

Down to Earth



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

Fall 2010



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Message From the Chair

Dear Alumni and Friends,

We are looking forward to another great year and I am pleased to report that the overall strength of the Department remains very high. Last year I reported on three challenges facing the Department: overcoming a 20% budget cut; becoming a more vital part of the general undergraduate curriculum; and replacing retired faculty. A number of very positive steps occurred last year and we made progress on each of these challenges. (See Charting the Future article.)



We have also made progress in becoming more central to the general undergraduate curriculum by adding courses that meet new University requirements. Rich Jarard and Sue Halgadahl developed Living with Earthquakes and Volcanoes as an online course that fulfills the “international requirement.” Pre-enrollments for this course were large, causing us to twice increase the enrollment cap! We are also offering more sections of popular courses such as World of Dinosaurs, and I expect a record number of 1000-level student credit hours this autumn. Also, our number of undergraduate majors increased 25% from Fall 2008 to Fall 2009; since 2004 our total number of undergraduate majors has more than doubled! We have added a new B.S. degree in Earth Sciences (see the story on page 4).

Finally, we have been successful in recruiting extraordinary new faculty (see Faculty Focus) and our “faculty transformation” is off to a great start!

The Department was reviewed by the Graduate Council this fall, so the faculty spent considerable time this summer looking carefully at where we have been, where we are, and where we hope to go. While we still strive to improve numerous aspects of the Department, I could not help feeling proud as I compiled measures of our research productivity, teaching, and service. Much of this pride comes from looking at the accomplishment of our alumni. You are truly an impressive group! I hope you enjoy this issue of Down to Earth and I look forward to having you drop by to say hello.

— Kip Solomon

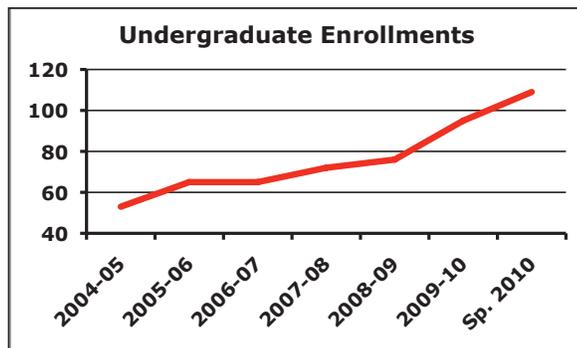
Cover Image: The colorful “Wave” of sculpted Jurassic Navajo Sandstone in the Vermilion Cliffs National Monument, near the Utah-Arizona border. Photo by Marjorie A. Chan.

Down to Earth editors: Dr. Marjorie Chan and Susan Fisher; Layout: Anita Austin

Charting a Course for the Future

Utah is an extraordinary state for Earth science. Few places in the world have our accessibility to fantastic exposures, valuable resources, and important geologic sites. With the completion of the Frederick A. Sutton Building, our internal environment now complements our geological surroundings providing exceptional educational and research opportunities.

Historically, geology has been taught as an academic subject at the University of Utah since the 1860s, even before John Wesley Powell and Grove Karl Gilbert accomplished their pioneering geologic work in this state! Earth science is still critical to society today and Earth's sustainability for the future. We offer several degree programs at the undergraduate and graduate levels, and are pleased with the dramatic rise in our majors this last year – numbers that have been unrivaled since the 1980s.



With some organizational changes over the years, our Department now has twenty-one tenure-track faculty (one of whom serves as a Dean), one lecturer, six research faculty, and twenty-seven adjunct faculty. However, the average age of the tenure-track faculty is now 55.8 years and more than 86% are 55 or older, which will soon mean a large turnover in the faculty.

Gifts to the College and the Department continue to sustain us in these tough budget times. Fortunately, both industry and friends of the department who believe in our mission continue to make significant contributions. Additional scholarship support from alumni and friends has helped us fill many gaps. Generous in-kind donations have added to our collections and displays. This support bolsters our programs in so many ways to help keep our program vibrant and competitive. Continued support will help secure our future.

- The Rev. Marta Weeks established the Francis H. Brown Presidential Chair in Geology. We expect to announce the first recipient later this academic year. We still actively seek additional endowed chairs and external support, but this most generous gift is a huge step towards helping our funding problems.

- We have received over \$235,000 in memory of Ricardo Presnell towards the scholarship fund for underrepresented students studying science. (Please see articles under Scholarship and Alumnus Section in this Newsletter.)
- With our spectacular new building and looming changes to our faculty, we are set on a new trajectory to raise our stature. At this new juncture, the following principles will guide us through this transition:
- Fundamentals over fashion. Directions of cutting-edge scientific research, sources of research funding, and the job market that our graduates enter are all changing rapidly. The best approach to such variability, for both the department and its graduates, is to maintain a solid and well-balanced foundation in basic scientific fundamentals.
- Focus resources to build areas of excellence, but still maintain overall balance. A priority in future faculty appointments will be to build and maintain critical masses in selected research areas. This Fall 2010, the Department was reviewed by leading peer-institution geoscientists, as well as internal reviewers from other departments on campus. Advice from these reviewers, alumni, and our general constituency help us focus directions for our future.

The departmental metamorphosis has already begun with recent hires of new outstanding faculty members (see Faculty Focus for details). Above all, we plan to hire the best and the brightest to continue both the long legacy of outstanding teaching and research. The future may take us into uncharted waters, but we are well equipped with exceptional facilities, and a well-defined course. It should be a great ride and we invite all of you to participate with us!

Going Green

We hope you noticed our newsletter is a little greener this year with a 25% size reduction. We have come to realize most of you still like to receive our newsletter in hard copy in the mail.

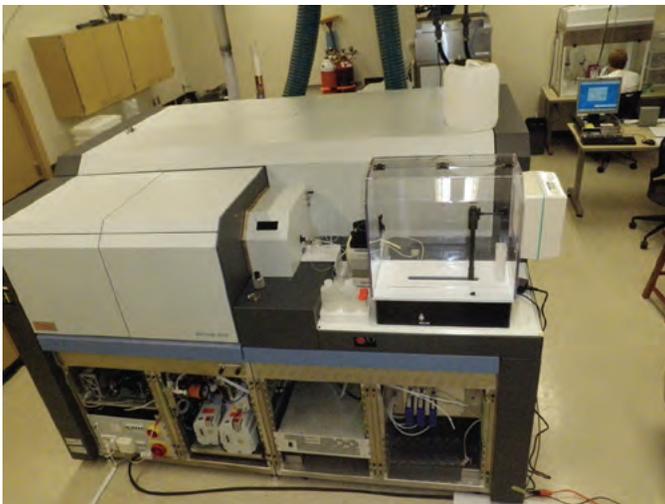
However, if you are one of those who would prefer to view the newsletter electronically, please drop us a line with your e-mail address and you'll receive e-mail notification when the newsletter is posted and available on our website at:

www.earth.utah.edu > Newsletters

ICP-MS Facility Extends State-of-Art Instrumentation

In the past year, the power and versatility of the Department's Inductively Coupled Plasma – Mass Spectrometer (ICP-MS) laboratory has seen increased use in determining trace elements across a broad range of both natural and anthropogenic systems. Our multi-collector ICP-MS has a laser ablation system, as well as a set of miniature counting detectors. The air-filtered positive pressure lab and extended "clean" workspace in the new Sutton Building now support projects from ten departments across the university as well as the needs of our own Department.

Researchers have asked for ICP-MS help in various projects to determine: how trace elements are distributed in natural water, which has implications for the entry of toxins into the food web; how the transport of various gold nano-particles in cells and tissues affects cellular activity; the apportionment of trace elements in different tissues of different organs to learn how to remove toxic metals and radionuclides from the body; how relatively innocuous inorganic mercury transforms to highly toxic methyl-mercury in sediments; and, a novel method for measuring trace elements in small samples of fly ash supported on paper.



The multi-collector ICP-MS Neptune is able to analyze isotopic ratios with high precision. Solutions can be sprayed or solids can be ablated with the laser in order to introduce them in the mass spectrometer. The samples are ionized in the plasma and the ions are analyzed in a set of detectors. These include miniature detectors to analyze low levels of lead or uranium.

Utah Universities Alumni Event
Mon., Nov. 1, 2010 - 6:00 pm to 8:00 pm
Hyatt Regency Denver
The Colorado Convention Center
Denver, CO

Our department will have a booth in the Graduate Information Forum area during the day on Nov. 1st. Please join us if you are able!

Presnell Memorial Scholarship for Underrepresented Students

In May 2010, the Dr. Ricardo Davis Presnell Memorial Scholarship Fund was officially established in the Department of Geology and Geophysics. The purpose of the fund is to provide scholarship assistance to departmental undergraduate or graduate students. Preference for an award shall go to underrepresented or non-traditional students. The fund's initial endowment of \$88,000 has now grown to over \$235,000 due to generous donations by Underworld Resources LTD/Full Metals Inc., Rio Tinto Exploration, an anonymous donor, and many of Ricardo's friends and family. These remarkable gifts reflects the loyalty and respect that so many in our earth science community had for Ricardo's life and scientific contributions. Please help us grow this fund to a quarter-million milestone in honor of an extraordinary geoscientist and friend. (See *Alumni section for more on Ricardo Presnell.*)



Sutton Building LEEDs the Way...

It's official! The Frederick A. Sutton building achieved GOLD level LEED certification (Leadership in Energy & Environmental Design) from the U.S. Building Green Council. This formal certification recognizes the energy savings, resource stewardship, and environmental commitment in the building's construction. We are pleased that the Sutton building is the first new construction on the University's academic campus to receive LEED recognition.

