate receiving outside visitors and tours as well as hosting the media. So there are many plans in the works intended to draw people into our building and to excite them about who we are and what we are about. We truly believe that the future of Earth Science is promising and relevant, and our new building will help us share that vision.

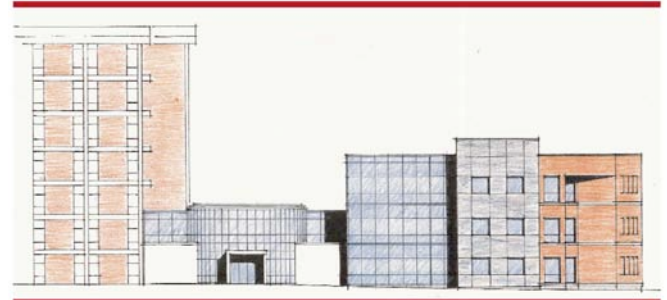
### *Donor Opportunities Abound for New Sutton Building*

With the advent of the Sutton building, we have a unique opportunity for friends and alumni of the Department to partner with us in completing and furnishing our new home. We know many of you will want to share in our efforts to realize a goal that will take us and our students into the next several decades.

We welcome benefactors of all levels, and donors will be recognized in a permanent, prominent and exciting geologic-themed wall in our new Sutton building foyer. The different levels are noted below, and donation levels of \$5000 or more offer different naming possibilities for facilities spaces, laboratories and classrooms. For example, named spaces will have a plaque to honor or recognize the memory of specific individuals. Donor levels of \$100,000 to \$250,000, \$50,000 to \$99,999, \$10,000 to \$49,999, \$5,000 to \$9,999, \$1,000 to \$4,999 \$500 to \$999, and \$100 to \$499 will each have separate notations.

Please send in any donations earmarked for the Sutton Building to the Department. We have a link so credit card donations can be made from the Department website that directly link through to the University's development office.

FREDERICK ALBERT SUTTON BUILDING



A NEW HOME FOR THE DEPARTMENT  
OF GEOLOGY AND GEOPHYSICS  
UNIVERSITY OF UTAH

### *Big Claw Signals End of an Era*

In early July 2006, the Geoscience Services building came thundering down. This building, known also as Building 22 or the Core Lab, was where the Department kept many of its storage items, field equipment, seismic records, thesis collections, and more. The building was torn down in anticipation of the construction of the new Sutton building, and the need for wider truck access into the soon-to-be construction site. It was quite the scene! The work was done quickly and efficiently, and as of the second day of school in August, 2006, a newly asphalted road had been installed. The Mines building is still standing. Its fate will be determined by the University administration once we have vacated and moved into the new Sutton building. So things look much the same as they did, and in many respects, the Mines building



looks more like it was originally intended so many years ago.



*Heavy machinery took aim at the old Mines laboratory ...*



*... and soon only a heap of rubble remained.*

## **Curator and Crew Cull and Refine Old Collections**

Many of our collections have been stored for years in the old Building 22. In anticipation of the demolition, our curator Quintin Sahratian and his helpers, undergraduates Orion Rogers and Chase Straight, had a huge task sorting through rocks and other items that hadn't seen the light of day in half a century. He and his team of hard workers did an amazing job, culling literally tons of rock. Several faculty had to routinely go over to examine the sorted piles before the final cuts were made. Quintin has done an outstanding job of reorganizing our collections, reducing redundancy, and creating an electronic database. Kudos to Quintin and his team!

Entire cabinets of paper items went into the recycling bin and literally tons of rock were thrown out, but several truckloads of books, journals, and maps, and more than ten pickup loads of rocks, minerals, and fossils were donated to Salt Lake public schools. The Utah Geologic Survey received a number of thesis collections and boxes of core samples, including several hundred boxes of the Burmester core collection. Much of the rock material was without provenance, so had limited usefulness for the department's teaching and research collections. However, the Utah Museum of Natural History received several loads of undocumented mineral specimens for their outreach programs. Nearly a ton of rock was kept for "give away" purposes for such events as the Avenues Street Fair, in which the Department participates every year.

We knew streamlining our collections would be absolutely necessary before moving into the new Sutton building, and because of this groundwork we will be better able to know what we have, showcase our best samples, and make these resources available for teaching and research. Nearly all specimens now have been cataloged, labeled and entered into a single computer database. Our systematic mineral collection, stratigraphic paleontology collection, and extensive teaching collections of minerals, rocks and fossils will continue to grow, with an emphasis on top quality specimens. We are currently looking for more Utah mineral and fossil specimens to supplement our Utah collections. Of course, we still accept samples as tax-deductible donations, so if you have fine, well-documented samples of minerals or fossils, especially from Utah or the surrounding area, we still can provide a very good home for them and put them to productive use in our departmental teaching and research collections.

## **Wanted: Petroleum Collectibles**

For our new Sutton Building, we would like to display a few high quality petroleum collectibles from bygone eras.



*How many of you remember when this was really the company's name ....*

In particular, we are looking for one or two neat old gasoline pumps 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



.... or when you last saw this elegant creature?

donate, please send a picture to the Department Chair. We hope the new building will be ready to display these memorabilia in 2008.

## Department Activities

### ***Important NSF Grant Will Fund Geoscience Studies that Complement Hominid Research***

Dean Frank Brown, Dr. Thure Cerling and Dr. Ron Bruhn have just been awarded a five-year, \$2.5 million grant from the National Science Foundation to study structural geology, sedimentology, geochronology, and isotope paleoecology in the Omo-Turkana Basin, East Africa, to better understand the environment in which humans and their ancestors evolved. This project involves field work in East Africa as well as studies at the University of Utah and the Australian National University.

The Omo-Turkana basin contains the most continuous sequence of hominid-bearing strata known, thus providing a repository that may answer many fundamental questions about early hominid evolution. Basic to understanding these problems is the ability to correlate archaeological sites across distance and time. Fortuitously, during the time in question, this area received successive ash falls from the frequent volcanic eruptions of the East African Rift and these deposits are now extensively exposed. Geochemical "fingerprinting" has identified many of these ashes and correlated them across distance. Coupled with potassium-argon dating of many of the ashes, both sequence and age of the ash falls has been established.

Along with these ashes are soil horizons that record climate and ecological information in stable isotopes. Studies of soil carbonates help define the development of savanna ecosystems in East Africa, and stable isotope studies of tooth enamel from fossil mammals show their diet choices and the availabilities of certain foods. Taken together, these factors can establish the aridity of the region over the last four million years or more. Considering such ecological data in the context of correlated volcanic ash falls between sites in the Omo-

Turkana Basin and the Awash Basin in Ethiopia, ecosystems in the two regions can be compared to answer whether or not both regions were behaving in the same way.

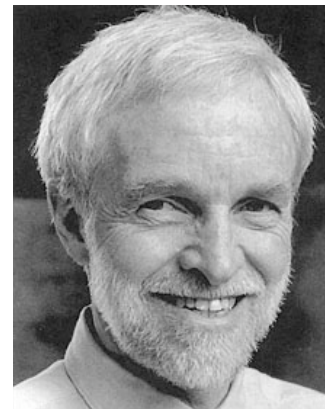
These studies will help define the changes in climate and ecology during the time of the early hominids, thus addressing questions about the relationship between environmental change and human evolution.

### ***University of Utah 2006 Rosenblatt Prize Awarded to Prof. Chapman***

David S. Chapman, Professor of Geology and Geophysics and Dean of the Graduate School at the University of Utah, was honored at the 2006 commencement ceremonies with the Rosenblatt Prize for Excellence, the University's most prestigious award. The \$40,000 gift is presented annually to a faculty member who displays excellence in teaching, research and administrative efforts.

The Rosenblatt Prize Committee, a group of distinguished faculty members, recommends selected candidates for the award; the University president makes the final selection. President Michael K. Young, in presenting the award, noted that "The Rosenblatt honor recognizes Dave's award-winning teaching skills, his valuable and ground-breaking research into global warming and other geothermal processes, and his admirable and efficient administrative skills.

The award also recognizes the extraordinary contributions he has made, not only in his field and to the University over a thirty-year period, but as an internationalist, having taught on four continents – in Africa, Europe, New Zealand and North America.



*Dr. David Chapman, winner of the 2006 Rosenblatt Prize.*

We are honored to have Dave as a faculty member and mentor leading the Graduate School."

Chapman is recognized as one of the top solid-Earth geophysicists in the world, measuring and interpreting heat and mass transfer in the geologic environment. His original contributions to the knowledge of the earth span a wide range of subjects, all concerned with temperatures in the earth and the way in which temperatures influence

geologic processes. His early innovative work measuring the heat loss of the earth is widely quoted in textbooks. Most recently he developed methods to assess the amount of global warming since the time of the Industrial Revolution by measuring temperatures in drill holes.

In receiving the prize, Dr. Chapman responded, "Credit for this wonderful personal recognition must also go to the Department of Geology and Geophysics, for providing a culture for growth and creativity, and particularly to my students, past and present, who are at the center of my research and teaching. I love the classroom, the energy that arises from close encounters with eager students and the opportunity to engage and enthuse them with ideas."

Chapman, recognized for his dedication to teaching, has received outstanding teaching awards at departmental, college, and university levels. Chapman's colleague, Frank Brown, Professor of Geology and Geophysics and Dean of the College of Mines and Earth Sciences, noted that, "To my knowledge, David is the only current faculty member who has captured the 'triple crown' of University of Utah teaching awards – University Professor, Distinguished Teaching Award and the most coveted of teaching awards, the Calvin S. and JeNeal N. Hatch Prize for Excellence in Teaching. It is symptomatic of David's deep concern for the professional development of his students that he established an endowment for student travel with the cash awards that accompanied these prizes. His service to the University has been as a faculty member, department chair, Associate Dean of the Graduate School and now as Dean of the Graduate School and Associate Vice President for graduate studies.

Chapman received his B.S. in physics and mathematics in 1964 and his M.S. in physics in 1966 from the University of British Columbia. He received his Ph.D. in geophysics from the University of Michigan. From 1966 through 1972, he taught and lectured at Canisus College in the Republic of Zambia, and at the University of Zambia. From 1975 through 1976, Chapman was an Assistant Professor of Physics at the University of Michigan at Dearborn. He joined our University in 1976.

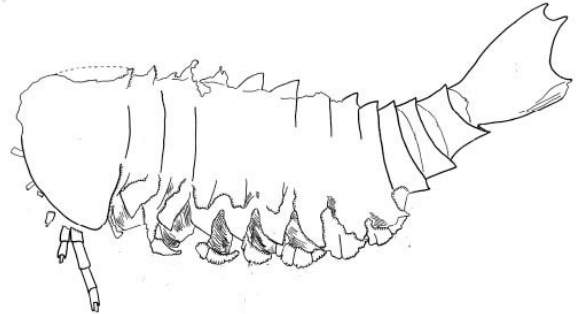
Chapman began his career in geophysics as a classical heat flow scientist, but his contributions to geophysics have broadened continuously throughout his career. He has authored more than 120 publications. Chapman leads an active research group studying thermal aspects of geological processes and is currently the chairman of the International Heat Flow Committee.

The Rosenblatt endowment, from which the prize money is drawn, was established in 1983 by the Joseph and Evelyn Rosenblatt family to honor the civic leadership and generosity of Joseph's parents, Nathan and Tillie Rosenblatt, who emigrated from Russia to Utah in the late nineteenth century.

## **Geophysics Faculty Members Continue to Find New Soft-Bodied Fossils**

Drs. Susan Halgedahl and Richard Jarrard, two geophysics faculty members, are also avocational

paleontologists. For over a decade they have quarried for fossils in the Middle Cambrian rocks of west-Central Utah, looking for fossils showing exceptional soft parts preservation. (In last year's Newsletter we reported to you Sue's co-discovery of *Skeemella clavula*, also from the Middle Cambrian.)



*Nettapedoura basilikos*, a new soft-bodied fossil, has been discovered in Utah's Middle Cambrian.

Recently, Sue and Rich have discovered a large arthropod with preserved soft parts in the Marjum Formation. This arthropod represents a new genus,

*Nettapedoura* (from *Netta* = duck; *ped* = foot; *oura* = tail). They have named the animal *Nettapedoura basilikos* (meaning "regal"), because the animal – perhaps the largest non-trilobite arthropod fossil yet to be found in Utah's Middle Cambrian – must have been an apex predator. They have deduced this based on its size alone, which is larger than any of the established predator *Anomalocaris* specimens found in Utah. Along with colleagues from Yale University and the University of Kansas, they have submitted a paper describing this fossil to the *Journal of Paleontology*.

## **Utah's Cretaceous Inspires a New Generation of Paleontologists**

On crumbly, gray Cretaceous slopes in southern Utah, modern paleontologists are finding a plethora of new dinosaur species. Until recently, this remote and rugged area has been passed over, largely because of its very isolation and the difficulty, first, of methodically searching its vast exposures, and then the logistical problems of recovery. While the ruggedness has precluded damage to many of the remains, workers must count on the BLM to provide a helicopter each year to bring in base camp supplies and take out the larger pieces. The task is daunting; only about forty thousand of about a half million acres of likely exposures have been searched.

For nearly a century now students at the University of Utah getting their first orientation in the incredible fossil wealth of the state have heard about two famous dinosaur sites. First was in 1909 when came the discoveries at Split Mountain near Vernal, Utah, where crews sought to find big specimens to fill Andrew Carnegie's new museum. And find them they did; *Apatosaurus* and *Camarasaurus* were unearthed from



the Late Jurassic Morrison Formation in what is now Dinosaur National Monument. Then in 1938 this department's Dr. William Lee Stokes discovered the Cleveland-Lloyd quarry, also in the Morrison (read more about his life's work in this issue of the Newsletter). The first dinosaur unearthed there was the monumental *Allosaurus*; fourteen species of dinosaurs have so far been found in this quarry. But for the latter half of the twentieth century, the science lagged. Not so now.

Vertebrate paleontology a century ago focused simply on finding new critters, naming them, and speculating on their phylogenetic relationships, but Dr. Stokes soon extended his observations to the depositional environment, the kind of work which is the focus of modern study. Today's paleontologists try to reconstruct everything they can about the animal – climate, topography, food, its competitors and predators, reproductive habits, its sight and hearing, how many there might have been in the area, and even its social behavior. Much of this information can be deduced from careful excavation of the animal and its surroundings. Fossil plants and their pollen, and the remains of small animals get equal billing with the spectacular big ones.

The Grand Staircase – Escalante area, not set aside as a National Monument until 1996, is producing new information at a speed that can be described without hyperbole as fantastic. Discoveries that paleontologists of the previous half century or so might hope to make once or twice in a lifetime are coming out of this area every year now. It is a new golden age. Says Scott Sampson, Associate Professor in our Department and Curator of Vertebrate Paleontology at the Utah Museum of Natural History, "Every dinosaur we can identify is new to science." There's a sense of urgency in the current field work because of Utah's weather. Our arid climate minimizes vegetation, and when coupled with the torrential downpours of late summer, erosion is fast, especially in these poorly consolidated sediments. Fossil remains can well be gone shortly after they are exposed on the surface.

Quite aside from the paleontological discoveries being made is what we are learning about the geological processes at work during the age of the great dinosaurs. During the Early Cretaceous, it is likely that ice caps were ephemeral at best and the atmospheric carbon dioxide level was periodically high. The climate at that time in Utah was tropical, and the landforms that produced the Morrison nearly flat, with meandering streams and lagoons. Violent storms would have brought heavy clay sediments that quickly covered dead animals, increasing the chances of fossilization. Understanding how ancient Earth and its inhabitants behaved may well have bearing on what is happening to us today, in an age when global warming is rapid.

## **Derrick Hasterok Receives GSA's Cox Award**

The Geophysics Division of GSA gave Derrick Hasterok the 2006 Allan V. Cox Award for student research. Out of the pool of GSA student research proposals, Derrick's project, "Illuminating Extensional Processes in the Colorado Plateau-Great Basin Transition Zone by Geodynamic Modeling and Heat Production Measurements", was recognized as the most outstanding project involving the application of the principals and techniques of geophysics. Derrick will receive his award during the 2006 GSA meeting, October 22-25, in Philadelphia.

