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Department of Geology

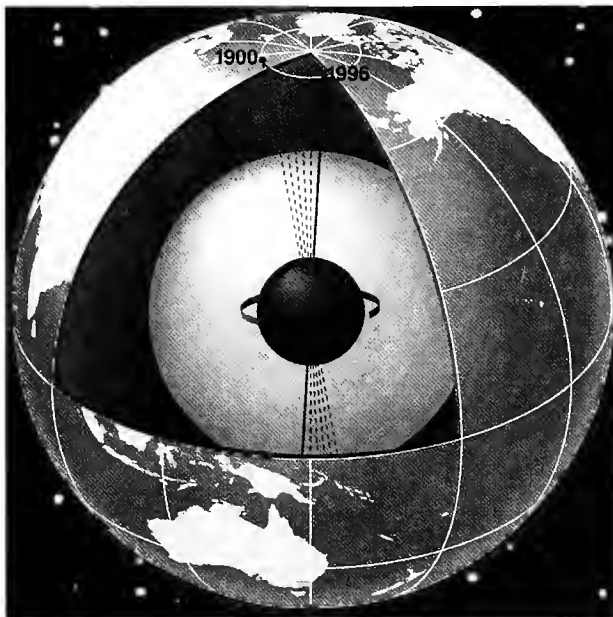
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Song: Uncovering Secrets of the Inner Core

Assistant Professor Xiaodong Song has done groundbreaking work using seismic data to better understand the Earth's core. Song recently came to the Department of Geology at Illinois from the Lamont-Doherty Earth Observatory of Columbia University, where he had been researching and teaching for three years after earning his Ph.D. in geophysics from the California Institute of Technology. His Ph.D. research investigated the properties of the Earth's core and lowermost mantle. His work at Lamont provided observations proving that the Earth's solid inner core rotates at a faster rate than the rest of the planet. This finding was listed as one of the most important scientific discoveries of the century in *Discover* magazine and one of the most important breakthroughs of the year in *Science*.

It has long been theorized that the inner core, which is solid, may move separately from the rest of the Earth—like a beach ball in water. In fact, the Earth's magnetic field is explained by the convective motions in the fluid outer core. This idea is known as the Dynamo Theory. According to this theory, electromagnetic force generated by the interaction of the magnetic field in



the outer core and the conducting inner core causes the inner core to rotate a few degrees per year. These few degrees translates to about 10 kilometers per year—clearly the core rotation is very fast in the context of geologic time. However, until Song's work, no one had been able to observe or prove this hypothesis.

"With this kind of speed, we should be able to observe the movement," says Song, "but the trick was figuring out how to do it." Song took advantage of his Ph.D. research concerning the anisotropy of the inner core. Seismic waves that go through the Earth go at different speeds and directions, depending on the composition of the part of the Earth it's traveling through (see image). In his research, Song had found that the inner core is not homogeneous and that seismic waves go faster along a roughly north-south axis than along

This diagram illustrates how the fastest path through the Earth's solid inner core has shifted over time, showing that the core moves at a faster rate than the rest of the Earth. Xiaodong Song's findings have been hailed as one of the most important discoveries of the century by *Discover* magazine.

any other. As luck would have it, however, the inner core is not exactly symmetric around the north-south axis. The fastest path was found to be tilted about 10 degrees off the pole and the wave speed changes laterally in the inner core.

Song and his Lamont colleague, Paul G. Richards, were able to observe the inner core's movement by reviewing seismic data over the course of about 10 years. They found that if they took measurements from the exact same station (relative to the mantle) and used earthquakes from the exact same point, they could observe a change in seismic speed with time, thus proving the core had rotated.

Song's next step is to use similar seismic data to understand the properties of the inner core. It is unclear whether the anisotropy of the inner core is caused because the core is a single giant anisotropic crystal or that there are different phases of iron in the core or even a transition zone within the inner core. Song hopes there are further clues about the composition and motion of the core in the seismic data he has collected.

