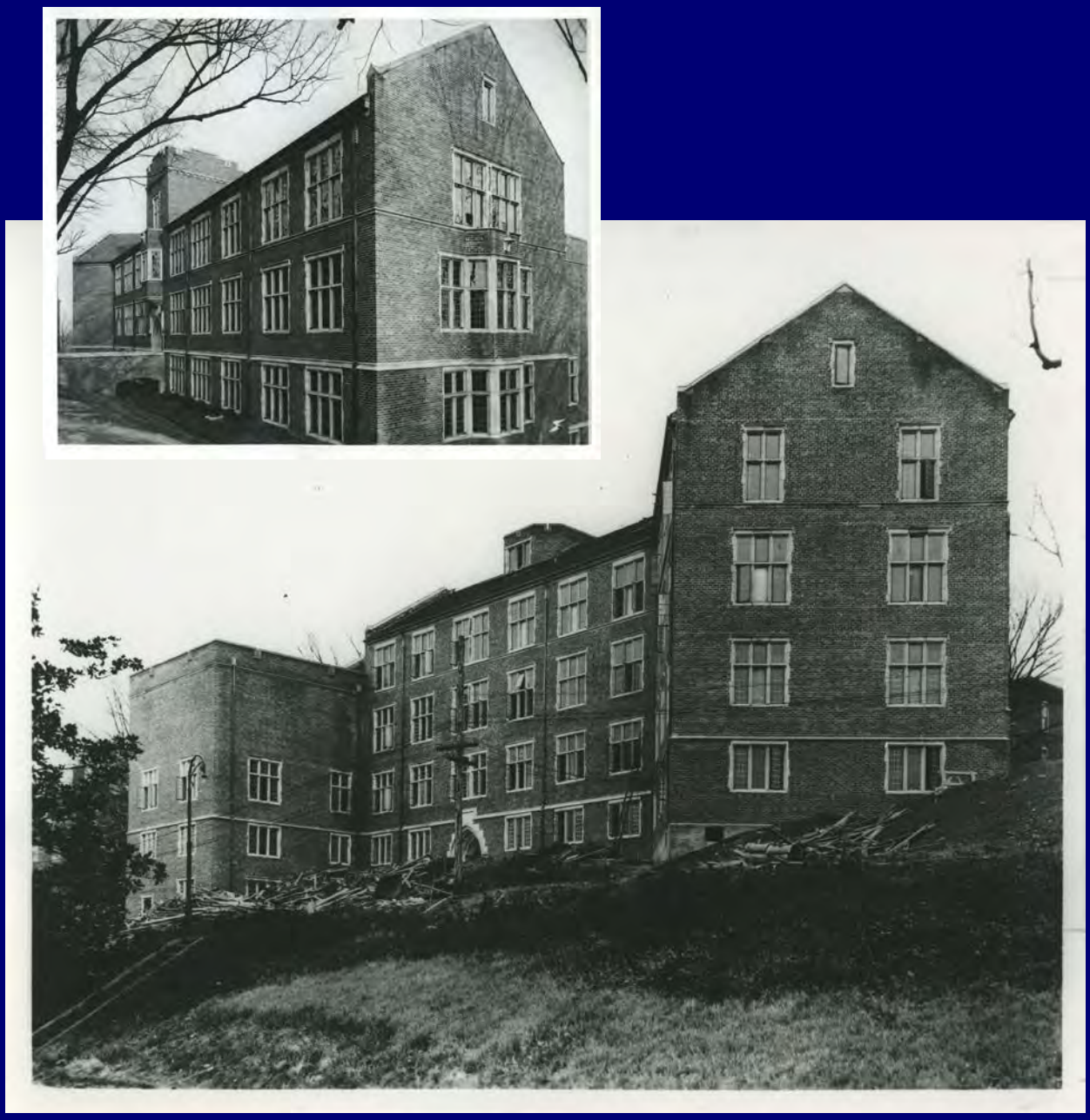
Department of Earth and Planetary Sciences

University of Tennessee, Knoxville



2010 Annual Newsletter

2010 Newsletter
Department of Earth and Planetary Sciences
University of Tennessee, Knoxville

Editors: Hap McSween and Bill Deane

Cover photos:

These two photographic prints were recently discovered in the historic collection of the UT Library by Cricket Haygood Deane (B.S. 1969). They show both ends of the Geology Building during its construction about 90 years ago. Note that construction material is clearly visible around the base of our building in the larger photograph. Alas, there is no information as to who took the photos or the exact date.

Authorization No. E01-1040-001-11

Letter from the Head

Larry McKay

It's been a very eventful year in the department of Earth and Planetary Sciences. The biggest news is that EPS is merging the undergraduate majors in Geology and Environmental Studies (ES) into a single major, with two concentrations and two different curricula. We now have approximately 100 majors, which has helped move our undergraduate program off the "endangered species" list of low-enrollment programs at UT. Both groups of students support the effort and are starting to have a lot more interaction in classes and social events. As well, we are finally receiving credit from the University for the years of hard work that our faculty (mainly **Mike McKinney** and **Don Byerly**) did in building up the Environmental Studies program.

This was an important year to reconnect with our alumni, which we did through a variety of events. We held alumni receptions at the GSA conference in Portland, OR and at the AAPG conference in New Orleans, LA. Last fall, we had a special reception at UT to honor **Bill Ross** (B.S. 1960) with the Distinguished Alumnus Award. In April, we held an alumni meeting and reception at UT (see report and photos later in this newsletter).

We reached some major milestones in the graduate program and faculty research. The number of PhD students has increased to slightly more than 60% of students in the graduate program. Research funding continues to grow, with a total of $2.5 million dollars for the 2009 calendar year. As well, every faculty member had at least one external research grant during this period. This is critical, because costs for research and education programs continue to increase, especially as we explore new technologies and new opportunities in the Himalayas, Bangladesh, Chile, Argentina, Spain, Mars, Titan, etc. The public research profile of our faculty also grew over the past year, especially for **Larry Taylor** and **Yang Liu**, who published a major "water on the Moon" paper in *Science*, which was covered in newspapers all over the world.

Mike Clark, Associate Professor in geomorphology, announced his retirement, effective December 31st of this year. Mike is our longest serving faculty member. He started at UT in 1967 and will be missed. In recent years, Mike ran a very active and well-funded program called TennMaps, which offered training in geology to high school and middle school teachers. This program involved a number of faculty and former students, most notably **Mike Gibson** (Ph.D. 1988), who's currently a Professor at UT Martin.

Finally, I'd like to thank alumni for their continued support. State funding has declined at UT by 30% over the past four years and our department expects $80,000 in budget cuts next year, due to the end of the federal stimulus program. Your generous gifts, especially to the Professors' Honors Fund and various Graduate Fellowships funds, are critical in helping us provide a high-quality educational experience and career preparation for our students.

Mike Clark Retires

For the last 43 years **G. Michael Clark** has been an active fixture in Earth and Planetary Sciences. On December 31, 2010, however, he will retire from the department. His participation will surely be missed.

Mike grew up in the mountains of rural north-central Pennsylvania. Hiking, hunting and year-round camping as an Eagle Scout in the Boy Scouts of America nurtured his interest in geography and in the natural world. He excelled in college at Penn State University, taking more courses than allowed every semester and graduating as one of three geography majors. Upon graduation, Mike enlisted with the Combat Army Engineer Battalion for six months of active duty and seven years of active reserve duty. Although he was never deployed, during his time on active duty Mike decided to give graduate school a shot.

He was given an assistantship in geology at Penn State under Dr. Laurence H. Lattman, and his focus on geomorphology began to develop. Near the end of his doctorate, Mike met Dr. Anders Rapp, an internationally known geologist at Uppsala University in Sweden.

From Anders, Mike discovered the field of periglacial geomorphology and decided it was worth pursuing. He completed his Ph.D. and moved on to postgraduate work with Anders in the tundra of north Sweden. With funding from a Thord-Gray fellowship, Mike made the first discovery of fossil permafrost features and the first evidence of permafrost degradation. Mike's career was off to a great start. He had already accepted a position the University of Tennessee, which was waiting for him after he completed his postdoc. Mike's research narrowed to the Appalachian Mountains, where he continues to study periglacial processes, debris flow and landslides, and the sinkhole environments of the Gray Fossil site. He has taught Geology 101 and Geology of National Parks, in addition to the occasional upper level geomorphology classes.

After he retires, Mike plans to continue his research in the Appalachians as well as work on a book about geology of the national parks. He will be remembered fondly for his humor, unmistakable lecture style, and insight on situations both mundane and absurd. In addition to his teaching, Mike has also been very active for years in the field of "teaching the teachers". "I have no idea what the future holds, it's a total blank. And that's good, because if you have some predetermined idea and it doesn't work out, you're crushed. I don't think that's the way to go. I have absolutely no idea what I'm going to do."