## **Aurelian Trandafir, Ground Movement Expert, Joins Geological Engineering Faculty**

This fall, Aurelian C. Trandafir joins the Geological Engineering faculty as an assistant professor. He will be developing and teaching "Introduction to Engineering Geology" and "Geological Engineering Design" for undergraduate students, as well as other classes for graduate students. He received Bachelor and Master of Engineering degrees in Geotechnical Engineering from the University of Civil Engineering in Bucharest, Romania. He then earned a D.Sc. degree at the University of Kyoto, Japan, where his thesis focused on



*New Assistant Professor Aurelian Trandafir arrived.*

earthquake-induced catastrophic landslides. He continued there as a post-doctoral fellow and researcher, probing the same phenomena and also the evaluation of rainfall-induced shallow landslide hazards. Turn to our "Faculty Focus" article to learn about his research interests.

## **Department's Undergraduate Degree Programs Revised and Consolidated**

Last year the Department elected to make some significant modifications to our undergraduate degree programs, which have just received formal approval from the State Board of Regents. The changes were adopted in order to streamline the curriculum and to make our program more attractive to a wider range of students. The major structural change is to consolidate our three current degrees in Geology, Geophysics and Environmental Earth Science into a single degree in Geoscience. At the same time, the curriculum was modified to provide students more flexibility in selecting

electives in their program. The consolidation of degrees is in keeping with the increasingly interdisciplinary character of the Earth sciences in the 21<sup>st</sup> century.

No changes were made to the Geological Engineering program or to the Earth Science Teaching degree.

The Geoscience degree allows students to select an emphasis in Geology, Geophysics or Environment, but all students take a common core of Earth science courses. At the junior and senior level, students have the opportunity to take elective courses in a wide variety of subjects so that they can tailor their degree to their particular interests.

The changes in the curriculum make it easier for students to complete the degree in a timely manner. The restructuring also provides a seamless degree route for transfer students who previously found the program daunting and very difficult to complete in two years.

### ***Dr. Bill Parry Receives 2005 Lehi Hintze Award for Contributions to Utah Geology***

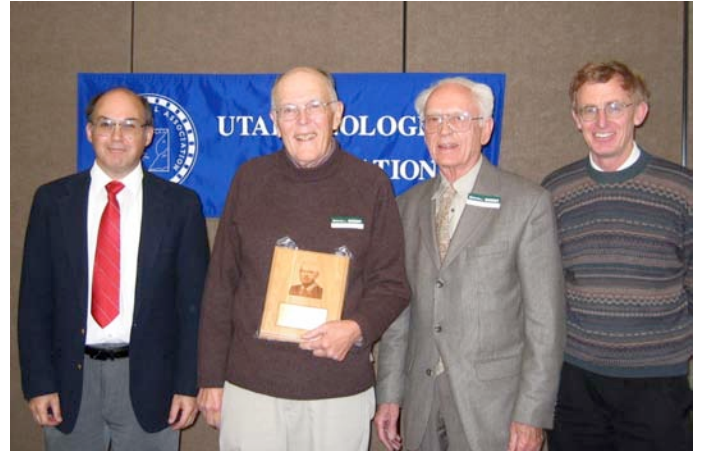
Dr. William T. Parry, Professor Emeritus of the Department of Geology and Geophysics, last November received the 2005 Lehi Hintze Award, presented annually by the Utah Geological Association and the Utah Geological Survey for outstanding contributions to the geology of Utah. He was honored at a luncheon where speakers noted "his significant, long lasting contributions that have enriched and enhanced our knowledge of the geology of Utah."

Over the years, he published more than a hundred papers that shed light on geology throughout the state. Bill's professional interests include Utah ore deposits, mineralization, fluid flow along faults, and practical applications such as carbon dioxide sequestration. He is a willing and able collaborator, generously sharing ideas and setting a high intellectual standard for respecting data and being open to new ideas.

Over the years he supervised forty-five graduate students and is still widely recognized as an outstanding teacher, having received numerous teaching awards. He genuinely likes and respects students, and his lifelong enthusiasm for geology has inspired both majors and non-majors. His vast knowledge makes rocks and their settings come alive. Add to that, that he is a wonderful raconteur and you'll understand why students still regard him with respect and warmth.

Bill is a quintessential Utahn. Born and raised in Manti, he earned all his academic degrees from the University of Utah. Even as he pursued his professional interests,

he found time for community service. An avid fly fisherman, hiker and skier, he has been a strong advocate for protecting and preserving Utah's uniquely beautiful landscapes. His interest and involvement in geology remains strong even since retirement. A field trip with Bill is still a rare treat.



*David Tabet 2006 President of the UGA, Dr. Bill Parry, Dr. Lehi Hintze (B.S. 1941), and Rick Allis, director of the UGS, attended the ceremony where Dr. Parry received this year's Lehi Hintze award.*

### ***Dr. Walter Arabasz Honored by Boston College***

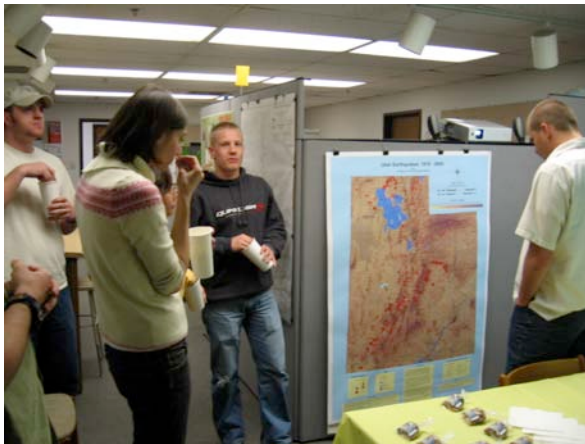
Dr. Walter Arabasz, the director of the University of Utah Seismograph Stations (UUSS) was honored with the 2006 Alumni Award of Excellence for Science by Boston College. One of Walter's colleagues in the Advanced National Seismic System wrote "Dr. Arabasz has earned my respect and admiration as a leader, a scientist, and a person. The UUSS is indeed privileged to have him."



*Dr. Walter Arabasz discusses seismicity at a mining conference in Salt Lake City*

## **UUSS Celebrates Its Fortieth Anniversary**

The University of Utah Seismograph Stations (UUSS) celebrated its fortieth anniversary in April 2006 with a three-day Open House. Today, the UUSS is staffed by three research faculty (Walter Arabasz, Jim Pechmann, and Kris Pankow), eight full-time technical staff, and seven part-time staff and students. It operates or records 223 regional and urban stations together with a real-time earthquake information system (which you can view at [www.quake.utah.edu](http://www.quake.utah.edu)) as part of the Advanced National Seismic System.



*Students (left to right) Jamie Farrell, Katrina Settles, Paul Seal, and Mike Vorkink attend the open house celebrating the 40<sup>th</sup> anniversary of the UUSS*

The UUSS has strong ties outside the department in the realm of science, engineering, public policy-making, and state and local government. A solid partnership between the UUSS, the Utah Geological Survey, the Utah Division of Homeland Security, and the Utah Seismic Safety Commission is the underpinning of Utah's state earthquake program. Since 2000 the UUSS has been at the forefront of implementing an Advanced National Seismic System (ANSS) in Utah and the Intermountain West which is guided by an advisory group from the public and private sectors.

## **UUSS Appoints New Assistant Director**

On July 1, 2006, Dr. Kristine L. Pankow became the assistant director of the University of Utah Seismograph Stations (UUSS). Kris joined the facility in April 2001 and has been a research assistant professor in the department since July 2003. She's developed broad interests in network seismology and, thanks to her great efforts, UUSS has vaulted to the lead among seismic networks outside California in implementing *ShakeMap*, *ShakeCast*, and other real-time earthquake information products as part of an Advanced National Seismic System. (See her *Faculty Focus* contribution for more details.)



*Dr. Kristine Pankow explains to engineers from the Utah Department of Transportation how to access and interpret real-time earthquake information products available from the UUSS*

## **Noble Gas and CFC Laboratories Undertake Numerous Projects**

The Dissolved and Noble Gas Laboratories headed by Dr. Kip Solomon are actively involved in research worldwide. Including ongoing student research and outside governmental and commercial clients, the lab has been involved in over twenty-five research projects this year alone.

The majority of the research involves isotopic measurements of the noble gasses for groundwater age dating and thermometry work. Two mass spectrometers system can determine the abundance and isotopic analysis of most atmosphere gasses, including: Ne, Ar, Kr, and Xe, H-3, and He-3. Although the vast majority of the laboratory's projects involves groundwater samples, the system is designed to accommodate rock samples for fluid inclusion and crystal lattice work as well. Groundwater dating in this laboratory concentrates on measuring the altered isotopes of helium produced by atmospheric testing of atomic bombs in the mid-twentieth century.

The CFC portion of the lab is used to detect the concentrations of chlorofluorocarbons (CFCs) in groundwater. Recharge age of water can be determined back to around 1945 when the release of CFCs into the atmosphere became common.

## **New Laboratory Begins Analyses of Trace Concentrations**

The Inductively Coupled Plasma Mass Spectrometry (ICP-MS or ICPMS) Lab is now up and running in the Engineering and Mining Research Laboratory bldg (EMRL). Our Department, as a member of the Center for Water, Ecosystems, and Climate Sciences (CWECs), has access to its new quadrupole mass spectrometer, an Agilent 7500ce. This machine is equipped with the



latest developments for quantitative analysis at very low concentration levels, in the range of ppm to ppq. The instrumentation is capable of broad elemental coverage; practically any element on the periodic table that can be prepared in aqueous solution except H, C, N, O, F, and the noble gases. The instrument is capable of  $\pm 5$  to 10 percent accuracies and low parts per trillion detection limits. The new ICP-MS lab is available for Department use, and can also accept outside contracts.

Dr. Greg Johnson, an analytical chemist who has worked in many applications of plasma spectroscopy, manages the lab. He and his wife have lived in Denver, Colorado, for the last twenty six years, but are in the throes of getting transplanted to Salt Lake City.

### **Department Members' Research Attracts Wide Public Interest**

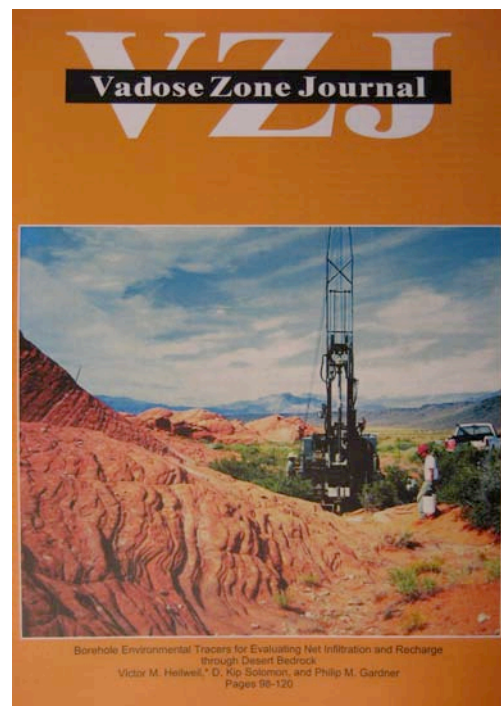
We know that the intellectual interests of our faculty and students often proceed far afield from what one would expect among Earth scientists. However, sometimes their reports catch the attention of the public media which pick up these stories, circulating them widely in newspapers, TV, radio stations and various web sites. Apart from the value scientific publications have among peers, wider media notice serves to alert the public of new scientific discoveries and also to promote interest among young people who may become interested in joining Earth science disciplines. Several of our faculty have recently received unusually wide notice.

### **Isotope Study of Elephant Hair Yields Dietary Clues**

Dr. Thure Cerling, whose field is geochemistry, became involved in studying the ecology of elephants while he was using isotopes to study the diets of ancient humans in Kenya last year. Carbon isotope analysis of the thick, foot-long hairs from an elephant's tail provides clues to what they eat. Photosynthesis, which fixes atmospheric carbon, is slightly different in various types of plants. Grasses, corn and millet all feature high ratios of  $C_{13}$  to  $C_{12}$ , while trees and shrubs have low ratios of these isotopes. As the elephant hair grows, this information is stored in the new growth. Analysis of the eating habits of one particular young male elephant showed that it made extraordinary efforts to travel from a safe preserve where it ate trees and shrubs to cultivated fields for more nutritious corn. Knowing its own danger, it made its raids at night, but it was eventually killed. Ecologists speculate that the extra nutrition may have enabled it to compete better among its peers in the preserve. Animal management agencies should be able to use this information to protect the areas where the elephants' foods of choice grow, or to provide them with alternate forage in their own reserves, thus keeping them out of agricultural lands where they're most likely to be killed.

### **Navajo Aquifer Assessment Featured on Journal Cover**

Dr. Kip Solomon of our department, Victor Heilweil (M.S. 1989, Ph.D. 2003) of the USGS and Philip Gardner (M.S. 2004), also of the USGS, published the results of their work on the Navajo Sandstone aquifer, "Borehole Environmental Tracers for Evaluating Net Infiltration and Recharge through Desert Bedrock," in the February, 2006 issue of the *Vadose Zone Journal* where it was presented as the cover story. The study was undertaken because rapid population growth and development of groundwater resources in arid regions necessitate a better understanding of infiltration and recharge processes.



*Vadose Zone Journal* cover shows Kip Solomon's team collecting core samples as part of a tracer study in the Navajo Sandstone aquifer.

### **Volcanic Ash Layers Date Human Remains**

Revisiting a 1967 site at Herto, Ethiopia, has pushed back the known advent of anatomically modern humans, moving the age of two human skulls found in the Kibish Formation from 154,000-160,000 to about 195,000 years ago, reported Dean Frank Brown of the University of Utah and Ian McDougall of Australian National University in the journal *Nature*, which covers many disciplines and has an enormous – and intellectually diverse – audience worldwide.

Being able to produce these dates is important because datable cultural artifacts don't appear until about 50,000 years ago, Brown said. These new dates are based on the Potassium/Argon ratios in feldspar phenocrysts in

volcanic ash layers that punctuate the river-laid Kibish Formation near Lake Turkana. Brown points out that the new values are much more in line with dates suggested by genetic studies for the evolution of our species. Furthermore, the skull found stratigraphically higher seemed on first discovery to be more "primitive" than the lower find. Now, with dating evidence, it appears that together they may be part of a period of rapid differentiation, when wide variation can be found in various populations within the same species. The clinching evidence, however, is Kibish Formation correlation to sapropels, dark rock layers on the Mediterranean seafloor that were deposited by outwash from the Nile. During wet periods, monsoons on the Ethiopian plateau sent sediments down the Nile to the Mediterranean and simultaneously down the Omo River.

### Utah Paleontologists' Discovery Ranks High in Magazine's 'Top Science Story' List

The January 2006 issue of *Discover* magazine listed the discovery of the *Falcaius utahensis* dinosaur as the year's 85th top science story for 2005. This study included Dr. Jim Kirkland from the Utah Geological Survey, and Dr. Scott Sampson from the Department of Geology & Geophysics and the Utah Museum of Natural History, and graduate student Lindsay Zanno from the Department of Geology and Geophysics.

The discovery was featured in our Fall 2005 *Newsletter* as part of our story about Utah's fossil treasures.

### Oil Industry Recruiters Return

The Geology and Geophysics Department will once again welcome oil company recruiters. Not only do we appreciate their value to our students who are contemplating joining the petroleum industry, but we always benefit from the insider perspectives they bring us about what's new on the horizon.



*BP recruiter Mark Vandergon tells students about working for Big Oil.*

Here are the dates we expect them for Fall 2006.