Our "Year in Review"



The year 1999 has seen a number of changes in the Geology Department. We are delighted to welcome two new faculty members to

the department. Professor Xiaodong Song, a seismologist, came to Illinois from Cal Tech, via the Lamont-Doherty Geological Observatory. His research focuses on understanding the nature of the Earth's interior. Already, his work demonstrating that the core does not spin at the same rate as the mantle has garnered international headlines. Professor Craig Lundstrom joins us from the University of California, Santa Cruz, via Brown

University. He is an isotope geochemist and has been setting up a new mass spectrometry lab in the Natural History Building. Professor Tom Anderson, on our faculty for 32 years, retired at the end of the fall semester. Fortunately, Tom will continue his research as an emeritus professor. We look forward to adding two more new faculty members to our roster during the next year, for we are now in the midst of searches for a geomicrobiologist and for a new R.E. Grim Professor in either mineral science or sedimentary geology. We've clearly entered a growth mode and are excited about building new and educational opportunities in the department.

At the beginning of the fall, Professor Jay Bass, who energetically guided the department for the past two years, dove back into his research

and teaching program. We all owe Jay a hearty thanks for his efforts on our behalf! I have become the department head. Though I've been teaching structural geology, geotectonics, and field geology at Illinois since 1983, this is my first experience with administration, so this fall was an intense learning experience. I've really enjoyed the opportunity to meet with our alumni and have been warmed by the continuing enthusiasm that alumni have for the activities of the department, and for the financial support that alumni provide through *GeoThrust*.

You may have noticed that, in honor of the new millennium, we've gone from publishing two alumni newsletters a year to publishing one Department of Geology "Year in Review". You'll find that this review, in addition to popular news about departmental and alumni activities, also contains a record of research and teaching activities in the department. We hope this information helps to give a sense of the scientific and educational mission of the department.

Please enjoy this publication and stop by if you're in the area — NHB is having a bit of a face lift, with new paint and new lights in public spaces. Otherwise, look for your departmental friends at the receptions we sponsor at the AAPG and GSA meetings.

— Stephen Marshak

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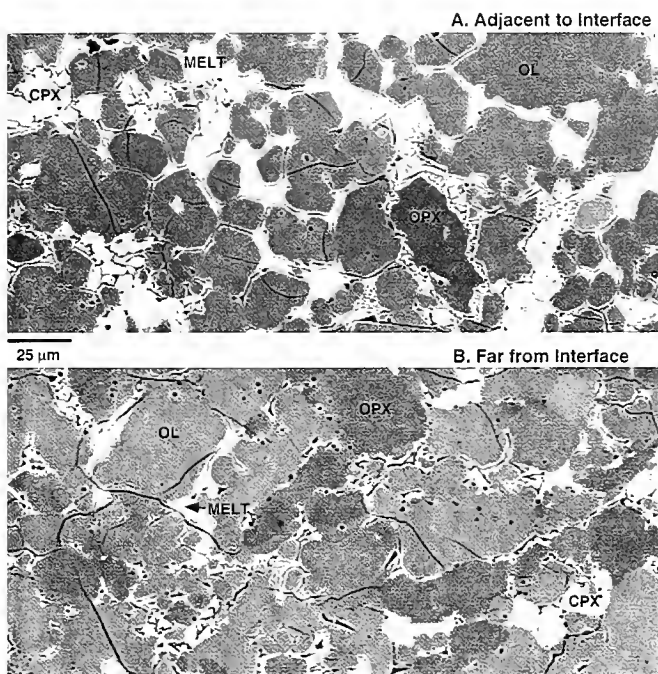


NEW FACULTY

Lundstrom Looks at Magmatic Processes

Craig Lundstrom recently joined the Geology Department as an assistant professor after completing a post-doc at Brown University. He is a geochemist who received his B.A. in chemistry from Colorado College and his Ph.D. in Earth Sciences from the University of California, Santa Cruz. Lundstrom uses uranium-series (U-series) disequilibria to study magmatic processes on the Earth. U-series isotopes have much shorter half lives than more conventional isotope systems such as Sr. The half lives of the isotopes Lundstrom studies (radium, thorium and protactinium) range from 1,600 -350,000 years and thus can be used to study geologically short-timescale processes. Using new techniques of mass spectrometry, Lundstrom can measure samples as small as one femtogram (10^{-15} grams), just a few million atoms.