The innovations, including its geoscience education attributes, are discussed in the GSA Today June 2010 issue. This article is available online at: <http://www.geosociety.org/gsatoday/archive/20/6/article/i1052-5173-20-6-52.htm>

But our accolades continue beyond that. Every year, Utah's American Institute of Architects and the Salt Lake Tribune newspaper jointly hold an annual architectural competition of new Utah buildings. We were so pleased that The Frederick A. Sutton Building won the 2009 People's Choice Award! Visitors love the open and airy feel of our building, with the spectacular displays of geology as art. It's no wonder you may see students of majors from across campus hanging out in our building to study!



Marjorie Chan shows the new LEED Gold plaque.

U Scientists Challenge Science Magazine's 'Breakthrough of the Year'

In October 2009, a team of scientists led by Tim White of the University of California-Berkeley, published studies hailed as Science magazine's "breakthrough of the year." The studies outlined work at Aramis, Ethiopia, where they excavated 4.4 million year old fossils of *Ardipithecus ramidus*, as well as animal and plant fossils. The *Ardipithecus* fossils are more than a million years older than the previously oldest known hominid. The group claimed that the environment supporting *Ardipithecus* was woodlands and forest patches with a climate cooler and more humid than today.

The habitat claim is an argument against the "savanna hypothesis", which holds that the expansion of savannas – grassy plains with scattered trees and shrubs – set the stage for ape-like human ancestors to come down from the trees and start walking upright to reach other trees for food or shelter.

In a May 2010 Science "technical comment", Professor Thure Cerling, speaking for geologists and anthropologists from seven universities, disputed the woodlands claim. Cerling and colleagues based their conclusions on the White team's own data, including carbon isotope data for ancient soils. The critique concludes that "Ardi" most likely lived in tree or bush savanna with 5-25% of the area covered by trees or shrubs, rather than the minimum 60% used to meet the definition of a closed-canopy woodland.

Dr. Frank Brown, Dean of the College of Mines and Earth Sciences, has been working at hominid sites in Africa for many years. Brown notes, "White and coworkers' study says *Ardipithecus* walked upright on two legs, yet lived in a forested environment. They then say the savanna hypothesis must be incorrect."

Cerling adds, "Our conclusion is that much of the evidence should be interpreted as a savanna environment."



UUSS Helps Analyze Samoan Quake

Keith Koper, the new Director of the University of Utah Seismograph Stations (UUSS), participated in a recent study showing that the devastating September 29, 2009, tsunami in Samoa and Tonga was caused not by just one earthquake, but a trio of temblors. The three large seismic events happened within two minutes of one another; the first, an 8.1 event, hid the second and third. In terms of energy release, the two following magnitude 7.8 quakes combined represented another magnitude 8 quake. Koper said fellow researcher Chen Ji, of the University

of California, Santa Barbara, argued that the known quake hid a separate seismic event. That prompted the new study. Koper said, "When we first looked at this, we just couldn't explain the seismograms with one earthquake." Scientists began to unravel the novel pattern of seismic behavior, finally unveiling the first known case of a normal earthquake occurring on the outer rise of the oceanic plate that then triggered two major thrust quakes in the subduction zone. Koper said, "This study will affect the way earthquake and tsunami hazards are calculated, not just in this region, but potentially in other places around the world."

The National Science Foundation and the U.S. Geological Survey funded the study, which was led by seismologist Thorne Lay of the University of California, Santa Cruz. In addition to Utah's Koper, other co-authors are seismologists Charles Ammon of Pennsylvania State University, Hiroo Kanamori of the California Institute of Technology, Luis Rivera of the University of Strasbourg in France and Alexander Hutko of the Incorporated Research Institutions for Seismology's Seattle data center.

Dr. Irmis Is Part of Team Discovering New Proto-Dinosaur

Department of Geology and Geophysics Assistant Professor Randall Irmis was part of an international team that discovered the fossil remains in southern Tanzania of a Triassic proto-dinosaur, some 10 million years older than the oldest known dinosaurs. Individuals were 1.5 to 3 feet tall at the hip and 3 to 10 feet long, and walked on four legs. The animal is part of a newly recognized group known as silesaurs, said Irmis, but the group could not be defined without the new anatomical information from *Asilisaurus*; they have teeth and a jaw suggesting their diet was omnivorous. It is now recognized that members of the silesaur group were distributed across the Pangaeon supercontinent during the Triassic. They are the closest known relatives of dinosaurs, however, their presence in rock 10 to 15 million years older implies the lineages of the two groups had already diverged by 245 million years ago. The research suggests that at least twice within 10 million years – a relatively short time in evolutionary terms – two separate lines of meat-eating animals evolved into animals with diets that included plants. This flexibility may have been a reason for the long-continued success of dinosaurs and their early relatives during the Mesozoic.



New Special Topics Course “Geothermal Systems for Geoscientists” Scheduled

Interest in alternative “green energy” sources has stimulated the department to team with the Utah Geological Survey in offering a new special topics course “Geothermal Systems for Geoscientists” this autumn.

The course deals with fundamentals of geothermal systems including occurrence, conductive and convective heat transfer, harnessing the heat, reservoir engineering, geology, geochemistry, exploration techniques, and geothermal field management. The focus is on case studies and the practical application of theory. The course also includes a two-day field trip to geothermal systems in Southern Utah.

Prof. Dave Chapman and Rick Allis, director of the Utah Geological Survey (previously a geothermal scientist at Wairakei, New Zealand), are coordinating the course with many visiting guest lectures. Other faculty participants include Joe Moore, Greg Nash, Pete Rose and Phil Wannamaker from the Energy and Geoscience Institute. A Department of Energy grant through the Utah State Energy Program is supporting the course.



Geology Ph.D. students Scott Hynek and Glen Mackey examining a site in the Desert Mountains, NE of Delta, UT. Soil collection and analysis is an ongoing project to measure trace element compositions in Utah soils.

Carnivorous Dinosaur Discovery Revises Early Dinosaur Evolution

Nearly everyone is familiar with hypotheses for the extinction of dinosaurs 65 million years ago, but much less is known about the origin of the dinosaurs during the Triassic Period, 252-201 million years ago. Now, a new carnivorous dinosaur species reported in the December 11th, 2009, issue of “Science” has helped clarify our view of dinosaur origins. The study, by team of researchers

that included Geology and Geophysics Assistant Professor Randall Irmis, describes a new species, *Tawa hallae*, from several skeletons found in the Upper Triassic Chinle Formation at Ghost Ranch, New Mexico.

The complete and well-preserved remains of *Tawa* helped the team resolve the evolutionary tree of early dinosaurs. The evolutionary relationships of some of the earliest dinosaurs, *Herrerasaurus* and *Eoraptor* from Argentina, had been controversial, but with the new data from *Tawa*, Irmis and the rest of the team were able to demonstrate conclusively that they



belonged to the carnivorous dinosaur group called theropods, which includes our state fossil *Allosaurus*, *Tyrannosaurus rex*, and modern birds. *Tawa* also shows the earliest evidence for air sacs in its neck, just like those found in birds like your holiday turkey. The presence of these air sacs in such a primitive theropod only serves to emphasize that many features that are hallmarks of birds actually evolved quite early in the dinosaur lineage.

Using this improved evolutionary tree, biogeographic distributions of early dinosaurs suggest that theropod dinosaurs originated in South America, and soon radiated across Pangea. *Tawa* is just one of three carnivorous dinosaurs found at Ghost Ranch, so one might expect that these species represent a North American radiation during the Triassic. Instead, the research team discovered that these species represent three separate emigration events from the southern continents. This suggests there were few physical barriers to dispersal across Pangea. The team hypothesizes that the absence of other groups of dinosaurs (ornithischians and sauropodomorphs) from North America during the Triassic may be due to climatic conditions.

FACULTY FOCUS

Our faculty continues to expand their interests and activities, and their rewards are rolling in. New members bring talents that provide new opportunities and challenges, and the productivity of those who’ve taken advantage of sabbatical leaves sets a strong recommendation for that policy.

Awards Recognize Exceptional Talent & Perseverance

It is gratifying when we see faculty members recognized publically for their years of foresight, innovation, and perseverance. It enhances the stature of both the Department and the University, and it encourages us all to try harder in our own endeavors.

Marjorie Chan Recognized for Outstanding Contributions

Dr. Margie Chan's alma mater, the University of Wisconsin, in spring 2010 named her a Distinguished Alumna. She joined our Department immediately after receiving her Ph.D. in 1982. U. Wisconsin cited her contributions in the fields of sedimentary geology, basin analysis, stratigraphy, and planetary geology, and went on to praise her for being an exemplary role model for young women in the field of geoscience through outstanding education and mentoring. They continued with praise for her administrative skills as a seven-year department chair, during which she was tirelessly involved in seeing the new Frederick A. Sutton building through to completion.



In addition, the University of Utah recently awarded her the John R. Park Teaching Fellowship Award for 2010. This award is to enable professors to take one semester for study outside the state of Utah, in order to enlarge and enrich their teaching role.

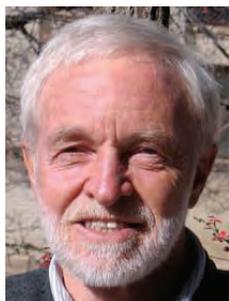
Cari Johnson Receives University's Campus-Wide Early Career Teaching Award

In the six short years she's been with us, Dr. Cari Johnson's activities in research, service, and teaching have made her a standout with colleagues and students alike. Her philosophy of treating research and teaching as symbiotic activities are especially evident in both her classes and the field trips she leads. She created a new course for non-majors that de-emphasizes the traditional lecture format; rather, inquiry-based assignments guide students toward understanding basic earth processes. Student evaluators speak of her as "crazy brilliant" and "the perfect instructor."



