



Down to Earth

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

Fall 2005

Protecting Utah's Fossil Treasures

Hunter Almost Gets Away With New Dinosaur

Because everything on public lands belongs to the public, and in order to prevent destruction of artifacts that may have either historical or scientific value, federal and state laws prohibit selling fossils obtained on public lands. These laws cut two ways: While they encourage the responsible public to leave alone any sites they may discover and hopefully to report them to someone who can properly care for them, they also encourage clandestine plundering of such sites for profit. Obviously, such artifacts can't be readily marketed honestly.

Such was the case that eventually led to the identification and naming of *Falcarius utahensis*, a new dinosaur species believed to be the earliest known link between the carnivores and the herbivores. Its discovery was formally announced in the May 5, 2005 issue of "Nature", by James Kirkland of the Utah Geological Survey and an adjunct faculty in our department, Lindsay Zanno, one of our own graduate students, Scott Sampson of the Utah Museum of Natural History and of our department, James M. Clark of George Washington University, and Donald Deblieux, also of the Utah Geological Survey.

In 2001, a southern Utah native finally revealed a site on BLM land near Green River, Utah, that he'd kept secret for three years as he removed fossilized dinosaur remains. To thwart discovery, he had dug tunnels, removing blocks of stone and discarding pieces of bone he thought useless. Paleontologists, who glean much of their new knowledge from such factors as how a skeleton is positioned and the nature of the enclosing sediments, cringe at these methods. This fossil hunter, who planned to rebuild a skeleton at home, at first thought that the bones belonged to *Utahraptor* but soon suspected it might be a new kind of dinosaur. Finally, needing money, he sold pieces of his find in the parking lot at the huge Tucson Gem and Mineral Show, telling anyone who asked that they'd come from the Morrison Formation on private land near Blanding, Utah.

However, says Utah's State Paleontologist Jim Kirkland, "The black market is fairly visible." When these bones began appearing on dealers' tables for resale for

hundreds of dollars, knowledgeable experts saw them and realized something was amiss. Kirkland, who had discovered the first therizinosaur in New Mexico, was given a box of scrap bones and recognized they were similar to his find. He recognized, furthermore, that the fossils were the wrong color to have come from the Late Jurassic Morrison. Rather, their color resembled that of fossil bone preserved at several early Cretaceous sites in east central Utah. Plagued by fears of prosecution, and finally willing to give much of a skeleton he had reconstructed to the scientific community, the man arranged to meet Jim Kirkland at the site near Green River, Utah.



*Doctoral candidate Lindsay Zanno examines the arm bones of *Falcarius utahensis*.*

(Utah's Fossils – Continued p. 3)

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Message from the Chair

Dear Alumni and Friends,

Over the last year I have had the opportunity to do a lot of traveling, visiting fourteen institutions across the country. It is fascinating to see what Earth scientists are doing to build our knowledge and technology. Our multifaceted science offers real applications to issues of water and air quality, petroleum resources, natural disasters, global warming, and stewardship of the environment. One way we help affect positive change is through our students. The accomplishments of our alumni are impressive, and attest to the quality of their training. I see the enthusiasm of new students sharing their newest discoveries at professional meetings, or sharing why they like geoscience and geoenvironment at public outreach events. It is satisfying to see students doing what they enjoy and making a career with concepts they've learned in Earth Science (whether they go on to be scientists, doctors, lawyers, business folks, or parents who share their enthusiasm for the outdoors). Our new programs will continue to add to the success of the next generation of alumni.



This issue of the newsletter is certainly our biggest to date, and we have many features that illustrate the wealth of activities within our department as well as among our alumni. Although we have featured stories of interdisciplinary programs and future building plans in past issues of "Down to Earth", this time we're focusing on a new but traditional field of fossil discoveries.

Sometimes what first gets students interested in Earth Science is a fascination with fossils. The environmental indicators surrounding fossils have become increasingly important in developing models to understand fossil context. Fossils are both an important scientific resource and are avidly collected by enthusiastic non-scientists as well. In this issue we highlight some exciting new discoveries documented in the fossil context.

I hope you enjoy the stories in this issue as well as our news. We hope to see many of you at some of our alumni functions associated with national meetings. Please continue to keep in touch, as we always enjoy hearing from our alumni!

Best wishes, Marjorie A. Chan
Professor and Department Chair

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(Utah's Fossils – Continued)

Fortunately, the man had thrown his “useless” pieces on a scrap heap near the tunnels. Three years of systematic digging by Kirkland’s team produced over 1700 pieces of bone which represent a 90% complete skeleton. As reported in “*Nature*”, *Falcarius utahensis* is an early therizinosaur, probably the earliest so far discovered. The structure of its teeth and beak, a pelvic structure that suggests increased intestinal volume, and digits that can bear more weight are some of the evidence that led its discoverers to propose that the therizosaurs may have been shifting their diets from carnivory to herbivory. Since evidence from therizosaurs excavated in China indicates they were probably feathered; it seems likely that *Falcarius utahensis* was also.



Paleontologists and volunteers from the Utah Geological Survey, the Utah Museum of Natural History, and Temple University excavate bones at the world famous Crystal Geyser Dinosaur Quarry in south-central Utah. Pictured from left to right are: Foreground- Salina Suarez, Lindsay Zanno, James Kirkland; Background- Marina Suarez, Michael Getty, and Don DeBlieux.

Responsible Collaboration Results in New Discovery

Amazing fossil remains still lie hidden in the deep-water carbonates that make up much of the Paleozoic rocks of the Basin and Range. We know that many soft-bodied creatures populated those Middle Cambrian seas, yet they are poorly represented in the fossil record because their bodies were unlikely to be preserved.

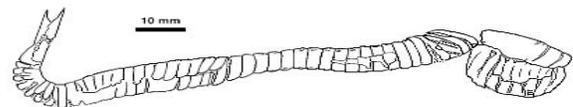
Dr. Sue Halgedahl of our department tells the almost-too-good-to-be-true story of *Skeemella clavula*, a new addition to the catalog. She says, “This fossil not only represents an important contribution to our understanding of the Cambrian radiation (of life), but it also represents a happy conclusion to collaboration between avocational and academic paleontologists.”

About six years ago, Sue and her husband, Dr. Rich Jarrard of our department, were out in the Drum Mountains in west-central Utah, pursuing their decades-long search for soft-bodied fossils when they met another collector and exchanged big fossil tales which, she says, are often akin to big fish tales. They learned about other, unnamed, collectors who had found a “large worm-like” fossil in about 1995. When asked about the locality of the find, the collector waved vaguely at some outcrops that Sue and Rich couldn’t quite see; they turned out to be part of the Middle Cambrian Pierson Cove Formation.

Later, in that vicinity Sue found in the float a long, appendage-like fossil that showed clear segments. Wondering if this possibly could be the rest of the previously discovered creature, she phoned the collector, Holly Skeem of Oasis, Utah, who then sent a photo of the specimen. Sue’s specimen and the photo matched up beautifully, clearly parts of the same organism!

Holly and her father, Ken Skeem, had found the front (anterior) part of the animal. They sent their specimen to Dick Robison at the University of Kansas, who at that time couldn’t tell them much about it. Sue’s find was the back (posterior) part of the body. Several years later, Sue corresponded with several invertebrate paleontologists and the connection was made; the two parts of the specimen were matched up. Without both parts, a formal description of the entire animal would have been impossible, demonstrating that cooperative efforts between amateurs and academics can prove both crucial and fruitful.

The news was published in the April, 2005 issue of “*Paleontology*”. This soft-bodied creature, somewhat more than 14 cm long, is thought to be one of the few known representatives of a relatively new (and problematic) phylum, the Vetulicolians. Its skeleton was not mineralized and it was compressed laterally into the sediment, leaving only a red-purple stained impression.



New soft-bodied fossil Skeemella joins a phylum of strange and rare creatures.

The genus, *Skeemella*, has been named after Holly Skeem. The species name, *clavula*, means small club which describes the club-like part of the animal attached to a long, segmented appendage.

There are many other unique Cambrian fossils in the Great Basin ranges near Delta, Utah, that need both protection and scientific study.

Departmental News

Geology and Geophysics Included in University's Capital Campaign

The Department of Geology and Geophysics will be part of a University-wide capital campaign currently in the planning stages. In preparation for that endeavor, the Geology and Geophysics faculty has been considering its long-range developmental strategy. Over the next ten years or so, a high percentage of our faculty will reach retirement age. In making replacements, we need to determine the direction the department should take. To assist us in the process, and to help us attain the goals that we will set, we are establishing a group of alumni and friends that we're calling the GEO Round Table. We've asked Chuck Williamson (M.S. '73) to lead the effort. Chuck, as CEO of Unocal, has just completed the sale of the company to Chevron Corporation. We are very excited about getting the input of friends and alumni as we look towards shaping our future.

New Career Awareness Class Offered

Cari Johnson and John Bartley are organizing a one-credit course that will be offered in Spring 2006 (first half of the semester), called "Geoscience Career Exploration." As the name suggests, the goal of this course is to expose students to the many options they have as a graduate with a geoscience degree, and to help focus individual interests and strategies for the future. The course will include a one-day session (early January) with guest speakers from various industries (petroleum, geotechnical engineering, hydrogeology, education, etc.). Follow-up sessions will be personalized to meet individual goals including, for example, resume writing, making contacts, exploring graduate school options, assembling an academic application package, interview practice, etc.; both graduate and undergraduate students will benefit from such a course.

Oil Industry Recruiters Return

Each year when the oil industry recruiters come to the department, we encourage our students to meet with them. These representatives can tell students a great deal about what the industry expects of successful job candidates. Students have a chance to ask about their expectations not only with respect to knowledge and experience, but also about company culture and the working environment. Last year and this year our Chevron Corp. recruiters on campus have been two of our very own alumni - Aksel Quintus-Bosz (M.S. Geophysics 1992) and Bryan Bracken (Ph.D. Geology 1987).



BP Recruiters Mark Vandergon, Elena Shoshitaishvili, and Jean-Paul Van Gestel met with students in 2004.

Recruiters will be in the department on the following dates:

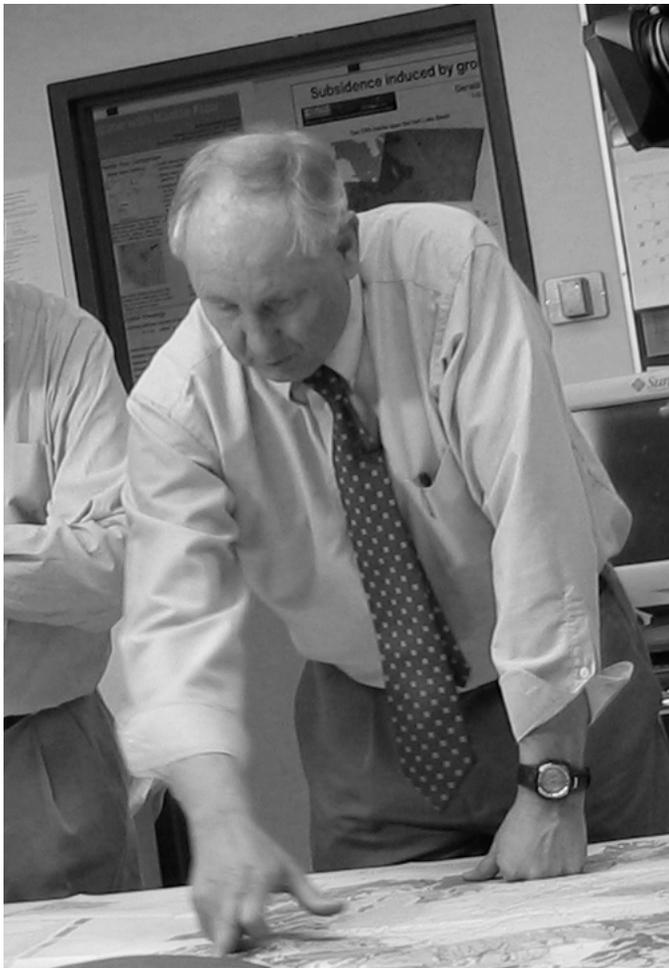
- ExxonMobil: September 12, 13, 14
- BP: September 28, 29, 30
- Chevron Corporation: October 3, 4, 5
- Anadarko: October 5
- ConocoPhillips: October 10, 11, 12

Annual Awards Luncheon Salutes Faculty and Students

Our annual awards luncheon was again held picnic-style on the lawn outside the Alumni House at the end of April. Many students and faculty were honored. Dr. Scott Sampson received the Outstanding Faculty Teaching Award, and Dr. Robert Smith received the Distinguished Faculty Research Award. The Outstanding Teaching Assistant Award was given to Joseph Sertich. Leif Tampanila received the Outstanding Ph.D. student award and the Outstanding Masters Student Award was given to Jessica Moore Ali-Adeeb. The Outstanding Undergraduate Geology Major was Michael Fillnow; the Outstanding Undergraduate Geophysics Major was Laura Russon. Justin Seal was named the Outstanding Undergraduate Geological Engineering Major; the Outstanding Undergraduate Environmental Earth Science Major was Elaina-Louise Howes. Marianne Cannon was cited as the Outstanding Earth Science Teaching Major.

Bob Smith Receives Hamilton Award for Career-Long Contributions to Science

In February 2005, Dr. Bob Smith received the prestigious Hamilton Scholar Award from Southern Methodist University which cited him for career-long research productivity and leadership. The citation noted his career focus on seismicity, mantle structure and GPS deformation of the Yellowstone hotspot. His primary contributions have been in theory and computational methods in seismic structure of the intraplate lithosphere, earthquake seismology, and GPS studies of extensional tectonics. These long-term interests supported a record number of graduate students and contributed to the development of an internationally recognized academic program in seismology at the University of Utah.



Bob Smith explains Yellowstone GPS maps.

The Award also noted his service as chairman of the new EarthScope Science and Education Committee, as chair of the Southern California Earthquake Center Advisory Committee, and as a member of the USGS Scientific Earthquake Studies Advisory Committee.

Online Class, Earthquakes and Volcanoes, Proves Successful

Because University of Utah undergraduates increasingly have very busy and diverse schedules that combine classes with jobs and family responsibilities, we are trying to help them find ways to take classes during the little time they have available. A distinguishing characteristic of such students is that they have both access to a computer and good computer skills. For these reasons, faculty members Richard Jarrard and Susan Halgedahl designed the first UOnline course given in the Department of Geology and Geophysics: "Earthquakes and Volcanoes Online", which fulfills a science foundation requirement. The course was first offered during spring semester, 2005, and it is being given again this fall. The course has fourteen modules; subjects include rocks and minerals, plate tectonics, earthquakes, volcanoes, and associated hazards such as tsunamis. Each module is accompanied by a "slideshow" featuring colorful, annotated photos and illustrations of the subject material. Students may ask the instructors questions anytime via e-mail, and they may hold discussions among themselves (and with the instructors) via a course bulletin board.

The course has had very good enrollment (about 90 students per semester), and last spring it received excellent evaluations from the students. The participants were particularly pleased with the much greater availability of the instructors, via e-mail, in comparison to standard lecture classes with set office hours. The students particularly enjoyed the slideshows, which vividly illustrated facts and concepts.

Industry Speakers Help Broaden Our Perspective

We are always pleased to welcome guest speakers who bring industry's activities and outlooks to our attention. This year we heard Michael Shultz and Axel Quintus-Bosz from Chevron who talked about deep water petroleum systems in the Gulf of Mexico. Bryan Bracken, also from Chevron, also spoke at our Distinguished Lecture Series last fall about sequence stratigraphy applications in reservoir prediction with examples from offshore West Africa. Tony Reynolds from BP Exploration (London) was an AAPG distinguished lecture this year, and he gave an excellent talk on "Oil and Gas Fields – What Make them Distinctive: From the Pore Scale to the Reservoir Scale." He also met with several students and faculty to discuss ongoing research.

Carleton College Earth Science Undergraduates Work in Our Department

Our department had the pleasure of hosting thirteen undergraduate Earth science majors from Carleton College over their spring break. Under the direction of their professor, Bereket Haileab (Utah Ph.D. 1995), the students went on field trips in the area and collected rock and water samples. They then analyzed water samples in Kip Solomon's isotope hydrology lab, measured oxygen and carbon isotope ratios of water and carbonate samples in Thure Cerling's stable isotope lab, and analyzed the chemical compositions of minerals and volcanic glasses in Barbara Nash's electron microprobe lab.