Faculty Happenings

Greg Baker

The 2009-2010 academic year was an exciting one in near-surface geophysics at UT, full of international travel, important research discoveries, and student successes. Shortly after the 2009 newsletter was published, our near-surface geophysics team—including graduate students Bill Arant (M.S.), Megan Carr (Ph.D.), David Gaines (Ph.D.), and Matt Edmunds (M.S.), along with UT collaborator Dr. Doug Howard—was able to secure ~$300k for the first year of technological development from a private corporation interested in tunnel detection at U.S. boarders using remote techniques (ultimately to market to the U.S. Department of Homeland Security). In September 2010 we presented our preliminary results at a technology conference for the sponsor, and the enthusiastic response and encouragement suggests follow-up funding is likely. Also, we've continued our work on time-lapse geophysical studies (led by student David Gaines, who will be leaving for a job in the Geophysical Processing Group at ExxonMobil in January 2011) focused on environmental-remediation monitoring at Oak Ridge Nat'l Lab (Y-12). We have just had funding extended for an additional two years, so the workload will now be picked up by a new M.S. student, Rachel Storniolo. On the travel front, I, Storniolo, and Caitlyn Williams) spent two weeks along the shores of the Mediterranean in June 2010, surveying for buried Roman architecture on the Akrotiri Peninsula of southern Cyprus—a tough job but someone has to do it! We discovered several new structures and structural components, and anticipate going back in the near future. Last but not least, Prasanta Yeluru (Ph.D. candidate) has just returned from taking a break from her studies to have a baby—congratulations and welcome back!

Devon Burr

In my second year at UT, I got to implement a new 100-level course: Exploring the Planets. Developing the lectures and working with some awesome GTAs made it a great growth experience for me. The enrollment has continued to increase, and I'm excited to see how it evolves over the next year. I also got to teach Geomorphology for the first time. Although I could never approach **Mike Clark**'s expertise in Appalachian geomorphology, I had a lot of fun bringing in more global and planetary topics. The new lab exercises spanned a range of activities, from collecting data for estimating weathering at the local cemetery, to numerical modeling, to making and measuring 'glaciers' using Elmer's glue and borax.

Once again, I spent part of my summer in California, continuing to work in the planetary wind tunnels at the NASA Ames Research Center. It was exciting to be able to – finally! – conduct our first experimental runs in the wind tunnels (although booster pump difficulties prevented us from achieving the desired pressure conditions). Colleagues from UT Mechanical, Aerospace, and Biosystems Engineering joined me at Ames and are contributing to the work through numerical modeling. The cross-department collaboration has been both interesting and productive. When not in the wind tunnels, I was out with planetary colleagues exploring the bottom of paleo-Lake Lahontan, a glacial lake bed in northwestern Nevada. Meandering channels on Earth are commonly considered to require vegetation to provide the necessary cohesion. However, the discovery of highly meandering channels on Mars has compelled reinvestigation of that idea. Meandering channels on the barren floor of paleolake Lahontan have developed since the glacial lake dried up ~12,000 years ago. In field work this summer, we investigated the sediment characteristics to determine what could be providing cohesion in the absence of vegetation. In future work, we'll be relating our findings to Mars.

Bill Deane

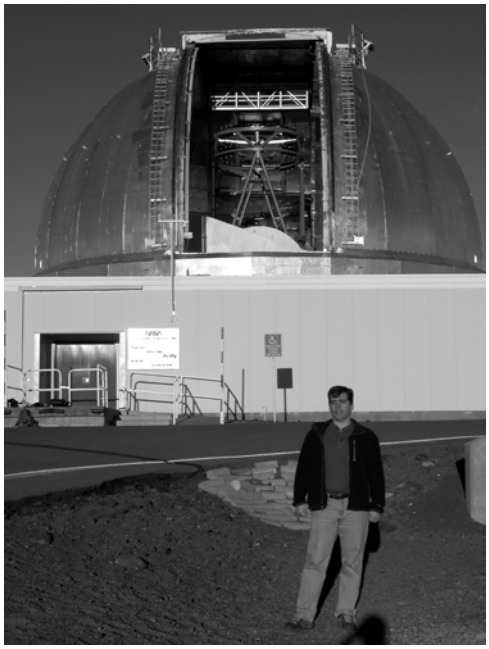
I continue to teach 101 in the fall and 103 in the spring, plus either 101 or 103 in the summer. For three years, Mike Clark and I taught the TennMaps summer course to teach teachers how to teach geology. Alas, the $750,000 grant expired in May 2010. This June, my body was quite happy to NOT get up at 5:00 am and drive up to Greeneville every day. I continue to be in charge of the GTAs and the 100-level labs. For both 102 and 103, we have switched to what we call "mad scientist labs." These are hands-on labs where the students actually do experiments, take measurements and write-up the results, rather than listen to or watch the GTA do a demonstration. For example, we have added a radioactivity lab to 103 and the students have to measure radioactivity. In another new 103 lab, the students go outside and measure CO emissions in car and bus exhaust. These labs are far more interesting to students. Plus, we no longer have a midterm or final in 103 (less grading!). Devon Burr has created Geo 104, planetary geology. It has been very challenging to create labs for this course. GTAs like Christina Viviano, Katie Singer and Kevin Thaisen have done yeoman-duty in creating 104 labs.

Bill Dunne

I transitioned from working as an associate dean for research and facilities in Arts & Sciences to the same position and responsibilities in Engineering during the last year. The new position has been fun because it is an opportunity to learn a new culture and to see research "closer to the ground" and less abstract. Facilities at UTK continue to be a

severe challenge as we grow our research programs, increase our number of graduate students and deal with being a public university at a time of financial constriction across the country. UTK is making progress but only through the dent of the quality of its faculty and students really. With respect to the department, I have not been entirely a ghost as I taught a slice of Planetary Geology (tectonics of Earth vs. Mars vs. Venus…fun!) and a larger slice of Advanced Structure, plus assisted **Ed Perfect** with one of his graduate students. Fortunately, I have had the opportunity to continue as one of the editors of the *Journal of Structural Geology*, which keeps me involved and thinking about rocks enjoying deformation.

Josh Emery



My second year in EPS has been tremendously fruitful as I continue to be inspired by the vibrant research community in the department. My longtime search for complex organic material in the outer Solar System was finally rewarded with the first detection of both organics and water ice on the surface of an asteroid (24 Themis). Ph.D. student Driss Takir made a splash at the recent American Astronomical Society/Division for Planetary Science (DPS) meeting in Pasadena, CA with similar research showing, through telescopic observations, a trend in the form of water on asteroids that will lead to deeper understanding of the geochemistry of these bodies. Master's student Riddhi Dave (Physics) and senior undergraduate Daine Wright also presented their research on infrared observations of Near-Earth asteroids (NEAs) and Kuiper Belt objects (KBOs), respectively, at the DPS meeting. I am also very pleased to be working with geology majors Kelsey Crane on developing shape models of asteroids and Emily Lea on observations of KBOs, and physics major Meagan White on observations of an extra-solar planet. Research this year has required a fair amount of travel, including two trips to Hawaii (Mauna Kea observatories), one to the Paris Observatory, meetings in Boston and Philadelphia about NEAs and KBOs, geology field trips in Glacier National Park (led by Prof. Kah) and Great Sand Dunes National Park, the DPS meeting in Pasadena, and I am preparing as I write this for a trip to Chile to use some great telescopes in the southern hemisphere.

Chris Fedo

My fascination with banded iron formation (BIF) and early Archean history continues to play a dominant role in my research agenda. More on that front in a moment. I also cannot seem to depart from Death Valley and the Mojave, where I have been cracking quartzites open to understand their minutest details for 25 years now. That number I simultaneously find amazing and terrifying, since I have M.S. student that is finishing his research on rocks I worked on for my B.S. degree senior thesis in the '80s! I've been working on sandstone and shale provenance for quite a while, and decided to really start emphasizing a first principles approach by trying to determine if sediment directly shed from a pluton in a desert setting actually does carry an unambiguous parent mineralogy and geochemistry. The answer, as another student is discovering, just isn't that simple.

Along these lines, **Hap McSween** and I are co-advising a student doing remarkably similar work on Mars. Back to BIF. It has been a busy year trying to piece together a better understanding of BIF through time. One of my soon to be graduating students is hard at work deciphering whether we see evidence for a clear cut oceanic redox chemocline from her samples of the famous Gunflint iron formation from the Great Lakes area, which formed shortly after the Great Oxidation Event. I am working hard at determining limits for using geochemistry for fingerprinting BIF and other chemical sediments. Why? Well, our very earliest surficial rocks on Earth, those in excess of 3.7 billion years old, have suffered greatly at the hands of time, temperature, and transposition, so much so that they often don't really look like sedimentary rocks any longer. Being that there is great interest in finding fossils in these layers, a clear understanding about the limits of their, shall we say, more low-temperature presence is quite essential. With field work last summer suspended because of lack of helicopter options, 2011 is Greenland or Bust! With this work pushing forward, I co-convened a session at Goldschmidt Conference this year, where experts on BIF came in from as far as South Africa.