- Chevron – September 11, 12, 13 – Aksel Quintus-Bosz, Bryan Bracken, Jacob Umbrico
- ConocoPhillips – September 18, 19, 20– Betsy Torrez, and David Sheley

- Anadarko – September 20, 21, 22– John Dewey, Tom Fletcher, and Ben Kessel
- BP – September 27, 28, 29– Mark Vandergon, Richard Clarke, and Min Zhou
- ExxonMobil – October 11, 12, 13 – Jaime Buitrago

We'll be especially glad to greet returning alumni Bryan Bracken (Ph.D. 1987), Aksel Quintus-Bosz (M.S. 1992), Min Zhou (Ph.D. 2005), David Sheley (B.S. 1999, M.S. 2001), and Jacob Umbrico, (B.S. 2002, M.S. 2004).

### We'll Miss These Familiar Faces

This past year saw two of our knowledgeable and helpful staff retire. It'll be hard to find someone to do what they've done with skill and grace under pressure.

Donna Thomas took early retirement last November. She worked in the College of Mines and Earth Sciences for thirty-five years, her last years as an Administrative Manager in the Department of Geology and Geophysics.

Kenneth J. Burton retired in June 2006 of this year. He has nearly 35 years of service at the University of Utah. For the last eleven years he was the Development Officer for the College of Mines and Earth Sciences. He's the one who helped keep track of us and our alumni.

Our executive secretary Jennie Brown chose to be home with her children when she added a new one to the family in the summer of 2005; and Missy Grow in our business office moved up the hill to the Medical Center. Norma Haas and Thea Hatfield are the new faces that have joined Kim Atwater and Chris Carver in keeping all Department offices afloat.



*Donna Thomas helped us keep on track.*



## **Alumnus' Autobiography Inspires PICIP Students**

In this era when the price of oil is at an all time high, many of you might be interested in reading *From Prospect to Prosperity: Wildcatting in Arabia and the Rockies* (ISBN: 0874211743) by one of our very own graduates, Paul T. Walton (B.S. 1935, M.S. 1940, deceased 1988). This is a fascinating account by the geologist who made J. Paul Getty the richest man in the world back in the late 1940s. As the dust jacket says: "Paul Walton – geologist, prospector, deal maker, and rancher – has lived a life that would leave Indiana Jones panting in the dust."



*Vaughn Thompson, Jordan Nelson, Pakkala Konark, Eric Sahm, Matthew Heumann, Weiping Cao, Anastasia Mironova, Winston Seiler, Anastasia Yatsenko, Sally Potter, and Anita Brown display their Walton books*

This year, we are giving this book to all the enrolled students in our Petroleum Industry Career Path (PICIP) courses. We hope one of our own Utah graduates will be an inspiration to them, giving them a sense of history and the excitement of the industry. Even today, many of us reap the benefits of Paul Walton's legacy through the conservation easement of his ranch property to the Jackson Hole Land Trust that gives the Teton and Yellowstone area much of the flavor of ranchland of the west. The book is out of print, but the Department has some available for a small donation to the Department, and there are a number of used copies available online.

## **Departmental Geophysicist's Yellowstone Research Featured at New Visitor Education Center**

University of Utah geophysicist Robert B. Smith, who studies earthquakes, volcanism and other geological processes at Yellowstone National Park, gave the keynote science address for the grand opening ceremonies of the new, \$10.5 million Canyon Visitor Education Center in August of this year. The grand opening coincided with the ninetieth anniversary of the creation of the National Park Service.

The new Secretary of the Interior, on behalf of the Department of Interior and the National Park Service,

presented Dr. Smith with a plaque of recognition for his long-time research in Yellowstone. It cited him "for more than thirty-five years of basic research on understanding the Yellowstone Volcano and for unconditionally sharing that knowledge for the benefit of future generations."



*Suzanne Lewis, Superintendent of Yellowstone National Park and Secretary of the Interior Dirk Kempthorn present Bob with his plaque at the dedication of the new Yellowstone Visitor Education Center*

The new facility has state-of-the-art, interactive exhibits, online-seismograms, and 3D interactive maps that help visitors and students understand the geology of Yellowstone and the "supervolcano" which lies beneath. It features several exhibits showing Bob Smith and his students and highlights YVO and the University of Utah seismograph stations.



*Worker installs one of many new exhibits in the Canyon Visitor Education Center.*

Bob was also honored this summer at the Teton Science School July 8 with the donation of an original painting of the Tetons by a family in California. This painting donated in Bob's honor will be displayed at the Teton Science School.

## **Veteran Geophysicist Begins Phased Retirement**



Dr. Robert B. Smith started a two-year phased retirement (meaning he should be cutting his commitments by half!), beginning January 1, 2006 and continuing until Dec. 31, 2007. At the end of that period, he will consider an Emeritus Professor appointment. Bob has had a highly successful and well-funded academic research program during a thirty-seven year career at the University. His research productivity and leadership has brought national and international recognition to the department, college and university. He has supervised 63 graduate students (including four currently), authored one hundred fifty papers, given hundreds of presentations and invited lectures, and written a major book. Bob has served in key national scientific leadership roles, for example, helping establish the Integrated Research Institutions in Seismology (IRIS), the national Global Positioning System (GPS) consortium for earth science research (UNAVCO), and most recently, the Congressionally-supported NSF EarthScope program. During Professor Smith's tenure he taught more than a dozen different courses, specializing in earthquake seismology, earth structure, and deformation. He used high-level computing, and during the 1970s and 1980s was involved in an early expansion of the University of Utah Seismograph Stations (UUSS), where he served as Director from 1980 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). Bob will be hard to replace, but we are currently looking to interview potential candidates to provide a transition. If you know of some good candidates – send them our way!



*New Canyon Visitor Education Center at Yellowstone National Park owes many of its exhibits to Bob Smith's scientific contributions.*

## Lectures Draw Attention to Geoscience Advances

The Geology and Geophysics Department strives to expand both professional and public awareness of

advances in Earth science knowledge and activity. Lectures that bring experts in related fields come often to campus, and we in turn send our faculty to other institutions and out into public forums.

### **Upcoming Frontiers of Science Lecturer to Discuss Mars Tectonics and Climate**

On January 31, 2007, Dr. Matt Golombek of the Jet Propulsion Laboratory, at California Institute of Technology in Pasadena will present a public talk at the annual Frontiers of Science lecture about "Mars Exploration Rover Science Results: Climate Change from Wet to Dry". On Jan. 30 he will give a more technical Department talk on "The Tectonics of Mars". Put these dates on your calendar for this winter.

### **Faculty Members Bring New Earth Knowledge to the Public**

In March, Dr. David Chapman addressed attendees at the eleventh annual Wallace Stegner Center Symposium, which this year focused on the effects of global warming. Dr. Chapman leads a research group that studies the thermal aspects of geological processes.

Dr. Robert Smith, participating in the Science in the News lecture series sponsored by the Utah Museum of Natural History and our Department, gave a lecture at the Salt Lake Public Library about the historic Yellowstone supervolcano and recent seismic activity there.

### **Guy F. Atkinson Distinguished Lecturers Present Professional Interests**

The 2006 Guy F. Atkinson Distinguished Lecture Series again presented current insights into Geoscience problems. These lectures are open to the public as well as the University community. As always at these Thursday afternoon events, lecture-goers have an opportunity to meet the visitor and have a bite to eat before the talk begins. As you can see, the range of topics is enormously diverse and always interesting.

This spring the following speakers appeared:

- **Adolph Yonkee**, Weber State University: "3-D Kinematic History of the WY Salient, Sevier Fold-Thrust Belt: Preliminary Results of Structural & Paleomagnetic Studies, and Implications for Wedge Mechanics"
- **Jonathan Price**, Nevada State Geologist: "Current Geological Issues in Nevada: Gold, Earthquakes, Water, Nuclear Waste – What More Do You Want?"
- **Binod Tiwari**, Virginia Tech: "Residual Shear Strength of Soil and Its Use to Repair Existing Landslides"

- **Aurelian Trandafir**, Kyoto University: "Slope Stability Issues Regarding Earthquake- and Rainfall-induced Landslides in Japan"
- **Jerry Higgins**, Colorado School of Mines: AEG Richard Jahns Lecturer, "Rockfall Analysis and Mitigation"
- **Duncan Metcalf**, University of Utah: "Range Creek: Past, Present & Future"
- **Jim Trexler**, University of Nevada: "Re-examining Late Paleozoic Stratigraphy & Tectonic History of Nevada"
- **Ralph Archuleta**, University of California, Santa Barbara: "Ground Motion from Dynamic Simulations of Earthquakes on Dip Slip Faults – The Hanging Wall May Live Up To Its Name"
- **John Valley**, University of Wisconsin: "Crustal Growth and Maturation – A Modest Proposal"
- **Ned Field**, U.S. Geological Survey: "A Path to a More Physics-Based Approach to Seismic Hazard Analysis– Why and How"
- **Doug Sprinkel**, Utah Geological Survey: "Exploration History and Petroleum Geology of the Central Utah Thrust Belt"
- **Darrel Schmitz**, Mississippi State University: "Hurricane Katrina – Geologic, Disaster, and Personal Perspectives"
- **Andrea Brunelle**, University of Utah: "Using Sedimentary Proxies to Reconstruct Long-term Records of Beetle Outbreaks"

The Fall 2006 series is scheduled to include:

- September 7<sup>th</sup> – **Frank Brown**, Dean of the College of Mines and Earth Sciences: "Stones and Bones: Geological and Hominid Investigations in Lake Turkana Basin, East Africa"
- September 14<sup>th</sup> – **Ittai Gavrieli**, Israeli Geological Survey: "Is the Dead Sea Dying and Will the 'Peace Conduit' from the Red Sea Save It?"
- September 20<sup>th</sup> – *N.B.: Wednesday at 4:00* – **Dale Durran**, Department of Atmospheric Sciences, University of Washington: "Orographic Precipitation and the Form of Mountain Ranges"
- October 19<sup>th</sup> – **Dave Naftz**, USGS: "Great Salt Lake, Utah: Mercury Methylation Factory or Hemispheric Bird Habitat?"
- November 2<sup>nd</sup> – **Jim Steenburgh**, "Department of Meteorology, University of Utah: "Fear and Loathing in Salt Lake: Fact and Fiction about the Dreaded Lake Effect"
- November 16<sup>th</sup> – **Kevin Pogue**, Department of Geology, Whitman College: "Terroir - the Geology of Viticulture (a.k.a. Wine Making)"
- December 7<sup>th</sup> – **Olivier Leupin**, Department of Water Resources and Drinking Water, Swiss Federal Institute for Environmental Science and Technology

(EAWAG): "Arsenic Crisis in South Asia: Arsenic Removal at the Household Level"

Other lectures will be added. Watch the departmental bulletin boards.

## Faculty Focus

Our faculty continues to exhibit widely diverse interests and pursue them 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** reports that the University of Utah Seismograph Stations (UJSS) is a 24/7/365 thing—not quite with the same rhythms as the academic year. Since 2000 their seismic network has more than doubled in size (180 current stations) to meet needs for public safety and earthquake engineering as well as science. And near-real-time earthquake information products have vastly expanded. Also, there are increasing requests for information and guidance relating to earthquake hazards and risk in our "post-Sumatra, post-Katrina" world. Currently, the UJSS is attempting to get state funding to improve seismic monitoring and real-time earthquake information products in the dramatically-growing St. George–Cedar City area. Closer to home, they are working to get funds to relocate the University of Utah Seismograph Station (UJSS) earthquake network center in the planned F. A. Sutton Building.

**John Bartley** centered his summer field work once again on the genesis of granitic rocks in the Sierra Nevada, and particularly on evidence for assembly of superficially homogeneous intrusions in small increments over millions of years. Field results from the Half Dome granodiorite in Yosemite confirm amalgamation at two or more length scales: lithologic cycles five hundred to one thousand meters thick are bounded by sharp, mappable contacts but the cycles also contain internal contacts that are more difficult to recognize and to map. A major priority for the summer was to introduce three incoming graduate students to Sierran regional geology to give them a running start toward selecting thesis projects.

**John Bowman** and his students have had a fun and productive year of research. Lori Chadwell Tapanila completed her M.S. thesis, a very nice and detailed study of the progressive changes in grain size and spatial dispositions of olivine grains in contact metamorphosed dolomitic marbles of the Alta Stock thermal aureole. This study provides insights into the mechanisms and rates of nucleation and growth of crystals during contact metamorphism. Kristie McLin continues her Ph.D. research, investigating processes of fluid flow, fluid-rock interaction, and hydrothermal alteration in an array of geothermal and hydrothermal systems. John and his colleague Des Moser have had a great deal of fun this summer measuring lead and oxygen isotopes *in situ* within Archean zircon grains on

ion microprobes at Stanford University and the University of Wisconsin. The initial objective of their NSF-funded project is to evaluate the oxygen and trace element behavior of zircons across the amphibolite-granulite facies transition in the Kapuskasing block, Ontario, Canada. Their initial results are very exciting, showing very little diffusion of either lead or oxygen, which suggests that zircons can reliably preserve their lead isotope ages and oxygen isotope compositions even through long-lived granulite facies (high temperature) metamorphic events, and can therefore serve as “time capsules” recording events and crustal-forming processes early on in Earth history.

In June, John and Beth enjoyed a delightful and relaxing long-distance walk along the Robert Louis Stevenson trail in southeast France (Les Cèvennes) with their friends Andrée and John Valley. The scenery, people, food and wine were all wonderful, and they had the privilege of seeing a little-populated and less-known area of France.

This coming year John will be on sabbatical, spending the fall as a visiting professor at the University of Lausanne in Switzerland and working with Lukas Baumgartner. They will be working on projects that share their mutual interests in the processes and mechanisms of fluid infiltration, mineral reactions, and the rates of mineral growth in metamorphic rocks.



*Drs. Bowman, Bruhn and Smith talk over this year's awards at the annual luncheon.*

**Frank Brown** once again spent the summer in the Turkana Basin of northern Kenya along with two undergraduate students, Orion Rogers and Rex Bigelow. Rex was there for three weeks; Orion, for six. Both were introduced to much geography, geology, culture, botany, and languages previously unfamiliar to them and they learned a lot. Paleomagnetic samples collected from selected sections improved the chronology of the Koobi

Fora Formation not only in its type area, but also in the Loiyangalani region near the southern end of the lake. In addition, some new hominid sites were documented east and west of Lake Turkana, and the stratigraphic levels of many hominid fossils were also re-examined. Near the end of the field season Frank's daughter Erica gave birth to Grayson Gaddis, making Frank a grandfather, and confirming his antiquity.

**Ron Bruhn** was busy as usual with a combination of field work in Utah and Alaska, as well as developing new airborne systems using radio controlled airplanes and kites for obtaining aerial images of geological features. The latter work is being done in collaboration with Steve Brown (B.S. 1979) who now works for New England Research in Vermont. Ron received the departmental and college teaching awards for 2005 and 2006 – partly for his new class on airborne imaging and photogrammetry. This summer he spent a month in the Saint Elias mountains of Alaska trenching active faults and folds with paleoseismologist Jim McCalpin and three visiting geologists from Spain. The results are spectacular – the landscape is permeated by Holocene scarps created as sedimentary layers slip by one another during active folding and reverse faulting. He is also using newly acquired LiDAR data to detect and study this active deformation in conjunction with Terry Pavlis (M.S. 1979, Ph.D. 1982), now a faculty member at UTEP. Ron also continued to publish on both Alaskan and Utah geology, producing papers on the tectonics of the Cook Inlet region in Alaska, and the Wasatch Fault in Utah. He organized and co-led a field trip along the Wasatch Fault during the GSA annual meeting in Salt Lake City. Ron continues to work with his graduate students – Ph.D. student Julie Willis completed a study of an active strike-slip fault that will be a major contribution to the seismic hazard map of Alaska, and Ph.D. student Mike Vorkink just completed a month-long study of the fold and thrust belt in the Saint Elias Mountains. Closer to home Ron worked with undergraduate Clay Jones, who produced a great three-dimensional model of the structure of the Wasatch Mountains near Salt Lake City for a web page on local geology. If you would like to see the new “Structural Geology and Active Tectonics” airborne imaging systems plus other results of research just go to Ron's web page and follow the research links.