Carleton College undergraduates analyzing their samples in our labs.

The students then returned to Carleton and wrote their final projects based on their findings here. We enjoyed their visit, and are looking forward to having Bereket bring out next year's group.

Petroleum and Environmental Interdisciplinary Certificate Proposed

The Geology and Geophysics department is partnering with the departments of Chemical Engineering and Civil Engineering (specifically, the Energy Geoscience Institute) to propose an interdisciplinary certificate program that will afford students a coherent academic background in petroleum and environmental systems. To be known as the Integrated Petroleum and Environmental Geosystems (IPEG) Certification, it will help prepare students for industry or policy-making positions as well as contributing to a more informed citizenry. Certificate requirements will be fifteen hours of completed credit hours selected from a designated list of core and optional courses. Qualified students who complete the certificate requirements are eligible to receive a \$1000 award for a 3-year assessment period;

there will be twenty-five such awards available. The proposal for this certificate is going through administrative approval and we hope to have it in place by the fall of 2006.

Guy F. Atkinson Distinguished Lectures Presented

The Guy F. Atkinson Distinguished Lectures series planned for 2005 is once again notable for providing current insights into disciplines of interest to those in the Earth sciences. Lecture-goers are invited to meet the speakers half an hour before the lectures, which are usually held Thursday afternoons at 4:00 PM. If you're off campus and would like to attend, call the Geology and Geophysics office to confirm the time and place.

Overall, the Spring 2005 series had a distinct paleontological flavor, with speakers presenting such topics as reproductive strategies in mollusks, reconstructing Mesozoic ecology with isotopes, and locomotion in human evolution. In addition, several members of our own faculty presented some of their latest research findings. Other topics spanned debris flows, Tibetan fault structures, and environmental monitoring of coral reefs. In sum, there was the usual dynamic assortment of geo presentations.

- Daniel A. Stephen, Utah Valley State College: "The Impact of Reproductive Strategy on Cephalopod (Mollusca) Evolution"
- Jerry Schuster, University of Utah: "Seeing the Invisible with Seismic Interferometry"
- Sarah George, Utah Museum of Natural History: "A Natural History Museum for the 21st Century"
- David Chapman, University of Utah: "Geothermics of Climate Change – A View from the Ground"
- Bradley Ritts, Utah State University: "Tertiary Slip Rates of the Altyn Tagh Fault and Magnitude and Timing of Shortening and Strike-Slip in Northeast Tibet"
- Paul Jewell, University of Utah: "New Perspectives on an Old Lake – Pleistocene Lake Bonneville"
- Reese Barrick, College of Eastern Utah: "Physiology and Phish Phood – Reconstructing Mesozoic Ecology with Stable Isotopes"
- Pamela Hallock Miller, University of South Florida: "Environmental Monitoring and Risk Assessment of Coral Reefs – A Multi-Scale Approach"
- Ray Rogers, Macalester College: "Extraordinary Burial Events in the Terrestrial Vertebrate Record – Case Studies from the Middle Triassic of Argentina and the Late Cretaceous of Madagascar"

- Richard Iverson, USGS: "Dynamics of Debris Flows and Rock Avalanches"
- Barbara Nash, University of Utah: "The Yellowstone Hotspot in Space and Time"
- Tom McCandless, Ashton Mining of Canada: "Kimberlitic Magmatism and Diamond Genesis – Add Water and Stir"
- Henry Fricke, Colorado College: "New Ways of Studying Old Dinosaurs: What Geochemistry Can Tell Us About Their Diet and Ecology"
- Dennis Bramble, University of Utah Department of Biology: "Running From Eden – Locomotor Transformation and the Origin of Homo"

The fall 2005 lectures will include:

- Thure Cerling, University of Utah: "Paleosols and stable isotopes: the Good, the Bad, and the Ugly"
- Jim Paces, USGS: "Evaluating the hydrologic response of the unsaturated-zone at Yucca Mountain to Pleistocene climate change from secondary minerals - Learning more-and-more about less-and-less"
- Gabe Bowen, University of Utah: "Soils, water, and terrestrial-marine connectivity through the Paleocene-Eocene Thermal Maximum"
- John Dohrenwend, USGS (retired): "Man on Mancos: Erosional impacts of ORV's in the Caineville Badlands"
- Ian McDougall, Australian National University: "Dating the Cenozoic: a historical perspective of K-Ar and Paleomagnetic Dating"
- John Welhan, Idaho Geological Survey: "Geostatistical modeling of subsurface data: heterogeneity at different scales and spatial-temporal trend analysis"
- Bob Webb, USGS: "Big Rocks and Rapids: Debris Flows and the Colorado River in Grand Canyon"
- Brenda Beitler Bowen, Central Michigan University: "Extreme Hydrogeochemistry and Sedimentology of Hypersaline Acid Lakes in Southern Australia"
- Blair Jones, USGS: "Mineral mass balance modeling of weathering fluxes in a forested headwater catchment in Virginia"
- Karen Chin, University of Colorado: "Coproliotes in the High Arctic"

New Instructional Projector Funded

The Department acquired a new color video camera and projector, funded by instructional funds from the University. This great instructional tool will be stored on the fifth floor of the Browning Building, but it is a mobile unit that can be moved to different classrooms. This equipment will enhance our ability to show thin-sections and polished sections in classrooms and for demonstrations.

Geoantiquities Film Highlights Bonneville Basin Landforms

Margie Chan was the principal investigator for an NSF Informal Science Education (ISE) project to produce a ten- to fifteen-minute educational video to educate non-professionals about "geoantiquities, a term she and others coined to describe natural records of Earth surface processes that document environmental change on local, regional, and global scales – in other words, cool landforms such as shorelines, glacial moraines, and so forth that tell us something about past environments. The film is intended for distribution in classrooms, government offices and other places where Earth science and public policy intersect.



Graduate student Holly Godsey during filming of the Geoantiquities project.

She and Don Currey (of the Dept. of Geography, who passed away in June 2004) received the grant to document various "geoantiquity" sites around the Bonneville basin. The project is based on NSF-funded research that examined threatened geologic landscape features, using as a case study the Salt Lake City area, which is one of the country's fastest-growing urban centers. The intended audiences are lay people to professionals involved in land-use decisions regarding areas that both possess unique geological resources and a development potential.

The video, which will make its debut at the October 2005 GSA meeting in Salt Lake City, highlights the steps being taken by Earth scientists to achieve geoantiquity designation for geologic landforms created by Pleistocene Lake Bonneville, and includes a review of similar geoconservation movements in Europe, where ideas like the geoantiquity concept are well-established and "geoparks" already exist. Margie Chan, Holly Godsey, and John Bowman, joined on occasion by Tooele county commissioner Eric Jorgensen, spent about a week this summer filming at

Stockton Bar, Antelope Island, and other sites as well as in the lab at the University.

A practical application of this work has already surfaced. Part of Ph.D. candidate Holly Godsey's work was to help document the Stockton Bar near Tooele, Utah, which is an important feature of old Lake Bonneville. That work led her to the Tooele County records office for maps, which subsequently led to a request from the planning commission for our help in providing information to the community about the Stockton Bar. It turned out that the commission had a request to rezone the area for more sand and gravel mining and many residents were unhappy with the idea of more extraction and the noise and dust it would generate.



Stockton Bar, a geomorphology formed by Pleistocene Lake Bonneville, was featured in the film.

Once the commission learned that the Bar had scientific relevance, they wanted to know more. Chan and Godsey presented information at two of the county meetings, led two field trips for residents and policy makers of the towns of Stockton and Tooele, and distributed an information flyer about the Stockton Bar in the cities' water bill. These efforts succeeded in stalling the zoning permit for now, and it is hoped that the Stockton Bar will retain its geomorphic expression for many more centuries.

Faculty Focus

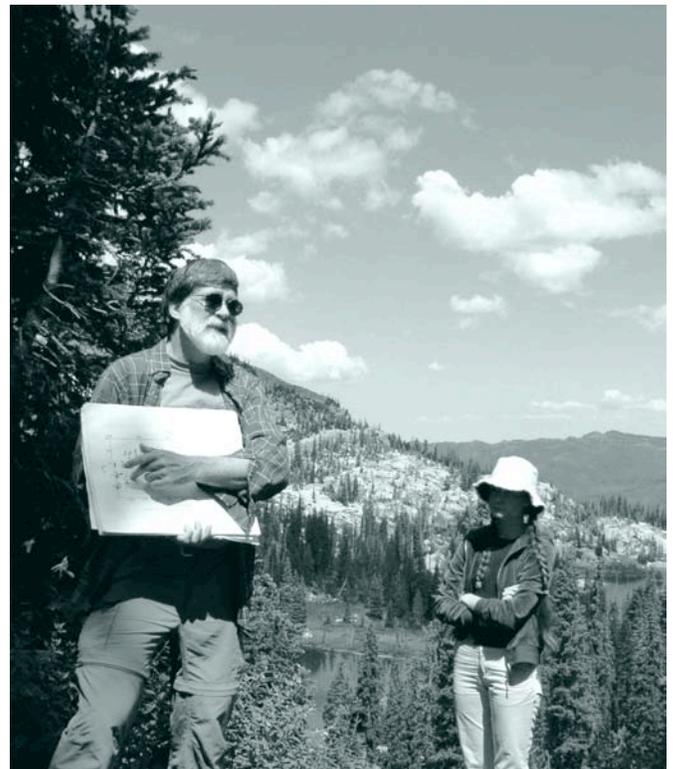
We find our faculty members have once again engaged in a myriad of activities around the globe. New and continuing support for their projects allows them and their students to contribute to the growing understanding of the Earth sciences.

Walter Arabasz: The coming year, 2006, will mark the fortieth anniversary of the University of Utah Seismograph Stations (UJSS) as an organizational entity, and 2007 will mark the centennial of seismographic recording on campus. We've come a long way toward the world of real-time earthquake information systems (as part of an Advanced National Seismic System) and to a fast-paced life of intertwined research,

academics, and widening circles of public service. Meeting the state of Utah's needs for earthquake data and information demands both constant attention and long-term planning. For those of us looking toward retirement, this means succession plans and finding creative ways to help the next generation build upon all that's gone before.

John Bartley: I am lead convener, with co-conveners Drew Coleman and Allen Glazner of the University of North Carolina and Aaron Yoshinobu of Texas Tech, of a GSA Field Forum titled "Rethinking the Assembly and Evolution of Plutons: Field Tests & Perspectives" to be held in the Sierra Nevada and White Mountains of California. Much of my time during the spring and summer of 2005 was spent planning and preparing for this meeting. The field forum will bring together an international group of professional earth scientists and graduate students to examine recent advances in understanding the structures and growth processes of plutons and the implications of these advances for how plutonic and volcanic systems are related, and for the roles of plutons in tectonics and crustal growth.

John R. Bowman: As usual, I enjoyed teaching both sharp graduate students and motivated undergraduates who are full of questions and willing to work hard. My students and I have had a fun and productive year of research. We presented papers at the Geological Society of America (GSA) meeting in Denver and at the Goldschmidt Conference in Moscow, Idaho.



John Bowman explains the Alta contact metamorphic aureole to new students on the fall kick-off field trip.

I continue to research the processes and mechanisms of fluid infiltration, mineral reactions, and the rates of mineral growth in the Alta contact metamorphic aureole, and textural and chemical changes accompanying the transition from schist to gneiss in the Chugach Metamorphic Complex in southern Alaska, as well as hydrothermal alteration and isotope geochemistry of the East Coso, California geothermal field.

This past summer I started an NSF-funded project with Desmond Moser (now at University of Western Ontario, Canada) to evaluate the oxygen and trace element behavior of zircons across the amphibolite-granulite facies transition in the Kapuskasing block, Ontario, CA. On a personal note, Beth and I enjoyed a delightful and relaxing long-distance walk along the Southwest Coastal Path in Cornwall, England this June with Dr. Dave Chapman and Inga. Among many highlights, we had the pleasure of walking over the type locality for the serpentine mineral lizardite on the Lizard Peninsula, and the further pleasure of celebrating this deed with a pint of the local ale in the village of Lizard.

Frank Brown: During the academic year I completed several projects. The first was publication in *"Nature"* of "Ages of early Homo sapiens from the Kibish Formation in Ethiopia"; this work was done with Ian McDougall of the Australian National University and John Fleagle of the State University of New York – Stony Brook.



Thure Cerling and Frank Brown ready to attack a giant termite mound.

I also wrote, with Bereket Haileab, now at Carleton College, and Ian McDougall, the results of a long-term project on a series of tuffs between 1.9 and 1.4 Ma. In addition I finished, with Ian McDougall, a companion paper on the geochronology of this interval. These two papers were accepted by the Journal of the Geological Society. I also published, with Patrick Gathogo, a comment on drainage anomalies southwest of Lake Turkana which will be published in Basin Research.

During the summer I traveled once again to East Africa to continue work on the Pliocene and Pleistocene history of the Turkana Basin. First, some very specific stratigraphic problems were dealt with in the Koobi Fora Area, then I accompanied Dr. Tesfaye Kidane and his student Getachew Eshete to the Shungura Formation in southern Ethiopia for paleomagnetic sampling of the interval between ~2.3 and 1.9 Ma, and finally continued reconnaissance work west of the lake between Lodwar and Lokichar. Overall, the summer was a grand success, despite sorely missing Patrick Gathogo who could not travel for health reasons.

Ronald Bruhn: I spent part of the year doing field work both in Utah and in several mountain ranges and basins in Alaska, including a flight on NASA's DC-8 to collect airborne radar data over several glaciers. This was all part of ongoing research dealing with processes of mountain building and interactions between tectonics and climate. The work will continue for the next five years as part of a new NSF grant. I was also busy in Utah working with Jerry Schuster, developing new geology and geophysics methods to study active faulting. This fall I am collaborating with former student Chris DuRoss and other colleagues to lead a field trip along the Wasatch Fault during the GSA meeting in Salt Lake City. I continue to work with Ph.D. students Julie Willis and Mike Vorkink who have thesis projects in Alaska, and I am also supervising M.S. and undergraduate research projects in Utah. Newer interests in teaching include tectonic geomorphology as well as integrating training in GIS and remote sensing into our curriculum. Other developments include becoming a grandad and a new hobby – flying radio controlled planes.

Thure Cerling: I spent 2004 and 2005 on sabbatical in Africa, based at the University of Cape Town in the Archaeology Department. I did field work in Kenya, Tanzania, Ethiopia, and the Democratic Republic of Congo.

While in the Congo I discovered how difficult it is to do field work (or any sort of work) in a failed state.

I remain involved in the Nuclear Waste Technical Review Board which evaluates scientific and technical issues related to Yucca Mountain, Nevada, and continue to direct my students.



Thure Cerling and park ranger Surika at Virunga National Park in Dem. Rep. Congo, crossing the Semliki River. Sukira is in charge of "community relations" which means stopping poachers, illegal woodcutters, and illegal mining, as well as evicting squatters.



Thure Cerling and his students Ben Passey, Naomi Levin and Dave Marchetti collecting cosmogenic samples from massive landslide deposits near Capitol Reef National Park.

Marjorie Chan: This last year has topped out as "out of this world". Within the last twelve months, I gave fourteen invited talks across the country on "Red Rock and Red Planet Diagenesis – Utah Concretions and Mars Blueberries". These took me from the east coast to the west, including my old stomping grounds at University of Wisconsin – Madison on the occasion of their new building dedication, and my birthday to boot.

We received recognition in a Discovery Channel segment on our work plus mention in a National Geographic article on Mars. I squeezed in several trips to the field and visits with alumni.

I think (!) I was still teaching and trying to run the Department at the same time. I am very happy to report that two Ph.D. students, Eric Roberts and Brenda Beitler Bowen, finished up and happily procured faculty positions. My current students are Holly Godsey, Greg Nielsen, and Sonja Heuscher.



Margie Chan and King TUT on the Athabasca Glacier, Jasper National Park, Alberta, Canada.