Bob Hatcher

2009-10 was marked by continued work on understanding the crustal history of the Appalachians and embarkation into a new project. Graduate students are conducting fieldwork in the Valley and Ridge in northeastern Tennessee and the Inner Piedmont south of Atlanta. Phillip Derryberry has mapped the southwestern end of the Pulaski fault, reconfirmed that rocks of the thrust sheet and footwall were folded before emplacement of the sheet (unusual), and is the first to subdivide both the Knox and Conasauga Groups within the thrust sheet. Several students have been working in the Inner Piedmont south of Atlanta, near where I began working in the late 1970s and early 1980s. We were attracted to this area by truncating patterns on aeromagnetic maps that indicate a large, previously unrecognized fault. This fault turns out to be a suture and terrane boundary separating two Inner Piedmont terranes. A surprise discovery involves

the Mesozoic reactivation of the well-known Towaliga fault, where some segments exhibit brittle behavior, while others exhibit plastic behavior. Matt Huebner and Brittany Davis began work here and Chris Howard has begun work to the west. This past summer Matt and Chris separated zircons from several samples and, with Phillip's help, analyzed them at the Stanford–USGS ion microprobe laboratory. Their analyses provided some crucial U–Pb age dates that reconfirmed the nature of terranes on either side of the suture, but produced several surprises in the younger ages of some of the granites.

My new tectonic map of the entire Appalachian chain will be published in a GSA memoir in 2010. A long-term project to digitize and convert all of our detailed geologic maps to shape files in ArcMap continues to move along with some support from the USGS. A new project funded by the Nuclear Regulatory Commission began with a pilot study of the East Tennessee seismic zone, which extends into Georgia and Alabama. The project goals are to determine if there have been prehistoric M>5.5 earthquakes and, if so, how frequently they recur. We hope to receive additional funding to continue this work. In addition to these activities, two undergraduates are working on senior thesis problems in mapping an area in the Valley and Ridge and in analyzing mylonitized granite from Montana. Brittany Davis, Mary Varnell, Heather Byars, and William Gilliam completed their M.S. degrees, and Jennifer Whisner completed her Ph.D.

Micah Jessup

I and my research group continue to work on the evolution of active mountain chains in Asia and mid-crustal rocks exposed in Colorado. Jackie Langille (Ph.D. candidate) is working on samples from India and published her research on the Ama Drime range, Tibet. Nick Costello (B.S.) was awarded a 2010 EUReCA (Exhibition of Undergraduate Research and Creative Achievement) award for his project on the Leo Pargil dome, India and accepted a job with Horizon Well Logging Company. Both Jackie and Nick were partially funded by a grant from the National Science Foundation. Donnie Hick's (M.S.) received grants from the Geological Society of America, Tobacco Root Geological Society, and Four Corners Geological Society. He spent 1.5 months conducting fieldwork in the Black Canyon of Gunnison Nat'l Park, CO. Remy Leger (M.S.), the newest member of my research group, spent two weeks working with Donnie in Colorado. Liz Lee (M.S.) presented her research at the national Geological Society of America meeting. Last summer she worked for ExxonMobil in Houston on an internship. I was a keynote speaker at the

Geological Society of America meeting, convened a session at the NE-SE joint sectional GSA meeting, and presented at the Himalaya-Karakoram-Tibet workshop. I worked with Donnie in the Black Canyon and also conducted a 1-month field season to southern Tibet.

Linda Kah

For my group, this has been a year to finish some old projects before new ones get underway. The first success of the year came when my postdoc, Fernando Gomez, was awarded a research position at the University of Cordoba, Argentina. Miles Henderson (M.S. 2010) defended in July and is now working as an environmental site manager for Sierra Piedmont, and Sarah Cadieux (M.S. 2010) is scheduled to defend as soon as her committee members return from overseas travel and has already begun her Ph.D. research at Indiana University. This leaves me two Ph.D. students, Cara Thompson and G**eoff** Gilleaudeau. Cara is preparing to defend this fall, and Geoff is rearranging his

Linda leading a field trip, attended as well by UT faculty Devon Burr and Josh Emery, for scientists and engineers associated with the Mars Science Laboratory mission, which is scheduled to be launched in 2011.

dissertation to account for State Department restrictions on travel to his field area in Mauritania. Undergraduate Jesse Sexton completed a research project on a newly rediscovered fossil tree locality. Another undergraduate, Kelli Harrelson, completed work looking at the isotopic composition of lower Ordovician strata from Argentina. I would also like to welcome the newest member of my lab – George Stephen**s** – who started this summer. George began reconstructing a carbon-isotope profile for the Paleoproterozoic Vempalle Formation of India, and will spend his fall starting a new project on the Holston Limestone. In the meantime, I am keeping myself busy trying to get out more publications and gearing up for the 2011 launch of the Mars Science Laboratory mission. It has been a both a challenge and a true joy to work with a whole new community of scientists, and to see the breadth of interpretations that arise when you bring more than 20 diverse scientists and engineers on a field trip to look at Proterozoic sedimentary rocks! I am also gearing up for a busy fall – particularly at GSA where I am giving two invited talks…one in a topical session on isotopic change in the Proterozoic, and a second in one of the conference's *Pardee Keynote Symposia*, entitled Mineral Evolution: The Coevolution of the Geo- and Biospheres.

Ted Labotka

I spent much of last year preparing for the 2010 Goldschmidt Conference, which I, **Hap McSween**, and Dave Cole (ORNL) organized. The conference was held at the Knoxville Convention Center in June and was judged a great success from the numerous compliments from the participants. Dana and I traveled to Davos, Switzerland, and will go to Prague, Czech Republic, to give reports on the Goldschmidt Conference. I am now finishing several research projects on reactions between minerals and aqueous fluid that I and Dave Cole have been working on for the last ten years or so. I am helping Mike DeAngelis, Ph.D. candidate, finish up his dissertation on olivine–water reactions, and looking forward to an exciting year beginning new lines of research.

Larry McKay

Bugs, bombs and dirt were the main research interests for me and my students this year. Peter Knappett finished his Ph.D. on pathogens in aquifers in Bangladesh and accepted a post-doctoral position at the University of Munich. Beth Lavoie completed her M.S. on transport of explosives residues on soils. These residues are produced from incomplete explosions at military testing ranges and are becoming a significant problem for the Department of Defense. Last fall, the students in my Field Methods in Hydrogeology course designed and installed a network of monitoring wells at the new UT Little River Dairy Farm. The site is under construction, and Bob Hunter will monitor the environmental impacts of dairy wastes for his M.S. thesis. Undergraduate student Greg Carlso**n** is carrying out research at the site on bedrock controls on soil development.

Mike McKinney

As usual, I have been very busy as Director of the Environmental Studies Program. There have been plenty of students to advise and changes in the curriculum, especially

since the Program is merging with the Geology Department. On the research front, I greatly enjoyed writing a paper with **Colin Sumrall**, on ontogenetic and evolutionary changes in edrioasteroid allometry in Lethaia. This paper was part of our NSF grant.

My teaching schedule also keeps me busy. In addition to the usual intro courses, such as environmental geology, I co-taught a new course, Geology 456, on Climate Change, with **Dave Finkelstein**. It was a lot of fun and a very good learning experience for me. It was nice to have a course with both Geology and Environmental Studies majors in it.

Hap McSween

Over the past twelve months I've spent a great deal of time and energy on the steering group for NASA's Planetary Exploration Decadal Survey, which recommends how the space agency conducts its planetary programs. This has been an interesting experience, especially in regard to science priorities for spaceflight missions, and I've learned more than I wanted to about such arcane topics as plutonium power systems, launch vehicle costs, and deep space communication networks.

My new textbook, *Cosmochemistry*, appeared in print a few months ago, and I'm test-driving it in a graduate seminar this fall. So far, so good (or maybe the students are just being kind). I have repopulated my cadre of graduate students, adding three new students this fall to the four already here. And I am enjoying working with four postdocs – Brian Balta (Caltech), Doug Howard (George Mason), Brian Hahn (Stony Brook), and Andrea Patzer (Max Planck Institut, Germany).

Hap McSween with his undergraduate petrology class in spring 2010.

I'm looking forward to next summer, when the Dawn spacecraft arrives at asteroid Vesta. I am a co-investigator for that mission, in charge of the surface composition group which will analyze the chemistry and mineralogy of volcanic rocks on its surface. I'm still a co-investigator for the Mars rovers, which keep chugging along, and Mars Odyssey, an orbiter mapping the planet from afar. My undergraduate petrology class

keeps growing larger (see picture) – a healthy reflection of our increased number of majors. I still enjoy teaching that class more than any other. It's hard to believe that this is my 34th year on the UT faculty, although gray hair is testimony to my longevity. Over that time, I've seen many changes in our Department, but it remains a very special place.

Jeff Moersch

In fall, 2009, I was given a reduced teaching load so that I could care for my new son, Max. Nevertheless, I was able to keep a relatively active research program going, including advising four graduate students and two undergraduates. In the past year, my group has worked on such diverse research topics as characterizing the thermophysical expression of sedimentary features on alluvial fans in the desert southwest, mapping phyllosilicate deposits on Mars using both thermal and

Jeff Moersch gives his new son Max his first flight lesson.

near-infrared spectroscopic data, and identifying evidence for contemporary movement of Martian sand dunes. My group also continues to provide day-to-day operational support for the Mars Exploration Rover mission, and planning for the Mars Odyssey orbiter. In the spring, I took over as chair of Graduate Admissions, and over the summer created an online application system that has replaced our paper application system. I'm the new Mars Editor for the journal *Icarus*, which is the oldest and highest "impact factor" journal dedicated to planetary science. I also continue to serve as a member of the National Research Council's Committee on the Origins and Evolution of Life.