David Chapman Receives Distinguished Professor Accolade

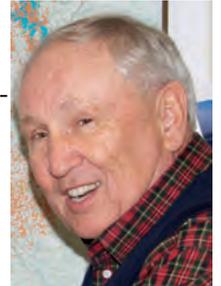
Professor David Chapman, a faculty member in the Department since 1976, has just been elected to the rank of Distinguished Professor at the University of Utah. A maximum of three faculty members from the entire University are appointed to this rank in any given year. The University reserves this honor for selected individuals whose achievements exemplify the highest goals of



scholarship, as demonstrated by recognition accorded to them from peers with national and international stature, and whose record includes evidence of a high dedication to teaching as demonstrated by recognition accorded to them by students and colleagues.

Bob Smith Recognized for Yellowstone Research Contributions

Professor Bob Smith received recognition from Yellowstone National Park at the August 25, 2010 opening of the new Old Faithful Visitor Education Center. The award noted how ideas from his book "Windows Into the Earth", written with Lee Siegel, had contributed to the Center. Bob's career-long research on how Yellowstone geology demonstrates the processes of the active volcano and earthquake activity of Yellowstone were incorporated into the theme and exhibits of the new \$27M center. This state-of-the-art Old Faithful Visitor Education Center will serve nearly three million visitors per year, and is a model of sustainable building practices.



New Faculty Expand Our Horizons

We feel our strong and exacting faculty searches have rewarded us with the best of the best. We count on these newcomers to challenge the rest of us to expand our own insights.

Keith Koper, New UUSS Director and Associate Professor, Brings an Interest in Extending Usefulness of Seismic Imaging

Dr. Keith Koper took over the reins of the University of Utah Seismograph Stations (UUSS) last July. He comes from a position as a geophysics professor at St. Louis University, where his NSF-funded research activities over the past ten years focused on mapping the fine-scale structure of Earth's deep interior using data recorded by arrays of seismometers. This work sheds light on the generation of the geodynamo driving core convection. While he expects that focus to continue, he has an evolving interest in imaging the rupture properties of large earthquakes using teleseismic array data. Techniques he has developed may provide important rupture details within 20 to 30 minutes of origin time, a significant improvement for emergency responders. Keith is also interested in non-earthquake seismic "noise", from wave energy to explosions. He brings with him to the department a post-doctoral student, Moira Pyle, and a Ph.D. student, Oner Sufri. When you meet him, ask for an introduction to his cat, Alice, who accompanied him on his move.



Faculty Focus (continued)

Engineer-Geostatistician Lisa Stright to Join Faculty

Lisa Stright is set to join the Geology and Geophysics department in Spring 2011, after completing her Ph.D. at Stanford University. She is a petroleum engineer and geostatistician with a unique geologic focus, holding M.S. degrees in both geological and petroleum engineering. Originally from Colorado, she earned a B.S. degree from the University of Colorado at Boulder. Her position is a unique collaboration between EGI and our department, and will help to bridge petroleum-related research between the two entities. Her research uses outcrop and subsurface measurements, observations, and interpretations to build geologically realistic numerical reservoir models. The direct application of this research is to reduce risk in hydrocarbon exploration and production by exhaustively using all available data and knowledge, across all disciplines. The broader contribution of this research is to develop better model building methods for groundwater hydrology and contaminant transport, carbon dioxide sequestration, climate modeling, basin modeling, or any problem that depends upon spatially or temporally distributed variables.



Lauren Birgenheier Focuses on Reservoir Characterization

Dr. Lauren Birgenheier specializes in sedimentary geology and geochemistry, with application to petroleum geology and paleoclimate. She came to the University of Utah in 2008, after receiving her Ph.D. from the University of Nebraska – Lincoln, and currently has a joint research faculty appointment in the Geology & Geophysics department and Energy & Geoscience Institute (EGI).



Lauren's projects focus on interdisciplinary approaches to characterize hydrocarbon reservoirs. Approaches include: climatic control and reservoir fairway delineation on channel reservoirs, oil shale heterogeneity, and geomechanical parameters of shale gas zones. In spring 2010, she taught a new half-semester course "Fundamentals in Applied Earth Science," which caters to non-geologists such as engineers, lawyers, or business people who deal with geologic-related topics.

Sabbaticals Provide a Thoughtful, Productive Hiatus

It looks to us like our faculty members leave behind little when they're on sabbatical other than class work and committee meetings. They finish long-standing projects, lavish thought on the direction of new work, and yet continue to take good care of their students. This year we're pleased to have someone choose us for her sabbatical.

Ron Bruhn's Sabbatical Reflects His Wide-Ranging Research

Dr. Ron Bruhn looks back with satisfaction on his year-long sabbatical leave. He completed manuscripts, wrote new proposals, obtained funding for a new field spectrometer, and took a field trip to Costa Rica. He also did a workshop on the oil and gas potential of the Cook Inlet Basin in Alaska for an oil exploration company.

Bruhn, Dr. Frank Brown and two of our Ph.D. alumni, Patrick Gathogo and Bereket Haileab, published their work showing how volcanism and faulting over time have affected the Omo River's drainage and ultimately the closed drainage of the Turkana Basin in Kenya.



Ron's work on Alaskan tectonics includes an article on the Bering Glacier and its interaction with geological structures, articles that apply airborne laser elevation measurements to further investigate the Saint Elias Mountains and another project on paleoseismology. Ron's research encompasses collaborative work with a number of colleagues across the country.

So what does Costa Rica have to do with Alaskan tectonics? Bruhn has been working on the recurrence interval of megathrust earthquakes in Alaska, and that requires understanding the evolution of marine terraces which get uplifted during big earthquakes. A perfect parallel exists in the uplifted marine terraces of the Nicoya Peninsula in Costa Rica.

On the Utah geology front this year, Ron applied for funding to study the Thermo Hot Spring geothermal area in southwestern Utah. New graduate students will also be working on the structural geology and tectonics of Utah.

The year also provided a wonderful opportunity to temper work with pleasure. Said Ron, "My wife Sandy and I have acquired a small house overlooking the Hood Canal and Olympic Mountains in Washington, where we keep a sailboat. So we did some marine geology – or was it oceanography? – while hiding away to write on manuscripts and proposals!"

Bill Johnson Studies Water Quality in Uganda and Ecuador

Dr. Bill Johnson's sabbatical this year involved water quality research at two widely separated sites along the equator. He spent two months in Kampala, Uganda, and one month in Ecuador.

During his time in Uganda, Dr. Johnson worked on a UNESCO-IHE (Institute for Water Education) project led by Jan Willem Foppen, a Dutch colleague from Delft University. Bill worked with three Ugandan Ph.D. candidates working toward degrees at Delft University, as well as faculty at Makerere University in Kampala. The graduate students' research involved hydrologic, engineering, and socio-economic aspects of developing sustainable sanitation solutions in slum areas bordering Kampala. Interest in the project was also high among the local 5-10 year-olds, who were always willing to lend a hand in the field.



Greg Carling, Abby Rudd, and Eddy Pazmino at the Nambija Mine, located in the Rain Forest in the Amazon Basin, Ecuador. They were part of Bill Johnson's field work during this summer.

In Ecuador, Dr. Johnson and graduate students Greg Carling, Eddy Pazmino, and Abby Rudd spent a month examining water quality issues with our Ph.D. alumna Ximena Diaz, who is now Director of the Instituto Nacional de Investigación Geológico Minero Metalúrgico, and her colleagues. They took water quality samples in transects above, within, and below mining districts on three rivers in Ecuador as part of a U.S. National Science Foundation project scoping grant. They forded rivers, climbed a volcano, consumed mucho locro (potato cheese soup), and required no antibiotics.

The project was a great success on all counts, and we hope this effort can grow into a larger project involving a Utah-Ecuador research exchange.

Adjunct and Visiting Faculty

Adjunct Professor Schuster Continues Connections with Our Department

The globe-trotting Dr. Gerard (Jerry) Schuster, former regular faculty member of this Department, completed his first year at King Abdullah University of Science and Technology (KAUST) as Professor of Earth Sciences, teaching seismology and imaging. Jerry already has five Ph.D. students, two postdoctoral students, and two research professors in his group. KAUST provides good research opportunities with access to their 64,000 processor "Blue Gene" computer. KAUST also set up joint research projects with the University of Texas in Austin, Stanford, and Imperial College in London. Schuster recently enticed several KAUST students to work with University of Utah graduate programs, including one who is working with Prof. Cari Johnson on seismic stratigraphy. Schuster plans to explore further collaborations on seismic stratigraphy using his new 620+ channel seismic instrument to involve KAUST students in Petroleum Institute Career Path (PICP) courses. He hopes to lend assistance to his new University of Utah faculty replacement in facilitating the transfer of Utah Tomography and Modeling/Migration Consortium (UTAM) software and expertise for a continued partnership with the Geology and Geophysics Department.