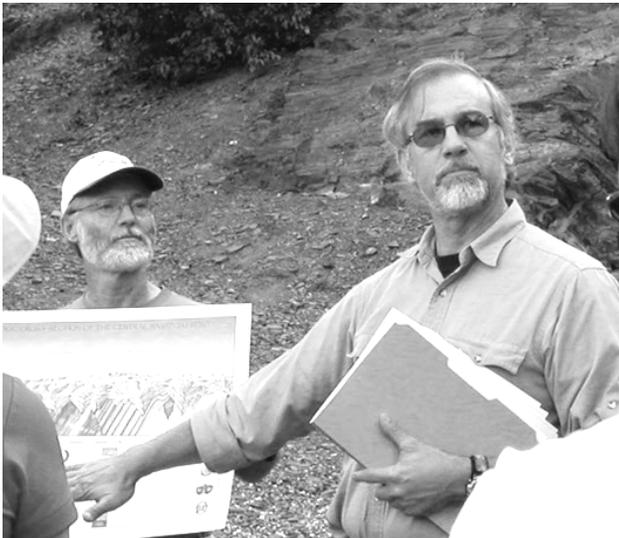
David Chapman: The Friends of Lord Kelvin said goodbye this summer to two long-standing members. Rob Harris, former graduate student at Utah and most recently Assistant Professor (Lecturer), received a tenure-track position in the College of Oceanic and Atmospheric Sciences at Oregon State University and moved to Corvallis, Oregon, in August. Rob will initiate a thermal studies group at Oregon State and will be involved in both marine and continental tectonics and geothermal research. Marshall Bartlett, upon completing his Ph.D. degree, received two academic job offers and chose the mid-Pacific over the Atlantic seaboard. In September, Marshall assumed his position as Assistant Professor in the Department of Physical Sciences at BYU Hawaii.

In other news, Derrick Hasterock completed his M.S. thesis on thermal isostasy and is continuing doctoral work at Utah working with Phil Wannamaker on a magnetotelluric transect across the Basin and Range – Colorado Plateau transition in Central Utah. Paul Gettings completed his masters degree and will continue working for his Ph.D. on the theme of using repeat precision gravity surveys to detect subsurface water storage.

Although temporarily depleted in numbers, the Friends of Lord Kelvin group is rebuilding with the addition of Mellisa Masbruch who is combining hydrology (supervised by Kip Solomon) and thermal geophysics (supervised by Dave Chapman) for her Ph.D. work. Melissa returns to Utah where she completed her undergraduate degree after completing an M.S. at the University of Wisconsin. Eric Sahm, a new M.S.

student, has also joined the group and will apply precision gravity to investigate artificial groundwater infiltration near the mouth of Little Cottonwood Canyon.

David Dinter: I continue to teach Earthquakes and Volcanoes, Geologic Field Methods, and Summer Field Geology, and I am developing, with Barbara Nash, a 1000-level Natural Disasters course adapted from her highly regarded honors course. My research currently focuses on the geometry and paleoseismicity of the Great Salt Lake normal fault system, and on Sevier-aged deformation in southern Utah. I also coordinate outreach and recruitment activities for the department, including mailings to incoming freshmen and transfer students, Earth science projects and field trips with local high schools and middle schools. I provide academic advisors throughout the university with information regarding Geology and Geophysics courses and majors, and presentations at professional, campus, and community events.



John Bartley and David Dinter explaining Wasatch Front geology to new students.

Tony Ekdale: My trace fossil research activities continue to proceed on several different fronts, including ongoing projects in both Utah and Scandinavia. In addition, I have been playing (literally!) around with the use of sound to teach students about certain aspects of fossil morphology, and I recently published a paper in the *Journal of Geoscience Education* on applications of "paleontological sonification" in the teaching lab, based upon some exercises that I developed with the help of my undergraduate Paleobiology students over the past three years. Students generally have been quite surprised to discover their own innate abilities to *listen* to brachiopods and identify ammonites with their *ears*!

Along with our curator Quintin Sahratian and several student assistants, I have been working over the past year (and especially this past summer) to organize, expand and curate the department's extensive fossil collections for use in both teaching and research. In the last few months alone we have accessioned hundreds of

new specimens. Working with scientific collections is an extremely time-intensive – and often tedious – task, but our enthusiastic working group under Quintin's able supervision recently has made major progress in whipping our collections into a shape where they are fast becoming a very significant resource for teachers and researchers alike.

During the past year I've continued to teach at all levels in the department – undergraduate non-majors in National Parks: Geology Behind the Scenery, undergraduate departmental majors in Paleobiology, and graduate students in Ichnology. In September of 2005 I took my Paleocology students on our class field trip to the northern Gulf of California in Sonora, Mexico, where we spent a week collecting fossils, beach combing and tide pooling under the warm Mexican sun.

Susan Halgedahl: I continue my life-long study of rock and mineral magnetism, focusing on the physical mechanisms that result in magnetic domains preserved in the paleomagnetic record. This September my review of "Magnetic Domains" went to press; this is an invited contribution to the *"Encyclopedia of Geomagnetism and Paleomagnetism"* to be published by Kluwer.

During the past year Richard Jarrard and I have spent many weekends and holidays in the desert of west-central Utah, collecting both Cambrian fossils from the Wheeler and Marjum formations and geophysical data that yield clues about the sequence stratigraphy of the same rocks. We are especially interested in tying geophysical signatures of sedimentary environments to conditions that yield exceptionally preserved fossils with soft parts. We were delighted to collaborate with scientists from Yale University and University of Kansas on a paper in *"Palaeontology"* about a new Cambrian fossil which Rich and I found a part of several years ago in the Drum Mountains. (*Editor's note: See this issue's feature story starting on page 1.*)

For departmental majors I teach Physical Fields I: Geophysics. Richard Jarrard and I developed and team-taught Earthquakes and Volcanoes Online, a course for non-majors which is the first online course offered by our department. (*Editor's note: See "Online Class ..." in this issue's Departmental News.*)

Richard Jarrard: My research on marine geology and geophysics has followed two disparate paths this year. Sue Halgedahl and I have been using outcrop geophysical measurements on Cambrian sedimentary rocks of Utah to explore the relationship between sequence stratigraphy and exceptional fossil preservation. Preparations for the international Antarctic Drilling Project (ANDRILL) have moved into high gear, with drilling planned for next year. My recent ANDRILL activities included chairing the ANDRILL Scientific Measurements Panel, which recommended the kinds of measurements and

associated staffing needed for ANDRILL. I will be using downhole measurements to study the intraplate stress pattern and Late Tertiary tectonics of part of the boundary zone between East and West Antarctica.

Paul Jewell: I spent the 2004-2005 year teaching Fluid Dynamics, Numerical Methods, and a relatively new course, Field Geology for Geological Engineering Majors. I also helped supervise graduate student Julie Willis in her efforts to teach Geographical Information Systems (GIS) applications to the department. While wrapping up research projects on Lake Bonneville and pit mine lake hydrology, I am beginning new research efforts in digital mapping of surficial processes.

Cari Johnson: My basin studies continued in full force this year as two new Ph.D. students, Matt Affolter and Sam Hudson, began their research projects in Mongolia and Azerbaijan, respectively. The summer 2005 field season in the Gobi was particularly thrilling when "our" fault moved with an epicenter almost under our camp! The magnitude was estimated at 5.3 but nothing was damaged – just rattled a few camels and goats.

We are also very excited that BP will support our ongoing geochemical correlation studies (with the Geological Institute of Azerbaijan), focusing on the Maikop and other potential Cenozoic source rocks from the South Caspian basin. Jessica Ali-Adeeb successfully defended her M.S. thesis last spring, and is working on a publication stemming from an American Association of Petroleum Geologists (AAPG) Hedberg conference on lacustrine sandstone reservoirs (as well as relocating to northern Minnesota). I attended the International Geological Congress (IGCP-480) on Central Asian Orogens in Irkutsk, Russia (and took a boat ride across the deepest lake in the world), as well as taking part in the Himalaya-Karakoram-Tibet workshop in Aussois, France.



Cari Johnson (standing) on Lake Baikal with (l-r) Ivan Gordienko, Boris Natalin, and Celal Sengor.

William Johnson: Ph.D. candidates Xiqing Li, Meiping Tong, Goetze Yal, Post-Doc Shoeleh Assemi, M.S. student Vivek Jain, and I are continuing to examine nano- to pore-scale processes influencing colloid

transport in porous media, in collaboration with Jan Miller's research group. I am developing, in collaboration with the new Center for Water, Ecosystems, and Climate Science, a conceptual model for selenium cycling in the Great Salt Lake for the Utah Department of Environmental Quality. I'm also co-teaching a new Aqueous Geochemistry for Engineers and Scientists class this fall with Dave Naftz of the United States Geological Survey (USGS). We're hoping that the Geological Engineering program attracts loads of applicants.

Barbara Nash: I'm continuing my work on the long-term evolution of the Yellowstone hotspot and the origins of its voluminous rhyolite volcanism, ably assisted by my Ph.D. student Henny Cathey. Field work has been concentrated in eastern Oregon and southern Idaho. New funding from the National Science Foundation will provide for a broad spectrum of high resolution isotopic and compositional analyses intended to resolve the issue of how large volume silicic magmas evolve and how long they reside as liquids in the crust.



Barbara Nash and distinguished lecturer and alumnus Dr. Tom McCandless.

Henny will be heading off to Canberra to do some of the analytical work at Australian National University. A fun project has been working with Frank Brown and undergraduate student Tom Marston on pumice Frank picked up several years ago on the shore of the Indian Ocean in Kenya. Through microprobe analyses, Tom has been able to show that the pumice was derived from the 1883 eruption of Krakatau on the other side of the Indian Ocean. I teach a natural disasters class each fall, and there are always hurricanes, but this year Katrina has led my Honors section to decide to devote a significant effort to measuring the impact of this tragic event over the course of the semester. On the administrative front, I continue to chair the

department Undergraduate Affairs Committee and oversee undergraduate advising. In addition I chair the University Teaching Committee. I can also report that I am happily living my life backwards, and have finally bought that Fender Stratocaster I have always wanted ever since high school. Rock on.

Kristine Pankow: My research interests include studies of earthquake hazards, attenuation and site amplification of seismic waves, earthquake triggering, three-dimensional seismic wave propagation, and studies of crustal structure. Most recently my research has focused on using data recorded by the Utah Regional Seismic Network/Advanced National Seismic System to study amplification of seismic waves in the Salt Lake Valley and Salt Lake Valley basin structure. Another ongoing project includes detailed analyses of Utah micro-seismicity. Together with J. Mark Hale (whose senior thesis is "Utilizing New Seismological Techniques to Analyze the December 27, 2003 Levan – Nephi Earthquake Sequence, Central Utah"), we implemented recently developed tools to more accurately locate and determine focal mechanisms for a series of small earthquakes in central Utah. Other projects include assisting with ongoing development and operation of the Utah Regional Seismic Network and continuing to develop and maintain ShakeMap in Utah.

James Pechmann: During the past year I worked on four different research projects: earthquake ground motion studies, with Kris Pankow; improved magnitudes for the University of Utah earthquake catalog, with several collaborators; the paleoseismology of the Great Salt Lake fault, with David Dinter; and construction of a "community velocity model" for the Wasatch Front region, with Harold Magistrale of San Diego State University. Some of this work, and earlier work, was reported in three meeting presentations, two published papers, and an extended abstract during the past year. I also continued to be heavily involved in the ongoing development and operation of the University's seismic network, and served as the primary responder to felt and significant earthquakes in the region monitored by the network.

Erich Petersen: Again this year I teamed up with Dr. William X. Chavez, Jr., of New Mexico Tech to lead an international field trip to world-class copper deposits in Chile. (*Editor's note: See the "SEG Student Chapter ... " article in this issue.*) This fall I will be updating the X-ray diffraction laboratory with new hardware and state-of-the-art computers and software. The goal is to make the facility much more user-friendly for research and teaching. I continue to teach Earth Materials I, Analytical Methods and Ore Deposits and Exploration, and greatly enjoy the numerous field trips we have been on this year, from Antelope Island to Chile, Nevada, Arizona, New Mexico and throughout Utah.

Duke Picard: He wrote up a nice summary and tribute to Dr. Lee Stokes that came out in *Rocky Mountain Geology* v. 40, p. 53058 (July 2005) entitled: "William

Lee Stokes: Earth historian from Hiawatha". Many of Lee Stokes former students will enjoy reading this account - check it out if you haven't already!

Peter Roth: During the past year I have worked on high-resolution nannofossil biostratigraphy, especially of the upper Cretaceous and lower Cretaceous, in sections that have calpionellid and ammonite data available. This allows for an integrated biostratigraphy. Quaternary paleoceanographic studies using nannofossil data from the South Atlantic are also in progress.

Scott Sampson: The past academic year my team and I have continued with active paleontological fieldwork in Madagascar and Utah. Both regions have been extremely productive, resulting in the discovery of many animals new to science. A number of these new species are now finally seeing the light of publication. One of the Utah finds, *Falcarius utahensis* – which represents a lineage of predatory dinosaurs caught "in the act" of evolving toward herbivory – was featured in the pages of the British journal "*Nature*"; the paper included Geology and Geophysics doctoral candidate Lindsay Zanno as a co-author. [See featured story.] I am also pleased to report completion (after too many years) of a monograph-sized contribution devoted to one of the carnivorous dinosaurs from Madagascar. The coming year should see formal announcement of at least two additional ancient beasts from the Mesozoic of Utah: a horned dinosaur and a carnivorous dinosaur, both recovered from the Grand Staircase – Escalante National Monument."

Gerard Schuster: I circumnavigated the world in May and June, giving invited talks at a Chinese Geophysical Conference in Beijing, the National Institute for Oceanography and Applied Geophysics (OGS) research institute in Trieste, Italy, a Norwegian Technical University symposium in Trondheim, Norway, and the European Association of Geoscientists & Engineers (EAGE) workshop on near-surface imaging in Madrid, Spain.



Jerry Schuster and two UTAM members at the Cucina party.

My adventures included flying across Hanoi at night during a monsoon lightning storm, trying to determine if Bangkok's humidity was worse than Houston's humidity, and interacting with wild baboons and cobras near Marrakech, Morocco. I had a successful Utah Tomography and Migration Modeling (UTAM) consortium meeting this spring, capped off by a private dinner party at Cucina, a local neighborhood restaurant.

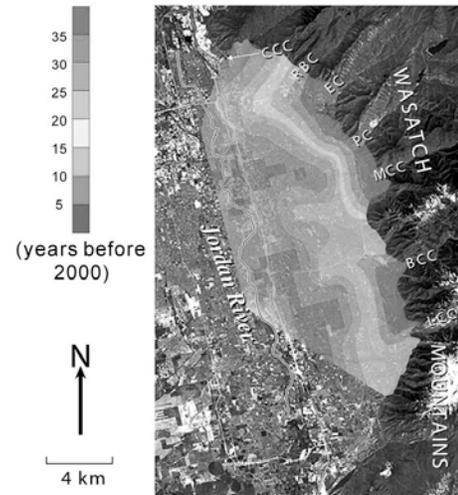
Robert Smith: I completed a term chairing the national EarthScope Science and Education Committee, served as a member of the USGS Scientific Earthquake Advisory committee, and also completed an eight-year chairmanship of the Southern California Earthquake Research Center science advisory committee. I continue to serve as the Coordinating Scientist of the Yellowstone Volcano Observatory.

Post-Doc Michael Jordan and I focused on detailed tomographic imaging and geodynamic modeling of the Yellowstone plume. (Yes, there is a Yellowstone Plume!) Post-Doc Wu-Lung Chang and I worked on integrated earthquake hazard research and GPS measurements of active normal faults to understand the whole seismic cycle, interseismic viscoelastic behavior, and how this information can be integrated into earthquake hazard study. Bonnie Pickering White, an M.S. student, developed a new catalog of high quality earthquake locations and calibrated magnitude and earthquake hazards analysis of the Teton–Jackson Hole area. Jamie Farrell, M.S. candidate, made great progress on developing and populating the Yellowstone–Teton GEON GIS web site and analyzing earthquake swarms of Yellowstone. Ph.D. student Christine Puskas has put together all of the Yellowstone–Snake River Plain GPS data, 1987 to present, a fully integrated online dataset that reveals how contemporary deformation of the entire western U.S. interior is behaving. Aaron Denasquo, an M.S. candidate, is developing a 3D seismic velocity model from the Utah earthquake catalog that will allow us to evaluate in much more detail the relationship of small background earthquakes with faults and basins, focusing on the Wasatch fault.

Kip Solomon: I continued my tour as the Darcy Lecturer for the National Ground Water Association with visits to Israel and Reston, Virginia. In total I will give about forty-five lectures at both domestic and foreign institutions.