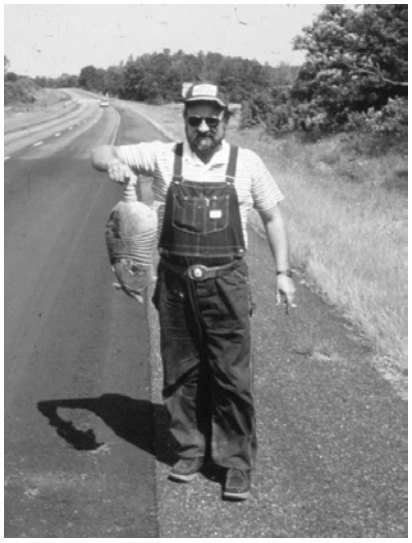
Ed Perfect

I was promoted to Professor in August 2010, and am presently serving as Associate Head with administrative responsibilities for academic scheduling and space. I teach a large introductory class on environmental geology and also offer upper levels classes in hydrogeology and geostatistics. On the research front, I and my students are active in applying quantitative methods to the study of flow and transport in variably-saturated porous media. Current research projects involve the use of neutron imaging to measure the hydraulic properties of rocks and soils, and estimating the storage capacity of rock units for subsurface sequestration of carbon dioxide.

Colin Sumrall

I spent most of this year finishing an extensive project on Ordovician edrioasteroid faunas from Morocco. Although I never made it to Morocco, I spent time in Spain and England while completing this work. Unlike the very well-documented North American edrioasteroid faunas that lived in warm, equatorial, carbonate environments, the African faunas lived in cool, siliclastic environments about 85 degrees south. Still, these faunas are as rich and diverse as their North American counterparts, defying common wisdom. This work, and related projects in China and South America, have shown that our understanding of the true nature of global, Paleozoic echinoderm diversity is tremendously skewed by a North American sampling bias.

Larry Taylor



I continue on my myopic ambition to catch my tail, so to speak, with an ever-increasing load of fun research to do. But, I am fortunate to have two fine associates in postdoc Amy Riches and Research Professor Yang Liu, as well as two ambitious Ph.D. students in Kevin Thaise**n** and Katie Singer.

No, even approaching 73 years of age has not been able to slow me down. This year has seen my involvement with the first discovery of water on the Moon, as a member of the Moon Mineralogy Mapper team that had a unique spectrometer on the Chandrayaan-1 orbiter of the Moon by India. I also was a major player on two different teams of scientists who discovered water in lunar apatite – up to 7,000 ppm = 0.7 wt% HOH. The Moon is not the 'bone-dry' body we 'proved' it must be 35 years ago. In fact, when asked by the *New York Times* about the fact that now I had done a 180 on the water issue, I said, "I've had to eat my shorts!" - something that my Dad used to say when he lost money at the race track. This prompted all sorts of emails from around the world – e.g., "What two side-dishes would you like with your shorts?" My team continue researching on a fast pace, funded by several grants from different portions of NASA. Besides their studies on lunar rocks and meteorites, we are also involved in the toxicity of lunar dust for future astronauts, applications of microwave energy sintering/melting with a lunar paver, and engineering aspects of a return of humans to the Moon for the establishment of a permanent settlement. Although this probably is not about to happen in my lifetime, I will still be watching from high above (or below).

Research Funding

The Department depends heavily on external funding to support its research programs, graduate students, and laboratory facilities. Obtaining grants is difficult because selections are so competitive, and the success of the faculty in obtaining them has made all the difference in these times of diminishing State funding for the institution. **Total external funding in force during calendar year 2009 was more than 2.5 million dollars!** The sources of funding for each faculty member in 2009 are given below.

Greg Baker	ORNL, NSF (2 grants)
Devon Burr	NASA (6 grants)
Mike Clark	Tenn Dept of Education
Josh Emery	NASA (7 grants)
Chris Fedo	NASA
Dave Finkelstein	NSF
Bob Hatcher	NRC, US Dept of Interior (2 grants)
Micah Jessup	NSF
Linda Kah	NSF (2 grants), ACF PRF, Evolving Earth Fund, Barringer Fund, National Geographic Society
Zhenghua Li	US Dept of Justice, NSF
Larry McKay	ORNL
Mike McKinney	NSF
Hap McSween	NASA (4 grants)
Jeff Moersch	NASA (5 grants)
Ed Perfect	ORNL
Colin Sumrall	NSF
Larry Taylor	NASA (6 grants)

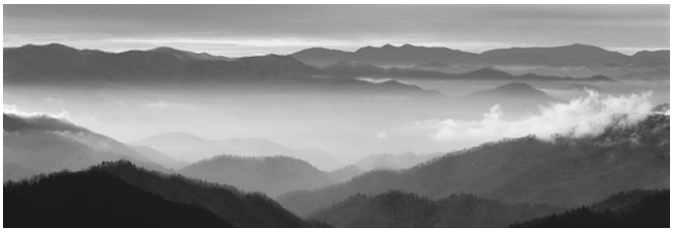
Environmental Studies Merges with the Geology Department

Mike McKinney

This last year saw the migration of the Environmental Studies major out of the Interdisciplinary Program in the College of Arts & Sciences into the Geology Department. This migration will greatly benefit everyone involved. All of the Environmental Studies students will benefit from access to more resources, including funding for trips to conferences and for research, which was lacking in their former status without a Departmental affiliation. The Geology Department will gain quite a few new students (about 40) and help our efforts to build a stronger environmental component. This move also included some changes in the curriculum structure. Undergraduate students in our Department will now be able to choose from one of two "tracks", allowing them to concentrate either in Geology or in Environmental Studies. The former is the more traditional major while the latter includes courses such as environmental policy, economics, and resource management.

Goldschmidt 2010

Ted Labotka



The 20th V. M. Goldschmidt Conference was held in Knoxville, on June 13 to 18, 2010. This conference is *the* international conference for all things geochemistry. Research presented at the conference ranged from planetary geochemistry to biogeochemistry, with every imaginable geochemical topic in between. The Goldschmidt conference began in 1988 with a small meeting in Baltimore, just before the American Geophysical Union meeting. It has grown to be the premier geochemistry conference with an attendance of more than 2000 delegates.

The conference usually alternates between a European and a North American venue. This was the first time since 2005 that the conference was held in the United States. With the large number of delegates and the exhibitors, the conference was held at the Knoxville Convention Center. The Convention Center proved to be an ideal spot because all technical sessions, poster sessions, and exhibition were housed in a single location. In the end, 2200 delegates attended the conference. The delegates enjoyed the hot Knoxville sun, a welcoming party with ample food and drink and bluegrass music, a banquet with excellent food, jazz, and dancing, field trips to the Smoky Mountains and the Spallation Neutron Source at Oak Ridge National Laboratory, and convivial exchange of scientific ideas

The theme of the meeting was "Earth, Energy, and the Environment." The conference convened with a speech by Senator Lamar Alexander about alternatives in the US energy mix. Every morning the meeting began with a plenary lecture on some aspect of the theme. We heard presentations on the use of neutrons to study environmental materials, the problems of trying to remove and store CO_2, and the weathering of rocks and minerals. A panel discussion was also held to discuss energy and environmental issues from the perspectives of academia, government, and industry. The plenary sessions and the panel discussion were recorded and are available on the web. If you would like to see them, go to the website http://www.goldschmidt2010.org and click on the link to the web streams (it's on the right side under "What's New?").

The organizers of the conference were **Ted Labotka** and **Hap McSween** and **Dave Cole** (Oak Ridge National Laboratory). Much of the logistics for the meeting were arranged by a group from UT Conferences, and on-site projectionists and computer operators were our students and a few from Appalachian State, Vanderbilt, Tennessee Tech, and Florida International, all organized by **Bill Deane**. The Knoxville meeting has set the tone for all future Goldschmidt Conferences.

Our department benefits from the conference, too. Not only did it enjoy the prestige of an international conference, it also received some monetary benefit. The conference was successful enough to provide some compensation for the time the organizers devoted to it. The department plans to replace our aging X-ray diffractometer as a result. The organizers all agree, though, that they'd really rather not do this again!

Linda Kah to Germany, Spain

With the political and security situation in Mauritania not getting any better, Ph.D. student **Geoff Gilleaudeau** and his advisor, **Linda Kah**, instead travelled instead to Kassel, Germany (in January) and Madrid, Spain (in May) to work on core material from the Taoudeni Basin. Although working from core will necessitate some redirection of Geoff's dissertation research, the new work has provided Geoff with some great experience and wonderful colleagues at three different European oil and gas corporations. Working with core also gives one the opportunity to remember the quote by Cervantes – as true to the story of the Earth as it is to the story of Don Quixote: *Wherein are related a thousand trifling matters, as trivial as they are necessary to the right understanding of this great history.* Of course, Geoff and Linda tried not to spend the whole time in core barns – there was der Herkules to visit in Kassel, and the Prado and Plaza Mayor to visit in Madrid!