Recently, Lundstrom has been studying U-series isotopes in basalt samples taken from mid-ocean ridges. He is striving to understand the rate at which the mantle melts and to characterize the amount of partial melting that occurs in the mantle beneath the ridge axis. So far Lundstrom has found that the melt (basalt) starts to rise as soon as it comprises one part per thousand of the mantle, and that melt rises at a rate quicker than the solid mantle (peridotite). In addition, Lundstrom found that mantle flows at the same rate as the ridge spreads, thus confirming that the sea-floor

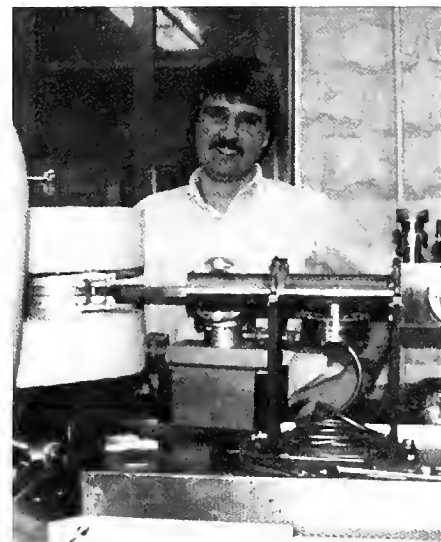


Top: Back-scattered electron images of peridotite shows clear differences between melt and mineral modes of "A" the region closest to the basaltite-peridotite interface and "B" the region farthest from the interface.

Bottom: Craig Lundstrom sitting at his newly assembled mass spectrometer.

spreading is a passive process. These findings were published in *Earth and Planetary Science Letters* in 1998.

In a related area of inquiry, Lundstrom has conducted experimental studies on the interaction between basalt and peridotite. He wants to understand how the melt interacts with the mantle. Can basalt, for example, re-equilibrate with the mantle as it ascends? Lundstrom found that as the basalt interacts with the peridotite, sodium and alkali elements from the basalt rapidly diffuse into the peridotite. The diffusion of sodium into the peridotite triggers further partial melting. Instead of 10 percent of the solid melting at a given pressure and temperature, the solid melts at 20 percent. So, as melt rises through peridotite, it generates more melt. Previously it was believed that basalt doesn't interact at all with peridotite as it ascends. Lundstrom's work shows that the peridotite can melt without an increase in temperature. The results of this research—which he conducted using a piston cylinder apparatus similar to the one he has just built at Illinois—was reported in the February 3 edition of the journal *Nature*.



Lundstrom now plans to move out of the mantle, on to the Earth's surface. He hopes to use the U-series disequilibria approach to look at the formation ages of carbonate rock. Results of such work can be used for looking at the evolution of landscape (including such processes as uplift and erosion) and evolution of the environment.

Two Faculty Searches Underway

After losing several faculty members to retirement, the Geology Department has begun to grow again. Two faculty searches are now underway. One seeks a geomicrobiologist, a person who can study the role of bacteria in the earth system. Like other sciences, geologists have begun to explore new interdisciplinary opportunities. This person would combine expertise in biology with expertise in geology. A person with this background could attack many important topics ranging from the origin of life, to bioremediation of contaminated aquifers, to the maturation of petroleum, to the nature of the carbon cycle. Many of these subjects have important applications in the environmental or petroleum industries. So far, the search has identified many outstanding candidates, several of whom were interviewed during the first weeks of February. The position is being partially funded by the Environmental Council, a campus organization that works to foster interdisciplinary research and teaching that addresses environmental issues.

The other search seeks a candidate to fill the R.E. Grim Professorship, a position that has remained vacant since the retirement of Richard Hay in 1997. This search will try to draw candidates in either mineral science or sedimentary geology. As it is an endowed position, the successful candidate will be hired at either the associate or full professor rank. Thus, the department is focusing on applicants with strong track records in research and teaching.

The department's hydrogeology program was recently ranked as eighth in the nation by *U.S. News and World Report*.