My group had a busy summer. We continued our work associated with the Moab mill tailings and were delighted when the Department of Energy announced that their preferred alternative was to move the tailings away from the Colorado River. I am certain that Phil Gardner's M.S. thesis regarding river migration and groundwater flow beneath the river played a key role in this decision.

Interpreted $^3\text{H}/^3\text{He}$ Age Distribution



This figure shows groundwater ages using the tritium/helium method, for the principal aquifer beneath the Salt Lake Valley.

On other research fronts, Ph.D. candidate Bert Stolp continues to work on gas exchange in streams as it relates to groundwater dating, M.S. student Hugh Klien is finishing his analysis of groundwater in the Snyderville Basin, M.S. student Steve Hill is working on the major ion geochemistry of Red Butte Canyon, and Payton Gardner is collaborating with Danish scientists on using passive sampling methods for noble gases in Danish groundwater. On the lab front Alan Rigby continues to keep the mass spectrometer running, and Melissa Klinder got married and unfortunately left us at the end of August.

Michael Zhdanov: I have been invited to be a keynote speaker at the Norwegian Research & Technology Forum in the U.S. and Canada, organized by the Norwegian Research Council, the Norwegian Ministry of Petroleum and Energy, and the Norwegian Embassy in Washington, D.C. To be held in November, 2005, the focus of the Forum is to provide a Trans-Atlantic collaborative network arena for front-line research in the petroleum industry.

Over the summer, the Consortium for Electromagnetic Modeling and Inversion (CEMI) has steadily expanded. We have now more than twenty consortium members representing major petroleum, mining, and environmental corporations and agencies from around the globe. The CEMI sponsors come from different countries and different continents, including North and South America, Europe, Australia, and Asia. This fall three new graduate students, Sasha Kaputerko, Jonathan Goold, and Pichet Puahengsup have joined the CEMI research group. Alex Gribenko successfully completed his Ph.D. degree in Geophysics and will continue to work with CEMI as a post doctoral research associate.

Departmental Field Trips Deepen Earth Science Knowledge

Summer Field Camp Develops Basic Skills

Summer Field Camp is, as director David Dinter puts it, "a rite of passage for earth scientists since time immemorial." Required of seniors in Geology, Geological Engineering and Environmental Earth Science, this intellectually and physically demanding course teaches aspiring professionals how to measure rocks, map structures and geomorphic features, work in teams, and finally compile their observations into professional technical reports. All this and cooking edible food, too!

Students working in the Great Basin mountain ranges' unparalleled natural laboratory draw upon skills learned in stratigraphy, structure, petrology, and geological engineering courses to solve real field problems. This year they undertook two projects, each two weeks in duration. Both sites exhibited Mesozoic compressional deformation overprinted and exposed by Cenozoic Basin-and-Range extensional structures.



Tired, dirty, and hungry but still enthusiastic, field camp participants once again pile into their overpacked van.

The eastern limit of Sevier thrusting in south central Utah crops out in Parowan Gap, an antecedent stream canyon that traverses the Red Hills Range northwest of Cedar City. Here field students mapped the Iron Springs thrust, which juxtaposed oyster coquinas and beach strata deposited at the extreme western margin of the Cretaceous inland sea eastward over foreland fluvial deposits containing dinosaur tracks and bones, petrified wood, and Sierran ash beds. Tertiary boulder conglomerates and pyroclastic breccias overlap the thrust. For the second project, the class moved paleogeographically westward into the Sevier hinterland, to the Raft River Mountains in Utah's northwest corner. The metamorphic core of this range, exhumed from mid-crustal depths in Miocene time by low-angle normal faulting, comprises the oldest rocks in Utah.

Students Tyson Addy, Steve Clausen, Patrick Emery, Dave Harnsberger, Brooks Hintze, Scott Mann, Carole McCalla, Britt Miller, John Moore, Jillian Ries, Lisa Santon, Brian Sparks, and Adam Williams, and instructors David Dinter and David Applegate, breakfasted while the sun rose, then mapped ten hours a day in spectacular mountains with perfect weather. They returned to camps by rushing snowmelt streams, to ink and color maps, discuss field problems, and cook dinner under the able guidance of camp managers Anna Hunter (at Parowan) and Marianne Cannon (in the Raft Rivers), both Earth Science Composite Teaching majors and wizards of organization. Most evenings ended with the class arrayed around the campfire, watching the sun set over the Great Basin and telling tall tales while coyotes howled in the distance.

SEG Student Chapter, Faculty, and Industry Professionals Visit Chile

Dr. Erich Petersen led students from the College of Mines and Earth Sciences Student Chapter of the Society of Economic Geologists (CMES-SEG), students from New Mexico Tech, and industry exploration geologists from Bulgaria, Mexico, Turkey, Peru, Chile and the USA on the 8th International Student – Industry Field Trip. For twelve days during January they visited the porphyry copper deposits of northern Chile. It is thought that the world-class deposits that occur in this region owe their existence to very long-term subduction processes at this convergent plate boundary. Participants visited small deposits at Ivan, Emeratriz, Sierra Gorda, Santo Domingo, Ojos del Salado and Carola, and large ones at El Abra, Spence, El Salvador, Manto Verde, Lomas Bayas and Michilla. They found that the Damiana exotic copper deposit at El Salvador, which they had visited on the first international field trip in 1994, is now in full production. Prominent discussion topics included slope stability issues, economics, ore grade estimation, and characteristics of hydrothermal alteration.

Field Work Proves Integral for Geological Engineers

This past summer Dr. Paul Jewell taught the initial offering of Field Geology for the Geological Engineering program. This course was designed to give our majors a rigorous, field-oriented design experience as a fundamental part of their curriculum. After successfully completing the first two weeks of traditional field mapping with Dr. David Dinter, eight students embarked on a one-week exercise mapping a recent debris flow in Tooele County, and then a one-week hydrogeologic exercise in the Matheson Wetlands near Moab, Utah. Dr. Jewell and the students all enjoyed beautiful May weather, an unusually small number of mosquitoes, and great geology.

Hydrology Students Undertake Field Projects

Kip Solomon's Groundwater class went to Red Butte Canyon to measure water levels (assuming the moose and snakes would let them), learned about why female box elder trees are smarter than males, at least in terms of drought tolerance, and performed hydraulic tests on wells. They also went to the Weber State campus to perform an aquifer test and observe efforts to induce recharge into the aquifer.

The Water Planet class traversed the Provo River system from its headwaters in the Uintah Mountains to its final fate in the Great Salt Lake. Along the way they measured the chemistry of the water. (Yes, the sewage treatment plant in Heber changes the chemistry a bit!) They also examined water issues in the Synderville Basin, development in the mountains, the Central Utah Project, and stream piracy.

Origin of World Class Gold Deposits Highlighted

In conjunction with of Geological Society of Nevada (GSN) 2005 Window to the World Meeting, SEG Student Chapter members JunYoung Sung and Sergio Rodriques Tapia, with Dr. Erich Petersen, attended an SEG workshop in Reno, Nevada where leading researchers from Europe, Africa, Australia and North America discussed the latest advances in our understanding of the genesis of the Carlin, Nevada, and Witwatersrand, South Africa, gold deposits.

Prior to the meeting JunYoung Sung (M.S. 2005) assisted with a GSN field trip to his field area in classic high-sulfidation gold deposits at Goldfield, Nevada.



Erich Petersen, geologist Robert E. Bennett, Jr., and JunYoung Sung (l to r) in Goldfield, Nevada.

General Ed Students Travel to Dinosaurs Sites

Along with teaching assistants Mark Loewen and Joe Sertich, Dr. Scott Sampson conducted a full one-day field trip for the World of Dinosaurs class on a spectacular sunny day this past April. As they do every year, they rented two buses and took about seventy-five students to Vernal and Dinosaur National Monument. The students were introduced to the site and then asked to come up with their own explanations to account for the unusual nature of this vast bonebed. They also did a written assignment in association with this question. After a great picnic-style lunch in a nearby campground within the Monument, they then went to the totally revamped Vernal Fieldhouse, which has some fine new exhibits. The students all enjoyed the museum a great deal. On the drive there and back, they saw videos of Jurassic Park and other (generally bad) dinosaur movies. This field trip requires considerable logistical planning, as you might imagine with a group of this magnitude, but it was a super day.

The class took a second field trip, this time to the Museum of Ancient Life at Thanksgiving Point in Orem, where they were able, while standing right underneath the dinosaurs, to review many of the topics they had covered in class. They also used this opportunity to discuss some of the politics of museums, for-profit institutions, collections and government-funded research.



World of Dinosaurs students cower in front of life-size dinosaur models at the Utah Field House of Natural History in Vernal.

Wasatch Front Geology Spotlighted on Fall Kick-off Field Trip

John Bartley and John Bowman, with help from Erich Petersen and Dave Dinter, again led a field trip to Alta as part of new graduate student orientation for the 2005-2006 school year. On a beautiful late-summer

Saturday just before the start of classes, about a dozen new graduate students along with several friends and spouses got a taste of Wasatch Front geology and scenery.



John Bartley and John Bowman (holding map) explain the geologic setting of the Wasatch Mountains to our new graduate students.

The trip began with a stop at the sand-and-gravel quarry near the mouth of Big Cottonwood Canyon to talk about the Wasatch fault and the geologic structure and geomorphology of the margin of the Basin and Range, and about Lake Bonneville and Gilbert fan-deltas. On the drive up the canyon to Brighton, they viewed the Proterozoic tidal rhythmites near Storm Mountain, and the terminal moraine and the transition from fluvial to glacial geomorphic features at Mill D (Cardiff Fork).



Erich Petersen (right) explores the metamorphic terrain in the Alta area with our new graduate students.

Upon arrival at Brighton, discussion turned to a new model for growth of the Alta stock and other granitic plutons by amalgamation of dikes, and the implications of this model for contact metamorphic processes in the wall rocks. These ideas were explored and elaborated at stops along the trail to Lake Catherine, where trip members ate lunch – after detouring to maintain a respectful distance from a big, handsome bull moose.



Our new graduate students enjoy a beautiful day in the Wasatch, with the beautiful Albion Basin as a backdrop.



A friendly bull moose joins the geology field trip high in the Wasatch Mountains near Alta.

The response to the trip this year and last has been so favorable that we plan to make it a regular part of new-student orientation. We will do something different each year, and both faculty and continuing students, both graduate and undergraduate, are welcome. So plan to join us next year on the Saturday before classes start!

Students Collect Invertebrate Fossils

Tony Ekdale led his Paleobiology students into Utah's hinterlands to collect fossils on two beautiful weekends during spring semester. In the west desert the students found a diverse assemblage of Paleozoic fossils including trilobites, brachiopods, corals and crinoids. The class camped in the junipers at the base of Fossil Mountain in the southern part of the Confusion Range.

In the San Rafael Swell they collected abundant well-preserved Mesozoic clams, snails and ammonites. The class camped at the mouth of a spectacular slot canyon in the massive Navajo Sandstone of the San Rafael Reef.

During September paleoecology students traveled to Puerto Penasco at the head of the Gulf of California study modern marine invertebrate communities juxtaposed against their fossilized Pleistocene counterparts. The overarching question was whether they could convince themselves of one of the guiding principles of geology, Uniformitarianism, that holds "the present is key to the past."



The fall 2005 paleoecology field trip stopped off at the Grand Canyon on their way to Mexico for this picture. Participants are Matt Affolter, Tony Ekdale, Rick Urash, Deanna Brandau, Jess Allen, and Greg Nielsen.

PICP Offers New Field-Based Short Course

The Petroleum Industry Career Path (PICP) program expanded during 2004-2005 with a new, field-based short course in sequence stratigraphy taught by Cari Johnson. It will complement others, such as the one shown in the following photo.



Bob Bereskin (adjunct faculty, second from right) and students on a PICP field trip to an oil well.

Students in this class were joined by Bryan Bracken (Chevron Corp. and a Utah alum) for an excellent tour of the Book Cliffs, as well as a unique experience at the 'Melon Days' in Green River, Utah. The Fall 2005 class will return to this area as well.



Bryan Bracken (pointing to the rocks) and students from the PICP Sequence Stratigraphy class in Tusher Canyon.

Book Cliffs Open to Sedimentology and Stratigraphy Class

Margie Chan and the Sedimentology and Stratigraphy students took their annual trip to the Cretaceous Book Cliffs near Price and Helper, in addition to a short trip along the Wasatch Front. Back in the lab, they use a Utah Geological Survey core lab exercise to look at similar Cretaceous facies in cores.

Geologic Italian Adventure Consortium Launched

The Geologic Italian Adventure Consortium (GIAC) formed at the closing of the Fall 2004 semester class "Reviews in Earth Science" with the encouragement of the instructor, David Chapman. Eleven students and two faculty began organizing and fundraising for a three week geologic trip to Italy to occur in June 2005. The trip was funded through student contributions, private donors (special thanks to Marta Weeks!), the department of Geology and Geophysics and its faculty, the College of Mines and Earth Sciences, and the Associated Students of the University of Utah. They focused on five major areas of study: volcanics at Mt Vesuvius and Pompeii, Apennine structure at Alpi Alpuane and Cinque Terre, geologic engineering at Venice and Vaiont, and plate tectonics at the Ivrea – Verbano zone near Lago Maggiore. Groups of one to three students were responsible for organizing a portion of the trip which included coordinating with local geoscientists.

In Naples they visited Mt. Vesuvius, Pompeii, and Herculaneum. The students rented cars in Naples and made an exciting journey to the Tuscan town of Volterra to visit the geothermal fields of Larderello. They then headed to the coastal town of Marina di Massa to study the structural geology of the Cinque Terra coastline and the Alpi Alpuane. The latter are the quarry sites of the famous Carrara Marble that Michelangelo used for many of his masterpieces. While staying in Marina di Massa the group went to Val Gravelia to look at ophiolite sequences including an impressive outcrop of pillow basalts. Moving towards Venice, they looked at their first geologic engineering problem, the leaning Tower of Pisa. Florence provided a rest day, where they took the opportunity to look at some finished products made from Carrara marble. In Venice the group met with the Venice Lagoon Consortium which administers the restoration of the lagoon and the protection of the city from flooding by high tides through the use of novel large steel gates that seal the lagoon. Next was a stop at the massive Vaiont landslide in the foothills of the Dolomites. Continuing further into the Dolomites, they studied the well preserved massive carbonate platforms of the Sella group. Next the group traversed the Italian Alps to the Ivrea-Verbano zone to straddle the plate boundary of the Adrian and European Plates and view ultrabasic rocks from the lower continental crust.

Fantastico!



GIAC on their Italian adventure. Student Members: Matt Affolter, Stephanie Bear, Aaron DeNosaquo, Abraham Emond, Payton Gardner, Paul Gettings, Nancy Harris, Sonja Heuscher, Greg Nielsen, Joe Sertich, and Katrina Settles Faculty Members: David Chapman and Fulvio Tonon.

Student News

GEO SAC Has Another Exciting Year

Jessica Moore Ali-Adeeb reports that the Department of Geology and Geophysics Student Advisory Committee (GEO SAC) has had another successful year, thanks to the participation of the students, and the support of the department and the Associated Students of the University of Utah (ASUU).



Field trip participants pose in Owens Valley. They are: Stephanie Bear, Katrina Settles, Dr. Erich Petersen, Matt Affolter, Alysen Pedersen, Megan Frederick, (sitting) Toshiko Furukawa and Jenny Szabo.

The graduate SAC was able to put together several activities including an informational graduate seminar last fall with the University's thesis editor, Christine Pickett. The turnout was overwhelming and Christine did a fantastic job of getting us ready to write those daunting manuscripts.

The undergraduate GEO SAC made a social occasion of one of the Friday "brown bag" seminars, a long-standing tradition in our department, by serving refreshments. These quasi-formal talks let students know what others are doing and also gives them experience presenting their research to their peers.

Last spring we were able to combine our efforts with those of the AAPG student chapter to plan and fund our annual ski weekend at Brighton Ski Resort. (Read more about it in the Student AAPG story.)

Through the efforts of the GEO SAC, a number of our students, both undergraduate and graduate, received travel funding for their research. Our College of Mines and Earth Science senate leader told us we are "one of the most active SACs in the college."

Last year's graduate SAC members, Jessica Moore Ali-Adeeb and Lori Chadwell, are pleased to be able to pass the torch to Aaron DeNosquo, Katrina Settles, and Matt Affolter as the new representatives for the 2005-2006 school year. Undergraduate SAC representatives Laura Russon and Riyadh Ali-Adeeb are pleased to announce that Aaron Geery and Jillian Ries will be their replacements. If you have suggestions for departmental activities, or if you'd like to help with the refreshments for the weekly Distinguished Lecture Series, please contact one of these GEO SAC representatives.