(L) Statue of Cervantes at the Biblioteca Nacional in Madrid, Spain. (C) Linda Kah (center) and Geoff Gilleaudeau (right) with colleague Mateu Esteban in a very nice (i.e., heated) core facility. (R) Three of the several thousand meters of core that Geoff examined this year.

Faculty Recognition

Bill Dunne received the Outstanding Service Award from the UT College of Arts and Sciences at its Winter Convocation in December, 2009. This award recognizes his service as Associate Dean from 2002-2009. He was responsible for overseeing research and graduate education in the College, as well as physical space used for instructional and research activities. Although Bill retains his position as Professor of Earth & Planetary Sciences, he now serves as Associate Dean in the College of Engineering.

Chris Fedo was named a 2010 Fellow of the Geological Society of America. He was recognized at the annual GSA meeting in Denver.

High-tech Water Witching – an interview with Ed Perfect

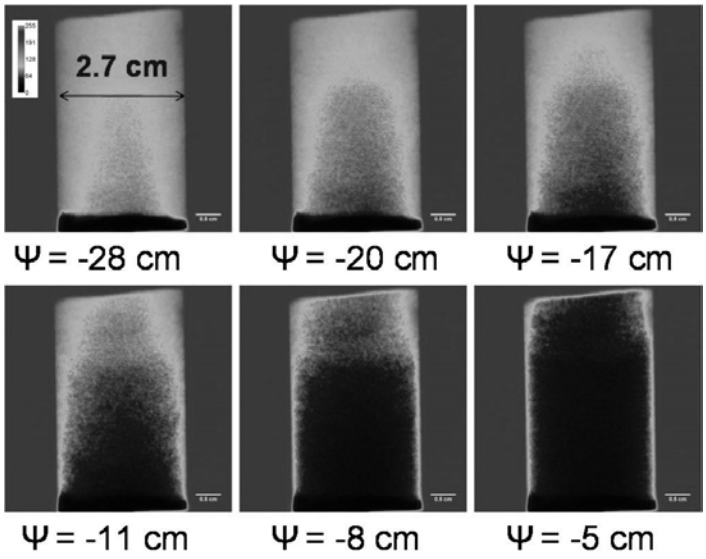
A dowser scans the ground with a fresh-cut, Y-shaped twig held taut in closed, upturned palms. When the stick turns down, water is said to lie below. What the twig is alleged to do for the dowser, neutrons do scientifically for vadoze zone hydrologist and Professor **Ed Perfect**.

Sensitive to hydrogen, neutrons are attenuated (scattered and/or absorbed) as they pass through samples of moist soil. Patterns of attenuated neutrons create visualizations of the distribution of water in pores throughout the soil. Images collected at varying sections reveal how air replaces water inside the sample during drying, or vice versa during wetting (see image below).

Soil scientists use hydraulic properties to determine soil's water-holding capacity, the time it takes to adsorb rainfall or irrigation, and the rate at which water moves through saturated or partially-saturated soils. Traditionally, such properties are measured based on experiments run on samples in containers. "But, inside the sample, it's essentially a black box," says Perfect. As a result, the data obtained must be combined with assumptions about the distributions of air and water in the sample to predict flow and transport.

A newcomer to neutron imaging, Perfect joined forces with the ORNL LDRD team to develop neutron-imaging techniques for better predicting the behavior of fluids in plant-soil groundwater systems. Ultimately, the teams hope to build a community of users to benefit from a future neutron imaging facility at the Spallation Neutron Source at ORNL.

Currently, Perfect conducts neutron imaging studies at ORNL's HFIR facility and at NIST Gaithersburg, MD. His JDRD study combines data from both 2-dimensional (radiography) and 3-dimensional (tomography) analyses. When plotted the data form a water-retention curve, from which he can glean those all-important hydraulic parameters. The results will be used to strengthen mathematical models for predicting flow and transport in soils, and oil-water displacements in underground petroleum reservoirs.



Series of neutron radiographics showing water (dark) moving into a dry soil column (light) at different suctions (ψ)

ExxonMobil at UT

Beth Storey (B.S. 2010)

For over 30 years, ExxonMobil has been coming to University of Tennessee to recruit geology students for internships and employment. **Wesley Diehl**, an Earth and Planetary Sciences alumnus, interviewed with Exxon at UT in 1981. He began working for them after he graduated with his master's degree in 1982. Now Diehl is the ExxonMobil representative sent to scout out the talent at UT.

"Overall, UT students have been very good employees," Diehl said. "The master's and Ph.D. students coming out of UT are strong, well-rounded scientists and that's really what we're looking for: well-rounded geoscientists who can solve problems with multiple solutions and who can think on their feet."

Most ExxonMobil recruiters return to their alma mater, having made faculty and student connections during their time as a student. Diehl says he can keep up with his previous connections as well as make new ones as faculty and students come through the department.

Internships at ExxonMobil are challenging but rewarding and never involve busywork. "The internships we offer are meaningful, real science," Diehl said. "Real, in that they're a snapshot of the type of projects that a fulltime employee would be working on, but maybe smaller in scale. They give you a real sense of what it's like to work in the oil industry."

Two UT graduate students participated in ExxonMobil internship over the summer. **Liz Lee** and **Eric Hogan** worked for two different projects under ExxonMobil, but both say their projects were interesting and rewarding. Lee worked as a sort of beta tester with new computer applications and software programs related to mapping complex structures. She interpreted how this new software responded to faults and other features in stratigraphy. "I really enjoyed working for ExxonMobil. It's a great company to work for with tons of resources and really great people doing some amazing things. I learned lots about the oil and gas industry in general, more specifically about 3D seismic interpretation."

Hogan worked with ExxonMobil's Production Company on a stratigraphic correlation project in the Piceance Basin Group. He did a field study on several wells where ExxonMobil is actively drilling, gathering detailed data for a small area to see how the wells are performing. "I really liked the people I was able to work with and the challenging project I was given. I learned so much about the process of oil and gas production as well as how geology, engineering, and business are integrated to make for really interesting and complex problems that deal with mining natural resources."

Letter from Afghanistan

Whitney Nelson (Ph.D. 2008)

Greetings from Kandahar Airfield! It's the beginning of October and I'm one month in to my four-month deployment to Afghanistan. I left UTK in November 2008 to take a Visiting Scientist position for the Department of Defense. Several months into that post, they hired me full time. If you would've asked me during my tenure as a grad student where I would be when I graduated, I would've said: at a small school with a teaching focus where I could do research with undergraduates. I was offered a job like that, but took the Visiting Scientist position instead because it intrigued me. I am happy to say, I made the right choice! My job is full of adventure, travel, and service to my country. In January, I traveled to Colombia and now, here I am deployed to Afghanistan. People often ask me what I do: my favorite response is that I support the war fighter…at a respectable distance. Being deployed is one the best things I have ever done; it is truly a remarkable experience. Seeing the success of your efforts first hand and in near real time provides a level of satisfaction you just can't get "back at the office." Have a great fall and holiday season stateside!

Whitney is wearing an Earth Science Fair tee-shirt under her flack jacket.

Louie Greene Gift

Larry McKay

In spring 2009, the Head of EPS, **Larry McKay**, received a call from **Louie Greene**, from Hampton, TN. Louie is an amateur photographer who said he'd like to give a photograph of Mt. St. Helens to the department. Larry invited him to visit UT and was delighted when Louie (with his brother and cousin) walked in with a superb, high-resolution photo of the caldera, already matted and framed. Louie explained that he took the photo from a helicopter during a visit to Washington State and just thought it belonged in a geology department. This was particularly generous of Louie, because he has no prior ties to the department and this was his first visit to UT. The photo is on display in the Head's office.

News of Alumni

Bill Moehl (M.S. 1965) and his wife Saundra visited the Department in October 2009. Bill had quite a successful career as a geologist and manager with Amoco, before retiring just prior to the BP takeover. His granddaughter, Kristen, is now a student at UT.

Harry Moore (B.S. 1971, M.S. 1974) retired from the Tennessee Department of Transportation in June 2009. He has contributed significantly in popularizing geology, as the author of, *A Roadside Guide to the Geology of the Great Smoky Mountains National Park*, *A Geologic Trip across Tennessee by Interstate 40*, and *The Bone Hunters: The Discovery of Miocene Fossils in Gray, Tennessee*. Harry is pictured with **Don Byerly**.

John White (M.S. 1975) was transferred from Devon's offshore division to safer ground in late 2009. He is riding a steep learning curve in geophysics.

Tom Cronin (B.S. 1980, M.S. 1983) has been a senior project geologist with BP in Houston for the past decade. He works on regional projects and drilling prospect identification in the Arkoma Basin, Oklahoma. Tom (right) is pictured with his wife, son, and nephew.