**Thure Cerling** went back to Iowa State in October 2005 where he was honored to receive the College of Liberal Arts and Sciences Alumni Award. He was particularly pleased to visit Harry Svec, now in his 80's, who had introduced him to stable isotopes in 1972. His introduction was to give Thure two ancient (even for then) double-collecting mass spectrometers and tell him that he should be able to make one working mass spectrometer from the two. Unfortunately, Thure found out that both instruments had been junked only in the past year, so he missed out on getting a photo of them.



He is continuing his service on the U.S. Nuclear Waste Technical Review Board which evaluates the scientific and technical issues concerning Yucca Mountain. This involves a lot of travel but gets him thinking about the importance of geological "predictions" on a time scale of a million years. A major change in the program is that considerations for the stability of the Yucca Mountain repository have been extended from a thousand to one million years.



*Dr. Cerling visits with alumni Phil Armstrong and Bereket Haileab at GSA.*

Research in his group continues to have several foci. These include using stable isotopes to understand isotope turnover in mammals, regional to global geographic patterns of stable isotopes in water and hair, applications of isotope records in mammals to understand individual histories for both modern and fossil animals, fossil soils as indicators of paleoclimate and paleoecology, effects of traditional African pastoralism on ecological succession, development of the laser ablation method to sample micromammals for stable isotopes, use of cosmic ray produced  $^3\text{He}$  to date landforms, and studies of glacial ice to understand glacier movement. Field work on these and related projects by members of the lab was carried out in the western USA, China, Kenya, Ethiopia, Sweden, Argentina, Krygystan, and Australia.

**Margie Chan** spent another busy year traveling to meetings, workshops, and to the field. April was especially busy when she was only in town for about seven days out of the whole month. This summer she found it especially good to get back to Navajo Sandstone field work areas with John Bowman, Bill Parry, and Erich Petersen who are co-investigators with her on a NASA grant for iron oxide concretion characterization. Two graduate students, Greg Nielsen and Winston Seiler, had successful field seasons mapping diagenetic facies in different areas of southern Utah. M.S. student Sonja Heuser is finishing her thesis, mapping near Pecos, New Mexico. Dr. Chan enjoyed hosting fifty soft-rock faculty from across the nation for the NAGT "Teaching Sedimentary Geology" workshop she helped convene

this summer in Salt Lake City. Interaction and sharing of ideas always contributes to stimulating new ideas for teaching – now she just needs to find time to incorporate them!

**David Chapman** and the five graduate students who collectively form the Friends of Lord Kelvin continue to work on a variety of projects: Mike Davis studies climate change inferred from borehole temperatures, Derrick Hasterok works on thermal isostasy, Melissa Masbruch studies thermal aspects of groundwater flow, Paul Gettings uses repeat gravity to study extraction of fluids from geothermal reservoirs, and Eric Sahm continues to work on artificial injection of groundwater. Our work is currently supported by three NSF grants and a contract with the Metropolitan Water District of Salt Lake and Sandy. David is continuing a creative collaboration with Rob Harris, now at Oregon State University. In September, we welcomed back Dr. Sukanta Roy from the National Geophysical Research Institute in Hyderabad, India. Dr. Roy spent 2000-2001 in our lab and has just been awarded a prestigious Raman Research Fellowship to spend six months with us and continue his innovative work on geothermics of climate change.

In June, two of Dr. Chapman's students, Mike Davis and Derrick Hasterok, presented papers at a heat flow conference held in a castle-farm near Pilsen in the Czech Republic. As Chairman of the International Heat Flow Commission, Dr. Chapman had assisted their host, Vladimir Cermak of the Czech Academy of Science, in organizing the scientific program for that meeting.

Finally, in his two roles as a Geology and Geophysics faculty member and Dean of the Graduate School, he tries to make sure that Geology and Geophysics graduate students take advantage of the many benefits and programs offered by the Graduate School including the tuition benefit program, the new health insurance subsidy, travel assistance to present papers at meetings, the Utah Teaching Assistant (UTA) program, and the graduate research fellowship awards.

**David Dinter** annually teaches Geologic Field Methods, Summer Field Camp, and two sections of Earthquakes and Volcanoes. This year he and Barbara Nash are co-developing a new course, Natural Disasters: Hollywood vs. Reality. 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 James Pechmann have collected about eight hundred kilometers of high-resolution seismic reflection data in the Great Salt Lake, imaging tectonostratigraphic horizons formed by at least nine surfacing-rupturing, late Quaternary earthquakes. Fieldwork in the summer, 2006 field season focused on the remote north arm of the lake, near the epicenters of two of Utah's largest historical earthquakes, in Hansel Valley in 1909 and 1934. Dinter is also involved in field-based studies of late Sevier orogenic deformation in

southern Utah, metamorphic core complex evolution, and the geologic record of large meteorite impacts.

**Tony Ekdale** continues to teach National Parks Geology to General Education students, paleobiology to undergraduate Geology and Geophysics majors, and both paleoecology and ichnology to graduate students. Also, he continues his trace fossil research on several different fronts with various students and colleagues. He has a paper in press, with Richard Bromley and David Loope, that names a new ichnofacies for trace fossils in aeolian settings and another paper in press, with Leif Tapanila (Ph.D. 2005), that deals with the paleoecology of fossil organisms that lived symbiotically inside the growing skeletons of other organisms. This fall he will chair a symposium at the GSA convention in Philadelphia on "Fossil Behavior" and deliver a keynote address at the Fifth International Bioerosion Workshop in Erlangen, Germany. In his spare time, he continues to enjoy playing (literally!) with sonification of paleontological information. It's fun, but he says he still has not figured out how it might possibly benefit the future of mankind.

**Susan Halgedahl** continues her research on rock magnetism and geophysics which includes physics of magnetic domains and outcrop geophysics. Richard Jarrard and she are using outcrop geophysical measurements, namely gamma-ray and magnetic susceptibility, on Middle Cambrian sedimentary rocks of Utah to explore the relationships among sequence stratigraphy, sea-level change, and exceptional fossil preservation. They have focused on the Wheeler Formation of west-central Utah, which is internationally renowned for its rich deposits of the trilobite *Elrathia kingii*, as well as non-trilobite fossils with exceptionally preserved soft parts.

**Richard Jarrard** currently has research projects in marine geology and geophysics which include 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. The international Antarctic Drilling Project (ANDRILL) will drill their first scientific drillhole this Fall, on the Ross Ice Shelf. His recent ANDRILL activities included chairing the ANDRILL Scientific Measurements Panel, which recommended the kinds of measurements and associated staffing needed for ANDRILL. He will be using downhole measurements to study the intra-plate stress pattern and Late Tertiary tectonics of part of the boundary zone between East and West Antarctica.

**Paul Jewell** continues his research investigating Lake Bonneville features and their relationship to Pleistocene climate. Pit mine lake hydrology is also an interest. This coming year Kevin Perry of the Department of Meteorology and he will investigate the atmospheric transport of mercury in the Great Basin. With luck, a

modest ground-based Light Detection And Ranging (LiDAR) project will also get off the ground. Expect this new technology to begin showing up in all sorts of earth science applications! Paul spent the past academic year covering the teaching assignments of Darcy Lecturer Kip Solomon (Groundwater) and Fulvio Tonon (Geological Engineering Design) as well as his own courses on earthquakes and volcanoes, and numerical methods. With the help of Ph.D. candidate and University Teaching Fellow Julie Willis, a new course in the geological applications of Geographic Information Systems (GIS) was developed and will be offered in the coming year. He is now chair of the Geological Engineering program and spends a large amount of time advising students, getting word on the program out to possible majors, and keeping the myriad documents required by the Accreditation Board for Engineering and Technology (ABET) in order.

**Cari Johnson** this year took her sixth trip to Mongolia, which coincided with the eight hundredth Anniversary of Chinggis Khan's founding of the Mongolian Empire. Her group is now on a newly-funded NSF project to investigate the long-term displacement history of the East Gobi Fault Zone. Incoming graduate student Matt Heumann and undergraduate Megan Frederick joined her and two colleagues from Syracuse University for a five-week field season that featured several severe dust storms, but was nevertheless a great experience. Ph.D. students Sam Hudson and Jess Allen also made major progress in their work in Azerbaijan and southern Utah, respectively. Other highlights from the 2005-2006 year included a trip back to her alma mater, Carleton College, for an invited lecture, and working with the AAPG student chapter to organize a field trip to South Africa, scheduled hopefully for 2007.

**Bill Johnson** says his proud little group squeezed out ten publications this year and members are now working on four separate projects including selenium cycling in the Great Salt Lake (with Dr. Dave Naftz at the USGS), riverbank filtration for water treatment, and fundamentals of colloid deposition and re-entrainment in porous media. Highlights of the summer include discussions of optimal technique for emergency tracheotomy via bic pen following ingestion of Great Salt Lake water, as well as development of a Lagrangian particle trajectory model for colloid deposition and reentrainment in porous media that was implemented on the INSCC Linux clusters. Also, our brand-new inductively coupled plasma mass spectrometry (ICP-MS) facility is now up and running under the expert analytical skills of Dr. Greg Johnson. Non-technical highlights include a developing proposal for digital simulation of the post-Pleistocene Salt Lake Valley, and design by Italian artists of a mosaic portraying rock and water cycles for the entry floor of the Sutton Building.

**Barbara Nash** continues with her NSF-funded research on the volcanic history of the Yellowstone hotspot. The study focuses particularly on the timescales for magma

reservoir longevity and differentiation mechanisms in these large-volume silicic systems. Along this same line, Barb and her graduate student Henny Cathey participated in a planning workshop on proposed deep drilling in the Snake River Plain. Henny will be going to Australia National University in a few months to use their analytical facilities for some detailed trace element work on zircons and other minerals in hotspot rhyolites. A new student, Amber Rheubottom, joined the volcano group this fall. She has considerable experience in the active volcanoes of the Caribbean arc. Barb continues to teach an upper division course in Natural Disasters which she also offers through the Honors Program. This fall she is initiating a new introductory course, Natural Disasters: Hollywood vs Reality. Among other things, the class will use clips of good to awful disaster movies as starting points for discussion about disasters. The subject is timely, and there is no shortage of disaster films! Barb continues to head up undergraduate advising for the department and is very excited about our new curriculum. On the recreational scene, Barb has been having a lot of fun competing in masters swimming. She was designated an All American last spring, and had two top ten finishes in the World Championships this August.

**Kristine Pankow** has continued to focus her research during the past year around data recorded by the Utah Regional Seismic Network/Advanced National Seismic System. Specific projects include using strong-motion data to better constrain locations, particularly depth, and focal mechanisms for small earthquakes occurring in the Salt Lake Valley; analysis of the Salt Lake Valley basin structure; and analyses of the physical processes involved in remote triggering of earthquakes. A promising new area of research involves the analysis of infrasound data generated by local blasts and hopefully earthquakes. In May, her group installed an infrasound array near the Salt Lake Valley and in the late summer they plan to install a second array on the west side of the Great Salt Lake. Other projects include contributing to ongoing development and operation of the Utah Regional Seismic Network, and continuing to develop and maintain ShakeMap in Utah.

**Bill Parry** is currently doing research that focuses on improving our understanding of Navajo Sandstone coloration and concretion formation in the collaborative project with Profs. Chan, Bowman, Petersen, and graduate students. A paper on the geochemistry of carbon dioxide sequestration has been accepted to the *Journal of Environmental Geoscience* and future plans for detection of hydrocarbons using fluid inclusion characteristics are in the works. He recently completed a book "A Hiking Guide to the Geology of the Wasatch Mountains" and is nearly done with another on "The Geology of Utah Rivers".

Bill has season fishing licenses for Utah, Montana and Yellowstone National Park, and just purchased a season skiing pass for Alta, Utah. He did several summer backpack trips including ones to Southwest Yellowstone

National Park and the high Uinta Mountains. Bill leads geology sessions for the Salt Lake Audubon Society, leads hikes for Save Our Canyons, gave keynote talks for the International Rock Garden Society Conference at Snowbird, and a talk at the WEST retreat at Alta.

**Jim Pechmann** is at work improving magnitude determinations for Intermountain Seismic Belt earthquakes with several collaborators, the seismic velocity structure of the Salt Lake Basin with Kris Pankow, the paleoseismology of the Great Salt Lake fault with Dave Dinter, and construction of a "community velocity model" for the Wasatch Front region with Harold Magistrale of San Diego State University. A paper on the magnitude work was accepted by the *Bulletin of the Seismological Society of America*, and Jim coauthored two other papers submitted for publication. He has been active in several committees and working groups including the Sutton Building Design Committee, the Basin and Range Province Earthquake Working Group, and a U.S. Bureau of Reclamation review board on the seismic safety of East Canyon Dam. Much of his time continues to be spent on the operation and development of the University of Utah regional seismic network.

**Erich Petersen** spent this summer above 17,000 feet in the Chilean Andes, studying a recently exhumed high-sulfidation gold system that is remarkably well-preserved. This opportunity is an outgrowth from observations his group made on a student-industry international field trip he co-led earlier in the year. Coincidentally, two recent students, Noel Carreon and Sergio Rodrigues Tapia, are exploring for similar systems in the northern Andes Mountains. He is working with Marjorie Chan, Bill Parry and John Bowman on a NASA project on the characterization and genesis of terrestrial analogs of Mars hematite. Earth Materials and Ore Deposits and Mineral Exploration continue as his mainstays in teaching, but he has added Earth Systems, which is very rewarding. In December he will be co-leading with Dr. William X. Chavez, Jr. (of New Mexico Tech) the first of two all-student international field trips which will visit world-class ore deposits in Chile. Erich may well have been too busy to notice that he was promoted to full Professor!

**Duke Picard** saw his article on A. J. Eardley, former Dean and Professor in our College, appear early in the year in *Rocky Mountain Geology*. His research paper on the Piave River Sands in northeast Italy has been accepted by the GSA and will be printed in early 2007. The river debouches north of Venice, ending its long run from the crest of the Dolomites. Ernest Hemingway was shot in World War I near its course, an incident immortalized in *A Farewell to Arms*. Duke was awarded second place for "Non-Fiction Books" by the Utah Arts Council for his manuscript *Journeys of a Volcano Lover*.

**Peter Roth** has continued his studies of calcareous nannofossil biostratigraphy, especially of the Upper Jurassic and Lower Cretaceous, and correlation of



nannofossil biostratigraphic units with ammonite and calpionellid biostratigraphies. His goal is to establish a high resolution biostratigraphy for the Jurassic-Cretaceous boundary interval. In June he attended a CHRONOS workshop to develop web-based activities for teaching stratigraphy and sedimentary geology using the large data base of CHRONOS. Together with Audry C. Rule, a specialist in geological education, and Mark Lecky, a micropaleontologist, an activity was developed that explored evolutionary trends in the Cenozoic. Students would investigate evolutionary patterns in marine microfossils and potential responses of these biota to global change. First and last occurrences through chosen ten million year intervals between sixty-five and thirty million years provided the basis for this activity. Data on paleotemperature and sea-level changes are made available to possibly interpret the evolutionary patterns. Once completed, this activity will be available for use in university courses at [serc.carleton.edu](http://serc.carleton.edu).

**Scott Sampson** and his group have remained busy hunting dinosaurs the past year. This work has focused on several fossil localities in Utah, most of them within Grand Staircase-Escalante National Monument (GSENM). This month alone, the crew working in GSENM—including graduate students, volunteers, and Utah Museum of Natural History staff—excavated two horned dinosaur specimens, distant relatives of *Triceratops*. Remarkably, both appear to represent animals that are new to science. During the spring, an exceptionally preserved tyrannosaur skeleton, also a new species, was removed. And 2006 also saw publication and formal naming of the first new dinosaur from GSENM, *Hagryphus giganteus*, in a paper first-authored by GG doctoral candidate Lindsay Zanno. All of these fossils and many more are helping us to establish a highly significant new window (76-74 million years ago) into the Late Cretaceous world of dinosaurs. One of the vertebrate paleontology graduate students, Joseph Sertich, completed his Masters degree in the fall of 2006 and has begun doctoral studies in a prestigious program at Stony Brook University. Lastly, Scott has just wrapped up a lengthy edited monograph describing a large carnivorous dinosaur from Madagascar. This study, which took six years and represents perhaps the most detailed scientific description to date for any dinosaur, will be published shortly in the Memoir Series of the Journal of Vertebrate Paleontology.