AAPG Student Chapter Travels From Mountain Peaks to Death Valley

The University of Utah's student chapter of the American Association of Petroleum Geologists (AAPG) has had another busy year. Besides the normal activities involved with the recruitment process, the silent auction, the presentation of the undergraduate Weeks Scholarship, and invited guest lectures, two other big – and fun – activities took place.

The AAPG, together with the SAC and many others, again held what is fast becoming an annual tradition, a ski weekend at the Wasatch Mountain Club cabin at Brighton in Big Cottonwood Canyon. Lots of people came, and it turned out to be a perfect weekend. Everyone enjoyed skiing, sledding, good food and good company. Once again, the roof sledding was the highlight.

We teamed again with the GEO SAC to sponsor the spring break field trip to Death Valley and Owens Valley, which was led by Matt Affolter. This year we're already planning a similar trip for the spring 2006 break.

Bonnie Pickering, who served as president for 2004-2005, was awarded the Team of Excellence award by the Utah Engineering Experiment Station.

The officers for the coming year are president Sam Hudson, vice president Matt Affolter, secretary Ruiqing He, and treasurer Jess Allen. John Narajo won the AAPG Foundation L. Austin Weeks Undergraduate Grant, provided by a generous endowment gift from L. Austin Weeks to the AAPG foundation. At the silent auction, various mineral specimens, rare maps and books, jewelry, and even a cactus were donated to the auction, which brought \$200 to the club.



Late afternoon sun highlights sand dunes in Death Valley for student photographers.

Speakers from our chapter were:

- Bonnie Pickering: "Structural Mapping of the Kuparuk C1 and B7 Sands in the North Borealis Area, Prudhoe Bay, Alaska."
- Bonnie Pickering and Jessica Ali-Adeeb: "Our BP Summer Internship Experience"
- Jessica Ali-Adeeb gave her technical talk on "The Carboniferous Lisburne, Wahoo Formation Depositional Environment & Facies Study in Prudhoe Bay Area, Alaska"
- John Narajo: "Analysis of Production and Reservoir Characteristics from Drunkards Wash Coalbed Gas Field, Carbon County, UT: Identification of Parameters Favoring High-Performance Gas Wells."

Student Gives Worldwide Webcast

Jamie Farrell, an M.S. candidate, gave an invited presentation of the Yellowstone GIS project at the 2005 Geosciences Network (GEON) national meeting that was broadcast live on the worldwide web, from the San Diego Supercomputer Center. Jamie is a member of Bob Smith's GEON project, "Building Cyberinfrastructure for the Geosciences", supported by the National Science Foundation (NSF) Information Technology program.



Jamie Farrell, backdropped by one of Yellowstone's steaming vents, collects GPS data.

Undergraduates Find Research Opportunities

As students soon find out, every research topic soon generates more questions than any single investigator can begin to follow up on. Thus, many faculty members have research opportunities for interested and ambitious undergraduates. Students can both earn credit and learn how research is carried on, for example, sampling techniques, instrument operation, the management of databases, how to write up research results, and many other tasks they can expect to confront if they are to become professional earth scientists. Here are a few of the projects currently underway.

- Ron Bruhn supervises Brooks Hintze, working on GPS-assisted mapping of complex fault geometry along the Salt Lake Salient of the Wasatch Fault, and Clay Jones, who is building computer-aided visualizations of 3D structures in the Central Wasatch Mountains.
- Bob Smith worked with John Naranjo and Laura Russon last spring on interpretation of seismic reflection data from Yellowstone Lake.
- David Dinter supervised Page Anderson's study of ductile deformation in the Precambrian Little Willow Formation, Salt Lake City, Utah. He also started Tom Marston analyzing pumice clasts and their phenocrysts from coastal Kenya. Tom has been able to show that the pumices are from the 1883 eruption of Krakatoa, and is giving a GSA talk about it. This was part of an undergraduate research project done during the summer of 2005.
- Kristine Pankow supervised J. Mark Hale's senior thesis centered on earthquake analysis.

- John Bowman had two undergraduate students engaged in research projects this past year. Riyadh Ali-Adeeb and Anthony Pollington measured tremolite and talc reaction processes in the Alta thermal aureole, which involved careful mapping of the outcrops as well as getting to know such analytical procedures as measuring isotopes. Riyadh has gone on to graduate school; Anthony will present his research results in a poster at GSA this October.

Other faculty members also have projects both in the works and waiting for interested students. If you find yourself deeply interested in something you see or hear, whether or not it's in a class, find out which faculty members may share your enthusiasm, and go see them! (See related story, "Undergrads Awarded Research Assistantships.")

Society of Economic Geologists Students and Advisors Plan Chile Trip

The Society of Economic Geologists Student Chapter (SEG -Economics) is planning its Ninth International Industry–Academia field trip for early January, 2006. They will once again visit the world-class gold deposits on the border between Chile and Argentina. The trip is open to students in the College of Mines and Earth Sciences and professional geologists and engineers. The trip will be lead by Drs. Erich U. Petersen and William X. Chavez, Jr. of New Mexico Tech.



CMES-SEG Students. (l->r, front) Dr. Erich Petersen, JunYoung Sung, Brian Aillaud, (back) Melissa Dimeo, Doug Weyher, Sara Chudnoff, Jason Odette at La Portada, Antofagasta, Chile.

Graduate Student Awarded Unique Boren Fellowship

This year we won't be seeing much of Scott Hynek, who received his M.S. degree in 2003 from our department and is now a Ph.D. candidate here. He has received the David L. Boren Graduate Fellowship

for the 2005-2006 academic year. This unique program enables graduate students to add important international and language components to their educations. Boren Fellows study languages, cultures and world regions that are critical to U.S. interests but that usually attract less attention than the developed, English-speaking countries. The National Security Education Program (NSEP) which awards this grant hopes that recipients will be highly motivated to work in the federal government and will comprise an ever-growing cadre of experts that can provide leadership and direction in our national efforts to increase economic growth, peace and security abroad.

Scott will be in Kyrgyzstan until mid-December, then for the spring semester he will be going to the University of Wisconsin–Madison to work with a Professor of Turkic languages. While making treks at elevations between twelve and fifteen thousand feet into the Tien Shan Mountains to collect water and grass samples, Scott is also on the lookout for carcasses of winter-killed Ibex (mountain goat); he collects their teeth. The project is based around the stable isotope ecology of Capra Ibex, a sub-species in the Tien Shan that may potentially record regional climatic signals in their teeth.

Scot lives in a small orchard in the village of Bosteri on a large tectonic lake that is 700 meters deep and has a well-developed thermocline during July, August, and September, making the lake a wonderful place to swim and play on the beach, and so it has become a Central Asia vacation destination. He lives on the north side of the lake where the mountains rise from ~1,600 meters to more than 4,000 meters. Across the lake (~70 km) is another mountain range that rises more than 7000 meters. That's two to three times the relief of the Wasatch Front!

Internships Broaden Graduate Students' Professional Experience

Our students often do summer internships. These are a cooperative effort with government or corporate sponsors, designed to give them work experience on real geologic problems and applications in a career environment. Several have reported interesting and challenging jobs.

Abraham Emond, an M.S. Geophysics candidate, worked for Battelle this summer in Oak Ridge, Tennessee. His project was on the development and operation of airborne geophysical systems for detecting sub-surface unexploded ordnance. Specific tasks included system preparation and maintenance, performance analysis using inert ordnance, and data processing.

Sam Hudson, a Ph. D. Geology candidate, received an internship from Chevron to work in San Ramon in the Earth Sciences Research and Development Group. He writes, "I am working with a lot of really smart people who are teaching me a lot. It's quite the challenge." He worked on refining stratigraphy along the western coast

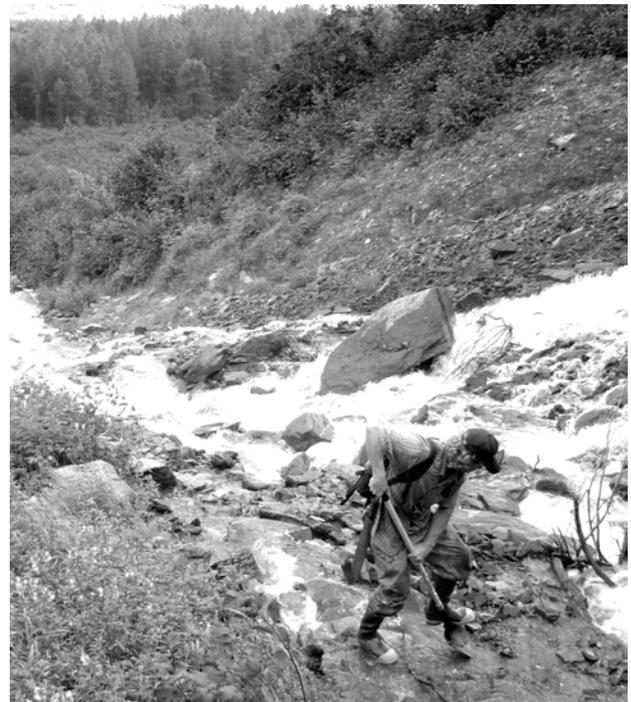
of Angola through some salt-cored, growth faulted, shallow marine sediments.

Min Zhou, a Ph.D. Geophysics candidate, worked this summer in Houston with BP in the Advanced Imaging Research Group, using BP's field data to test the multiple elimination algorithm developed by the Utah Tomography and Migration/Modeling (UTAM) consortium. (See last year's "Down to Earth" for details about this consortium, put together over the last several years by Dr. Jerry Schuster.)

Ruiqing He, a Ph.D. Geophysics candidate, spent this summer working as an intern with BP America in Houston, Texas, where Brian Hornby was his mentor. The objective was to use VSP data (with many geophone levels) to image steeply dipping salt flanks (or faults). These structures are very important for reservoir characterization, and are not commonly found easily by surface seismic data. The study proposed and then developed two new imaging approaches. Synthetic and field data tests showed both these new methods are more efficient and can provide better salt flank images than most conventional methods.

Xiang Xiao, a Ph.D. Geophysics candidate, worked for Schlumberger in Houston. His task was to implement seismic migration methodology.

Zhiyong Jiang a Ph.D. Geophysics candidate, did a summer internship with BP. The program involved seismic imaging and attenuation of seismic multiple reflections. He says, "I learned a lot during the internship, made a lot of friends and had much fun. It was a great experience for me."



New graduate student Jonathan Gould digs for buried treasure above Horsetail Falls #2 near Valdez, Alaska.

Undergraduate Interns Get Firsthand Looks at Professional Job Scene

Undergraduate students in our department have a wonderful opportunity to earn up to three units per semester of 5000-level credit, while working with geoscience professionals at various local agencies and companies; the amount of credit depends upon the hours they spend on the job. The purpose of this program is to help students gain geological, geophysical, or geoengineering experience in a career environment. Participating government agencies and private companies provide representatives who host the students and oversee their work.

The program has had sponsored internships from such Utah state agencies as the Geological Survey, Department of Natural Resources, Division of Oil, Gas and Mining, Division of Environmental Quality, and the Utah Museum of Natural History. Federal agencies include the BLM, U.S. Department of Forestry, U.S. Geological Survey, and National Park Service.

Participating non-profit, industry and corporate concerns have included the Nature Conservancy, Kennecott, Pioneer Oil and Gas, Flying J Oil and Gas, AGRA, Pacific Corp., Secor, Sinclair Oil, TerraTek, Evans and Sutherland, and many others including private consultants.

This past summer, Toshiko Furukawa, one of our undergraduates in Geophysics, did an internship at the Energy and Geoscience Institute. Marilyn Segall, Toshiko's advisor at EGI, writes:

"Toshiko Furukawa conducted independent research on the global distribution and geophysical responses of methane hydrates for her Spring 2005 internship at the Energy & Geoscience Institute. Hydrates pose a significant threat to hydrocarbon exploration because the over-pressured gassy formations can cause blowouts during drilling and sediment failure under an imposed load such as an oil platform. Toshiko's research will form the basis for a predictive global hydrate database that will characterize the potential for hydrate formation in unexplored offshore regions. We enjoyed working with her and wish her all the best in her professional career."

Toshiko is just one of our success stories. Students interested in this program should contact the faculty advisers, Dr. Susan Halgedahl, Dr. Rich Jarrard, or Dr. Peter Roth, who will try to match them with an appropriate company.

Society of Exploration Geophysics Student Chapter Is Contemplated

Geology and Geophysics department students are looking into starting a University of Utah student chapter of the Society of Exploration Geophysics (SEG). SEG is the major society for exploration geophysics with over 20,000 members in 110 countries and publications such

as "Geophysics" and "The Leading Edge." Everyone from students who are active in exploration geophysics research to undergraduate geology and environmental student will want to consider joining.

(Editor's note: To avoid confusion, the Newsletter will refer to this new organization as SEG-Geophysics; we'll refer to the student chapter of the Society of Economic Geologists as SEG-Economics.)



Here's a new generation of graduate students hard at work on Bob Smith's project in Yellowstone.

Undergraduate Research Opportunity Program (UROP) Assistantships Awarded

Through the Undergraduate Research Opportunity Program (UROP) assistantships, the department can provide support for undergraduates who would like to work on research projects. Here are examples of the kinds of projects they undertake:

- J. Mark Hale worked with Kristine Pankow to produce his senior thesis, "Utilizing New Seismological Techniques to Analyze the December 27, 2003 Levan-Nephi Earthquake Sequence, Central Utah". He presented his results at the spring undergraduate research symposium.
- Jared Singer will be working under the direction of Professor Thure Cerling, studying chemical substitution in tooth enamel and its effects on hydrogen isotope analysis.
- Jillian Ries is working with Erich Petersen on the mineralogy of Great Salt Lake evaporite sequences.

Graduates Honored at 2005 Convocation

The University Commencement was held May 6, 2005, with Michael K. Young presiding. Following that, the College of Mines and Earth Sciences held its Convocation with Dean Francis H. Brown presiding.