Roger Kittleson (M.S. 1988) formerly was an environmental geologist in Oak Ridge, and is now a software developer for i Sirona, a company in Knoxville that focuses on medical device integration. Roger and his wife, **Janet Hopson** (Ph.D.1994), stopped in to see Hap McSween recently. Janet now has an adjunct faculty appointment in Earth and Planetary Sciences.

Mike Quinn (M.S. 1991) works for Hess Corporation and is spending a year at their corporate headquarters in New York City as a technical advisor. He says he misses doing the geologic fieldwork he normally does in Houston.

Gene Rankey (M.S. 1993) recently accepted a faculty position at the University of Kansas. Gene received his doctorate at KU in 1996 and subsequent worked at ExxonMobil's research laboratory and taught at Iowa State and the University of Miami (Florida).

Bearden Middle School took top honors at the Tennessee Science Olympiad State Tournament for the second year in a row. Two of their science teachers – **Miller Calloway** and **Bryan Schultz** (M.S. 2005) – are UT geology alumni.

Dawn (formerly White) Gordon (B.S. 1995) ran into **Larry McKay** at the East Tennessee Geological Society's annual Christmas get together. Dawn said Dr. McKay should remember her, because she took his 485 class in 1994 along with **Carla Sparks**. Dawn has worked for a number of environmental companies in the Knoxville area, but recently got back to her first love, mining. She's working with ASARCO at their zinc mine in Jefferson City. The mine had closed for 3 or 4 years, but recently reopened. Dawn spends a lot of time underground and really enjoys it. Her husband, Wesley Wright, is also a geologist, but he's working in another field right now.

Brent Midyett (B.S. 1995) and **Hap McSween** ran into each other at a restaurant on the strip. After an early career in geological consulting, Brent is now a partner in @home, a company that designs and installs audio and video systems.

Amy Kwiatkowski (B.S. 2000) completed a M.S. in geophysics at Cornell in 2003 and then went to work for Conoco Phillips in Houston. She is now working on the Magnolia Field in the Gulf, waiting on the drilling restriction to be lifted. She just completed a year's assignment in Aberdeen, Scotland.

Andrew Pitner (M.S. 2000) does regulatory work on a wide variety of hydrogeologic issues with the North Carolina DENR Division of Water Quality in Mooresville. He and his family just moved to a new house in Salisbury.

Aaron Diefendorf (B.S. 2002) completed a Ph.D. at Penn State, and has been hired as a new faculty member in isotope geochemistry at the University of Cincinnati.

Mark Pollock (M.S. 2003) and **Tracy Campbell Pollock** (B.S. 2003) are back living in Knoxville after some time spent in Washington, D.C. Mark continues his work with AMEC, which concentrates in environmental and geological engineering, and Tracy is working part-time at Oak Ridge National Laboratory. Tracy also continues to do free-lance cartography, and has had several recent projects with the National Geographic Society and with National Public Radio. The free-lance work has been quite successful, and Mark and Tracy spend the salary form these projects on world travel – most recently visiting Greece and Istanbul, Turkey.

Josh Cahill (M.S. 2004) and **Karen Stockstill-Cahill** (Ph.D. 2005) completed their respective graduate and postdoc work at the University of Hawaii, and have now moved to Washington, DC with their daughter Maggie (born November 2009). Karen is enjoying her postdoctoral position at the Smithsonian Institution.

Shawna Cyphers (M.S. 2009) and **Dave Riestenberg** (M.S.2001) are both working at ARI in Knoxville, involved with geologic sequestration of CO_2.

Stephanie Drumheller (B.S. 2005) moved back to Knoxville to work in collections at UT's Frank H. McClung Museum as she finishes her Ph.D. dissertation in vertebrate taphonomy at the University of Iowa. Part of Stephanie's work at McClung involves establishing and manning the museum's facebook site.

Jamie Phillips (B.S. 2005) and his wife, **Shelley Miller** (B.S. 2005), both defended their M.S. theses in early May. Jamie received his M.S. from the Geography Department at UT, where he focused on GIS use in the analysis of water resources. He is currently working as a programmer and senior GIS analyst for the city of Austin, Texas. Shelley received her M.S. from Texas State University, where she analyzed the potential of wildlife as active geomorphic agents. She is also living in Austin, TX, where she works in the water quality division of Austin Water and as a researcher in Balcones Canyonlands Preserve.

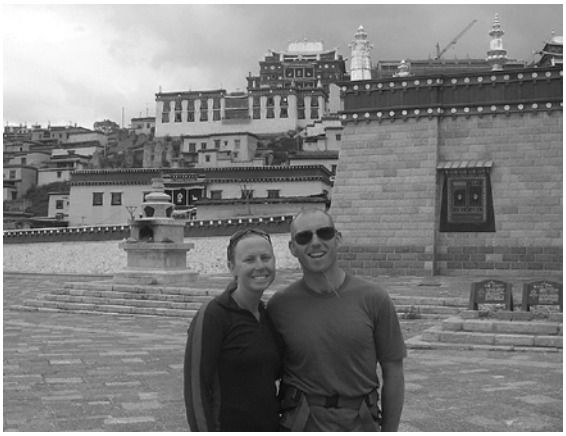
Syreeta Dickerson Vaughn (M.S. 2005) has been promoted to senior level Waste Engineer at BWXT Y-12 in Oak Ridge. She is currently lead for one of the stimulus projects at ORNL. She and her husband had their first child, Nia, born in early 2010.

Andy Kenst (M.S. 2005) is currently living in Liverpool, England. Prior to that, he worked with an engineering firm in Ohio, installing monitoring and recovery wells, as well as landfill and water supply projects. Andy and his significant other are enjoying world travel and hoping to end up back in Tennessee before too long.

Valerie Reynolds (Ph.D. 2005) returned to the department to speak at the Thursday afternoon seminar on September 16th and also at the planetary brown bag at lunch. Valerie spoke about pallasite meteorites for the seminar and lithium on Mars for the brown bag. She is one of very few alumni who have returned to give a seminar. Of course, she received the coveted coffee cup. Valerie is a tenure-track assistant professor in geology at Colby College in Maine.

Adam Johnson (B.S. 2006) has been continuing his overseas adventures, working and teaching in Dailan, China. He sends regular updates to friends from UT, outlining his

sometimes extraordinary experiences of being immersed in a culture very different from either our own, or that which he experienced earlier with his Peace Corps time in Senegal. He is now working out details on one more stint (this time in Taiwan) before heading back to school. He is looking at graduate programs right now, and hopes to attain a M.S. degree in a water resource related field so that he can continue his passion for helping nations, particularly in West Africa, deal with water-related issues. He is pictured here with his fiancé (below left).



Julie Mathis (B.S.2006) has completed her M.S. at the University of Florida on tooth enamel in artiodactyls (think deer, sheep, antelope, etc.) across the Eocene-Oligocene transition. As a secondary research project, Julie has also been researching how social media, such as facebook, can be used as an effective outreach tool for museums and other educational institutions. Julie is currently teaching in Japan (photo above right).

Crystal Wilson (M.S. 2006) continues her very successful stint as an instructor of introductory level courses and laboratories in the Department of Geology, Appalachian State University. Geology at App State has grown substantially in the last several years and provides Crystal with vibrant and enthusiastic colleagues. In her position, she is also able to continue with her interested in the structural evolution of the Appalachians....a true bonus for a field geologist.

Quintin Overocker (M.S. 2006) and **Meg (Howard) Overocker** (M.S. 2006) have moved! They are now currently living in Eau Claire, WI, where Meg continues to work in the environmental field as a geologist, consultant, and grant writer for Ayers Associates. Quintin has successfully

transitioned from his previous work at Stillwater Mining to a position at University of Wisconsin-Stout, where he is working as a science and math outreach coordinator and admissions counselor.

Stephen Brellethin (B.S. 2007) and **Don Smith** (B.S. 2006) both work for NAEVA Geophysics out of Charlottesville, VA. NAEVA specializes in subsurface geophysical surveys for environmental assessment and remediation, underground utilities and storage detection, landfill investigation, and for locating potential unexploded ordnance on active military bases or formerly used defense sites.

Lee Goad (B.S. 2008) has been living in Arlington, VA, since graduating from UT. She is working with the USGS on projects related to carbon sequestration and reduction of CO_2 emissions.

Rhiannon Mayne (Ph.D. 2008) is now an assistant professor at Texas Christian University. Besides teaching geology courses, she also curates TCU's extensive meteorite collection. Before her TCU appointment, she was a postdoc at the Smithsonian Institution. Rhiannon was recently married to John Rose at a ceremony in her home town in England. **Rene Shroat-Lewis** and Mike **DeAngelis** attended the service.

Terri Brown (M.S. 2009) was awarded the prestigious Marathon–Geoscience Diversity Enrichment (M-GeoDE) Fellowship for her Ph.D. studies at Louisiana State University. The three-year fellowship is funded by Marathon Oil Co. and is helping Terri pursue her passion for research in karst aquifers, in this case the Edwards aquifer in Texas. Before Terri left UT, Dr. Larry McKay (her M.S. supervisor) and the hydro students held a going-away party for her.