Karen Chin from University of Colorado Spends Sabbatical with Us

Dr. Karen Chin, Associate Professor of Geological Sciences and Curator of Paleontology at the University of Colorado in Boulder, is spending fall semester 2010 with us in our department while on sabbatical leave. Karen is a world-renowned paleoecologist who specializes in the description



and interpretation of coprolites (fossilized feces of extinct vertebrates) and other trace fossils. She is collaborating with Dr. Tony Ekdale on a research project involving new paleontologic evidence of the Cretaceous-Tertiary boundary strata in North Dakota. Karen also is interacting with our paleo graduate students and participating in the Ichnology course this fall.

Samuel Andanje Joins Us from Kenya

Dr. Samuel Andanje, a wildlife biologist from Kenya, is assisting Dr. Thure Cerling in determining the isotopic composition of Kenyan large mammal species, in an effort to determine dietary changes, environmental stress, and forensic possibilities. Animals of special focus are elephants, rhinos, hippos and cats. His focus has been on antelopes, their habitats, and relationships with predators.

We Try to Keep Our Old Ties

Walter Arabasz, Former UUSS Director, Retires

On June 30th, Dr. Walter J. Arabasz officially retired as Director of the University of Utah Seismograph Stations (UUSS), a position he has held for the past twenty-five years. Early in June, a reception honored his distinguished career. It was attended by past and present colleagues, family, and friends. During a short formal program, Walter received a letter of commendation signed by Governor Gary Herbert thanking Walter for his service to the State of Utah. Walter also entertained the audience as he recalled many anecdotes about events at UUSS during his career.



At Walter Arabasz's retirement reception, friend and colleague Paul Okubo presented him with this beautiful maile lei, a Hawaiian tradition for such special occasions.

Walter joined the Department of Geology and Geophysics in 1974 and became the Director of UUSS in 1985. During his time in Utah his research interests have included network seismology, earthquake-hazard analysis, mining-induced seismicity, and tectonics and seismicity of the Intermountain West. Walter is well-known and respected for helping to build a state earthquake program in Utah. He is often credited as a driving force for the creation of the Utah Seismic Safety Commission.

On the national scene, Walter worked to promote greater coordination and cooperation among regional seismic network operators and is one of the co-authors of the plan detailing the requirements for an Advanced National Seismic System (ANSS). In 2000 Congress authorized the full implementation of ANSS. As a regional partner of ANSS, UUSS received funding to build a multipurpose, real-time earthquake information system and an urban strong-motion seismic network along the Wasatch Front area. Walter has received numerous awards including the Governor's Medal for Science and Technology, State of Utah (1996), the U. S. Geological Survey John Wesley Powell Award (2007), and the Western States Seismic Policy Council Lifetime Achievement Award in Earthquake Risk Reduction (2007).

To honor Walter for his outstanding service, the Department of Geology and Geophysics is creating the Walter J. Arabasz Endowed Scholarship Fund to assist students interested in seismology. The goal is to raise \$25,000 to establish the fund. (If the goal is not reached by June 30, 2011, the funds will be used at the discretion of the department chair to assist students.) If you would like to contribute to the fund, please contact Martha Knowlton at knowlton@seis.utah.edu.

Field Trips Promote Crucial Understanding of Geology

Students and faculty alike gain vital expertise by confronting geological problems out in the field. Each year they find remarkable new opportunities.

Geology's Rite of Passage Celebrated Once Again

Earth Science and Geological Engineering majors learn to map and interpret rocks, depositional and tectonic structures and geomorphic features, and to work in teams, write professional technical reports, and cook great food at Summer Field Camp, set in Utah's Great Basin. This year's students were challenged physically and mentally, first at the Parowan Gap, where they mapped a major thrust fault, marine strata, foreland deposits, boulder conglomerates, pyroclastics, and normal faults. They then moved to the Raft River Mountains, a metamorphic core complex exhumed by low-angle normal faulting. Their indefatigable camp managers made life a lot more comfortable, and were fondly acknowledged in nearly every report. The summer culminated with lighter moments along the 1869 railroad grade north of Great Salt Lake (the first trans-continental route), rock prowling at City of Rocks in southern Idaho, and dessert at the close by Outpost Café in Almo, famous for its pies.



David Dinter demonstrates "World Class Fold" in the Raft Rivers in northern Utah.



Field camp students working in Parowan Gap near Parowan, Utah.

Students Compare Living and Fossil Marine Invertebrates

In November 2009, Dr. Ekdale's Paleocology class went to Mexico in an attempt to escape the frigid Utah winter, only to freeze on the shore of the chilly Sea of Cortez while spending a week investigating intertidal and eolian paleocology and sedimentology in the area around Puerto Peñasco, Sonora.

In March and April 2010, Ekdale's "Paleobiology" class ventured into the wilds of central and western Utah to collect abundant invertebrate fossils (and even a few small plant fossils and fragmented vertebrate fossils) in rocks of Cambrian, Ordovician, Devonian, Mississippian, Jurassic, Cretaceous and Tertiary age.



Paleobiology students braving the sleet while hunting for fossils in the San Rafael Swell, Emery County, Utah.



Paleocology students (Crystal Hammer, Carrie Levitt, Tracy Thomson, Megan Crocker, Jim Lehane and Lars Petersen) at Cholla Bay, Sonora, Mexico.

Capitol Reef Provides First-Class Look at Depositional Environments

Marjorie Chan's Depositional Environments class took an early March 2009 field trip to Capitol Reef National Park and managed to dodge most of the snow storms. They took several hikes and enjoyed the terrific sedimentology, scenery, and camaraderie.



Depositional Environments Class at Hickman Bridge, Capitol Reef National Park

Sedimentary Environments Stimulate Evaluations of Reservoir Quality

On a beautiful day at the end of April 2010, the Fundamentals of Applied Earth Sciences course took a one-day field trip to Helper Canyon near Price, Utah with Lauren Birgenheier. They explored different types of sedimentary deposits, including the alluvial Red Narrows Conglomerate, the fluvial Price River Formation and Castlegate Sandstone, and the shallow marine to paralic Blackhawk Formation. As a project for the course, each formation was evaluated in terms of its potential quality as a petroleum reservoir.



Applied Earth Science Field Trip to Price Canyon, Utah

Volcanism Class Focuses on Utah's Young Formations

Barb Nash's Volcanism class took a two-day field trip to investigate Quaternary volcanoes in Utah. Large lava tubes were one of the highlights.

Turkana Basin Sediments Draw Scientists from Diverse Disciplines

Frank Brown and Thure Cerling taught a mini-field course on the Geology of the Turkana Basin in northern Kenya. Ten students participated, representing the U of U, Penn State, SUNY Stony Brook, U. of Georgia, Yale University, and the Kenya National Museum. Students included anthropologists, geochemists, biologists, and paleontologists – a good mix of interests. They spent two weeks in northern Kenya, at Lake Turkana, with excursions to the Pliocene and Pleistocene sediments that host the many hominid fossils found in the area over the past forty years.



Liz Barrett, Brittany Dame, Adam Hiscock, Nora Nieminski taking a break in Parowan Gap, Utah.



Doing geology the old way. Prof. David Dinter and friend explore the Torres del Paine laccolith and massif in Chilean Patagonia.

SEG Students Lead German Peers to Northern Utah Mineral Deposit Sites

SEG Student Chapter members and faculty advisor, Dr. Erich Petersen, lead Dr. Christian Schardt's group of nineteen students in the Natural Resources program at RWTH Aachen University (Rheinisch-Westfälische Technische Hochschule Aachen), the largest university of technology in Germany, on a two-day leg of a three week field trip to visit classic mineral deposits districts in northern Utah. At the Tintic district students examined drill core from a deeply buried porphyry copper deposit. The group also visited the small copper skarn deposits associated with the Alta Stock and the giant Bingham Canyon deposit.



SEG Student Chapter hosts German group in northern Utah.

AEG Student Chapter Revived Amid New Interest

The Association of Environmental and Engineering Geologists (AEEG or AEG as it is commonly referred to) Intermountain Student Chapter has been revived. A Fall 2009 meeting was held to gauge interest and when the dust settled, students from both the University of Utah and Utah Valley University became involved with the student group, as well as the parent professional organization. In February, Jesse Moyles (U of U Geological Engineering) and Ryan Anderson (UVU Geology) presented research they had been conducting at the AEG professional chapter's "student night." In April, the student chapter traveled to Great Salt Lake Minerals Corporation in Ogden to tour their facility and discuss water management in evaporation ponds.



AEG Student Chapter's April trip to Great Salt Lake Minerals Corporation, Ogden, Utah.

PICP Class Hosts LMU Students from Germany

Dr. Cari Johnson and her PICP (Petroleum Industry Career Path) class hosted a student group led by Dr. Anke Friedrich (Utah alum M.S. 1993) from LMU in Munich, Germany in September. A luncheon was given to allow students from both countries to get to know each other. The following day, co-representatives from Hess and Anadarko, John Byrd and Lee Shannon led a hike to southwestern Wyoming. They enjoyed a “cultural” experience of going out for Mexican food in Evanston.



Dr. Cari Johnson explains hummocky cross stratification in the Frontier Formation of Wyoming.

Students Expand Horizons

Our students strive to expand their activities into areas that will enrich both their professional and non-professional lives.

SEG Student Chapter Activities Promote Lectures, Field Trips and Meeting Participation

The Society of Economic Geologists (SEG) student chapter now sponsors one of the speakers for the Guy F. Atkinson Distinguished Lecture Series. In September 2009, they presented Dr. Ryan Mathur who spoke on “The Fractionation of Copper Isotopes at Low Temperatures and What It Can Tell Us in the Rock Record,” then again in November 2010 they will sponsor an international consulting geologist from Australia, Stuart Simmons, who will speak on geothermal systems. In addition, they were responsible for inviting Micky Fulp, an SEG mentor, to present a career seminar for students in 2009.