Doctoral Dissertations Defended:

Marshall Bartlett, Geophysics, "Ground and Air Temperature Tracking: Applications in Climate Change"

Brenda Beitler Bowen, Geology, "Sandstone Bleaching and Iron concretions: An Index to Fluid Pathways and Diagenetic History of the Jurassic Navajo Sandstone, Southern Utah"

Alex Gribenko, Geophysics, "Methods for Interpretation of Tensor Induction Well-Logging Data in Three-Dimensional Inhomogeneous Geological Formations"

Eric Roberts, Geology, "Stratigraphic, Taphonomic and Paleoenvironmental Analysis of the Late Cretaceous Kaiparowits Formation, Grand Staircase-Escalante National Monument, Southern Utah"

Leif Tapanila, Geology, "Lithichnology: Paleocology and Evolutionary Significance of Hard Substrate Trace Fossils"

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

Masters Theses Presented:

Jessica Ali-Adeeb, Geology, "3-D Stratigraphic Architecture and Sequence Stratigraphy of Marginal Lacustrine Strata in the Eocene Green River Formation, Utah"

Jason Babcock, Geology, "A Comparative Study of Tourmaline Composition as a Potential Exploration Guide to Porphyry Copper Deposits; South American Cordillera, Chile and Peru"

Chad Robison Fuller, Geology, "Tephrostratigraphy of the Kibish Formation, Southwestern Ethiopia"

Paul Gettings, Geophysics, "Repeated High Precision Gravity Surveys in the Salt Lake Valley, Utah"

Michael L. Jessop, Geophysics, "3-D Modeling and Inversion of Gravity and Gravity Gradient Data Collected on an Arbitrary Surface"

Katie Kovac, Geology, "Geologic Framework and Paragenesis of the East Flank, Coso Geothermal Field, California"

Junyoung Sung, Geology, "Mineralogy and Geochemistry of Gold Mineralization in the Goldfield District, Nevada"

Professional Master of Science and Technology, Environmental Science Track Degrees awarded:

Scott Claerhout

Bachelor of Science Degrees awarded:

Riyad Ali-Adeeb, Environmental Earth Science and Geology

Steven M. Burgon, Geology

James F. Davis, Earth Science Minor

Michael Fillnow, Geology

J. Mark Hale, Geophysics

Elaina-Louise Howes, Environmental Earth Science

Britt Miller, Environmental Earth Science

John Carlos Naranjo, Geophysics

Laura Russon, Geophysics

Scholarships presented:

Frischknecht: Toshiko Furukawa

Chevron Exploration & Production Services: Micah Jeppsen

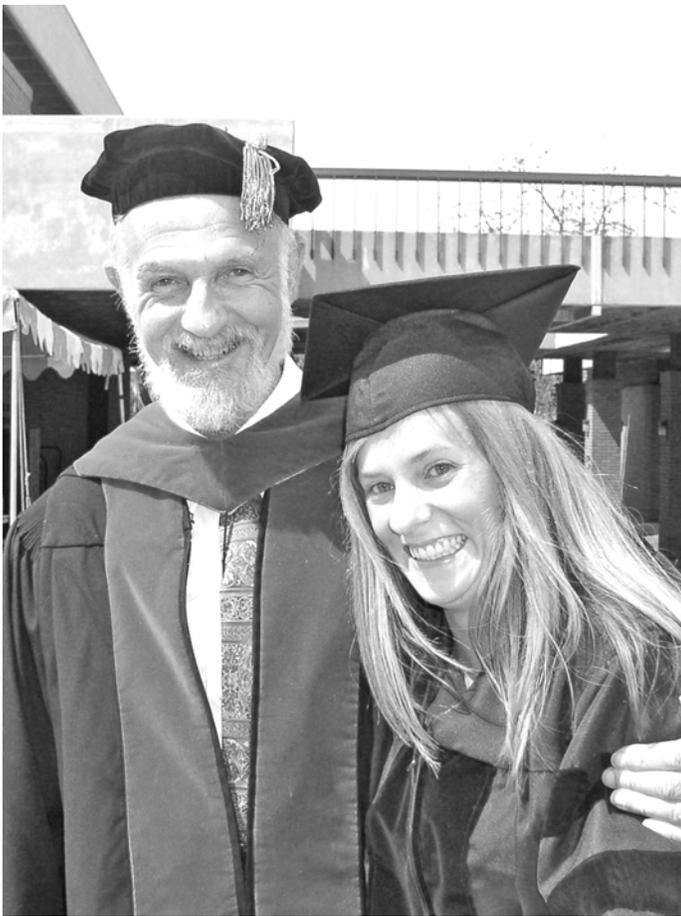
Matt Mikulich: Daniel Smith

Ken Cook Memorial: Paul Seal

Ken and Nedra Bullock Keller: Zachary Hansen, Toshiko Furukawa, Robert Hernandez, Justin Seal

Sedimentary Geology: Clay Jones

Mineralogical Society of Utah Memorial: Leigh Anderson, Justin Healy, Anthony Pollington, Clay Jones, Tyson Addy



Dean Frank Brown congratulates new Ph.D. Brenda Beitler Bowen.

- Dorothy Rice Goode:** Teresa Adams
- Norma Eardley Academic Career Advancement for Women:** Anna Hunter, Abigail Rudd
- The Earls Family Endowment:** Barry Johnson
- John Prince First Generation:** Scott Mann
- Dean's Office Cooper Hansen:** Don Crandall, Katie Nelson, Dan Seely, Cameron Sheya, Adam Williams, Justin Wriedt, Tyson Addy, Eric Hunt, Orion Rogers
- Dean's Office Comstock:** Scott Boyd
- Dean's Office Billings:** Emily Jackson
- CMES Gift:** Erika Gleim, Haylie Whitaker
- University of Utah Special Departmental:** Marianne Cannon, Rebecca Priggmeier, Elizabeth Hardwick

Annual on-campus outreach initiatives include presentations and displays at Plazafest, Freshman Orientation, the Majors Expo, the High School Counselor Conference, Science and Engineering Day, Admissions Day, and Transfer Day. Our recruitment booth earned the first-place award at Plazafest last year, and at the Majors Expo this year.

Earth Science Outreach

Outreach Committee Expands Its Commitments

The Department of Geology and Geophysics is committed to expanding enrollments in its courses, increasing the number of majors, and enhancing the visibility of Earth science and department programs on campus, in Utah secondary schools, and in the community at large.

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. These programs are then presented by faculty, staff and students. For extraordinary efforts this year, we particularly thank students Jillian Ries, Scott Seal, and Patrick Gathogo, academic coordinator Kim Atwater, and faculty member Jerry Schuster.



Rob Harris with Science Day participants looking through 3-D glasses at a map of the Wasatch Front.



Brenda Beitler Bowen explaining Utah red rocks and Mars red rocks on Science Day.



Kim Atwater tends our table at the Majors Expo, a campus-wide event featuring all departments and majors, with breakout sessions about choosing a major.

We also make in-service presentations to University College advising staff, publish course advertisements, do direct marketing to academic advisors in non-science departments, and promote the department website.

General Education Courses Increase Earth Science Awareness

Hundreds of freshmen and sophomores are introduced to Earth science in our highly-rated general education courses: Earthquakes and Volcanoes, The World of Dinosaurs, Architecture of the Earth, Geology of the National Parks, and Unstable Ground.



Scott Sampson explains dinosaurs to non-majors.

Beginning spring semester, 2006, Profs. Nash and Dinter will offer a new general education course, Natural Disasters, which examines causes and effects of hurricanes, tsunamis, global climate change, and meteorite impacts. These courses acquaint students with geoscience-related societal issues and career options, and several new majors enter the department through them each year.

Community Activities Attract Lots of Attention

Our Geology and Geophysics display at the Salt Lake City Avenues Street Fair, with a huge *Allosaurus* skull, impressive sulfide crystals, posters and literature on Utah earthquake and landslide hazards and water and mineral resources, and a prospecting pile of free mineral specimens, attracted hundreds of visitors again this year.

Department outreach personnel also host Kindergarten through twelfth grade science class visits to the University of Utah's Seismic Stations, provide docent training and geologic field exercises for high school and middle school students at Red Butte Garden, speak on geologic issues at local schools, churches, and scouting functions, judge science fair projects, and staff AGI Geoscience Week exhibits at the Utah Geological Survey.



David Dinter talks about Earth sciences with Avenue Street Fair-goers.

New initiatives for 2005-2006 will include earthquake awareness presentations at local high schools, and efforts to attract the growing number of transfer students at the University of Utah to programs in the Earth sciences.



Children prospect through a pile of free mineral specimens at the Avenue Street Fair.

Research and Classroom Activities Featured on Prime-Time TV

We are pleased that the results of research conducted by members of this department prove of interest to the general public. It is a challenge and a pleasure to present it responsibly, and to further awareness of the relevance of the Earth sciences in many aspects of everyday life.

University of Utah professor Bob Smith's Yellowstone research was highlighted in the BBC-Discovery Channel release *Yellowstone Supervolcano*. It was aired in February in Europe by the BBC and the Discovery version was shown in April in the U.S. Following that, his team participated in an NBC documentary, produced by Tom Brokaw, on how the University does science in Yellowstone.



Bob Smith explains his Yellowstone projects to a TV documentary team.

In addition to field and lab shots, the BBC documentaries used material from Bob Smith and Lee Siegel's book "Windows Into the Earth: The Geologic Story of Yellowstone and Grand Teton National Parks" as the basis for much of their story on the Yellowstone super volcano.

ABC News filmed a session of Barbara Nash's Honors class, Natural Disasters. The class has its hands full with the effects of hurricanes Katrina and Rita. The exercise of the day was to calculate the storm surge for Rita thirty-six hours before landfall. The class project over the duration of the semester is a multifaceted study of the impact of Katrina, covering such effects of the disaster as health, commerce, energy, politics, and employment, among others.

Project WEST Sends Graduate Students Into Community Schools

Project WEST (Water, the Environment, Science and Teaching) is a National Science Foundation GK-12 program at the University of Utah, created to increase the scientific community's impact on the public at large. The program, the first of its kind in Utah, is headed by David Chapman; other members of the effort are Thure Cerling, Margie Chan, Erich Petersen, Scott Sampson, and Kip Solomon from our department, Ed Zipser from the Department of Meteorology, and Denise Dearing from the Department of Biology. Fellowships are granted to graduate students in the Science, Technology, Engineering and Math (STEM) disciplines to perform outreach activities in K-12 classrooms.

In 2004 -2005, WEST sent five graduate student fellows from the Department of Geology and Geophysics, two from the Department of Biology, and two from the Department of Meteorology. to seven schools in the Salt Lake City School District. Collectively, they worked with over a thousand school children in elementary and middle school classrooms.



Members of WEST investigate the source of water in the Wasatch and test the pH of the snow. Dave Chapman, Erich Petersen and Professor Emeritus Bill Parry gave talks at the top.

Fellows led field trips, taught inquiry-based lessons, mentored students in science fair projects and served as role models as they introduced students to the wonders of science and nature. Fellows helped teachers author grants to turn a school atrium into a desert tortoise habitat and an artesian well-plagued soccer field into a wetland and outdoor classroom. The latter proposal was awarded \$100,000.00 by the National Geographic Society and featured on a special showing of "Home Makeover - Extreme Edition".



Graduate student Scott Hynek performs water testing experiments with a fourth grader at Escalante Elementary School.

For 2005 -2006, WEST has twelve fellows working in twelve schools in the Salt Lake City School District. This year began with a workshop and retreat at the Alta Peruvian Lodge, where over fifty faculty, fellows, teachers and staff discussed teaching pedagogy, classroom management skills, inquiry-based teaching methods, and technology in the classroom. Field sessions discussed the geology, biology, hydrology, and meteorology of the Wasatch and Salt Lake valley. The workshop provided everyone an opportunity to share ideas and plan activities for the year. In the week following the retreat, no fewer than three schools performed one of the hands-on activities demonstrated at the retreat!



Graduate student Jessica Ali-Adeeb took a group of seventh graders to Snow Canyon to discover its "secret".

For more information about WEST and its activities please visit www.mines.utah.edu/west

Departmental Development

Sutton Building Plan Proceeds to Design Phase

The Sutton Building program keeps forging ahead. Last year we reported that the Utah legislature had approved its planning and construction, and we can report we successfully completed those tasks. In the first week of September we received permission to proceed to the design phase of the project. The estimated cost is \$22 million. We have just over \$18 million on hand and in pledges, so we still have more money to raise. We're very happy about the prospect of having a modern facility dedicated both to the department's present needs and to those we foresee for the future. We look forward to moving from nineteenth century conditions in the old Mines Building into a twenty-first century facility offering an enlarged scope for research and study. We will begin a campaign to raise the balance of the costs soon.

King TUT Becomes a World Traveler

While supplies last, you can still get your special University of Utah – Geology and Geophysics red mug decorated with arguably the most significant Utah fossil: the *Elrathia kingii* trilobite. We send one of these mugs to everyone who contributes \$200 or more to our department's endowment funds.

As you can see in this issue as well as last year's, the King gets around! We'd like to get a photo of you with your mug wherever you are, and have you send it in to us. Our King TUT (Traveling Utah Trilobite) competition shows that the mug has already traveled to many countries. So send in your own mug shots!

For individuals who pledge and donate \$1,000 or more to our endowments, we send a second, one-of-a-kind, hand-thrown pottery mug with real *Elrathia kingii* impressions. This unique mug is truly a piece of art, designed by one of our own research faculty members. See the last page of this newsletter for how to send a donation, and join in the fun with King TUT! Your gifts make a tremendous difference to our programs.



Department Thanks Donors

October 2004 – August 2005

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

Matthew D. Affolter	Sandra Haws Hodge
Grant I. Anderson	Scott Anthony Hynek
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Sonja Heuscher	William S. Young
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James Richard Hindman	Michael Zhdanov
Marta S. Weeks	Zonge Engineering & Research Organization
Lawrence E. Wender	

We hope we have not forgotten anyone on this list of donors. If for some reason we have overlooked you, please let us know.

Blasts From the Past

It's always a pleasure to find out that our graduates have spent a lifetime enjoying geology in all its many facets. We've lately heard from two more who began their careers in the 1940s, and thought our "Down to Earth" readers, too, might like what they had to say.

Grant O. Parsons (B.A. 1942) a long-time friend of this department, passed on recently, shortly after he'd shared some early memories and then mused about geological careers. Dick Clawson (B.S. 1948) still remembers fondly the field work that was part of his long career as an oil geologist.

Grant O. Parsons Recommends Adaptability for Young Geologists

His first experience at the University of Utah was when he was 15 and hitched a ride up to the U of U stadium to see a football game between Utah & Wyoming. He paid 75 cents for a bleacher seat in the "kids section" in the NE corner of the stadium, in the area behind the goal posts on a big pile of dirt. He remembers, "They put up a wood and wire screen to hold us in place. At times, we would break out and try to occupy the unused benches nearer the center of the field, where the admission was higher." At 17, he returned as a student.

Grant majored in Geology because his sister here in Salt Lake had a co-worker who married a local petroleum geologist who, said Grant, "seemed to know what he was doing." His sister advised him that it would be a good idea if he went to the University and studied geology. So he did. (Later, he learned that his sister's friend was the granddaughter of Joseph Kingsbury, a former president of the University of Utah; Kingsbury Hall was dedicated in his honor.)

Prof. Frederick Pack was his first teacher in General Geology, which he took as a freshman in 1937-38. Prof. Ferdinand Hintze taught him Sedimentation and Paleontology. Prof. Ray Marsell who, after Prof. Pack's retirement lectured on General Geology, Historical Geology, Geography and Field Mapping, was an excellent teacher and particularly good at blackboard illustrations. Prof. Bronson Stringham was a great teacher in thin section Mineralogy – a subject young Grant did not enjoy. Mr. Lee Christiansen came on board

during that time. When Prof. Hyrum Schneider took a group of students on a field trip, Grant remembered saying to him, "This old Geology building has about seen its best days. If I ever get some extra money I sure would like to make a contribution toward the building of a new facility that would better serve our needs" Schneider replied "Well, get out there and start working." He would have, but World War II intervened.

Grant's college days at the University of Utah came to an end when he was called into military service in May of 1942, when studies for his Master's degree were already well underway. Because he was a University graduate, trained in Geology and experienced in map reading, surveying, and measuring distances, the U.S. Marine Corps put him in the artillery. He had also taken civilian pilot training at the Salt Lake City airport during his fourth year at the university. (He remembers paying \$25.00 for the necessary thirty five hours of air time to obtain his private pilot's license.) Because of this special training in aviation, he served as an "artillery air observer", directing naval and artillery gunfire during warfare. In 1944 he participated in the battles over Saipan & Tinian Islands in the Pacific.

After the war, Grant put in thirty-nine years in the oil industry working for Atlantic Richfield and BP, retiring in 1985. In late years, he has reflected on the importance of a well-rounded education because, he notes, "We never know what we'll have to do to make a living. Working for a big company is not necessarily safe, even for top executives. Trouble is, in time, the company goes up for sale and many lose their jobs. If you want to keep on working, place yourself in the upper middle of the work force. The surviving company will make use of your services providing you can adapt and go along with the changes."

In retirement, he enjoyed his family and his small projects. Shortly before his death he wrote us, "I think my greatest achievement this past month or so has been the building of a small windmill for the back yard. We must have spent at least \$25.00 for gasoline in driving around town in search of \$5.00 worth of materials. For some reason, no matter how old we get, we still think it is important to know which way the wind is blowing."

Dick Clawson Recalls Classes, Fieldwork, and a Nurturing Faculty

(Editor's Note: Dick Clawson received a B.S. in Geology from the University of Utah in 1948. He's such a good storyteller that we'll just let him tell it!)

It is especially rewarding to see [in "Down to Earth"] the occasional references to people of my era. Lehi Hintze was a classmate as were Gordy Wise and Jack Young. Lehi's father was my Economic Geology teacher, when he wasn't off checking on his wildcat wells in Wyoming. I hope he hit! We all loved Ray Marsell for his love of Geology and the enthusiasm he created in his students.

My mentor, tutor and ideal was Lee Stokes. He was the complete Field Geologist. From him as well as others I learned all I needed to make my way with Standard Oil of California, now Chevron. (It gives me great joy to see that Chevron is still contributing to the Department.) Dr. Herman Schneider also gave me extra help and encouragement. I was his lab assistant and he later allowed me to teach two classes in beginning Geology. Dr. Stokes, Ray Marsell and Dr. Christiansen helped by letting me correct tests for them. I stole Ray Marsell's idea of using the entire blackboard space to show a continuing landscape that incorporated most of the landforms of the world. My rendition was not nearly as artistic as his.