**Gerard Schuster** is on sabbatical for the 2006-2007 year. This coming fall, he has been invited to speak at the SEGJ international symposium in Kyoto, the CNPC VSP workshop in Kunming, China, and at the EAGE workshop on Passive Seismic Imaging in Dubai, the latter which he helped organize. In October he will also attend the SEG conference in New Orleans and participate in a Ph.D. defense in Delft. He will work three to four months with Aramco Geophysical Research scientists in Dharhan beginning in February. He is finishing the second draft of his book *Seismic*

*Interferometry*, which is under contract with Cambridge Press.

**Bob Smith** and his GPS group continue to conduct research on seismic and aseismic ground motions of earthquakes of the Wasatch Front, and the origin and active processes of the Yellowstone hotspot. Graduate students were busy completing degrees including Bonnie White who is Bob's 64th graduate student. The group continues research on visualization with the Scripps Institute of Oceanography on GeoGIS. Greg Waite (M.S. 1999, Ph.D. 2004), a USGS Post-doctoral student, continues to work with the group, publishing the seminal JGR paper on tomographic imaging of the Yellowstone plume, thus ending the debate on the existence of its mantle plume origin. Bob serves as the Coordinating Scientist of the Yellowstone Volcano Observatory, is the University of Utah representative of the Southern California Earthquake Center, and completed his term on the USGS Scientific Earthquake Advisory committee. He gave distinguished lectures this spring to the Swiss Federal Institute of Technology in Zurich, and at the Italian National Geophysical and Volcanology Institutes in Florence and Rome.

**Kip Solomon** in 2005-2006 had the honor of delivering the Darcy Lecture (sponsored by the National Ground Water Association) to more than forty universities and research organizations in the United States, Europe and Israel. On the home front, the noble gas labs continued to operate, in spite of a recent nasty setback in which a national laboratory (to remain nameless) included a complimentary dose of He-3 (which contaminated our machine) with the Kr and Xe isotope spike we purchased from them. Otherwise the lab has been doing well under the capable hands of Alan Rigby (B.S. 1995). Students using the lab have been busy collecting samples from Yellowstone, wherein Payton Gardner is trying to figure out if Old Faithful will remain "faithful", Steve Hill is trying to make sense of a somewhat odd flow system in Red Butte Canyon where the age distribution is "upside down", Bert Stolp is trying to figure out how to convince developers in Tooele Valley that groundwater recharge really can't be greater than precipitation, and at the Storglaciaren glacier in Sweden Kevin Uno wins the prize for backpacking with a 30-liter liquid nitrogen dewar.

**Aurelian Trandafir** is involved in research projects addressing earthquake-induced catastrophic landslide risk assessment in liquefiable soils, evaluations of landslide damage, mapping of the landslide hazard, and the behavior of earth retaining structures. As a JSPS (Japan Society for the Promotion of Science) Research Fellow, he was the principal investigator in a research project funded by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan on the evaluation of rainfall-induced shallow landslide hazard on steep forested slopes. His research at the University of Utah will focus on liquefaction-induced lateral spread studies along the Great Salt Lake

shoreline with the object of improving earthquake hazard assessment in the area. He is also interested in the seismic behavior of geofoam (man-made foam) structures. He also plans to focus on field surveys and laboratory investigations on the failure mechanism of recent landslides triggered by snowmelt in combination with rainfall in Davis County.



Dr. Aurelian Trandafir (second from left) with colleagues from Kyoto University, collect soil specimens from an earthquake-triggered landslide.

**Michael Zhdanov** spent the summer traveling in Europe and working on several research and book projects. He was invited as a Keynote Speaker at the International Conference on Contemporary Mathematics organized by the Russian Academy of Sciences and Moscow State University, where he gave a talk on mathematical geophysics. He was also invited to present a talk at the Annual Meeting of the European Association of Geoscientists & Engineers (EAGE) in Vienna, Austria, on advanced methods of interpretation of the marine-controlled source EM data.

His textbook *Geophysical Inverse Theory and Regularization Problems*, published by Elsevier in 2002, has been translated in Russian by a group of mathematicians and geophysicists from the Russian Academy of Sciences and will be used as a major textbook in Russian Universities. During this summer, he began working on a new book project, *Geophysical Electromagnetic Theory and Methods*, which he plans to complete during his sabbatical leave next year. This book will serve as a major textbook in my Physical Field II: Electromagnetic Methods class. He is currently working, as an editor-in-chief and as an author, on another book project, *Active Geophysical Monitoring*, which will present new methods for studying the time-evolving structures and states of the earth's interior.

## Field Trips

### ***Society of Economic Geologists to Sponsor All-Student Field Trip Series***

Dr. Erich Petersen of our department and Dr. William X. Chavez, Jr. of New Mexico Tech have been selected to organize and run the first two all-student international field trips, one in each hemisphere, sponsored by the Society of Economic Geologists (SEG-Economics). This field trip series was created in response to student desires voiced at the SEG conference on Wealth Creation in the Minerals Industry. The first trip, undoubtedly inspired by the success of the Chilean trip Drs. Petersen and Chavez previously led, will go in December 2006 to world-class ore deposits in Chile and the second trip will visit world-class ore deposits in Nevada in May 2007. Each trip will be limited to twenty student participants from North America, South America, Europe, Asia, and Africa. The ten-day field trips will provide an overview of all aspects of the minerals industry including exploration, geology, mining practice, legal framework, environmental standards, economics and social license in the context of world class ore deposits.

For more information please visit the field trip website: [www.mines.utah.edu/pyrite/](http://www.mines.utah.edu/pyrite/)

### ***Gold and Iron Deposits of Chile Again Draw SEG – Economics Students***

The ninth international student-industry field trip sponsored by the Society of Economic Geologists (SEG – Economics) student chapters at the University of Utah and New Mexico Tech once again focused on world class gold and iron deposits in Chile. Dr. Erich U. Petersen of our department and Dr. William X. Chavez, Jr. of New Mexico Tech led five students and thirteen professional geologists from nine countries on four continents on a visit to five major deposits. The first stop was the Punta del Cobre district near Copiapo where gold occurs as inclusions in massive chalcopyrite ores. Los Colorados is an iron mine with massive magnetite of hydrothermal origin. A classic acid-sulfate system is exposed at 17,000 feet elevation at La Coipa.

Cinnabar pseudomorphs of fiamme occur in volcanic rocks that have been pervasively converted to alunite and kaolinite. At San Cristobal, a minor gold prospect, participants had an opportunity to collect samples with visible gold. The final visit was to El Peñon, the largest gold deposit in Chile, where high value by-products more than cover gold mining costs and therefore the cost of producing gold is negative.



*John Porter and Dr. Erich Petersen examine rotary drill cuttings from the El Peñon hydrothermal system.*

### **Third Annual Fall Kick-off Field Trip**

Once again, on the last Saturday before classes started, fifteen incoming graduate students, accompanied by Profs. Bartley, Bowman, and Dinter, and undergraduates Lee Barnett and Cameron Sheya, got a taste of Wasatch Front geology and scenery. The trip began overlooking the mouth of Parley's Canyon, where they reviewed the regional geology of northern Utah, the bedrock structure of the Wasatch Range, and the Wasatch fault. Proceeding to the mouth of Big Cottonwood Canyon, they talked about Lake Bonneville, Gilbert fan-deltas, and the geomorphic evolution of the Wasatch Range. As always, they interrupted the drive to Brighton with stops at the Proterozoic tidal rhythmites near Storm Mountain and the terminal moraine and the transition from fluvial to glacial geomorphic features at Mill D. Upon arriving at Brighton, they hiked to Lake Mary where Profs. Bartley and Bowman in turn held forth regarding their contrasting perspectives on growth of the Alta stock and resulting contact metamorphism. They then bushwhacked over the ridge to the south to eat lunch at the Wasatch Mine, where conversation turned to metasomatism, mineral deposits, and that perennial favorite of GEO 3080 labs, the rare borate mineral ludwigite.

Visit our new web page at [www.mines.utah.edu/geo](http://www.mines.utah.edu/geo) !

### **Sedimentology and Stratigraphy Trip Visits Classic Sequences**

The Fall sedimentology and stratigraphy field trip made its annual trek to the Helper, Utah area to examine Cretaceous alluvial to deltaic deposits. This year, while sunning ourselves on the turbidites of the Panther Tongue at Gentile Wash, we ran into Dr. Peter McCabe and an oil company group he was leading up the canyon. You never know who you'll run into at these popular outcrops! In past years it has been Bryan Bracken and Chevron geoscientists and some others!

### **PICP Field Trip Takes Students to Book Cliffs**

In September 2005 the Petroleum Industry Career Path (PICP) class joined Bryan Bracken (M.S. 1987), representing Chevron in San Ramon, California, and a group of graduate students from Stanford University on a field trip to the Book Cliffs. They visited many of the classic sequence stratigraphy outcrops, and learned first hand that even in well-studied areas there are many remaining questions and controversies. After the trip, students used information gathered in the field to complete cross sections and make predictions about stratigraphic traps in analogous petroleum systems.



*Undergraduate student Megan Frederick and graduate student Leif Cox work on an outcrop correlation exercise in Blaze Canyon near Green River, Utah.*

### **Geological Engineering Program Introduces Students to Practical Problems**

The geological engineering program currently has approximately fifteen undergraduate majors, many who are actively involved in the life and governance of the department. Geological engineering students continue to have a close association with the local professional chapter of the Association of Engineering Geologists. In



early May a group of students, guests, and faculty members took a field trip to examine the geotechnical aspects of highway reconstruction in Provo Canyon.



*Geological Engineering students get a look at highway reconstruction.*

## **Field Studies Call On All Facets of Students' Earth Knowledge**

Geology, Geological Engineering, and Environmental Earth Science majors learn to map and measure rocks, structures, and geomorphic features, work in teams, and write professional technical reports in the spring Field Methods class and then in Summer Field Camp, a perennial rite of passage for Earth scientists. This two-course strategy arose some years ago in response to the recognition that a lot of students were married or had young children, or had to work most of the summer to be able to afford to come back to school in the fall. Many simply could not spend the entire summer in the field, so the traditional curriculum was redesigned.

These intellectually and physically demanding courses use Utah's rich and varied Great Basin mountain ranges as natural laboratories, and requires students to draw upon skills learned in stratigraphy, structure, petrology, and geological engineering courses to solve complex field problems.



*Geologic Field Methods students measure slickenlines and tension gashes on the slip plane of the Wasatch normal fault, North Salt Lake.*

This year the Field Camp class mapped in Parowan Gap and in the Raft River Mountains.



*Summer Field Geology 2006 class poses at City of Rocks National Reserve, Idaho. Front row (from left): Darrah Appelfeller, Aaron Geery, Erika Gleim (with Iggy), Rachel Sappington, Jeremy Jackson, Clay Jones. Back row (from left): Emily Jackson, Page Anderson, Tom Marston, Anthony Pollington, Abby Rudd (camp manager), David Dinter (instructor).*

## **Student News**

### **AAPG Student Chapter Reports Another Active Year**

The AAPG Student Chapter, sponsored by Dr. Cari Johnson, had another active and successful year providing professional and social opportunities not only for our members but for the department. The events were all well attended, bringing together a mix of undergraduates, graduate students, and faculty.

February was marked by the traditional annual winter ski and geology adventure. Usually held at the Wasatch Mountain Club, cold weather and freezing pipes forced a slight delay this year, but once another cabin was found everyone had a great time.

The club received the AAPG Foundation L. Austin Weeks Undergraduate Grant which was then awarded to Anthony Pollington.

In March, Mary Lou Zoback, a senior USGS research scientist, spoke about the 1906 San Francisco earthquake, and modern-day research of this historical earthquake.

In April the chapter had fun with "Geocache", a game currently played by some 500,000 people at 99,000 sites. We had ten "travel bugs", shown in the following

picture, that are moved from cache (a hiding place) to cache, then tracked and found using GPS technology. This game involved students and members of the community. We hope it will inspire Geocache players from outside the department to become acquainted with some of the very sophisticated GPS applications, such as those used in Dr. Bob Smith's activities in Yellowstone.



*These are trackable "bugs" used for geocaching.*

Our 5<sup>th</sup> annual AAPG silent auction held at the departmental picnic raised \$350. Local businesses donated items for auction including geodes, minerals, maps and books, gift certificates and gift bags, and gift items.



*Silent auction attendees examine donated items.*

Again this year our fundraising efforts have been successful. This is exciting because it will allow us to bring in distinguished speakers from out of state and potentially fund geology trips being planned for 2007, as well as provide refreshments for our well-attended meetings and talks. And last but not least, we'll once again be able to get together with Geo-SAC to fund our traditional winter ski excursion.

The officers for 2005-2006 were: President Samuel Hudson, Vice President: Matt Affolter, Secretary Ruiqing He, and Treasurer Jessica Allen

## **AAPG Students Present SAGE Project Accomplishments at National Convention**

The AAPG Student Expo was held in conjunction with the national AAPG meeting in Houston, Texas last October, 2005. John Naranjo (B.S. 2005) of the University of Wisconsin – Madison, Tim Shepard from the University of Texas – Austin, and Daniel Smith (B.S. 2006), representing the University of Utah, presented a poster about the project they and others completed at the Summer of Applied Geophysical Experience (SAGE) program. The work was done on the south tip of the La Bajada Fault, about thirty miles southwest of Santa Fe, New Mexico. Maps of the geology and various cross-sections were also used to correlate their findings with the work done by others in this area. Various recruiters from industry and peers from other universities were present and over the two days came to view their presentation and ask questions about their findings.

Dan called it "a very positive experience". This was his first exposure to poster presentations so he took full advantage of the opportunity to work on such skills as public speaking. The three students were interviewed by several companies and have brought back industry's interest in possible internships and employment opportunities. The three were also able to provide wider exposure for the SAGE program, interesting several company representatives in supporting the SAGE program in future years. In addition, Dan was able to talk to several graduate students about the excellent geosciences program and faculty at the University of Utah.

## **Annual Awards Luncheon Honors Faculty and Students**

Our annual awards luncheon was again held picnic-style in April on the lawn outside Alumni House. Here is a listing of the honors, recognitions, and awards our faculty and students earned.

### **Honors**

- Outstanding Faculty – Teaching:** Ronald Bruhn
- Outstanding Faculty – Research:** Marjorie Chan
- Outstanding Geology Student:** Page Anderson
- Outstanding Geophysics Student:** Toshiko Furukawa
- Outstanding Geological Engineering Student:** Adam Williams
- Outstanding Environmental Earth Science Student:** David Harnsberger
- Outstanding Earth Science Composite Teaching Student:** Anna Hunter
- Outstanding Teaching Assistant:** Joseph Sertich





Outstanding students receive awards at the annual luncheon. From left to right they are: Page Anderson, David Harnsberger, Toshiko Furukawa, and Adam Williams.

**Outstanding M.S.:** Joseph Sertich and Bonnie Pickering White

**Outstanding Ph.D.:** David Marchetti

### Scholarships, Fellowships and Awards

**Frischknecht:** Kristen Leigh Anderson

**Chevron Exploration & Production Services:** Kevin Jensen

**Matt Mikulich:** Paul Seal

**Ken and Nedra Bullock Keller:** Elizabeth Hardwick, Lars Petersen, Kada Topham

**Sedimentary Geology:** Megan Frederick



The Awards Luncheon was, as always, masterminded by our great staff. Shown here are Kim Atwater (left) and Norma Haas.