Leighton Receives 2000 Alumni Achievement Award



The Department is delighted to announce that Morris (Brud) Leighton, B.S. '47, has been awarded the 2000 Alumni Achievement Award from the Department of Geology. This is the Department's highest honor, and is presented to recognize a career of accomplishment. Leighton's original connection to the University of Illinois and to geology came through his father, who was chief of the Illinois State Geological Survey (ISGS). Leighton originally considered other fields before he returned to geology and a highly successful career. Leighton spent the first 30 years of his career in oil exploration, primarily with Exxon (then called Esso), with whom he held various posts, including chief geologist for Latin America. During his time in the industry, he played a key role in developing major oil plays in the North Sea and Australia, among other places. From 1983-1994 Leighton returned to Champaign-Urbana, serving as chief of the ISGS. "Brud continues to contribute to the Geology Department, both as a GeoThrust member and as an adjunct professor," says Steve Marshak, department head. "In our petroleum geology course, Brud gave an outstanding overview of world petroleum promises and of how an oil company develops an important play. This teaching could only have come from someone with many years in the industry." Congratulations, Brud! Leighton's award was presented at the Annual Geology Department Awards Banquet, which was held April 28.

Mega-Project At the Top of the World

Professor Wang-Ping Chen is beginning a large-scale project to investigate active mountain building across the Himalayan-Tibetan zone of the India/Asia continent-continent collision. The project, called HI-CLIMB (Himalayan-Tibetan Continental Lithosphere During Mountain Building) is an international collaboration involving researchers from the U.S., China, Nepal, Germany, and France. The group will examine the effects of the collision through the entire thickness of the lithosphere. Professor Chen, who will be directing much of the project, will focus his attention on obtaining high-resolution seismic data from an instrument array that records energy from natural earthquakes. He is particularly interested in the nature of deep earthquakes.



Tom Anderson—Great Teacher, Researcher—Retires

After 32 years at the Department of Geology, Thomas F. Anderson retired January 1. But retirement for Anderson won't mean he'll disappear from the department. He plans to spend much of his time writing up research he hasn't had time to publish over the last few years. "I'm keeping all the parts of my job I love and letting the rest of it go," he says with a smile. "I'm really looking forward to doing research at my own pace."

It won't be all work and no play for Anderson, however. He and his wife, Nancy, will be traveling extensively over the next several months. So far they have trips planned to the Caribbean, England, Switzerland and Jerusalem.

Although he is an isotope geochemist, Anderson also has spent much of his career in oceanography. This grew out of his graduate school experiences at Lamont Geological Observatory (now Lamont-Doherty Earth Observatory) at Columbia University, which is one of the principal oceanographic centers in the country. "I learned oceanography by osmosis," he says. "I've pretty much been the resident oceanographer for the last 25 years."

Anderson also has spent many years doing research that began with his Ph.D., which determined rates at which oxygen atoms move in crystals. Because calcium carbonate is commonly used for determining radiocarbon dates, Anderson wanted to see if there was significant exchange between the CO₂ and the calcium carbonate, which could throw off radiocarbon dates. He broadened the study to include oxygen isotope exchange.



Tom Anderson and his wife, Nancy, talk with friends at Anderson's retirement dinner.

"I'm keeping all the parts of my job I love and letting the rest of it go," he says with a smile. "I'm really looking forward to doing research at my own pace."

Although Anderson started out being primarily interested in isotope exchange reactions involving carbonates, this work led him to also look at the oxygen exchange in feldspars and micas. By using isotopes as tracers Anderson became involved in the geochemistry of light stable isotopes, a developing field in the mid-60s, especially the isotopic record of sedimentary carbonates.

About 20 years ago Anderson began to study the isotope geochemistry of sulfur in coal. The goal was to understand how sulfur gets in coal in order to get it out. Building on this experience, Anderson and his students initiated a number of studies on the sulfur, carbon and iron geochemistry of organic-rich marine sediments. "A

return to the oceans," he quipped. One of the rocks he continues to work on is the Oxford Clay of England. "It's a treasure trove of well-preserved vertebrate and invertebrate fossils, as well as nearly pristine organic matter. It's been lots of fun to work on that," says Anderson.

Anderson, who joined the department in 1967, developed four courses during his tenure: Geology 117, "Oceans;" Geology 118, "Earth and

Environment;" Geology 360, "Geochemistry;" and Geology 433, "Isotope Geology." Anderson also helped develop Geology 130, "Illinois and Changing Earth Systems," which is team taught with faculty from Geography and Atmospheric Science.