In 2009 they raised funds to cover the cost of field trips through a dinner and silent auction, with guest lecture by the late Dr. Ricardo Presnell (their Industry Advisor). They organized a field trip to Topaz Mountain, Utah, in which students from other campus associations participated. The chapter hosted students from Aachen, Germany, and they plan to host the opening event for the 2010 SEG pre-meeting field trip associated with the Keystone 2010 meeting. In addition, a field trip is being proposed in conjunction with the University of Utah stu-

dent chapter of the American Association of Petroleum Geologists (AAPG) in spring 2011 that would take them to northern Nevada to examine the Carlin-type deposits.

The First Annual SEG Fall Fiesta Fundraiser in November 2009.



Pictured: Robyn Greene and Nick Kerr. Funds were raised funds by selling a plate to a catered dinner, a silent auction, and a donation box. The special guest speaker was the late Ricardo Presnell.

Once again, in conjunction with the student chapter at New Mexico Tech, they have begun planning the next field trip to South America.

Student chapter members participated in two meetings. Anita Brown, Page Anderson, Alex Moyes, other students, and their advisor Erich Petersen attended the Society of Mining Engineering (SME) three-day annual meeting held in Phoenix. A cross-discipline nature of this conference (exploration geologists, mining engineers and metallurgists) really gave students a better perspective on professional careers. Through opportunities to network, two of the students returned with post-graduation job offers in hand!

The sixth Symposium of the Geological Society of Nevada, held in May 2010, provided an opportunity to touch bases with many alumni in the mineral industry.



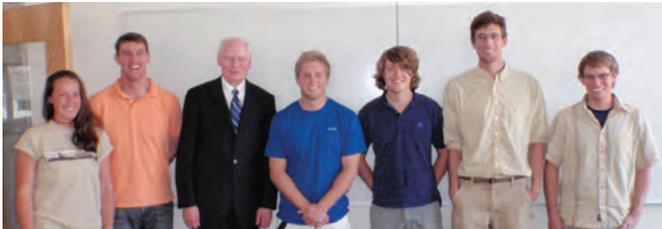
Society of Economic Geologist Student Chapter (SEG)

AAPG Honors Student Chapter and Members, Then Group Goes to Work

Former student chapter president Vaughn Thompson accepted an Honorable Mention for the U of U AAPG Student Chapter at the AAPG 2010 Annual Convention and Exhibition. This award, sponsored by Schlumberger, is given for recognition of active participation, utilization of chapter benefits, and attention to communication requirements.

A second honor, the AAPG L. Austin Weeks Undergraduate Grant was accepted by student chapter treasurer Nicholas Kerr. This award consists of \$500 to the AAPG student chapter and \$500 to a student, in this case Nicholas, who has demonstrated an impressive level of student involvement and academic success. The portion given to the chapter will be used to support future educational activities.

When the Geology and Geophysics Department was searching for a hydrocarbon faculty position during 2009, the AAPG students took charge of advertising the visits, hosting student questions and answer sessions, and encouraging students to attend the lectures. In spring 2010, guest lecturer Waldemar Rasmussen presented an intriguing discussion about the legalities of using and acquiring data.



Waldemar Rasmussen pictured third from left.

On the lighter side, the chapter continued the tradition of Geology Movie Night during the year by watching Superman and Armageddon. Not forgotten was community service: they sponsored a food drive and donated over 85 pounds of non-perishable food to the Utah Food Bank.



AAPG Student Chapter hosted a December Holiday Party at Tracy Aviary.

In December, the Holiday Party, sponsored by AAPG, was held at the local Tracy Aviary. It was catered by the Himalayan Kitchen and was a huge success. The annual Winter Outing was held in February at the Wasatch Mountain Club Lodge near Brighton. Students, faculty, and families alike were invited to socialize, network, play games, and go sledding, as well as ski or snowboard the next morning. At the end of the term, the annual AAPG Fundraising Event was held at the Department's annual picnic and award ceremony. Funding from this event will further support the chapter's activities this following year.

The chapter is looking forward to a large field trip to an area as yet to be determined in the near future, as well as smaller field trips, potentially one to an oil rig.

SAC Plans Wide Range of Activities for Coming Year

The Student Advisory Committee (SAC) is active this semester with raising funds for upcoming field trips. They are also planning field trips that will include mineral collecting, camping, and hiking.

All are welcome to join them. Students can rent lockers in the SAC room so they don't have to lug books around campus. A fall poster session for students will provide practice for upcoming conferences and professional meetings. SAC Nalgene bottles and Department T-shirts are still available through the Department office.

We Welcome New Graduate Students

Three Ph.D. candidates arrived this fall: Zahra A. Amini in Geological Engineering, Jeffrey Cross in Geology, and Oner Sufri in Geophysics.

Our new Master of Science group is a big one. In Geophysics we have: Hans Anderson, David Bierman, Muran Han, and Christian Hardwick. Those in Geology are: Warren Anderson, Jonathan Boswell, Chris Bradbury, Danielle D'Alfonso, Patrick Dooling, Thomas Good, Brendan Horton, Casey Kidney, Joshua Ryan Lively, William Mace, Luke Pettinga, Steven Pinta, Billie Smathers, and Kelly Ann Sullivan. Two join us in Geological Engineering: James Schloss and Christian Martin.



New graduate students Daniela Anguita and Casey Kidney join Geology and Geophysics faculty and staff in the rock garden for a new graduate student orientation luncheon.

Outreach Programs Promote Earth Science Inside and Outside Our Walls

The strengthened commitment of the Department of Geology and Geophysics to enhance the role and relevance of Earth science programs and perspectives at the University of Utah through campus and community outreach activities is showing robust signs of success. Enrollments in GEO courses are way up and numbers of Earth Science majors have increased dramatically in the last few years.

Sutton Building Boosts Visibility

Our beautiful new Department home, the Frederick A. Sutton Building, has enormously boosted our outreach efforts and visibility. Groups from all over campus hold receptions in the Confluence entry hall, with its fossil fish and plant walls from Wyoming's Green River Formation, or gather for meetings in our state-of-the-art conference room with views of the Wasatch Front. Students from across campus come to study, talk, or sip drinks from the Two Creeks Cafe in our many open, comfortable informal gathering places, surrounded by museum-grade fossil displays and polished rock slabs from around the world.



Kids marvel at the life-size cast of an Allosaurus fragilis.

Avenues Street Fair Lures Local Residents Year After Year

Every autumn the Department's booth at the Salt Lake City Avenues Street Fair attracts hundreds of curious and enthusiastic visitors with a cougar-chomping australopithecene, large shiny crystals, ammonites and trilobites, posters and literature on Utah earthquake hazards, a 3-D map of the Wasatch Front, and a "prospecting" pile of free fossil mineral specimens. Our faculty and students enjoy staffing the booth and talking with city residents.

New Ideas Emerge Every Year

New outreach initiatives under discussion include a free Wasatch Front geology field trip during the first week of school for incoming freshmen and transfers, and a longer field excursion open to all students during either the fall or spring semester break, possibly visiting several of southern Utah's spectacular National Parks.

On-Campus Activities Showcase Our Interests

Annual on-campus recruiting and informational activities have grown to include:

- Plazafest (a student information fair held on the student union lawn in Fall Semester).
- Majors Expo
- Science Day – at which our faculty and students present research workshops to visiting high school seniors who have expressed interest in studying science at the U. of U.
- Future Students Open House
- Transfers Day
- Several freshman orientation events, including a geologic tour of Red Butte Garden

In addition there are in-service informational meetings with University College and Transfer Student advising staff, course advertisements, direct marketing to academic advisors in non-science departments, and the Departmental web site.



Brandon Horton teaches Earth Science to K thru 2 students at Dancing Moose Montessori school while Patrick Dooling looks on. Kids learned about soils and layers of earth and they passed around samples.

Success of WEST Program Leads to New Outreach Program, TGLL

Project WEST (Water, the Environment, Science and Teaching) was established in 2004 by a National Science Foundation grant to Dr. David Chapman. Since that time, WEST has provided fellowships for over sixty graduate students to bring their research into K-12 classrooms. WEST Fellows spend fifteen hours a week working with teachers and students, doing hands-on and inquiry-based science activities, labs and field trips. The fellowship program benefits all the partners in that the WEST Fellows develop their teaching and communication skills, the teachers receive up-to-date content knowledge, and the students get to experience the excitement of doing “real” science. In 2009-10, WEST granted eight fellowships to graduate students in Physics, Atmospheric Sciences, Environmental Biology, and Geology programs.

Think Globally, Learn Locally (TGLL) is another NSF-funded science education grant that developed as an outgrowth of WEST. TGLL funds graduate students in the Biological, Geological and Atmospheric Sciences to work with K-12 teachers developing and teaching inquiry-based curriculum centered on the themes of habitat alteration, infectious disease, global warming, invasive species, and pollution and disturbance. In 2009-10, two graduate students from the Dept. of Geology and Geophysics, Greg Carling and Megan Crocker, received TGLL Fellowships. Greg commented that one of his favorite experiences was leading field trips to local streams where the students measured water quality and related their measurements to geologic processes and human-caused pollution.

WEST and TGLL combined forces for training and professional development at the Alta Peruvian Lodge. Faculty, fellows, and teachers spent three days together sharing expertise in science and education, learning new ways to teach and developing authentic science activities. Faculty from several of Utah’s major institutions contributed to the agenda making for very dynamic and interactive discussions. The workshop ended with an “Iron Scientist” competition that challenged teacher-fellow teams to create an inquiry-based lesson using a two-liter plastic bottle as the primary piece of equipment.