**Mineralogical Society of Utah Memorial:** Tyson Addy, Adam Williams, Jennifer Howe, Abigail Rudd, Justin Healy, Dan Seely

**Ronald Terrill Memorial:** Tyson Addy

**Dorothy Rice Goode:** Jennifer Eustler

**Norma Eardley Academic Career Advancement for Women:** Deweylene Friesen, Kathleen Kirkham, Brittany Dame, Lee Barnett, Cameron Sheya

**Orlo Childs Field Studies:** Darrah Appelfeller, Emily Jackson

**Marta S. Weeks Legacy:** Emily Jackson

**Earls Family Endowment:** Darrah Appelfeller

**John Prince:** Orion Rogers

**Kennecott:** Lee Barnett, Anita Brown, Kevin Jensen  
**University Special Departmental:** Michelle Cotton, John Moore, Chase Straight

**Cooper Hansen Undergraduate:** Cameron Sheya, Brittany Dame, Megan Frederick, Deweylene Friesen, Justin Healy, Jennifer Howe, Tom Marston, Ashley Messina, Abigail Rudd, Jamie Spencer, Alex Warthen, Haylie Whitaker, Travis Young

**Comstock:** Anita Brown

**CMES Gift:** Don Crandall

**Eskeridge:** Emily Jackson

**Mountain Fuel:** Kathleen Kirkham

**Earl Johnson:** Sean Conner

**Kennecott Merit:** Stephanie Martin and Justin Wriedt

**AWG Susan Ekdale Memorial:** Erika Gleim

**AWG Undergraduate:** Darrah Appelfeller

**BP Graduate Petroleum Industry Career Path:** Leif Cox

**Chevron Graduate Fellowship:** Jonathan Goold and Jeremy Koons

**ConocoPhillips Graduate Fellowship:** Sam Hudson

**Eardley Graduate Fellowship:** Michael Stearns

**Stokes Graduate Fellowship:** Michelle Mary

**Water, Environment, and Science Teaching (WEST)**

**Graduate Fellowship:** Jessica Allen, Kit Clemons, Bucky Gates, Scott Hynek, Melissa Masbruch, Winston Seiler, Kevin Uno

**University Graduate Research Fellowship:** Julie Willis, Lindsay Zanno

**Entering Department Research Assistantships:**

Chaiwoot Boonyasiriwat, Ximena Diaz, Toshiko Furukawa, Bryce Johnson, Clay Jones, Arun Kumar, Sally Potter, Vaughn Thompson

**Entering Department Teaching Assistantships:** Page Anderson, Keith Beisner, Kimberly Beisner, Matt Heumann, Grant Hurst, Daren Nelson, John Porter, Amber Rheubottom

**Cooper Hansen Graduate Fellowships:** Keith Beisner, Kimberly Beisner, Jasmin Caton, Payton Gardner, Rick Urash



Here's a Mystery Picture for Utah geologists. What have we here, and where was this photo taken? The Answer is on p. 58 following the picture of King TUT.



## Fifty-Year Alumna Honored

Dean Frank Brown recognized Mona Wheelwright Lowe at the convocation services as a Golden Anniversary alumna. In 1956 she received a B.S. in Geology, and her M.S. in 1958. She now lives in Toquerville, Utah, and has been busy branding calves at the Lowe Angus ranch, but was able to take a break to join us in graduation festivities. Given that her mother lived to the age of 96, she may well attend these ceremonies for her 75th anniversary in 2031!

## Students Enter Graduate Programs

Our new graduate students come from around the globe – from Europe, Asia, Africa, and South America, as well as North America.

New Ph. D. candidates in Geology are:

- Matthew Heumann**, B.S. and M.S. degrees  
Syracuse University
- Daren Nelson**, B.S. Utah State University and M.S.  
University of Idaho
- John Porter**, B.S. Brigham Young University, M.S.  
University of Arizona
- Kristopher 'Kit' Clemons**, B.A. Eastern Kentucky  
University, M.S. University of Kentucky

Ph.D. candidate in Environmental Engineering:

- Ximana Diaz**, B.S. National Polytechnic University,  
Equador, M.E. University of Utah

M.S. candidates in Geology include:

- Leona Page Anderson**, B.S. University of Utah
- Michelle Mary**, B.S. California State at Fullerton
- Keith Beisner**, B.S. University of Kansas
- Kimberly Kissing Beisner**, B.S. University of  
Kansas
- Timothy Grant Hurst**, B.S. University of California  
at Santa Barbara
- Sally Potter**, B.S. Mesa State College
- Jasmin Caton**, B.S. University of British Columbia
- Clay Jones**, B.S. University of Utah
- Amber Rheubottom**, B.S. California State  
University at San Bernardino
- Vaughn Thompson**, B.S. Nelson Mandela  
Metropolitan University, South Africa
- Shengdong Liu**, B.S. from the University of Science  
and Technology, China
- Arun Kumar**, B.S. from K.L.D.A.Y. Degree College  
and M. Technology from the Indian Institute of  
Technology, Roorkee, India
- Michael Stearns**, B.S. Eastern Michigan University.

M.S. candidates in Geophysics are:

- Samuel Fluckiger**, B.S. Utah State University
- Toshiko Furukawa**, B.S. University of Utah

**Chaiwoot Boonyasiriwat**, B.S. from Mahidol  
University, Thailand

**Bryce Johnson**, B.S. New Mexico Institute of  
Mining and Technology

**Jeremy Koons**, B.S. University of California at  
Santa Barbara

**Anastasia Adamkova Yatsenko**, B.S. Tyumen Oil  
and Gas University, Russia

## Career Planning Seminar Sheds Light on Getting Hired

In spring semester 2006, John Bartley and Cari Johnson co-led a one credit hour seminar on Career Choices and Preparation. This included a one-day seminar with guest speakers from across the geoscience career spectrum, including John Byrd (Ph.D. 1995) representing Anadarko Petroleum Corporation, David Applegate from the USGS, Nancy Peterson who teaches at Rowland Hall St. Mark's school, and Jim White from the University of Utah Career Center. Students participating in the seminar went on to craft and critique resumes and five-year plans as well as research different career paths and options.



Student Mark Gwynn, David Applegate, and John Byrd (Ph.D. 1995) take part in the career planning seminar.

## New Graduate Students Consider Values, Goals, and Finding Jobs

Our Geology and Geophysics new graduate student orientation this fall included an afternoon career planning session with Cari Johnson and Kevin Hae Hae, a representative from Anadarko Petroleum Corporation. The session included thinking about personal values and goals, finding the right company, writing a resume, and how to impress interviewers. Discussions continued afterwards at The Pie Pizzeria, compliments of Anadarko, and students were "pumped" for the upcoming recruiting season!

### Scholarship and Grant Application Deadlines Loom

Those considering applying for NSF Graduate Research Fellowships should note that the deadline is November 1, 2006. University of Utah Graduate Research Fellowship nominations for fourth and fifth year Ph.D. students are due January 24, 2007.

Grant applications are due as follows:

- Society For Mining, Metallurgy and Exploration – October 15, 2006
- AAPG Grants in Aid Program – January 31, 2007
- Geological Society of America – February 1, 2007
- Society of Economic Geologists – February 1, 2007
- Society of Exploration Geophysicists – February 1, 2007
- Paleontological Society – February 28, 2007
- Rocky Mountain SEPM & Society of Sedimentary Geology – March 15, 2007
- Rocky Mountain Assoc of Geologists, Norman H. Foster Award – March 31, 2007

## Department Activities Affect the Greater Community

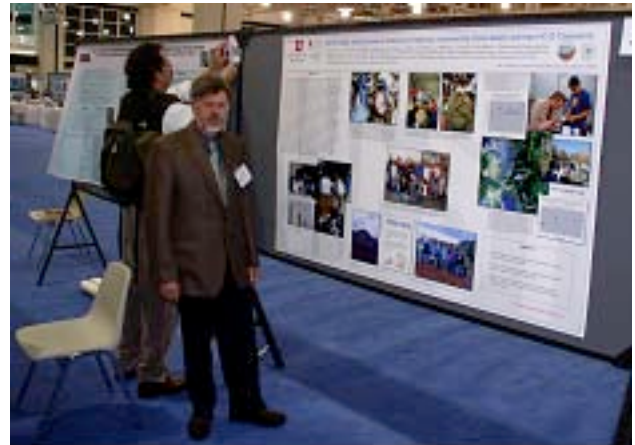
The Geology and Geophysics Department's educational outreach activities aim to increase the numbers of geology, geophysics, geological engineering, and environmental earth science majors, expand enrollments in Earth science courses, and enhance the role and visibility of department programs and Earth science perspectives on campus, in Utah secondary schools, and in the broader community.

### Outreach Events Welcomed Back

Recurring on-campus outreach events include presentations and displays at the Plazafest information fair, Freshman Orientation, the Majors Expo (our GEO display won first place this year), the High School Counselor Conference, Science and Engineering Day, Admissions Day, and Transfer Day, information sessions with University College and Transfer Student advising staff, course advertisements, direct marketing to academic advisors in non-science departments, and the GEO website. Department outreach personnel also host K-12 science class visits, provide content for geoscience displays at the Utah Museum of Natural History and The Leonardo science education facility in downtown Salt Lake City, docent training and geologic field exercises for high school and middle school students at Red Butte Garden.

Representatives of the department speak on geologic issues at local schools, churches, and scouting functions, judge science fair projects, and staff Geoscience Week exhibits at the Utah Geological

Survey. We are also planning a geology presentation for the Academy for Mathematics, Engineering and Science (AMES), a highly successful public charter high school housed in Cottonwood High.



*Dr. Erich Petersen at Science and Engineering Day, explains a poster about the WEST project.*

Most outreach activities are planned and coordinated by the faculty outreach and recruitment committee (David Dinter, Erich Petersen, Kris Pankow, Barbara Nash, and Marjorie Chan), and presented by faculty and students.



*Kristine Pankow hosts our display at Admissions Day.*

### New Initiatives Attract Interest

New initiatives in 2006-2007 include a new class, Natural Disasters: Hollywood vs. Reality, to our roster of highly-rated 1000-level general education courses. Dr. Nash has over one hundred students enrolled in her inaugural section of this course in fall semester, 2006. Another two hundred undergraduates are enrolled in Earthquakes and Volcanoes, fifty in Geology of the National Parks, and the World of Dinosaurs will be as popular as ever come spring semester. These courses introduce students to geoscience-related technical and societal issues and career options, and attract new majors to the department. To help promote the Geophysics program, Dr. Jerry Schuster initiated a Undergraduate Near-Surface Imaging (UGNI)



scholarship which has been funded by the Society of Exploration Geophysicists.



*Michelle Howell explains to a Science Day participant how the USS network functions.*

We will also enhance our community education efforts this year with an Earthscope component to be added to the University of Utah Seismic Stations traveling exhibit, and a new *Putting Down Roots in Earthquake Country – Utah* publication under preparation by Dr. Walter Arabasz and colleagues at the Utah and U.S. Geological Surveys, and scheduled for release and distribution in March, 2007.

### **Fourth Graders Dig Rocks – and Fossils**

Dr. Dave Richerson, an Adjunct Professor in the Materials Science and Engineering department, takes an active part in bringing Earth science artifacts and knowledge to Wasatch Front fourth graders. During fall of 2005 and spring 2006 he visited seventeen classes two to three times each in three different school districts to discuss rocks, minerals, and fossils. He distributed more than 3500 labeled samples, creating games and study modules using minerals, crystals, gemstones, and fossils along with study guides. Some of these samples were provided by Quintin Sahratian, the Department's curator.

### **Earth Science Booth at Avenues Street Fair Again Draws Crowds**

The Department of Geology and Geophysics booth at the Salt Lake City Avenues Street Fair, with a Cougar-chomping *Allosaurus*, huge galena, sphalerite, and pyrite crystals, ammonites and trilobites, posters and literature on Utah earthquake and landslide hazards and water and mineral resources, and a prospecting pile of *free* mineral specimens, is among our most successful off-campus events, attracting hundreds of visitors each year. The Avenues street fair in 2005 was held on South Temple, and there was plenty of room for everyone to enjoy all the booths, food, and music. Last year we

estimate a minimum of several hundred people stopped by. Sometimes it is so crowded it is hard to squeeze in to see the table. Kids and adults alike like to pick up several pet rocks from the free rock pile. Many folks like picking up a fault map of the Salt Lake Valley, or looking at a three-dimensional view of the Wasatch Mountains with the special 3-D glasses. We had a number of enthusiastic volunteers that helped staff the booth this year, and a brief period around noon when we offered free pizza at our booth seemed to draw in extra enthusiastic passersby.



*Dr. David Dinter helps Kris Pankow's son Topher – clearly a budding paleontologist – learn the scale of dinosaurs.*

### **Project WEST Brings Geoscience Information to Local Schools**

Project WEST is a National Science Foundation GK-12 program at the University of Utah designed to bring information about "Water, the Environment, Science and Teaching" to children in kindergarten through twelfth grade. Under the direction of Dr. David S. Chapman, the program employs twelve graduate student fellows from the departments of Geology and Geophysics, Biology and Meteorology to promote inquiry-based science teaching in twelve public schools. This year WEST welcomes new fellows Jessica Allen (Geology), Susan Bush (Biology), Kit Clemons (Geology), Bucky Gates (Geology), Elizabeth Jarrell (Biology), Melissa Masbruch (Geophysics), and Colby Neuman (Meteorology). WEST also welcomes back five fellows for a second year: Chris Harbison (Biology), Scott Hynek (Geology), Winston Seiler (Geology), Kevin Uno (Geology) and Elliot Wilkinson (Biology).

WEST recently completed its summer workshop at Ft. Douglas on the University of Utah campus. Dr. Bonnie Baxter from Westminster College taught about the process of inquiry using Great Salt Lake as a model. We were also pleased to welcome Marshall Welch, Director of the Bennion Center, to talk about team teaching.





*WEST fellows enjoyed the fresh air at Great Salt Lake.*

WEST's fall retreat at the Alta Peruvian Lodge began with a field trip up Little Cottonwood Canyon to discuss the geology, hydrology, ecology and meteorology of the Wasatch Mountains. Topical sessions included global climate change, the Great Salt Lake watershed, evaluation and assessment, collaborative teaching, Albion Basin environmental science, inquiry, and project development. Bill Parry, Professor Emeritus, Dept. of Geology and Geophysics, delivered the keynote speech on "Judges, Jurists, and Geologists".



*Winston Seiler teaches geological concepts to Salt Lake City district students.*

Three new WEST projects were introduced at the Summer Workshop. The first involves the first collaboration with the Great Salt Lake Water Quality Steering Committee. The second is a project focusing students on the planning and development of an urban wetland in partnership with Tracy Aviary. The third project, developed in conjunction with the Salt Lake City Mayor's Office, is an "e2 Schools" program which involves students in environmental science projects and

stewardship. Its objective is to teach children about their role in the environment.

WEST is starting the third year of a three-year grant and has reapplied for another three years of funding from the National Science Foundation. WEST has worked with over 3,000 students in the past two years and is beginning to show a tangible positive effect on science education in the state of Utah. Members of WEST have been busy making conference presentations and developing relationships with various organizations that may help to sustain the program beyond the years of NSF funding. WEST has also met with U.S.

Representatives Jim Matheson and Bob Bennett and has collaborated with Senator Orrin Hatch's office on the Providing America's Competitive Edge (PACE) Act. If you would like to help support the WEST program, please contact Holly Godsey, WEST coordinator, at [godsey@earth.utah.edu](mailto:godsey@earth.utah.edu) or visit the WEST website at [www.mines.utah.edu/west](http://www.mines.utah.edu/west).