Anderson likes to introduce relevant modern and cutting-edge research into his courses. "It makes it fun for me and more interesting for the students," he says. His impact has been long lasting. "One of the first courses I took as a graduate student was Tom Anderson's isotope geochemistry course," says James Kirkpatrick, Ph.D. '72, professor of geology and executive associate dean in the College of Liberal Arts and Sciences. "This was a new field then, and there was no textbook. We read and discussed research papers and had to make a comprehensive picture out of widely dispersed information. Although I did not become an isotope geochemist, the experience of doing this had a profound influence on my entire career. Tom is a great teacher."

Visiting Scholars, Post-Docs Collaborate With Department Faculty

Bonheyo: Origins of Early Life in Ancient Hot Springs?

Post-doctoral researcher George Bonheyo is working with Assistant Professor Bruce Fouke to understand the modern and ancient microbial populations of the travertine-depositing hot springs of Mammoth Terrace in Yellowstone National Park. This work will expand our knowledge of modern microbial diversity and origins of early life on Earth. In addition, Bonheyo's project will help identify microbial fossils and biomarkers. These data may be used to identify signs of early life elsewhere in the solar system.

Bonheyo, who received his B.S. from Bucknell and his M.S. and Ph.D. in microbiology from the University of Illinois, is studying the hot spring system in order to develop a model to identify the microbial species present during the active precipitation of travertine. The microbes, which encompass all three domains (archaea, bacteria and eukaryotes) are dependent upon the geochemistry of the spring for



Scene from the Yellowstone hot springs where Bonheyo seeks clues to the origins of life.

life and, in turn, create by-products that affect the geochemistry of the spring. These changes affect crystal growth morphologies and perhaps crystal chemistries within the hot spring. Microbial species are identified based on their signature ^{16}S rRNA gene sequences. Those species are then associated with metabolic processes that alter the spring geochemistry. Bonheyo's work will correlate microbial populations, spring

Bonheyo has been awarded a prestigious Earth Sciences Postdoctoral Research Fellowship from the National Science Foundation. His project is titled: "Geochemistry and Molecular Microbiology of Travertine." Only 10 of these awards are granted nationwide.

geochemistry, and carbonate precipitation chemistry, fabrics, and rates.

Bonheyo also is using the contemporary "depositional facies model" to study ancient travertine deposits and try to interpret the fossil record. Microbial cells get trapped within carbonate travertine deposits in the hot spring system. Cells may be trapped either between crystals or within crystal fluid inclusions. Fluid inclusions 10 to 50 μ in diameter occur in great abundance in Mammoth travertine, and a majority contain dark organic masses that may be microbial remains. It is possible then that these entombed cells (and their associated DNA) then have a high probability of being preserved. However, the mechanisms, time frame, and preservation potential for DNA in travertine carbonate is not understood. Bonheyo is screening ancient carbonate crystals for diagenetic alteration prior to removing and identifying fossil DNA entombed in fluid inclusions.

From Paris to Brazil, Whittington Traverses the Globe

Alan Whittington, a post-doctoral research associate working with Steve Marshak, received his Ph.D. from the Open University, in the U.K., and his undergraduate degree from Cambridge. He did his Ph.D. field work in the Himalaya Mountains of Pakistan. Prior to coming to Urbana-Champaign, Whittington spent two years as a post-doctoral researcher in

Orleans, France, and at the Institut de Physique du Globe in Paris.

Whittington is working with Marshak on two different projects. They are investigating the development and longevity of the Ozark Plateau of the southern mid-continent and its relationship to the New Madrid Seismic Zone. The plateau exposes basement rocks which are buried to more than 3 km deep in the adjacent Illinois basin, and may be a result of rigid block tectonics resulting from far-field stresses associated with Paleozoic orogeny at the continental margins.

The other project concerns Paleoproterozoic tectonics in Brazil, and will combine structural, metamorphic and geochronological investigations to ascertain the sequence and style of orogeny and orogenic collapse preserved in the Transamazonian orogen.

Prior to coming to the University, Whittington was involved with understanding the viscosity, heat capacity, and other physical/chemical properties of magmas as a function of composition, temperature and water content.



Kalinichev Visiting from Russian Academy of Sciences

Visiting scholar
Andrey Kalinichev is
working on computer

simulations of the molecular behavior of geochemical systems, including aqueous fluids and mineral/fluid interfaces. Kalinichev's background is in molecular and chemical physics, but he's been involved in molecular computer simulations of the properties of geochemical materials for about 20 years.