Steven Jaret (B.S. 2009) has spent the year happily ensconced in the graduate program at Harvard University. Both **Hap McSween** and **Linda Kah** remember their own graduate time at Harvard as being fairly full of work, but Steven surprised everyone in the department by finding the time to submit his undergraduate thesis work to, *Pursuit – The Journal of Undergraduate Research at the University of Tennessee*. Pursuit is a new

endeavor on campus, and Steven's work was honored with publication in the inaugural issue. Steven's paper on shock metamorphism, as well as more about this journal dedicated solely to undergraduate research, can be found at: http://trace.tennessee.edu/pursuit/.

Mary Varnell Jubb (M.S. 2009) is now a lecturer at UT Martin.

The annual student/alumni dinner held on Wednesday during the Lunar and Planetary Science Conference in Houston continues to draw a crowd of alumni, either working in the Houston area or attending the meeting. This year's group included **Josh Cahill** (M.S. 2004), **Karen Stockstill-Cahill** (Ph.D. 2005), **Wesley Diehl** (M.S. 1982), **Tasha Dunn** (Ph.D. 2008), **Steven Jaret** (B.S. 2009), **Nick Lang** (postdoc 2008), **Daniel Lewis** (Ph.D. 2009), **Rhiannon Mayne** (Ph.D. 2008), **Jen Piatek** (postdoc 2008), **Tomo Usui** (postdoc 2009), **Steve Welch** (M.S.20 05), **Sandra Wiseman** (B.S. 2004), and **Chris Whisner** (Ph.D. 2005) attended the student/alumni dinner at the Lunar and Planetary Science Conference in Houston in March 2010.

Congratulations, Russ Colson!

Russ Colson (Ph.D. 1986), a professor of geology at Minnesota State University in Moorhead, has been named the **2010 Outstanding Master's Universities and Colleges Professor of the Year**. This national award, which recognizes undergraduate teaching, was presented in Washington, DC in November. Russ is married to **Mary Cudzil Colso**n (M.S. 1985).

EPS Awards Day 2010

The department held its annual Awards Day celebration at the end of the spring 2010 term. Our students were recognized for their professional and outreach activities.

More than $28,000 in scholarships and awards, funded by generous donations from alumni, were presented.

Ten students received **Jimmy Walls Awards** for excellence in introductory geology courses. Many of these have become geology majors.

Undergraduate Professional Promise Awards to seven geology and environmental studies majors recognized their performance in courses in the major.

Otto Kopp Undergraduate Research Scholarships, used to fund the research of talented students, went to five undergraduates.

Department coffee cups have become prized commodities, and the **Coffee Cup Award** recognizes students with the highest GPAs. Undergraduate students, Emily Worsham and Morgan McCorkle, and graduate students, James Kocis and Matt Chojnacki, will be drinking coffee out of their mugs. All boast almost perfect GPAs above 3.95.

The **Knoxville Gem & Mineral Society**, a long-time friend of the department, presented undergraduate and graduate awards to six students. Our department has a long history of providing help for the gem show.

Mayo Foundation Awards ($3000 each) went to undergraduate Jesse Sexton and graduate student Melissa Hage.

The **EPS Outstanding Seniors** were Emily Worsham (geology) and Hannah Johnson (environmental studies).

Bill Ross, Don Byerly, and KGMS Field Camp Scholarships, ranging from $300 to $1000, were presented to 14 undergraduate students, to help defray the cost of field camps.

The **East Tennessee Geological Society Awards** recognized the best colloquium presentations by graduate students.

The **UT GeoClub** presented cash awards for outstanding professional promise, the Rock Solid Award, Outreach Award. They also recognized Hap McSween for outstanding teaching.

Awards to graduate students included the **Excellence in Teaching Awards** to GTAs, **Professional Promise Awards, Interdisciplinary Research Awards, Planetary Geoscience Institute Awards**, and the **Soft Rock Award**.

Swingle Fellowships for geological field research went to Liz Lee, Eric Hogan, and Phillip Derryberry.

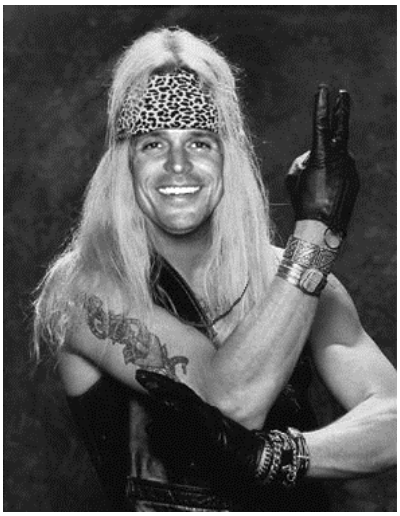
Alumnus Jim Bibee received the **Distinguished Alumnus Award** posthumously, and Professor Mike McKinney received the **2010 George Martin Hall Professorship**.

Spaghetti Supper 2010

Liz Lee (M.S. 2011)

The annual EPS Spaghetti Supper took place on February 21st at Sassy Ann's House of Blues in north Knoxville. It has become a tradition in the department for the Geology Club (GeoClub) to organize, cook, and host this event for faculty and their spouses as well as all undergraduate, graduate, and post-doc students. Four members of GeoClub made enough pasta and fixings to feed the crowd of well over 100 geologists. The highlight of the event was, as always, the entertainment.

This year, department head **Larry McKay** put together a collection he entitled "Stupid things professors do" where detailed accounts of professors mishaps were read aloud and the audience guessed the EPS professor for each "stupid thing". Needless to say, our professors really have done some crazy, silly things in their lifetimes. The bulk of the entertainment and laughs that evening was in the form of a 15 minute video that the GeoClub filmed with the goal of mocking our favorite professors. Graduate students dressed up as their professors and reenacted some of the classic scenes in the classroom, lab, office, and field.



Some of the highlighted faculty played by students this year included: **Chris Fedo**, **Larry McKay**, **Hap McSween**, **Devon Burr**, **Linda Kah**, **Greg Baker**, **Micah Jessup**, and **Bob Hatcher**. The GeoClub had a fun time filming the video, but an even better time watching the video with their professors at Spaghetti Supper.

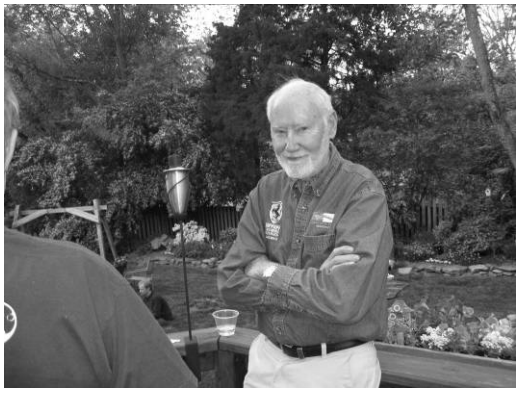
Alumni Meeting – April 30, 2010

Geology alumni visited UT this spring to meet with EPS faculty, students and UT administrators. The meeting started on Thursday with the annual Student Awards Day, where alumni had the opportunity to see how their gifts are used to support student activities. The following day, alumni met with faculty and administrators to discuss the merger with Environmental Studies and provide input for development of a strategic plan. In the evening, a Cajun shrimp boil was held at **Larry McKay**'s house, where over 30 guests enjoyed good food and good company.

Bruce Bursten, Dean of Arts & Sciences, and environmental consultant, Kevin Howard (M.S. 1997).

Linda Kah (faculty) and independent oilman Roger Bohanon (M.S. 1975).

Roger Bohanon (M.S. 1975) and John Dinkens (College Development Office)



Retired engineering geologist Larry Benson (M.S. 1960)


2010 Fall Party at the McKays

In Memoriam

Jim Bibee

This year, the EPS department lost one of its best friends, **Jim Bibee** (B.S. 1950). Jim was born in Hendersonville, N.C. but spent much of his childhood in Mexico and Mississippi. After serving in the U.S. Army, Jim came to UT to study geology. This led to a 34 year career with Gulf/Chevron Oil, where he retired as Vice President of International Exploration. Jim continued to work as a consultant for another 20 years and was active in philanthropy, service, fishing and hunting for his entire life.

Jim and his wife, Virginia, made friendships at UT that lasted a lifetime. These included Flo and **Don Jones** (B.S. 1950), with whom they shared a passion for geology, oil exploration, and UT football. Jim served for many years on the Geology Board of Advisors and the UT Development Council. This year, both Jim and Virginia were serving on the College Board of Visitors. In 1983, they created the Virginia and Jim Bibee Geology endowment, which has helped cover the costs of student travel, awards and teaching supplies for almost three decades. In the months since the funeral, our department has received approximately $22K in memorial gifts dedicated to Jim. Many of these gifts came from people with no ties to UT, other than through Jim. It's a fitting tribute to Jim and his commitment to the University of Tennessee. In April, Virginia Bibee accepted a posthumous UT Earth and Planetary Sciences Distinguished Alumni Award for her husband.

Mike Penley

Mike (M.S. 1973) passed away on May 8, 2010, and was buried in Fincastle, VA.