The WEST program is now supported through a combination of grants from NASA, the Salt Lake City School District, local charter schools, private foundations, the Bennion Center, the College of Mines and Earth Sciences, the College of Science, and the Graduate School. TGLL is supported via a grant from the National Science Foundation and fellowships from the VP of Academic Affairs. For more information or to donate to either of these programs, please contact Holly Godsey at: holly.godsey@utah.edu or visit the TGLL website at: <http://tgll.utah.edu>.”



Professor Chapman and his team of teachers and fellows show off their winning design for protecting eggs from high impact collisions (a lesson in physics!).



TGLL Fellow and Geologist Greg Carling teaches middle school students how to collect and analyze water samples from the Jordan River for various indicators of water quality.



Brendan Horton teaches kindergartener kids at a local school.

Alumni and Friends

We look forward to hearing from all of you. We're always amazed at the range of interests and activities our alumni continue to explore.

Ken Larsen Has Much More to Tell

Ken Larsen (B.S. 1953), the subject of last year's "Blast from the Past," continues to regale us with memories of his years as a student at the U. We know you'll be as delighted with these vignettes as we are.

Ken tells about the day he was studying in the old Mines building, located about sixty feet behind the metallurgy lab, when the metallurgy professor came into the classroom, very white-faced and visibly shaken. He told the class that he had just come from the metallurgical lab where several students were working. As he passed the ball mill, he casually asked what they were grinding. A student answered, "Oh, just a bag of ammonium nitrate that was a little lumpy." The professor dove for the breaker switch on the machine. He said, "The steel balls in the mill could have sparked an explosion that would have destroyed the entire metallurgical building, killing everyone present, and done serious damage to the Mines building as well."

We have another story from Ken that you're sure to enjoy, about how starving student survived in those times. So stay tuned!

Alumni Activities

We always look forward to hearing from our alumni who never fail to delight us with their diverse interests and activities.

1950s Graduates

Ken Larsen (B.S. 1953) and his wife Rosita visited us on their way for a summer adventure in Yellowstone. He enjoyed visiting the new Sutton building and delighted us with more stories, good memories.

1970s Graduates

Larry Braile (Ph.D. 1973) completed his rotation as Department Chair at Purdue University and is busy with Earth Science Education projects, SAGE (Summer of Applied Geophysical Experience) and other crustal seismic studies.

Howard Fishman (M.S. 1976) retired 6/30/10 after 35 years with Chevron.

W. Dan Hausel (B.S. 1972, M.S. 1974) enjoys his retirement from the Wyoming Geological Survey but continues to keep active interests in mineralogy and teaching martial arts clinics across the country.

Matt Mikulich (Ph.D. 1971) just completed a major piece of cabinetry and woodcarving, using solid cherry

hardwoods. He has been working on a new altar for St. Rose Church in Buena Vista, Colorado, for more than two years. The design is original, the construction is post-and-rail, and eight hand carved panels form the sides of the structure. It was completed, installed, and dedicated in early September 2010. Matt says the dedication ceremony "was really something to see."



Matt Mikulich spent two years making this altar.

Wallie Rasmussen (B.S. 1969 Mines and Earth Sciences, J.D. 1972 Law), former senior counsel at Exxon-Mobil Corporation, was a speaker for the AAPG student chapter this past spring 2010 on "Data, Data: What Do You Mean I Can't Get the Data?" This session focused on the rights for exploration, acquiring and using data, and environmental issues in obtaining seismic data.

Chuck Williamson (M.S. 1973) has been busy commuting to offices in Seattle and Calgary, but looks forward to board meetings such as the one in Scotland that offers a change of pace.

1980s Graduates

Craig Beasley (Ph.D. 1989) has his own successful independent geophysics company with projects all over the world.

Bryan Bracken (Ph.D. 1987) gets back to visit Utah fairly frequently, teaching Chevron's field courses.

David Braxton (M.S. 1997) and **Alicia Krogger** (M.S. 1997) and their 2 kids are now living in Perth, Australia. David travels and does worldwide exploration on porphyry deposits for Anglo American.

Mike Depangher (Ph.D. 1988) moved his Spectrum Petrographic business to Portland several years ago and his company is enjoying new growth with the development of sample prep techniques for new instrumental analyses.

Diane Doser (Ph.D. 1984) received a prestigious state-wide University of Texas system teaching award for innovative and exceptional performance and teaching at the undergraduate level. She is a professor and past chair of

Alumni Clips (continued)

the Department of Geological Sciences at the University of Texas at El Paso.

Bereket Haileab (M.S. 1988, Ph.D. 1995) is now Chair of Geology at Carleton College.

Doug Hollet (M.S. 1989) still does a lot of international geology and travel with Marathon Oil out of Houston.

Jacqueline Huntoon (M.S. 1985) continues as Dean of the Graduate School and Professor of Geology at Michigan Technological University. She serves as GSA Councilor and is on a number of other committees that encompass her outreach in geoscience education.

Rip Langford (Ph.D. 1988) manages to supervise a dozen or so graduate students doing a variety of sedimentary and environmental projects at University of Texas – El Paso. Somehow he still manages time to keep up with Robin and the three boys.

Dave Norman (M.S. 1983) is now the state geologist at the Washington State Geology & Earth Resources Division. Although he has faced some tough budget cuts, he is still trying to maintain their core. We sympathize in these tight times.

Steffen Ochs (M.S. 1988) continues to work for Shell and is settled into life in Perth, Australia, but recently has enjoyed globe-trotting trips to Thailand for rock climbing and sailing, as well as Germany.

Susan Olig (M.S. 1989) is enjoying a long and productive career in paleoseismology, with URS Corp. in Oakland, California.

Terry Pavlis (Ph.D. 1982) and **Laura Serpa** (M.S. 1980) are enjoying their faculty positions at University of Texas – El Paso. Terry has become an expert in Alaska geology and leader of a large St. Elias erosion tectonics project. Laura has been doing science outreach for both the Physics and Geology departments.

Chip Pedersen (M.S. 1985) has been running a successful bookstore in Park City, Utah.

Bruce Pfaff (M.S. 1985) is Associate Director of Marketing for Gilead Sciences, Inc. in California.

David Susong (M.S. 1987) is still skiing and enjoying the outdoors of Utah while working for the USGS Hydrology group in Salt Lake City.

Ralph Stearley (M.S. 1988) finished his rotation as Department Chair at Calvin College and is now back to studying fish fossils in collections around the U.S.

William Tafuri (Ph.D. 1987) has returned to the U.S. and continues his consulting practice out of Park City.

Peter Winn (M.S. 1982) developed Last Descents River Expeditions which brings people to the rivers of western China, and shows them a once in a lifetime experience. Peter is also the Director of Earth Science Expeditions, a non-profit organization devoted to researching and exploring rivers in western China. He currently lives in Grand Junction, Colorado.

1990s Graduates

Phil Armstrong (Ph.D. 1996) and **Tish Butcher** (M.S. 1993), faculty at California State – Fullerton, have many interesting field adventures in Alaska. Phil regaled a group of our alumni with one of his tales of a close call experience in 90 mph winds and the near-capsizing of his boat in the chilly Alaskan seas.

Roger Bond (M.S. 1993) is presently based in the Elko area, working for Barrick Gold.

Cassie Fenton (M.S. 1998) recently moved from the Scottish University reactor group to be a geochemist at GeoForschungsZentrum in Potsdam Germany.

Suzanne Janecke (Ph.D. 1991) enjoyed a sabbatical in Madison, Wisconsin. Some of her current research examines Pleistocene Lake Bonneville history through geomorphology and structural geology in the Cache Valley area.

Yi Luo (Ph.D. 1992) continues to work as a geophysicist at Aramco. His research covers many areas, but a current focus point is full waveform inversion. His son is an M.S. student in geophysics at Colorado School of Mines and is exploring several areas, including waveform inversion. Maybe his second son, now in high school, may also be swayed toward geophysics?!

Kim Olson (Ph.D. 1994) is Professor of Geophysics at San Diego State University. He is an internationally renowned leader in 3D earthquake modeling and continues a fruitful collaboration with research scientists at the University of Utah. Kim is enjoying life with his family in San Diego.

Lynn Peyton (M.S. 1991) finished her Ph. D. last December and returned to Colorado where she is currently consulting for Anschutz Corporation, working the Montana thrust belt.

Fuhao Qin (Ph.D. 1994) and **Wenyang Cai** (MS 1992) are senior geophysicists at Chevron and Repsol, respectively. They are raising their two daughters in Houston and continue to enjoy friends and family in the area, occasionally vacationing in Colorado and Utah.

Jay Quade (Ph.D. 1990) enjoys teaching and research at the University of Arizona. He is still working in Chile and Tibet, which he says is the roughest place in the world to go camping. We know that must be tough, coming from Jay.

Pete Shabestari (B.S. 1996) has been working on exploration projects in Utah, Nevada, China, British Columbia, and Russia, as well as in the currently hot West Pequop gold district in Nevada. He has combined geology with GIS to start True North Mapping, LLC (2006) which works with a wide variety of clients on many diverse projects.

Yonghe Sun (Ph.D. 1990) works for Chevron in Houston, and continues to make significant contributions at SEG after his two-year term as editor of Geophysics. His daughter is a National Merit Scholar at Texas A&M, and he has three other children at home.