### **Dr. Chan Finds Trove of Native American Art**

Dr. Margie Chan still finds a little time for Saturday garage sales. Maybe this fits right in with her passion for exploration and the keen observation she brings to her research. Beyond that, she's cultivated a deep interest in southwestern Native American artifacts, building a collection of her own. Three years ago, her awareness of these tribal arts led her to spot several southwestern art collectors' magazines among the household articles being sold off by the children of a woman who had recently died. Chan pursued the clue, asking if they had any Indian items. The sellers said yes, and a few months later, she was invited back to see pictures and learned that the collector, Dorothy Haslam, had put together more than six hundred stunning items ranging through katchina dolls, bead work, jewelry, weaving and leather. Dorothy's husband was a petroleum company executive, and she followed him on trips through the southwest, spending her leisure time "visiting anything Indian", said her son. He added that family trips, like it or not, were spent touring the Four Corners area to feed his mother's passion for collecting, and her last wish was that the collection stay together. Chan realized she'd made a great find and spoke with the Utah Museum of Natural History's Executive Director Sarah George, who realized that the collection would fill a vital gap in the Museum's collections, and worked to find money to buy it. Through the Museum's Collectors' Council, \$180,000 was raised for the purchase. The Haslam collection now resides in the museum where it will both delight and educate future visitors.

## G&G's Gallery of Faculty Greats

This issue of the *Newsletter* seeks to remind our readers of members of our faculty who have quite literally made us what we are today. Without their knowledge, guidance, and support we'd be a very different place. This issue's features are drawn from articles written with warmth and charm by another of our Emeriti, Dr. M. Dane Picard (more familiar to us as Duke) and first published in *The Rocky Mountain Geologist*. Because of space restrictions, all we can offer are these all-too-brief vignettes, but we're placing the originals on the Department's web site at [www.mines.utah.edu/geology](http://www.mines.utah.edu/geology). You can also find them at <http://rmg.geoscienceworld.org>, the *Rocky Mountain Geology* web site.

### William Lee Stokes

William Lee Stokes was a Utah native, born in 1915, whose early years were spent in Cleveland, a wind-weathered little community seventeen miles south of Price on the Mancos Shale. He followed the family cattle across the Mancos, the Morrison and down into the Navajo, Wingate and Chinle canyons of the San Rafael Swell, bringing home moss agate, petrified wood, dinosaur bones, and the interest that was to dominate his life. At eighteen he started off to Brigham Young University and within a year he collaborated on his first professional article, about Pleistocene musk-oxen from Utah. He received his B.S. in 1937 and M.S. in 1938 and immediately began graduate studies at Princeton University, returning during summers to the Morrison to dig for dinosaurs. With his younger brother as field assistant, in three months the pair opened what became the Cleveland – Lloyd Dinosaur quarry. The first skeleton removed was that of *Allosaurus*, the one-ton, forty foot long Jurassic predator that soon stood in the center of the Princeton museum.

He began work with the USGS in 1942, evaluating deposits of uranium and vanadium on the Colorado Plateau. Joining the Geology faculty at the University of Utah in 1947, he continued to study uranium. "I've probably been in more uranium mines than anyone alive," he often told his classes. Later field work saw him camping in San Juan County in southeastern Utah, in areas that received heavy fallout from the atomic testing in Nevada. All these experiences later had grave consequences when in 1974 he began suffering from a rare and poorly understood disease. Though in great pain, he continued to take students into the field.

In 1955 he had become head of the Department of Geology at the University of Utah. In the years to come he wrote a comprehensive account of the geology of Utah, shared with Lehi Hintze and J.H. Madsen in compiling the first geological map of the state, and prepared maps from his own field work that spurred commercial exploration for oil, gas and coal. He described and named thirteen new formations,

christened sedimentary structures, and interpreted the depositional processes that led to them. In all, he published well over a hundred scientific articles and several books. Eight fossils have been named for him. He contributed enormously to public understanding of geology as well as to Earth science. He died in 1994, still proclaiming that "you can't believe how much work there is out there to do!"

### Armand John Eardley

A.J. Eardley was born in Salt Lake City in 1901, the grandson of immigrant pioneers. He was always curious about rocks and minerals, and as a kid tramped through the nearby Wasatch Mountains, the terrain he would write about most often during his professional life. He earned a B.S. degree in Geology from the University of Utah, then went on to Princeton University, carrying out extensive field studies in the Wasatch Mountains for his doctorate, which he received in 1930.

He began his teaching career at the University of Michigan and served there for nineteen years, researching problems and publishing papers that focused on Utah geology. These papers were important contributions toward deciphering the Uinta – Wasatch junction, the effects of Precambrian structures on later structural trends, and the interrelation of the Precambrian, Laramide and Basin and Range folding and faulting. His 1938 paper on Great Salt Lake sediments and their environment was ahead of its time. These papers, which established his national reputation in structural geology, were cited into the late 1990s. While at Michigan he also published a book on how to use aerial photographs, and did much of the research and writing for the first edition of his *Structural Geology of North America*, too. For eight years he taught field geology at the University of Michigan's field station about twenty miles from Jackson, Wyoming. Here and in classrooms, Armand built and honed the skills that made him the exceptional and influential teacher he became. "He shared his thoughts, speculations, and knowledge in a way that no other professor did," said Dr. Helen Foster, a former student and faculty member at Michigan.

In 1951, two years after returning to the University of Utah, Eardley published the first edition of *Structural Geology of North America*, the single work for which he is most known.

He remained a geologist of the "Old School", striving to understand all aspects of the science. When, in the mid-1960s highly focused research poured out supporting plate tectonics and leading to its general acceptance, Eardley refused to become a believer. He continued to maintain vertical uplift as a primary tectonic force and to assert that thrust faults on the margins of the Rocky Mountains were the result of gravity sliding. Only in his last book did he grudgingly conclude that "the theory of sea-floor spreading" would survive.

## **Professional Women Express Concerns about Equality and Encouragement**

At the April 2006 meeting of the AAPG in Houston, a forum and a workshop focused on women in the petroleum industry. In view of an expected work force deficit expected in the geosciences within the next ten years coupled with the fact that women geoscientists are still under-represented in both academia and industry, there is a movement among women already established in geoscience careers to encourage other women to join the field.

A recent study (Holmes and O'Connell, 2000) documents the disparity of female representation in geoscience faculties. Although the number of women earning doctoral degrees has steadily increased over the last ten years, representation in the assistant professor positions has not increased since 1996. While the percentage of women earning bachelor's and master's degrees in the geosciences is estimated at roughly forty percent of enrollees and at thirty percent at the doctorate level, at the assistant professors level it is only twenty-one percent.

The AAPG *Explorer* profiled a number of women who have been successful in these fields in both academia and industry, in spite of the odds. Among them were three of our own:

- Marjorie Chan, our Department Chair
- Brenda Beitler Bowen, Ph.D. 2005, is a post-doctoral research assistant at Central Michigan University, a visiting professional at Purdue University, and slated to become an assistant professor at Purdue in the fall of 2007
- Jessica Ali-Adeeb, a recent M.S in Geology from our department, and the recipient of fourteen awards and scholarships

They and the others interviewed – besides being passionate about the study of rocks – see four factors as having been especially important influences in their own lives: powerful role models including family members, mentors from high school teachers to members of the industry, and just plain determination. They see themselves as mentors and role models now. They emphasize the importance of working for access to exciting and demanding projects, joining professional societies, giving back to your profession and publishing your intellectual accomplishments.

Other women profiled in this paper are equally remarkable for their persistence and insight. You can read the entire article on the AAPG *Explorer* website at <http://www.aapg.org/explorer/2006/04apr/geowomen.cfm>

## **Local Association for Women Geoscientists Hosts Annual Fund-Raising Event**

The Salt Lake chapter of the Association for Women Geoscientists (AWG-SLC) met in March at Anderson Commons, a renovated Victorian home here in Salt Lake City, for their 17<sup>th</sup> Annual Benefit Silent Auction and Wine Tasting event. As usual, the evening was an opportunity to enjoy conversation along with a variety of wines and edibles while supporting AWG-SLC educational programs that encourage the participation of women in the geosciences.

The group continues building the endowment fund for the Susan Ekdale Memorial Field Camp Scholarship through the AWG Foundation, a nonprofit organization that provides support for AWG educational programs. Though all proceeds from this year's event went to the Susan Ekdale endowment, the chapter continues to support additional educational programs. Erika Gleim, one of our undergraduates, received the AWG Susan Ekdale Field Camp Award for 2006. Darrah Appelfeller also received an AWG scholarship.

## **Blast From the Past**

In our "Blast From the Past" series, we take pleasure in giving the Geology and Geophysics community a look at how our alumni have used their educations to broaden their profession and brighten their own lives. This year, Matt Mikulich (Ph.D. 1971), who has been an Adjunct Professor in our department for several years now, happened to tell us he'd delivered a couple of professional lectures in Croatia this spring. When we enquired for a few more details, it became apparent that this activity was just part of a lifetime pattern that has persisted into retirement. As a member of the department, he has brought his interests and unusual energy to bear on a topic that concerns us greatly – professional preparation. He was instrumental in developing and implementing the Careers in Earth Science Seminar which has stimulated and guided many of our students the past several years.

## **Matt Mikulich Still Focuses on Professional Development**

Thomas Wolfe notwithstanding, at least some of us can indeed go home again, even to an ancestral home, if we work at it hard enough. Matej Ivan Mikuličić – pronounced in Croatian Mee-**ko**-lee-chich, was invited this past May to give talks about "Hubbert's Curve and Global Oil Reserves" at two Croatian universities, the University of Zagreb and the University of Rijeka. As a geophysicist of Croatian ancestry, the invitation to speak was especially gratifying. One of Matt's hosts in Zagreb took him to visit the Miragoj Cemetery. One of the remarkable people buried there is Andrej Mohorovičić (pronounced Mo-ho-**ro**-vee-chich) who was a professor



at the University of Zagreb when he published his landmark seismological research identifying the crust-mantle boundary, which later became known as “the Moho” in his honor. Matt says, “The Croatians somehow see me as one of them, and especially wanted to hear me speak, as one who has come back to offer encouragement and to share knowledge.” Following the lecture, he was invited to return next summer as a co-director of the Petroleum Engineering Workshops in Dubrovnik; he accepted happily.



*Matt Mikulich visits Mohorovičić's grave near Zagreb.*

The grandson of immigrants, he was the first of his family to go to college. After he'd earned his B.S. in Mathematics and Physics at Benedictine University near Chicago and his Master's in Physics at DePaul University, he was recruited by Ken Cook, who “just would not take no for an answer”, phoning Matt when it looked like he might go elsewhere. Matt could not believe that a university department chairman would even call and talk to him. “Ken Cook,” he says, “also worked hard with industry to see that the Geophysics graduates got jobs.” When Matt received his Ph.D. in 1971, he was even offered a job with a company who didn't interview him, just on the strength of Ken Cook's recommendation. Matt's dissertation director was Bob Smith. Matt says, “Bob and I seemed to get along well from our first meeting. He had the right touch in guiding me, giving me just what I needed, and letting me grow. It always has been, and still is, most enjoyable for me to visit with Bob.”

He went to work for Chevron, and in 1999 retired as the Corporation's Chief Geophysicist and Principal Technical Advisor, where he had worked in exploration and

production operations, in upstream research, and finally in corporate management. He was also a member of the Chevron Corporation Reserves Advisory Committee. In 1995 he was named a Distinguished Lecturer for the Society of Petroleum Engineers (SPE), and he currently serves on the SPE's Oil and Gas Reserves Committee. In the academic world he was formerly an Adjunct Professor at Oklahoma and is currently an Adjunct Professor at Utah and Virginia Tech. He is also Adjunct Scientist at SAGE, the geophysics field camp, where he makes annual visits to give talks and advise students.

We asked why he chooses to spend his retirement working this hard and he says that when he went to college there was no money from home and he got through on gifts, grants and hard work. Many people helped him along the way. Now, he says, he wants to give back. “I have always been supportive of the mission of the universities. I want more for them sometimes, it seems, than they want for themselves. And I want them to be better. Also, I see so much potential and opportunity for the students, and I can get frustrated with them when they seem willing to settle for less than they are capable of achieving. If some of my [financial] support and influence can help to make [universities] better, and the students better, it seems I should do it.”

## Alumni and Friends

Here are the folks who've written, visited the Department, or talked with us at the meetings. We love it. Keep it up!

### **Old Grads and Friends Send News**

#### **Pre-1970s Grads**

**Howard F. Bartlett** (B.S. 1955) has recently moved to his retirement home in Lehi, Utah, but still consults for his old employer, DuPont, about titanium for the company's pigments group. His wife is enjoying cooking, grandchildren and genealogy.

**Lawrence Beer** (Ph.D. 1967) is president of Potomac Photonics, Inc., which specializes in miniaturization of medical and electronic devices using laser-based technologies, with plans to expand into computer cooling technologies.

**Ray Resler** (M.S. 1955) spent several years working for Southern Pacific's land department mineral survey before joining the faculty at Grossmont College in El Cajon, California. In those days it was a new school and he taught math and physics as well as developing a geology curriculum. He's now retired as Professor of Geology and Oceanography. He's spent a lot of time traveling to wonderful geological sites in the Philippines, Hawaii and the Andes, among other places. He says he remembers fondly his days at the University of Utah, and still thinks Utah is the best state in the nation for geology. He was one of Ken Cook's students, and

remembers with pleasure such faculty as Eardley, Christiansen, Williams and Stokes.

**Peter Stiefel** (Ph.D. 1964) retired from the University of Maryland several years ago, and has been enjoying restoring his historic home, Hope House, which dates back to about 1800. His efforts include taking care of flocks of animals on the three hundred or so acres around the house.

### 1970s Grads

**Edith Allison (Campbell)** (M.S. 1979) is a petroleum geologist currently working for the U.S. Department of Energy. She is a member of the AAPG's House of Delegates, president of the American Association of University Women of Maryland, and as a member of the Association of Women Geologists wants to be involved in the encouragement of women in science. Until recently, she has been too busy with family and volunteer responsibilities to work on this, but says she now has the time, energy and passion.

**W. Dan Hausel** (B.S. 1972, M.S. 1974) is still working for the Wyoming Geological Survey in Laramie. His interests outside of geology are wide, and he recently completed two sketches of his interpretation of what the Triassic and Jurassic might have looked like in Wyoming which he donated to the University of Wyoming Geology Museum. Also, the American Biographical Institute selected him for the Institute's Man of Science award for his "lifelong contributions to geology and education of the public."



*Larry Wender and King TUT visit the dune fields of Qatar.*

**Doug Hollett** (M.S. 1979) and his new wife Pam, a NASA astronaut, are living in Houston, where he's working for Marathon Oil. This year Doug has done a lot of traveling from North Africa through southeast Asia and Australia, and well as along the eastern coast of North America. Doug and Pam also enjoy skiing, kayaking, and getting together with the family at a cabin in Maine.

**Margaret Kerr** (B.S. 1978) and family enjoyed the entire summer out on Cape Cod this year. Margaret is an enthusiastic soccer mom, and watches her daughter in

as many games as she can as the kids grow up fast and are soon off to college.

**Matt Mikulich** (Ph.D. 1971) got in a vacation last year to Florida and North Carolina – a reward for completing his retirement home, "Borzamok", in Buena Vista, Colorado. Here he hikes and fishes and enjoys the wildlife. He likes to make acoustic guitars and sing about the mining life in the West.



*Matt Mikulich talks and sings about mining in the old West.*

For more about Matt's whirlwind of activities, see our story about him in this issue's "Blast from the Past".

**Larry Wender** (M.S. 1976) sends greetings from the dune fields of southeastern Qatar. He has now worked for Exxon for twenty-three years, mostly in the Middle East, and is currently Exploration Coordinator in Doha, Qatar. He says it's a far cry from his igneous petrology days with Dr. Nash!

### 1980s Grads

**Diane Doser** (M.S. 1980, Ph.D. 1984) is still Chair of the Department of Geological Sciences at UTEP. She and her family stopped by when visiting Salt Lake last March.