Graduates From Fall 2009 Through Summer 2010

Bachelor of Science
Greg Archer
Adam Backus
Darrin Brager
Nick Costello
Matt Edmunds
Kelli Harrelson
William Honea
Andrew McNair
Jesse Stephens
Emily Worsham

Master of Science
Heather Byars
Britany Davis
Miles Henderson
Mary Grace Jubb
Andrew Moore

Doctor of Philosophy
Peter Knappett
Daniel Lewis
Jennifer Whisner

EUReCA

Nine undergraduate geology majors participated in the 2010 UT Exhibition of Undergraduate Research and Creative Achievement (EUReCA). The department boasted two winners in the Physical Science division. They are:

Nicholas Costello

Project: *Thermobarometry of the Leo Pargil Dome, NW India: Insights into Exhumation of Mid-crustal Rocks in the Himalaya*

Faculty Advisor: Micah Jessup

Daine Wright

Project: *Composition of Ices on the Surfaces of KBOs (136472) Makemake and (136108) Haumea*

Faculty Advisor: Joshua Emery

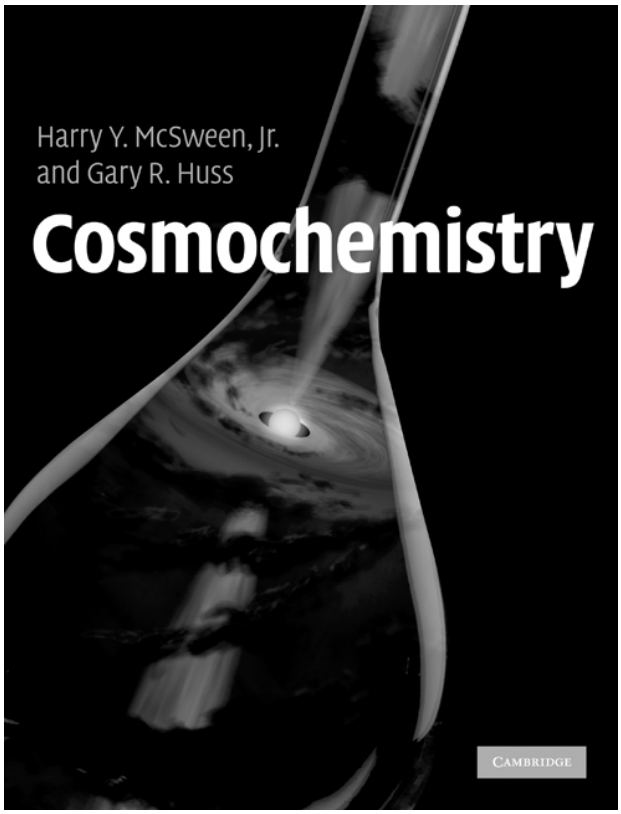
Standing, from left to right, are Emily Worsham, Blake McFerrin, Nick Costello, Paul Brooks, Kelli Harrelson, Greg Archer, and Daine Wright.

Kneeling, from left to right, are Jesse Sexton and Peter Robertson.

Please visit our department web site. Under the guidance of Devon Burr it has been greatly improved.

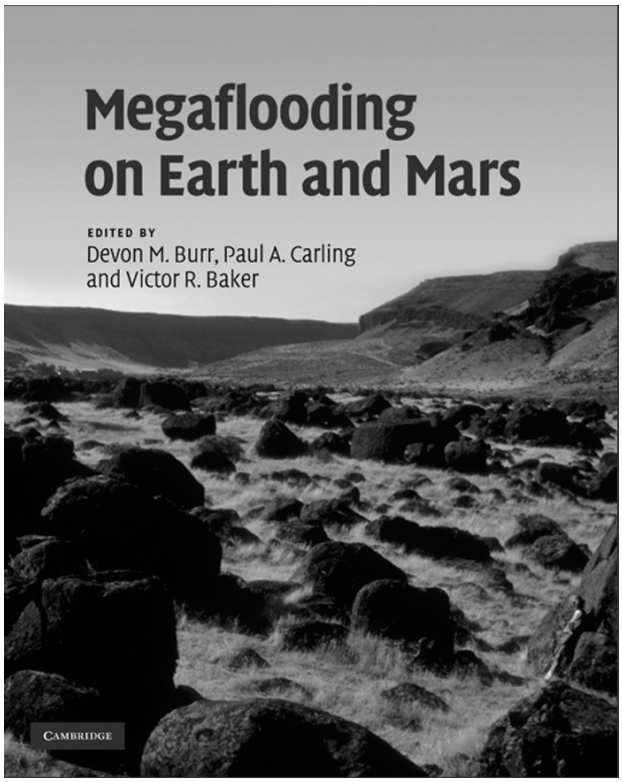
http://web.eps.utk.edu/

Book Nook



Cosmochemistry, by Hap McSween and Gary Huss, was published by Cambridge University Press in 2010. This textbook provides the first comprehensive overview of this emerging, interdisciplinary field. Among topics considered are: synthesis of elements in stars, partitioning of elements in the solar nebula and in planets, chemistry of meteorites and presolar grains, isotopic tools used to understand the chronology of the solar system, and the geochemical exploration of planets.

Megaflooding on Earth and Mars, edited by Devon Burr and several colleagues, was published by Cambridge University Press in 2009. Megafloods, the sudden discharge of great volumes of water, have significantly altered the terrain and possibly climate of Earth and Mars. On Earth, real-time measurements of Icelandic glacial outburst floods complement research into larger floods evidence in the rock record. On Mars, terabytes of data are dramatically expanding our view of the number and extent of flooding on that planet. Beginning with a historical overview of flood science, the book presents sections on morphology and mechanisms, flood sedimentology, and modeling, each illustrated with examples from Earth and Mars.



UT Students Attend Geology Field Camps

Beth Storey (B.S. 2010)

In summer 2010, UT students scattered across the globe to study processes that formed the fascinating features on our planet. They were aided by $7000 in Field Camp Scholarships donated by generous alumni.

Ty Herndon spent six weeks in Galway and Doolin, Ireland, learning mapping methods and sedimentary systems ideal for hydrocarbons, as well as a bit about local culture.

"The landscapes were amazing. We spent most of the time on beaches, in glaciated terranes with giant lakes, some with more than 300 islands scattered about, or on the edge of cliffs. We spent the first four weeks in a small town and by the time we left, the locals loved us. I even got invited to play on the local Gaelic football team. Camp changed my outlook on geology. I was geared toward geochemistry but now I want to pursue structure and tectonics."

James Carrasco traveled all over the western United States for six weeks, from Montana to Wyoming and Idaho, mapping stratigraphic units and glacial deposits, as well as touring Glacier National Park, Yellowstone and the Grand Tetons.

"Field camp gave me a more practical, job-centered way of doing geology. I learned how to efficiently map and interpret geologic features. We used what we'd already been taught and put it towards something practical."

James received a Field Camp Scholarship.

"Since I have a wife and a child, the scholarship I received from Mr. Ross was really what got me to field camp. If it wasn't for that scholarship, I wouldn't have had enough money to go. It literally was a life-saver and I am very grateful to the alumni who donate."

Blake McFerrin went to Taskesti, Turkey for five weeks where both the culture and geology are very different from East Tennessee.

"I thoroughly enjoyed all aspects of field camp. Not only did I learn about geology, I got a different view of the Middle East. The people are extremely friendly in Turkey. Field camp tied together everything I learned in the classroom and allowed me to apply it in a real setting. I'm very interested in field geology now. It's fun being in the field trying to figure out what's going on in the area."

Blake McFerrin, Andrea Hughes, and Sarah Drummond in Tasketi, Turkey

Kelli Harrelson spent five weeks in Nairobi, Africa studying the East African Rift Zone in Kenya. Although preparation for the trip was stressful, vaccinations in particular, seeing the geology in a completely different setting was worth it.

"I wasn't nervous about being prepared; my classes at UT definitely prepared me for camp. I met some awesome people and had a great time. I definitely recommend the camp to other students, just to get out and see the geology in that part of the world."

Kelli used her Field Camp Scholarship to pay for the vaccinations she needed to go to Kenya.

"Since it was such an expensive field camp to attend, with plane tickets, field supplies and everything, the scholarship money helped a lot."

Beth Storey spent five weeks in Beulah, Wyoming mapping in the Black Hills for field camp.

"Field camp really opened my eyes to the many careers in geology. I also learned how the concepts taught in the core geology classes can be applied in the field. It was fun to get to a new mapping area and be able to figure out what happened there geologically."

Beth received a Field Camp Scholarship. *"Not being able to work over the summer, my field camp scholarship helped me a lot. It paid for the required field equipment and my trip to Wyoming and back. Thank you to all the alumni who make camp easier for us."*

James Carrasco and Emily Worsham on Beartooth Pass, Montana

Field Camp Scholarships Awarded in 2010

Bill Ross Field Camp Scholars

Adam Backus
James Carrasco
Ty Conner
Nick Costello
Kelli Harrelson
Ian Lycke
Blake McFerrin
Andrew McNair
Elizabeth Storey
Daine Wright

Don Byerly Field Camp Scholars

Karen Buchanon
Greg Carlson
Matthew Edmonds
Emily Worsham

Department of Earth & Planetary Sciences 2009-2010

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