Tekla L. Taylor (B.S. 1994) recently joined the Golder International firm in Lakewood, CO, working in the groundwater and water treatment groups. She looks forward to new opportunities and challenges.

Yang Wang's (Ph.D. 1992) faculty position survived the budget cuts at Florida State University. She continues studies in paleoclimate, paleoecology, and the soil carbon cycle.

Jonathan Wynn (M.S. 1998) is at University of South Florida and was a co-author of the recent Aug. 2010 Nature article on "Evidence for Stone-Tool-Assisted Consumption of Animal Tissues Before 3.39 Million Years Ago at Dikika, Ethiopia."

Changxi Zhou (Ph.D. 1995) is working as a senior research geophysicist at Conoco-Phillips in Houston. He joined the company just a few years ago, after working at a variety of companies in the exploration industry. He and his family enjoy living in Houston.

2000s Graduates

Alison Alcott (M.S. 2000) continues with Rockware, Inc. and leads a busy life in Colorado.

Page Anderson (M.S. 2010) recently joined Barrick Gold in Elko, Nevada.

Brenda Beitler Bowen (Ph.D. 2005) and **Gabe Bowen** (Post Doc. 2004-05) added a new baby boy to their family this summer. They enjoy academic life in Purdue although their research programs take them travelling all over the world.

Michael Bunds (Ph.D. 2002) is Professor of Geology at Utah Valley University where enrollments are really growing. He is still happy with research, teaching, and exploring the great outdoors.

Rebecca Kessler Cardoso (M.S. 2002) has been working for ENV American in San Diego doing environmental quality studies.

Chris DuRoss (M.S. 2004) is rapidly becoming the "go-to" expert on paleoseismology and faults in Utah with the Utah Geological Survey.

Becky Flowers (M.S. 2000) and **Kevin Mahan** (M.S.

2000) are proud parents of twins (earlier this year)! They are enjoying their faculty positions at University of Colorado – Boulder.

Patrick Gathogo (Ph.D. 2009) is quite busy doing a lot of travel in his sales position for Schlumberger Terra Tek, but still manages to get back to Ethiopia fairly regularly.

Bandar Ghassal (M.S. 2010) headed back to Aramco where he was assigned to the city of the sun, "Dhahran." He is very happy in his new position as the Red Sea petroleum geochemist.

Dave Marchetti (Ph.D. 2006) is happily teaching at Western Colorado – Gunnison and still collaborates with colleagues here at the U of U.

John Moore (B.S. 2007) is studying Lower Cambrian fossils of China for his Ph.D. program in paleontology at University of California – Santa Barbara.

Greg Nielsen (Ph.D. 2010) continues his position counseling for University Career Services at Weber State University, but also enjoys getting to teach some geology classes there as well.

Ben Passey (M.S. 2004, Ph.D. 2007) and **Naomi Levin** (Ph.D. 2008) are happy with their recent positions at John Hopkins University and are busy building their stable isotope labs.

Scott Richards (M.S. 2001) lives with his wife Nicole in Rifle, Colorado, where he works in Engineering Geology.

Jeanne Richter (B.S. 2004) is a geophysics consultant working for Barrick Gold, presently based in Elko, Nevada.

Eric Roberts (Ph.D. 2005) with wife Dana and new baby boy, recently moved to a new faculty position at James Cook University in Australia. Eric continues active research in Tanzania, Mali, the Congo Basin, Zimbabwe, South Africa, and Australia.

Winston Seiler (M.S. 2008) enjoys his work with Chevron in Bakersfield California. It's still close enough to get to Yosemite fairly regularly with occasional visits back to Utah.

Shane Spor (B.S. 2001) continues to work for Barrick Gold in Elko, and has been encouraging the company to add more Utah alumni!

Leif Tapanila (Ph.D. 2005) was promoted to the rank of associate professor with tenure in the Department of Geosciences at Idaho State University, where he also holds the position of paleontology curator and head of the Earth Sciences Division at the Idaho Museum of Natural History. Leif and Lori enjoy being parents.

Lori Chadwell Tapanila (M.S. 2005) continues to teach introductory geology courses as a lecturer in the Department of Geosciences at Idaho State University. Lori and Leif welcomed a new daughter named Sylvie into their family last winter.

Alumni Clips (continued)

Vaughn Thompson (M.S. 2009) is leaving EGI (Energy Geosciences Institute) at the U of U's Research Park, and is headed for a new job with Occidental in Bakersfield.

Mike Vandenberg (M.S. 2003) works for the Utah Geological Survey and enjoys photography along the way. He has had many stunning photographs published in the Survey's popular annual calendar and this newsletter.

Julie Willis (Ph.D. 2010) enjoys teaching and being on the faculty at BYU - Idaho.

Many Old Friends of the Department Greeted Each Other at GSA

At the GSA Annual Meeting held October 2009 in Portland, Oregon, the following faculty, alumni and friends attended our function: John Moore, Roger Congdon, Phil Armstrong, Abby Rudd, Dave & Beth Norman, Sarah Hanson, Larry Braille, Adolph Yankee, Leif Tapanilla, Rob Harris, Laura Sherpa, Terry Pavlis, Michelle Mary, Scott Starratt, Elmira Wan, Ralph Stearley, Eric Roberts, John Bartley, Ron Bruhn, John Bowman, Margie Chan, David Dinter, and Tony Ekdale.

Other alumni seen at the meeting, but who didn't make it to the alumni function included: Kevin Mahan, Gabe and Brenda Beitler Bowen, Jackie Huntoon, Roy Van Arsdale, Jack Shroder, Devin Castendyk, Ron Blakey, Ben Johnson, Jessica Allen, and Naomi Levin.

The following students were at the meeting: Crystal Hammer, Sheri Harding, Anita Brown, Daniel Amoakoh, Kevin Uno, Michelle Mary, James Lehane, Sally Potter, Alisa Marie Green, Kristie McLin, Greg Carling, Mike Stearns, Brittany Dame, and Scott Hynek.

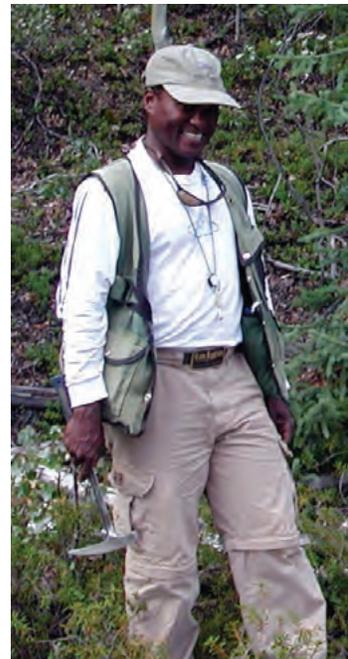


*Fish Springs near Dugway, Utah
Photo By: Michael Vandenberg (M.S. 2003)*

Alumnus Presnell Leaves Remarkable Legacy

Friend of the Department, and friend to many beyond our doors, Ricardo Presnell was killed last January in a tragic backcountry skiing accident near Solitude in Big Cottonwood Canyon.

The College of Mines and Earth Sciences established the Dr. Richard Davis Presnell Memorial Scholarship Fund for underrepresented students studying science. Substantial donations came in both from the industry and his many friends. At over \$235,000, it is almost enough to endow a full graduate fellowship. Friends may contribute by contacting the Dean's Office in the College of Mines and Earth Sciences at 801-581-8767.



Following a B.S. from Middlebury College and an M.S. from the University of Michigan, he came to the University of Utah to work with Dr. Bill Parry. Study of the Barney's Canyon gold deposit gave him a Ph.D. He worked for Kennecott Exploration for many years, then in 2009 he joined Full Metals and Underworld Resources as Chief Geologist. Presnell was devoted to his wife, Caroline Kroke (M.S. 1989), with whom he lived in Cottonwood Heights. Said Dr. Solomon, "He was a gifted exploration geologist and an extraordinary personality."

His career, focused on base and precious metals, and brought him wide respect as an economic geologist. He contributed to the Society of Economic Geologists (SEG) as a councilor and as the program chair of the highly successful 2005 SEG meeting held in Salt Lake City. In addition, he was a councilor for the Society of Applied Geologists and an associate editor of *Geosphere*. His concern for the development of aspiring young professionals led him to serve as the industry advisor for our SEG student chapter.

Dr. Erich Petersen, who contributed his obituary to the SEG Newsletter, called him a lifelong learner, mentor, scientist, explorationist and outdoor enthusiast. The SEG obituary said it well: "His unspoken but unwavering goal was to live big and make the most of his life, something most of those who knew him well consider his legacy and a challenge to ourselves."

Blast from the Past

In our "Blast from the Past" series we take pleasure in giving our geology and geophysics community a look at another alumnus, this time one whose interests and abilities were in the right place at the right time. He saw what was important and took advantage of it.

John Dorrier Moved Onward from Exploration, to Management, and to Entrepreneurism

John Dorrier began his career in geophysics during the first oil crisis. Since a lot of our readers are too young to remember how that shook our world, here are a few bare-bones facts: in January 1973, the price of Saudi Arabian light crude was \$2.05 per barrel; by January 1974, it was \$10.84 per barrel. Prices at the gasoline pumps tripled within weeks. Next, the Organization of Arab Petroleum Exporting Countries imposed oil embargoes worldwide and reserves around the world were quickly exhausted. Long lines of cars with frustrated and frightened consumers waited for hours at the pumps. The oil industry responded with unprecedented, unbridled expansion.