Another first that I brag about was that I started the first Geology Club and was its first president. That's one way to get to be president!

Dr. Schneider made sure that I got an interview with any representative that came to the U. looking for prospective hires. Jack Young was his other pet. As it turned out, Jack and I were the only Geology grad students to receive firm job offers from the oil business in 1949. (The job market got better after 1949.) Jack got an offer from Shell and I got one from the California Company. I had wanted that offer very badly because I had researched many oil companies and Calco had the type of operation that I wanted to join. It turned out to be a great choice. Another help I received from my professors was that their joint recommendations helped me get that job and later helped me become the first U. of U. graduate to be hired as an Exploration Geologist by Standard Oil of California, who had hired mostly Stanford and Cal people before.

Jack Young, Lee Stokes and Francis Christiansen did summer work in western Utah for Socal while I was their District Geologist. Maybe if we hadn't spent so much time collecting *Chaetetes milliporaceous* and *Elrathia kingii* we could have found some oil. The *Chaetetes* calyxes on Sheep Dung Ridge were so prolific that they gave the Ridge its name. Of course that was the politically correct name, not the field name. We followed the time-honored precedent set by the early USGS mappers in the western states.

Almost all of the samples and fossils I managed to pick up went to a junior college here in northern California. It was a one-man department and he needed help. My oldest daughter got what was left. As you know I didn't give them my Brunton compass – that needed some extra encouragement. Thank you for being the instrument to accomplish it. Please give it to some deserving or needy aspiring geologist. It does my heart good to read of all the field mapping you are doing and directing. I was afraid the Seismic people had convinced everyone that field geology was a dead language.

Thank you very much for the great reminders of my younger days. My congratulations for the sterling job you have done. The U's Geology Department was always topnotch and had great teachers and I am certain that the tradition will live on.

(Editor's note: The compass was given to Justin Seal, the year's Outstanding Geological Engineer, at the spring awards luncheon.)

News From Alumni and Friends

Alumni Talk Job Possibilities

We sometimes get letters from old grads that please us all around. One of Paul Jewell's undergraduate advisees, Aaron Bagley (B.S. 1995) clearly loves his job, which has given him experience in a wide range of geological engineering tasks. Also, after a more than respectable time in the profession, he has confidence in the education he received in this department, because he offered the possibility of both a summer internship and permanent jobs with his company. The lesson here is: if you're in the position Aaron is, please send a letter or e-mail to your old mentors or to the chair; if you're looking for a job, talk to your advisor – he or she may know someone like Aaron.

AAPG - Calgary Meeting Brings Utah Alums Together

A number of alumni and friends met with Dr. Margie Chan at the AAPG 2005 meeting in Calgary Alberta: Brad Hill, Bryan Bracken, Bob Lamond, LaRell Nielson, Roy Adams (a former adjunct faculty member in our department), Craig Morgan, Jessica Ali-Adeeb, and Doug Hollett.

Veteran Geology Scholar Publishes New Utah Book

Lehi Hintze (B.S. 1941) has a new book coming out, titled "Utah's Spectacular Geology – How It Came To Be." It will be published during 2005 by the BYU Press. Written for non-geologists, it is extensively illustrated and is focused on the more populated areas of Utah. Large panoramic photographs of the Wasatch Front and the National Park areas will have geologic interpretative overlays.

Old Grads and Friends Send Greetings

Pre-1970s Grads

John Costain (Ph.D. Geology 1960) sends greetings from Virginia, where he has retired from Virginia Tech but still tries to publish a little and give a talk now and then. John taught in the Department of Geophysics at the University of Utah from 1960-67. Elsevier has just published "Basic Theory of Exploration Seismology" which he wrote with Cahit Coruh. Geophysics majors who graduated from the University of Utah during 1960-67 will recognize much of the material in the book from John's classroom lectures, laboratories, and homework problems. Rose and he still manage to get to Park City every year, at least for the month of October.



John Costain giving his grandson the right start!

Robert Garvin (M.S. Geology 1967) is a senior geological consultant at Mak-J Energy Operating Company in Denver. He's done oil and gas exploration in the Rockies and Michigan most of his life. In 2003 he was named a Rocky Mountain Association of Geologists Explorer of the Year.

Kenneth W. Larsen (B.S. Geological Engineering 1953) spent five weeks touring and studying the geology of Spain. He recently saw his old roommates **Max E. Kofford** (B.S. Geological Engineering 1953) in Estes Park, Colorado, and **Will McDougald** (M.S. Geology 1953) in Moab, Utah. Ken makes geology travel his hobby now, and finds it very enriching. After stints with ASARCO, Monsanto and Anaconda, he attended Harvard Graduate School of Design for a Masters of Landscape Architecture, then worked thirty years as a consulting city planner in Albuquerque before retiring to

Sun City, Arizona. He adds that “*Down to Earth*” is a great publication for alumni. He wanted us to know that when he was a freshman he was helped by the Josephine Beam Scholarship Fund, and still appreciates it.

Mona Wheelwright Lowe (B.S. 1956, M.S. Geology 1958) writes that the last “*Down to Earth*” brought back many names, both faculty and students, from long-ago days. Now, instead of studying land forms she lives on a few of them in southern Utah where she and her husband have had cattle since 1979. Her husband, Calvin Lowe passed away, leaving her in the cattle and real estate business. She adds that although she hasn’t done anything related to geology for a long time she often recalls many of the topics she studied so long ago.

(Editor’s note: See “Blasts from the Past” in this issue for more pre-1970s alumni stories.)

1970s Grads

Roy Van Arsdale (Ph.D. 1979) is at the University of Memphis in Tennessee, and enjoys teaching.

George Berry (B.S. Geology 1972) was recently awarded the Navy Superior Public Service Award. Congratulations!

W. Dan Hausel (B.S. 1972, M.S. 1974) received the Wyoming State Geological Survey’s 2004 Distinguished Service Award for recognition of his outstanding endeavors and contributions to the work and progress of the association. Congratulations, Dan! Dan is the Senior Economic Geologist for the WSGS. During the past twenty-seven years, he has mapped more than 600 square miles of historic mining districts and Precambrian geology. He has authored or co-authored more than 450 books, professional papers, general interest articles and geological maps. Besides professional duties, he continues his interests in illustrative art and karate.

Brad Hill (B.S. 1978) works for the Division of Oil Gas and Mining in Salt Lake City. He enjoyed a visit to the Royal Tyrell museum outside of Calgary at the AAPG meeting.

Doug Hollett (M.S. 1979) is currently the exploration manager of New Ventures and Worldwide Exploration with Marathon Oil Company out of Houston.

Thomas Malecki, P.G., (B.S. 1978) lives in Roswell, Georgia. He has worked in many professional arenas including mining, environmental, petroleum and five years on the research faculty at Georgia Tech. He made a major career change in January 2003 to become an Information Security consultant. He now travels the world; recent trips have been to Turkey, the United Kingdom, the Netherlands, and Guatemala.

Craig Morgan (B.S. 1975) still has lots of projects at the Utah Geological Survey.

Ernie Otto (M.S. 1973) was prompted to write to us after reading about Dr. Chan’s “Moqui Marbles” research. He did research on an NSF grant with Dr. Duke Picard and Dr. Ray Wilson which resulted in an article titled “Meteorite Impact: A suggestion for the origin of some stream channels on Mars.” The GSA Bulletin rejected it as being too speculative, but the editors published it in the first issue of GSA’s new magazine, “Geology”. Ernie also gave a talk in the fall of 1973 at the GSA Convention in Dallas on their findings but it was *not* well received – What!? Water on Mars!?

1980s Grads

Gail Artrip (B.S. Geological Engineering 1985) works with URS Corporation in Chicago, Illinois and is pleased to see that the Geological Engineering program is getting re-invigorated. She wants to encourage new majors to get all the summer and part-time engineering work experience they can. She notes that geological engineering has proven to be a great background for environmental consulting work, combining the best of both into a solid hybrid.

Craig Beasley (M.S. Geophysics 1985, Ph.D. Geophysics 1989) is a principal at Wave Geophysics LLC of Evergreen, Colorado, a consulting firm. Earlier in his career he served as a Senior Project Geophysicist with BHP Minerals. His worldwide experience includes projects in North America, South America, Africa, Australia, and Eurasia. An instructor for many short courses for geophysicists and geologists, he has served as chairman of the Mining and Geothermal Committee for the Society of Exploration Geophysicists and assistant editor of the Society’s journal, “*Geophysics*”.

Richard Barnes (B.S. 1985 Geology) has created a successful business selling “popcorn” rock, a limestone that can be placed in vinegar and when the vinegar evaporates, popcorn-like aragonite crystals grow. A neat educational idea, we think!

Bryan Bracken (Ph.D. 1987) had a busy summer lined up, including supervising one of our current Ph.D. students, Sam Hudson, at Chevron in San Ramon.

William H. Diguseppi, P.G. (M.S. 1988) is the Senior Hydrogeologist/Geosciences Manager at Earth Tech, Inc. in Greenwood, Colorado.

Diane Doser (M.S. ’80, Ph.D. ’84) is Chair of the Department of Geological Sciences at UTEP. She is busy!

Perry Eaton (M.S. 1984, Ph.D. 1987) is Chief Geophysicist, Research and Development, for Newmont Mining Corporation in Denver, Colorado. Perry has worked for Newmont since graduating from the University of Utah in 1987.

Susan Fisher (M.S. Geology 1983) is busy every September editing this *Newsletter*. This summer she visited northernmost North America and was captivated by pingos.



A pingo, a sort of a blue-ice “blister”, in the Mackenzie delta north of Inuvik, Northwest Territories, Canada. They come in all sizes; at about 25 meters in height, this is one of the larger.

Farther south, she found the marks of passing geologists – their oriented core sample holes in what were clearly very exciting small-scale folds. She is in awe of the geologists who worked out the structure of these incredibly complex terrains.



Roadside geology at its best: Core holes (about the size of a quarter) in small-scale folds north of Valdez.

Sandra J. Hodge (Haws) (B.S. Geology 1985) writes that she is so grateful for the education that the department helped her earn. She fondly remembers the scholarships from the Geology Department.

Sandra earned an M.S. at the University of Nevada, Las Vegas (through the Desert Research Institute) in

hydrogeology. She still loves the field and has been consulting for about fifteen years. Currently, she works part-time out of her home doing ground-water modeling for a large mining company in northern Nevada. She has two daughters, ages two and four.

When she and her family were in San Diego last year, she saw two other alumni, **Jim Hoyle** (B.S. Geology 1986) and **Sherri Howard** (B.S. Geological Engineering 1986) at their new home in Leucadia. They are doing well and both working in geology-related fields.

Jerry Knaus (B.S. Geophysics 1980) is enjoying information technology and GIS work for a division of Boeing in Colorado. He revisited our department this fall and got to see the Utes win a football game!

Edward LaFehr (B.S. 1988) worked seventeen years with Amoco before the BP – Amoco merger. He is now an asset manager for BP in Alaska with responsibility for operations, reservoir management and development drilling.

Phil Moffit (B.S. 1987) has been working for Questar since 1990 and moved to Denver in 1992.

LaReil Nielson (PhD 1981) is busy with teaching classes, leading field trips, traveling, and more.

Rip Langford (Ph.D. 1988) attended the Fall 2004 GSA meeting in Denver, Colorado.

Steffen Ochs (M.S. 1988) and his wife Barb are in Muscat, Oman where he is working for Shell Oil. They are enjoying traveling throughout the mid east, from the Wahiba sand dunes to Zanzibar. They even got a little time off to travel back to the U.S. this year.

Alison (Harlick) Oakley (M.S. Geology 1989) is an environmental consultant in Reno, Nevada, although she now works part time so she can spend more time with her two children. She and her husband, Dan, like to ski and mountain bike in and near the Tahoe basin. The kids also like to ski and will soon be out-skiing their parents.

Peter Riemersma (M.S. 1989) was awarded tenure last year at Grand Valley State University, Michigan. He and Lena are having a grand time with their young son, Dakota.

Julie Shemeta (M.S. Geophysics 1989) is a geophysicist at Pinnacle Technologies in Centennial, Colorado. Her first job was with Chevron in New Orleans, then Unocal in Brea, California and Santa Rosa, then she took a few years off to have her kids, Maddie and Doug. Most of her work has been related to earthquake seismology and the energy business.

Scott Starratt (B.S. Geography 1987 and a Friend of this department) received his Ph.D. in 2005 from U.C. Berkeley. He is still working at the USGS in Menlo Park. He and his wife Elmira (GEO Drafting in the late 80's)

have been traveling in Colorado, Arizona, Idaho, Wyoming and Washington D.C.

Wanda Taylor (Ph.D. 1989) is on the faculty at University of Nevada Las Vegas and reports that their department is growing and going strong.

Janae Wallace (B.S. 1988) has been working on water quality issues for the Utah Geological Survey.

1990s Grads

Aaron Bagley (B.S. 1995) writes from Denver, where he's been working for JAC since 1999. He enjoys doing a wide variety of geotechnical and engineering activities. Recently, about 80-90% of his work has been in forensic and expert witness testimony. (See more about his letter in "Alumni Can Provide Job Possibilities".)

Devin Castendyk (M.S. 1999) is at the University of Auckland in New Zealand where his Ph.D. work has been on mine pit lakes.

Holly Godsey (B.S. 1995) earned an M.S. at the University of Michigan, then worked for Amoco and is now back in our department as a Ph.D. candidate. As well as her thesis work on Lake Bonneville and climate change, she has been in a whirlwind of WEST activity (GK-12 teaching graduate fellows program), and in preparations for GSA field trips and presentations.

Bereket Haileab (M.S. Geology 1988, Ph.D. Geology 1995) has been coming back to Salt Lake City periodically with Carleton students. They get to see more of the west and do hands-on projects in the lab.

Sarah Hansen (Ph.D. 1995) attended the Fall 2004 GSA meeting in Denver, Colorado.

Rob Harris (M.S. Geology 1992, Ph.D. Geology 1996) received a tenure-track position in the College of Oceanic and Atmospheric Sciences at Oregon State University and has moved to Corvallis, Oregon.

JoAnn M. Holloway (B.S. Geology 1990) completed her Ph.D. in Hydrologic Sciences at the University of California - Davis in 1999 and now works for the USGS Crustal Imaging and Characterization team in Denver. She characterizes herself as a "perpetual Post-doc" in biogeochemistry, splitting her studies between a wetland in the California Coast Range and thermal waters in Yellowstone.

She also serves as a referee for the American Geophysical Society's journals, and this year received a citation for "consistently providing constructive and thoughtful reviews" at the AGU fall meeting. Congratulations, JoAnn! She adds she's in good health and has been having fun.

Susan Janecke (Ph.D. 1991) is at Utah State University and continues to work on extensional deformation in the western United States.

Jennifer Joyce (M.S. Geology 1996) is working as a geologist for ExxonMobil, Inc.

Chris Kelson (B.S. 1994) finished up his M.S. at BYU, and is now in a Ph.D. program at the University of Georgia.

Berthold Kriegshaeuser (Phd 1997) and **Patricia deLugao** (PhD 1997) are living in Rio de Janeiro, he working at Baker Atlas and she at Landmark Graphics. Besides working, they are busy with their four children.

Jim Magwood (Ph.D. 1996) lives with his wife Kristina and daughter Zola, in Ottawa, Ontario, Canada where he is a physical science teacher at Lisgar Collegiate Institute. Jim is the faculty advisor for Lisgar's space simulation club (affiliated with Ottawa-Carleton Educational Space Simulation), which completed a successful virtual mission to Mars earlier this year!

Ross McNeil (M.S. 1991) is doing well in Houston, and catches up with Utah alum at the SEG meetings.

Lynne Peyton (M.S. 1991) is currently in the Ph.D. program at the University of Arizona.

Bill Powell (Ph.D. 1997) has been at ExxonMobil in Houston and he re-visited our Department earlier this year while on vacation in Salt Lake City.

Jorn Stenebraten (M.S. Geological Engineering 1998) works for SINTEF Petroleum Research in Norway.

Charles Williamson (M. S. Geology 1999) is currently a hydrologist with the Division of Water Quality, State of Utah.

Adoph Yonkee (Ph.D. 1990) is one of the local committee chairs for the GSA meeting to be held in Salt Lake City this fall 2005.