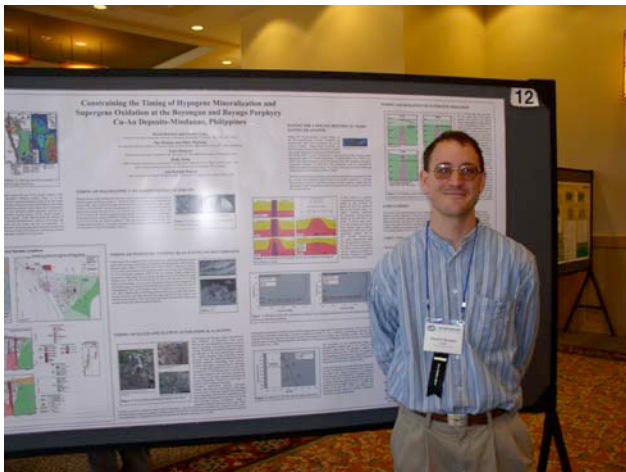
**Perry Eaton** (Ph.D. 1987), **Todd Grant** (M.S. 1990) and **Bob Anderson** (M.S. 1981) were on campus this past February as Newmont Mining's representatives to Michael Zhdanov's Consortium meeting. Perry runs Newmont's Exploration Technology group in Denver and Todd works in Perry's group, still using electrical methods for analyzing data. Their exploration group is also now doing shallow 3-D seismic surveys.

**Peter Eick** (M.S. 1989) received the ConocoPhillips Technology Achievement Award for the second time. He was recognized for the development and implementation of high-resolution seismic technology. His effort has yielded a cost-effective way to acquire seismic data with far better spatial resolution and signal



bandwidth and higher signal-to-noise ratio compared with previous methods. This innovative technology has resulted in five high-value, commercial wells and helped identify more than 50 drilling leads from a single 3-D survey. The Lower 48 Business Unit will apply this technology elsewhere in the region.

**Jackie Huntoon** (M.S. 1985) is Dean of the Graduate School and Professor of Geology at Michigan Technological University. From 2003 through 2005, she served as Program Director for Diversity and Education in the Directorate for Geosciences at the National Science Foundation. Besides teaching, she has developed innovative fields courses and classes for Earth science teachers, and is active in her university's effort to broaden participation in science and engineering.



*David Braxton presents his poster at the SEG Students meeting in Keystone, Colorado.*

**Thom Little** (M.S. 1988) is working for Intel, "making chips instead of chipping rocks", as he puts it. Besides playing occasionally in blues and folk rock bands, he's a very busy dad with a daughter just learning to drive and a son playing soccer.

**Steffen Ochs** (M.S. 1988) enjoyed a summer of hiking in Oregon, where he and his wife Barb saw lots of great scenery and obsidian plus glacial pavement grooves right along the Pacific Crest Trail. After the summer respite he is back to Oman.

**Terry Pavlis** (M.S. 1979; Ph.D. 1982) and **Laura Serpa** (M.S. 1980) have recently moved from their faculty positions in the Department of Geology and Geophysics at the University of New Orleans to take new faculty positions in the Department of Geology at the University of Texas, El Paso. Terry and Laura became refugees after hurricane Katrina destroyed their house last year, and the slow recovery of New Orleans made working at the University of New Orleans difficult. Terry continues to do research in Alaska where he is currently principal investigator of a large multi-institutional project on the tectonics of the Saint Elias Mountains. Laura continues her research in geophysics including aspects of gravity

and reflection seismology. Both Terry and Laura are also active in reaching out to minority students through field trips in the western U.S. each year.

**Pei-Fen Tsai Tamashiro** (M.S. 1989) works for the Navy overseeing a Superfund site and environmental cleanup programs in Southern California. She is busy shuttling her twin boys to school, soccer games and piano lessons.

**Bruce Pfaff** (M.S. 1985) is now Director of Marketing at Genitop Corporation in Redwood City, California.

**Peter Riemersma** (M.S. 1989) with wife Lena and son Dakota are enjoying life in the Midwest, and got in a visit to Holland (the real country, in addition to the nearby town of Holland, Michigan!). Peter continues to enjoy teaching at Grand Valley State University near Grand Rapids, Michigan.

**Steve Young** (B.S. 1984) is the business development manager (and a shareholder!) of Pipeline Systems Incorporated in Concord, California. The company is an international mining pipeline engineering company specializing in slurry transport and system design. He travels a lot to Latin America but always likes coming back to Utah.

### 1990s Grads

David Braxton (M.S. 1997) presented a poster at the Keystone, Colorado meeting of the SEG Student Chapters. He is now obtaining a Ph.D. at Codes in Tasmania.

**Devin Castendyk** (M.S. 1999) reports that he misses Australia. He's a new Assistant Professor at the State University of New York in Oneida.



*Devin Castendyk and Ann Mattson visit at GSA in 2005.*

**Todd Ehlers** (M.S.s 1996 and 1997, Ph.D. 2001) is the John and Betty Edman Faculty Fellow at the University of Michigan. His wife Miriam Schaller is a research scientist in cosmogenic isotopes. They have a young daughter who is keeping them hopping in Ann Arbor, Michigan.



**Anke Friedrich** (B.S. 1990, M.S. 1993) continued on to get her Ph.D. at the Massachusetts Institute of Technology. She is currently professor in the Institut für Geologie und Paläontology at the Universität of Hannover in Germany. She recently brought students through Utah on a field trip.

**Bereket Haileab** (M.S. 1988, Ph.D. 1995) brought something like forty Carleton College students to the GSA meeting in Salt Lake City last October. They had a great field trip to the Alta stock with John Bowman, and the weather was wonderful.



*Tekla King (B.S.1994), Bereket Haileab, and Dan Barnett (formerly of our research faculty) enjoy GSA.*

**David Lemons** (Ph.D. 1997) is enjoying his new job with Southwestern Energy in Fayetteville, Arkansa. He and Diane and their three small children are settling into their new home. David is developing a horizontal drilling prospect in the Arkoma Basin that he hopes to drill next February.

**Tony Lowrey** (Ph.D. 1994) is a new faculty member in Geophysics at Utah State University.

**Aksel Quintus-Bosz** (M.S. 1992) was promoted to Subsurface Manager for NSIKO, a deep water discovery project for Chevron.

**Lori Chadwell Tapanila** (B.S. 1998) is an Instructor in the Geosciences Department at Idaho State University in Pocatello, where she teaches various introductory geology courses.

**Kristi Watabe** (B.S. 1995 still lives in Sandy, Utah, and is busy with her growing family. She used to teach geology at a community college in New Mexico and loved it. She plans on returning to some aspect of geology or paleontology in a few years.

## 2000s Grads

**Omar Aboau-Ismail** (B.S. 2000) was featured in the August 2006 issue of *Salt Lake* magazine as the "King of Cool" for his successful raw foods restaurant in the Sugarhouse area of Salt Lake City. Omar enjoyed working as a geophysicist for a few years, but is happy to pursue his love of cooking and interacting with people.

**Jake Benner** (M.S. 2002) is a Lecturer in the Geology Department at Tufts University in Boston. He recently led

his East Coast students on a field trip into the west desert of Utah in order to show them the beauty of his old thesis area and other sites of geological interest.

**Brenda Beitler Bowen** (Ph.D. 2005) and **Gabe Bowen** (Post-doc 2005) spent a week in Italy where Gabe was teaching a short course on paleoclimatology. Says Brenda, "It was a nice combination of science work and some vacation." She attached a photo of themselves at the K-T boundary where Walter Alvarez discovered the iridium layer that helped validate the bolide impact theory. Brenda and Gabe are now both faculty in the Earth & Atmospheric Sciences Dept. at Purdue University.



*Brenda Beitler and Gabe Bowen, plus a soon-to-be Bowen examine the iridium-rich layer on the K-T boundary at Gubbio, Italy.*

**Rose Difley** (M.S. 2002) is an independent consulting geologist in Salt Lake City. She continues to study dinosaur tracks and other trace fossils whenever she gets the chance.

**Brooks Hintze** (B.S. 2006) has been hired by Biorem, a company based in Idaho Falls, that works with soil conservation, reclamation and agriculture. He is a shift manager and field technician. He says thanks for all the help he received throughout his time at the University of Utah.

**Kevin Mahan** (M.S. 2000) and **Becky Flowers** (M.S. 2000) are both currently doing post-doctoral research at the California Institute of Technology.

**Ann Mattson** (M.S. 1997, Ph.D. 2003) made a miraculous recovery after getting hit by a car while she was biking at Jackson Hole, Wyoming. She is once again biking – carefully!

**Dan Neuffer** (B.S. 2002) enjoys his work as a project engineer for RTW Engineering in Elko, Nevada. In this small office he's able to see projects through from start to finish, and he enjoys the variety. He and his wife Courtney have a house on a two-acre lot at the base of Lamoille Canyon with beautiful views of the Ruby

Mountains. They're enjoying life with their two-year-old son Eli who likes pretty much everything, especially dinosaurs. Courtney plans to finish her degree as soon as she completes field camp.

**Jason Nielson** (B.S. 2002) recently joined the Salt Lake City office of URS Corporation, a San Francisco-based engineering services firm. He currently supports instrumentation work for the government and private sector clients.

**Bill Phelps** (B.S. 1994, M.S. 2002) is a geology instructor at Riverside Community College in Riverside, California. His Ph.D. degree at the University of California at Riverside will be completed by the end of this year. Bill and Kate have just added a third son, Benjamin, to their family earlier this summer. He was welcomed into the world by his older brothers, Will and Jake.

**James Pearce** (B.S. 2004) has been looking at different business and investment opportunities, but still enjoys thinking about geology.

**Erik Reinert** (B.S. 2000) finished his M.S. at the University of Washington and is currently working for Environmental Strategies Consulting in Reston, Virginia. He has mainly been dealing with groundwater remediation. He has been enjoying hiking and climbing in the Adirondacks, and getting back to Salt Lake City for skiing.

**Eric Roberts** (Ph.D. 2005) and wife Dana recently bought a neat older home with lots of European architectural details in Johannesburg, South Africa and have been working to restore it. Eric's teaching at University of Witwatersrand (Wits) is going well and he was briefly in Salt Lake for a visit enroute to do field work.

**Eric Sahm** (B.S. 2004 and currently an M.S. student) has been continuing research, building on his summer 2003 experience as an intern at the American Museum of Natural History in New York City. Of his internship experience, Eric says he assisted George Harlow, the curator of minerals and gems with his ongoing research on high pressure/low temperature metamorphics. He was trained to use a microprobe and scanning electron microscope. He said the visible detail was amazing, on the scale of microns. He says, "Beyond the research it was absolutely amazing to be part of the museum community." Many top-ranking scientists from other institutions gave presentations. His highlights included being interviewed – and quoted – by the New York Times, and getting a taste of New York life.

**Leif Tapanila** (Ph.D. 2005) is an Assistant Professor of Geology at Idaho State University in Pocatello, where he teaches a variety of undergraduate geology and paleontology courses. His trace fossil research in Utah, Nevada and Sweden continues at full speed, and he will chair symposia at both the national GSA Convention in

Philadelphia and the International Bioerosion Workshop in Erlangen, Germany, in October of 2006.



*Lori and Leif Tapanila compare notes with Dave Dinter at GSA.*

### And Friends of the Department...

**Ralph Hafen** is still taking people out to the Hidden Splendor mine. He reports that uranium is UP!

**Linda Ayliffe**, recently one of our research faculty, has gone back to the Australian National University in Canberra where she is working on reconstructing the paleo-environments on Flores Island, the site of the recently discovered "hobbit" people. She is also working on understanding the effects of early human occupation of Australia and their possible role in the extinction of Australian megafauna.

### Alumni Meet at AAPG in Houston

It seemed that a number of other Utah alumni spotted at the meeting who didn't get to the alumni event were probably subverted when we were rudely interrupted and dispersed by a false fire alarm that emptied the whole convention hotel!

A loyal gang of Utes gathered at the Annual AAPG meeting held in Houston in April, 2006. Professor and Chair Margie Chan, Assistant Professor Cari Johnson, and others heard about the adventures – and misadventures – of some of our alumni. One prominent tale was the story of John Isby who was bitten by a rattlesnake and was laid up for two weeks in San Antonio a number of years ago. Craig Barker (M.S. 1986) regaled us with tales of Indonesia.

Others alumni sharing stories included **LaReil Nielsen** (Ph.D. 1981), **Greg Lord** (M.S. 1985), **Mary Milner** (M.S. 2004), **Mike Porter** (B.S. 1980), **Rip Langford** (Ph.D. 1988), **Craig Barker** (M.S. 1986), **David Handwerker** (M.S. 1996, Ph.D. 2003), **Bob Bucher** (Ph.D. 1971), and **David Bartel** (M.S. 1984).



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

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We also wish to express our gratitude to those donors who would rather remain anonymous. We hope we have not forgotten anyone on this list of donors. If for some reason we have overlooked you, please let us know.

## In Memoriam

### Nancy Stroud Was a Familiar Helper

Many of us remember Nancy Stroud who worked here in our department in the late 1980s. She was also well known across campus because of her more recent position as Administrative Assistant to the Academic Senate. In June 2005, Nancy was presented with the University of Utah's Presidential Staff Award in recognition of her dedication and knowledge. She passed away at home in May 2006, after a year-long battle with leukemia.

## Professor Ken Cook's Wife Passes Away

Lois Luke Cook passed away in February, 2006. For fifty years she was married to Ken Cook, late of our department. Raised in Utah, and with a lifetime devotion to education, she taught at elementary schools in Salt Lake City until her retirement. Many of our faculty and alumni will remember this kind and generous couple.



Lois Cook exchanges stories with Drs. Frank Brown and David Chapman in 2005.

## Geophysics Alumnus Dies

Charles D. Buttgerit, who earned an M.S. in Geophysics from this department in 1969 has died. During his long career with Kennecott Copper, he occasionally taught Mining Engineering classes at the University.

## King TUT Can Still Travel With You

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Mystery Picture answer: "Softball-sized" iron oxide concretions from the Jurassic Navajo Sandstone, Grand Staircase Escalante National Monument, S. Utah



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**Include my news in the next *Down to Earth*.**

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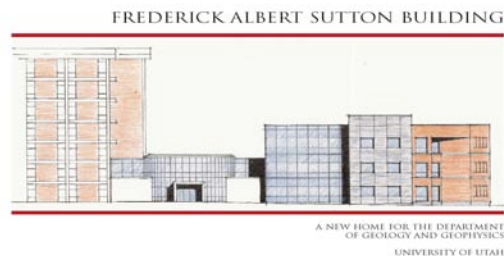
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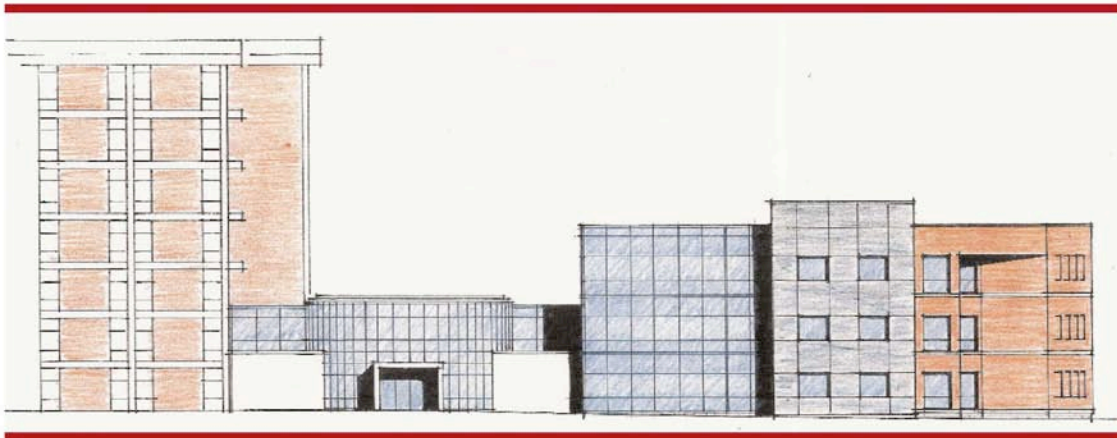
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