A few years earlier, John was a student at the University of North Carolina when he took a course in environmental science that was taught by an engineer who was interested in earthquake safety of nuclear reactors. Earthquake seismology piqued his interest and he went looking for more. He found it at the University of Utah, which at that time had one of the few programs nationwide that offered undergraduate degrees in geophysics. (Even so, there were only three other geophysics majors.) He was able to work with Dr. Ken Cook and Dr. Bob Smith, graduating magna cum laude with a B.S. in 1975. Oil exploration was frenzied, and jobs were both plentiful and exciting. He enjoyed it thoroughly, and still does even though the background has changed radically. The intriguing thing, for him, was the relatively short turnaround time from exploration concept to drilling result. He worked around the world, first in technical and then in management positions, for big oil companies such as Mobil, Amoco, Anschutz, and BHP.

By the mid-1980s, the oil shortage became a glut, and big oil companies shifted their strategy from supporting their own research and exploration functions, to outsourcing them. At the same time, geophysics was undergoing a technological revolution, taking advantage of the concurrent explosion in computing development. These factors provided a new set of possibilities for those like Dorrier who believed in their own expertise and wanted more opportunity to exercise their own judgment.

He still believes in the discipline of making and testing a model, then if it doesn't work going back to the data,

modifying the model if necessary, and testing it again.

By the mid-1990s, he could see his exploration methods working, and he wanted more autonomy. Furthermore, he could see that small companies have more versatility and management flexibility, thus making them able to react to new opportunities more quickly. He was soon ready to set up his own company, and in 1997 he founded Gulfsands Petroleum Plc, serving as its CEO until resigning in 2008 and then selling his interest in 2009-10. John shifted more attention to Enhanced Oil Resources, Inc., where he has been a Director since 2002.

Not content to just sit and watch, he started another new oil and gas venture in 2008, Orogen Energy, an exploration and development company for which he is busy finding new projects. He was a member of our Roundtable for a year, contributing information and ideas that improve the education and marketability of our students. But he still seems to have time to pursue his interests in fox hunting, golf, building and property development, mineral and fossil collecting, and travel.

The Guy F. Atkinson Distinguished Lecture Series is open to the public. Distinguished experts weekly explore new developments in the Earth Sciences. For more information, visit our website at: www.earth.utah.edu then click on the Lecture Series link on the left side.



Oner Sufri and Keith Koper enjoy some refreshments prior to one of the lectures.

Oil Company Recruiters Meet Our Students

We would like to thank the following recruiters (alum in italics) for coming to our department this year:

Chevron - *Jacob T. Umbriaco*, Gary Chapman, Bill Keyser, and Aksel Quintus-Bosz

BP America, Inc. - Doug Stoner and Elena Shoshitaishvli

ConocoPhillips - Carlotta B. Chernoff

ExxonMobil - M. Shane Long and Eric Wildermuth

Hess Corporation - *John Byrd*

Annual Awards Salute Exceptional Achievements

We take great pride in the achievements of members of our departments, and meet to honor them each year. The April 2010 event was hampered by snow, but all present enjoyed the year-end celebration.

Scholarships, Fellowships and Awards

The College, the Department, and our many Friends made substantial and important support possible for the following students:

Josephine Beam Scholarship: Jesse Moyles
Thomas P. Billings Scholarship: Mary Elizabeth Barrett, Jonathan Bingham, Rebecca Gage, Adriana Garcia, KayeLinda Heiner
BP Graduate Fellowship: Megan Crocker
Francis H. Brown/Rosenblat Prize Scholarship: Roxanne Winegar
Ken & Nedra Bullock Keller Scholarship Fund: Daniela Anguita, Casey Duncan, John Michael Fullmer, Adriana Garcia, Scott Greenhalgh, Allyson Harward
Chevron Undergraduate Scholarship: Brett E. Judy
Chevron Graduate Fellowship in Geophysics: David Bierman
Conoco-Philips Graduate Fellowships: Angela Kennedy, Luke Pettinga
Eardley Graduate Fellowship: Zahra Amini
Orlo Childs Field Studies: Brittany Dame, Christian Hardwick, Nicholas Kerr, Adam Hiscock, Pamela Brecht
James A. Comstock Scholarship: Robert Armstrong
Ken Cook Memorial Fund: Christopher Tingey
Cooper-Hansen Undergraduate Scholarship: Reshawn Jim, Kevin Jimenez, Richard Patterson, Jessica Renegar, Scott Stosich
Earl Family Scholarship: Robert Armstrong, Rachel Anderson
Earl Field Camp: Rachel Anderson
Etta Keith Eskridge Scholarship: Daniela Anguita
ExxonMobil Research Dean's Alumni Fund: Allyson Harward
Dean's Scholarship: Scott Greenhalgh, Angelo Montoya, Allyson Harward
Frischknecht Scholarship: Joseph Arpino
Geology and Geophysics Scholarships & Fellowships: Rachel Anderson, Jacob Rex Bigelow, Jonathan Bingham, Land Huegel, Reshawn Jim, Kevin Jimenez, Angelo Montoya, Ruthann Shurtleff, Scott Stosich, Jordan Waterman
Department of Geology & Geophysics Scholarships: Mary Elizabeth Barrett, Matthew Fenoglio, KayeLinda Heiner, Richard Patterson
Dorothy Rice Goode Scholarship in Geology: Leah Moelling
Gerald W. Hohmann Memorial Fund: Kimberly Hynes-Phifer, Shawn DeShazer
Sedimentary Geology Scholarship (H. Honda): Kelsey Jolley
Charles B. Hunt Award: Kathryn Bradbury
Earl Johnson Scholarship: Ian Feltt, Matthew S. Fenoglio, David Freistaedter, Land Huegel, Kelsey Jolley

G. Frank & Pamela M. Joklik Scholarship:

John Michael Fullmer

Kennecott Scholarship:

Thomas Lingard, Nora Nieminski

Kennecott Meritorious:

DeShazer, Luke R Dow, Ryan Allen Hillier, Jonathan Root,

Ruthann Shurtleff, Jordan Waterman

Matt Mikulich Undergraduate or Graduate Scholarship:

Hobie Willis

Mineralogical Society of Utah Memorial Scholarship Fund:

Frederick A. Beesley, Gordon Chapdelaine, Luke R Dow,

Thomas Etzel, Ian Feltt, Rebecca Gage, Mequette

Gallegos, Ryan Allen Hillier, Jessica Renegar, Jonathan

Root, Abbey Smith, Roxanne Winegar

Mountain Fuel:

Frederick Beesley, Katie Bradbury, Thomas Etzel

Petroleum Industry Career Path (PICP) Awards:

Megan Crocker, Angela Kennedy, Glen Mackey

Questar Scholarship:

Ian Feltt, Kevin Jimenez, Kelsey Jolley, Scott Stosich

Stokes Graduate Fellowship:

Joshua Lively

TGLL Fellowships:

Thomas Good

K-12 Project WEST (Water, Environment, & Science Teaching):

Stanley Smith, Dina Freedman, Erin

Moulding, Steve Pinta, Irene Rizza, Georgia Sinimdu

University Continuing:

Jacqueline Farnsworth, Kimberly Koeven, Jesse Moyles

URS Scholarship:

Ryan Hamilton

Marta S. Weeks Legacy Scholarship:

Hannah Durkee

AWG – Salt Lake Chapter:

Susan Ekdale Field Camp Scholarships – Kimberlee Pulsipher, Nora Nieminski

Outstanding Student Award – Brittany Dame;

Research Scholarship – Patricia Garcia

Honors

The Department recognized the following for their exceptional performance:

Outstanding Faculty Awards

Teaching: John Bowman

Research: Barbara P. Nash

Outstanding Graduate Students

Ph.D: Matthew Heumann

M.S.: William Gallin

Team of Excellence Award: Jared Gooley

University Graduate Research Fellows:

Gregory Carling Kevin Uno

University Teaching Award (UTA): Glen Mackey

Teaching Assistant: James Lehane

Outstanding Undergraduate Students

Geoscience/Environmental: Ted Balling

Geoscience/Geology: Nicholas Kerr

Geoscience/Geophysics: Christian Hardwick

Geological Engineering: Jesse Moyles

Earth Science Teaching: Rachel Shurdha

Ronald Terrill Memorial Award: Brooks Black

Student Research Grants and Internships

SEG Research Grants: Daniel Amoakoh, Alex Moyes
ExxonMobil Research Grant: Megan Crocker

Donors' Generosity is Vital to Our Mission (9/1/09 – 8/31/10)

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If we have inadvertently left someone out, we sincerely apologize.



AAPG Student Chapter Gift In-Kind Donations

Alta Ski Area
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 Wild Rose Mountain Bikes

Donation of Petrified Wood Now on Display

More of the Beatie petrified wood collection from Pat & Judy Beatie is arriving and being assimilated into our collections and displays. You will want to see more of this fabulous collection, showcased on both the first and fourth floors of the Sutton building.

BP Donates Sun Workstations

Through Keith Gray, manager of BP's High Performance Computing, the company has given the Department 36 Sun workstations. These will be put to excellent use supporting research efforts in the department, including earthquake monitoring at the University of Utah Seismograph Stations. We greatly appreciate their continuing support.

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Although our new building is completed, we still have many needs. Your gift to the department assists in maintaining and expanding our programs. You can designate a gift to the department to wherever you wish: scholarships, field trips, endowed chairs, new instrumentation, or the general fund. If your company offers matching funds, please let us know. We deeply appreciate your support!

It is every man's obligation to put back into the world at least the equivalent of what he takes out of it.
Albert Einstein