2000s Grads

Allison Alcott (M.S. 2002) has been working for RockWare in Golden Colorado; we get to see her at meetings when RockWare has their exhibit booths.

Jessica Moore Ali-Adeeb, (B.S. Geology 2002, M.S. Geology 2005) writes that this past summer she was able to present her 3-D lidar models in a poster session at AAPG. It was a total success! Her booth was completely packed the whole four-plus hours and she received some wonderful feedback. As a result of that research, She's currently working on two papers, and co-authoring a third. She has just moved to Duluth, Minnesota while **Riyad** (B.S. 2005) works on his M.S. in geology at the University of Minnesota, Duluth. He is extremely happy with his new advisor and is working on putting together a project on the Chinle Formation in southern Utah. Petroleum Systems International, Inc. (in Salt Lake City) has hired Jessica as a Staff Geologist to work remotely for them from Duluth. It seems to be working out well and she is happy to have a job that keeps her in the loop of both the petroleum world and

what's going on out there in Salt Lake. They also attended the Fall 2004 GSA meeting in Denver, Colorado.

Brenda Beitler Bowen (Ph.D. 2005) married Gabe Bowen, a Post-Doc in Thure Cerling and Jim Ehleringer's stable isotope lab, last summer. Brenda is now doing a Post-Doc on acid lakes in Australia through Central Michigan University. Both Brenda and Gabe have tenure track faculty positions lined up at Purdue University.



Brenda Beitler Bowen with her King TUT mug at Yellowstone.

Gaobin Bao (M.S. Geology 2000) is a lab tech at Georgia Tech.

Jake Benner (M.S. 2002) is a lecturer in the Geology department at Tufts University

Julie Bernier (M.S. Geology 2003) has been working with the USGS Center for Coastal and Watershed Studies in St. Petersburg, Florida. Her husband Trevor is teaching high school science, and they're about to move into a brand new house.

Christina Brow (M.S. Environmental Engineering 2005) is pursuing a Ph.D. at the University of Colorado in the department of Civil, Environmental, and Architectural Engineering.

Douglas Brumbaugh (M.S. Geophysics 2001) and his wife Julie recently moved back to Utah. He is an SAIC software engineer working as an Air Force contractor on Hill AFB supporting the F-16 weapon system. Julie is home with their two daughters, Maura (5) and Carys (2 months).

Tiffany Copyak (B.S. Geological Engineering 2002) and **Christian Martin** (B.S. Geological Engineering 2001) were married August 27, 2005. Best Wishes!

Brad Didericksen (B.S. Geology 2003) is currently finishing his M.S. at the University of Kansas and writes, "Things are going well. I'm in the middle of writing my thesis. I'm slated to start working at Chevron in

Bakersfield in the middle of November, so I think things will be wrapping up here soon. I will be at GSA (in Salt Lake City in October) giving a poster."

Christopher DuRoss (M.S. Geology 2004) is now working at the Utah Geological Survey with the Geological Hazards group.

Alisa Felton (M. S Geology 2003) is teaching science in the Park City School District.

Becky Flowers (M.S. 2000) is finishing up her Ph.D. at M.I.T., documenting a detailed P-T-t history for deep crustal granulites in the Snowbird tectonic zone of the western Canadian shield.

Matt Gregory (Ph.D. 2002) and **Jill Krukowski** (Ph. D. 2002) bought a new house in Houston. They are continuing their work and travel with ExxonMobil.

Bernd Imre (Undergraduate foreign student 2002) studied in our Department during his junior year, returned to Austria to complete his undergraduate degree, then moved to Berlin to complete a Master's degree. He is now an assistant in the Civil Engineering Department at the Swiss Federal Institute of Technology in Zurich.

Wynn John (M.S. Geological Engineering 2000) is working for Maxim Technology in Salt Lake City.

Kevin Mahan (M.S. 2000) is finishing up his Ph.D. in the Dept. of Geology, at Univ. of Maryland, College Park.

Dan Neuffer (B.S. 2002) and Courtney have a young son and are living in Reno where Dan finished up an M.S. at the University of Nevada, Reno, combining aspects of rock mechanics and planetary geology.

William and Mackie McIntosh (both M.S. Geology 2002) are working for the Corps of Engineers in Savannah, Georgia.

Eric Roberts (Ph.D. 2005) is now settled and living in Johannesburg and reports it is a very lively and interesting place! He is teaching at the University of Witwatersrand (Wits) and wife Dana is working on her Ph.D. project (at Wits) in Analytical/Environmental Chemistry.

Phil Schmitz (M.S. Geological Engineering 2000). Last word was that he was working at a consulting company in Michigan

Ian Schofield (M. S. Geology 2002) is presently a hydrologist at Kleinfelder, Inc., in Salt Lake City.

Glen Shaw (M.S. 2000) is at University of California, Merced, in the school of Engineering and Natural Sciences.

Leif Tapanila (Ph.D. Geology 2005) is a visiting instructor of geology at Idaho State University in Pocatello. He also attended the Fall 2004 GSA meeting in Denver, Colorado.

Scott Tangenberg (M. S. Geology 2000) is a hydrologist working for the U. S. Forest Service in Spearfish, South Dakota.

Pengfei Zhang (Ph.D. Geological Engineering 2000) is a faculty member at City College of New York.

Students and Friends

Bob Lamond and Shauna are enjoying being parents and chasing around their handsome son. Bob promises to come back and finish up his degree.

Roy Adams (former GG Adjunct faculty) and **Janet Roemmel** are traveling and enjoying work.

(Editor's note: We were shorthanded when it came to getting all the pieces together for this issue of the Newsletter since one of our staff members is on maternity leave. Hence, we hope none of your news has slipped through the cracks. Please continue to send us items to share with your friends and colleagues!)

In Memoriam

William Frangos Loved Learning

Willy Frangos (M.S. Geophysics 1992) died November 30, 2004. Born in 1943 in Kokomo, Indiana, he received his B.S. degree in Earth Sciences from MIT in 1967 and an M.S. in Geophysics from the University of Utah. During his years in Salt Lake City he conducted field research, taught at Salt Lake Community College and was a dedicated, much loved soccer coach. In 2000 he accepted a position as professor of Geology and Environmental Science at James Madison University in Harrisonburg, Virginia. A dedicated exemplar of life-long learning, in 2002 he earned his Ph.D. in Applied Geophysics from the University of California at Berkeley. In his career as a geophysicist, he published widely and lectured around the world.

Willy is survived by his wife of 25 years, Suzan Caylor Frangos, his mother, sister and two children.

Friends Say Terry Killpack Has "Gone Digital"

Terry Joe Killpack (M.S. Geophysics 1975) died March 21, 2005. He was 58. Terry received his B.S. in Physics from BYU and his M.S. in Geophysics from the U of U. He worked many years in the CAD industry. He had six computers and surely loved his Macs. All who knew him remember his enthusiastic storytelling and his great sense of humor. He is survived by his wife Dianne, his four children, and grandchildren.

Grant Parsons Had Utah Roots

Grant Parsons (B.S. Geology 1942) passed away on May 8, 2005 in Southern California. Grant was born and

raised in Salt Lake City and built upon his education and degree from the University of Utah to have much success and enjoyment in his career in the oil industry. He shared some of his thoughts in "Blast from the Past" just a few months before he died. He is survived by his wife Norma and two children.

Fred Pratley Pursued Many Interests

Fred Pratley (B.S. Geology 1957) died November 12, 2004. He was born in Salt Lake City, Utah in 1930. As he grew up in Glendale, California, he excelled in high school and college athletics. He earned a degree in Geology at the University of Utah while continuing to compete in the high jump, making the Olympic trials in 1952.

In the early 1960's Fred was employed as a geologist by Porter-O'Brien, traveling across the country researching missile sites. In 1970 he did graduate work in ocean engineering at the University of Hawaii, and then returned to Orange County to establish his own engineering geology consulting business. Until 1998 he owned Coastal Geotechnical in Laguna Beach.

Fred and his wife enjoyed racing and cruising their sailboat in local waters and along the Pacific Coast of Mexico. He also enjoyed a lifelong love of music and shared his enthusiasm for jazz, classical, and Stephen Sondheim with his friends and family. He was also an accomplished cellist, playing most recently in the Leisure World Orchestra.

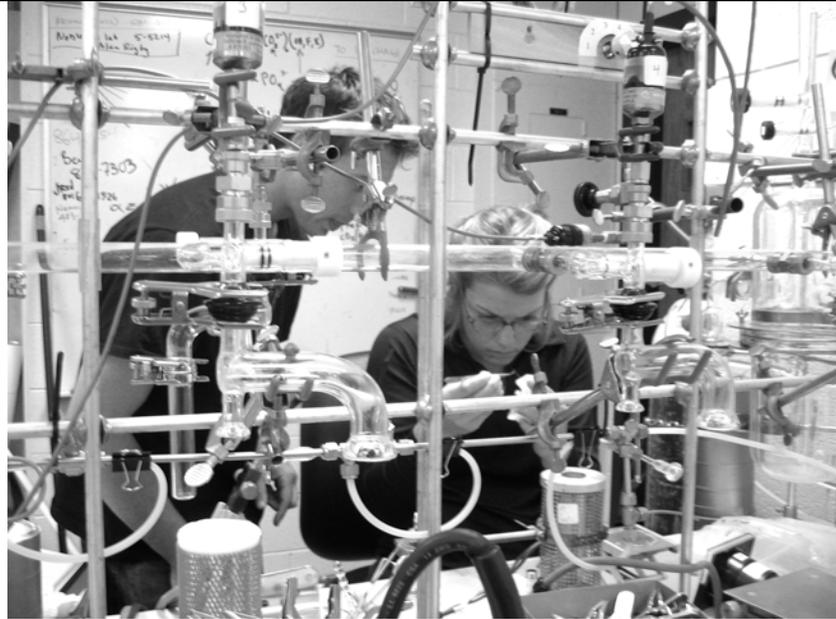
He is survived by his wife Patti Burke-Pratley, daughter Sue Pratley, son Dirk Pratley, and granddaughter Willa. He also leaves a brother and many nieces and nephews.

2005 Professional Meetings Calendar

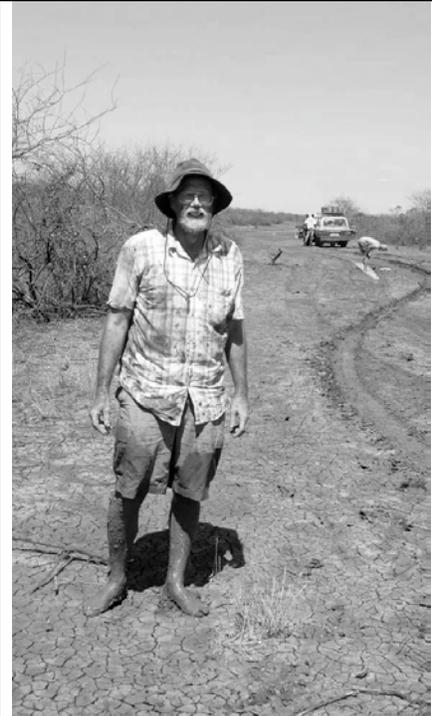
- The GSA meeting will be held in Salt Lake City the 16th through 19th of October. Come and enjoy the company of old friends and mentors while you hear about new developments in the Earth sciences. We're hosting a private alumni party on Monday, October 17th, from 5:30 to 7:00 at the City Center Hilton. There's no need to RSVP or be registered for the GSA meeting in order to come visit with us.
- The Society of Economic Geologists (SEG) meeting will be held in Houston, Texas the 6th through 11th of November.
- The AGU will meet at the Moscone Center in San Francisco the 5th through 9th of December. Faculty and students of this department will be presenting their research findings at some of these meetings. If you're going to be there, be sure to look for them.

And Presenting ... *Down to Earth's GEO Gallery!*

Here are a bunch of pictures too good to be left out! Geologists are by habit and nature happy shutterbugs, so send us your own for the next issue. We'll print as many as space allows.



So next we put this thingamajiggie into Port X on the diagram. Where's Port X? Where's your diagram? You left it under a ROCK? In MINNESOTA?



Wu-Lung Chang at the south arm of Yellowstone Lake during one of the GPS campaigns.

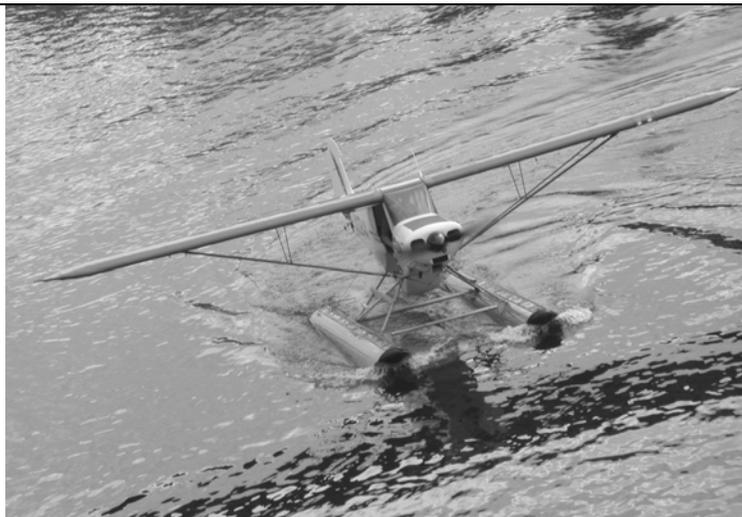
Thure Cerling trying to cross a particularly bad patch of road. (It took 9 hours to go 5 km.) That's Frank Brown cleaning himself up in the background.



Wow! Can you see that! . . . Students drop by our display on Science Day.

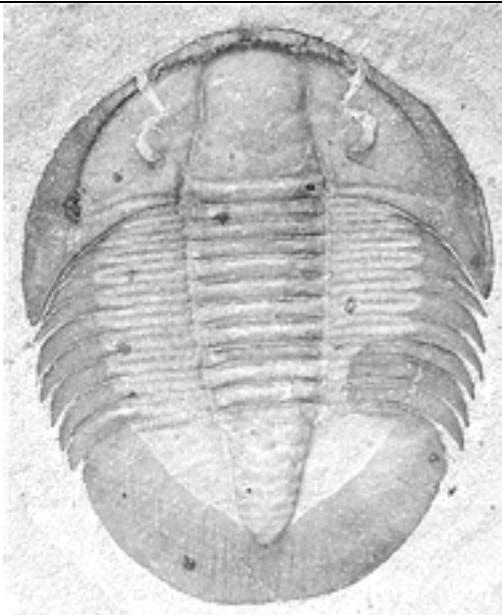


Salt Valley anticline, as seen from Hurrah Pass, south of Moab, Utah. Light lines under Wingate Sandstone in the distance are the potash plant's settling ponds.



Alaska's answer to the field wagon — a float plane on the Yukon.

Utah's Cambrian section produces species such as this extremely rare arthropod with appendages and antennae preserved. It is new to science.



Selenocythe tratyura, an extremely rare trilobite from the Weeks Formation near Delta, Utah.



Scott Sampson pointing out morphological adaptations to Science Day participants.

Your fellow alumni and colleagues in the Department of Geology and Geophysics would like to hear about your professional accomplishments, job promotions or changes, address changes, or any other news you would like to hear. You can also update your information on our website at: <http://www.mines.utah.edu/geo/alumni/index.html>.

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

Name _____ Class Year _____ Degree _____

Address _____ New Address? Yes No

City _____ State _____ Zip _____ Phone _____

Position _____ E-mail _____

Employer Name/ Address _____

City _____ State _____ Zip _____ Bus. Phone _____

My news:

Mail, fax, or e-mail to: *Down to Earth*

Geology and Geophysics

University of Utah

135 South 1460 East Room 717

Salt Lake City, UT 84112-0111

Fax: (801)581-7065; E-mail: gg_chair@earth.utah.edu

New opportunities to expand our facilities and services come to our attention constantly. Needless to say, there is seldom room in the budget to accommodate them. Gifts from our friends and alumni provide many extras that enhance our students' educations. We appreciate your support. If your company has matching grants, please send us one of their forms.

Yes, I'd like to provide support!

Preferred Name: _____

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Home Phone: _____

Company Name: _____

Company Address: _____

Work Phone: _____

E-mail Address: _____

The enclosed check is for:

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___ Geology and Geophysics Scholarship Fund

___ Orlo Child's Field Trip Fund

___ Larger donation: Please have Department Chair contact me.

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