Most chemical reactions near the Earth's surface and in the crust involve a fluid phase or occur at fluid/mineral interfaces, but in many fundamental respects these reactions remain poorly

understood at the molecular level. Computer simulation techniques enable researchers to realistically model properties of complex, many-body systems on an atomistic microscopic scale using a limited number of approximations, the crucial ones being intermolecular potential functions. Provided one has a reliable way to calculate potentials of intermolecular interactions, the simulations can lead to molecular-level information on a wide variety of properties (thermodynamic, structural, kinetic, spectroscopic, etc.) of the systems under study.

Kalinichev, collaborating with Jim Kirkpatrick's research group, is focusing on geologic systems that affect the Earth's carbon dioxide budget. This project involves experimental and computational studies of dissolved anionic species interacting with mineral surfaces which develop pH-dependent anion exchange capacity or have permanent anion exchange capacity due to isomorphic substitution. Kalinichev and

Kirkpatrick are now mainly focusing on carbonate species, but other geochemically significant species such as chloride and nitrate are also being studied.

One application of this research would be in controlling global warming. In order to limit global climate change caused by excess CO₂ (primarily man made), the CO₂ must be captured and stored, perhaps underground or in the ocean. However, deep-well injection of CO₂ could significantly change local groundwater chemistry. Understanding the molecular mechanisms controlling the properties of water-carbon dioxide-based fluids and their interaction with mineral surfaces is necessary before large-scale CO₂ storage can take place.

Kalinichev is head of the physical research laboratory at the Institute of Experimental Mineralogy at the Russian Academy of Sciences. He received his Ph.D. in chemical physics from the Russian Academy of Sciences.

Schilling Looking at Elasticity of Glasses and Minerals

Visiting scholar Frank R. Schilling came to the Geology Department from GeoForschungs-Zentrum Potsdam as a Heisenberg Fellow and is scheduled to be here for one year. By understanding in more detail the relationship between structure and physical properties of glasses and minerals, Schilling hopes to be able to relate the influence of pressure and temperature on their elastic properties. Ultimately he would like to examine the elastic properties of hydrous minerals, which are not clearly understood and are important to understanding subduction processes and earthquake mechanisms.

Schilling is collaborating with Professor Jay Bass and Visiting Assistant Professor Stas Sinogeikin in an investigation of the elastic properties of basaltic glass samples. This work, which uses Brillouin spectroscopy, will help explain how magmas rise. The data show how changes in chemical constituents affect the density, velocities and elastic properties in a highly systematic way.

In another project, Schilling is investigating the thermal transport properties of minerals. Temperature contrasts are one of the fundamental driving forces within the Earth, so precise measurements of thermal transport properties, which are strongly related to the structure of the minerals, are key to understanding how the Earth system works.

Schilling is involved in a third project that concerns the physical properties of partially molten crustal rocks. He is conducting laboratory

experiments to make quantitative interpretations of the data from large mountain belts such as the central Andes. Schilling is working to measure electrical conductivity, elastic properties and thermal transport properties of partially molten rocks under defined conditions.

A fourth project Schilling is involved in concerns the quantitative interpretations of geophysical observations. This is a collaboration with several German colleagues and two colleagues in China. He and his colleagues study the interrelationship between various physical properties and the amount of partial melt, in order to understand the chemical composition of the Andean crust. Ultimately he would like to quantify fluid flow through the convecting mantle wedge. The results may help to explain the origin of intermediate-depth earthquakes.

Herrstrom Connects With Geoscience Educators

Eileen Herrstrom, teaching specialist, attended the "Third International Conference on Geoscience Education," in Sydney, Australia, last January. The conference enabled her to connect with other geoscience instructors and discuss common interests and concerns, such as the effective and appropriate use of technology, results of educational research, and what students learn when teachers teach. Instructors from elementary through college level attended the conference, as well as museum educators and others in related fields.

Herrstrom gave a poster at the conference about part of the National Parks course (Geology 104) given last spring in which she replaced the final exam with a poster project. Students were required to summarize the geology of one park on two sheets of poster board, display their posters during the final exam time, and review others' posters. Her goal was to have students concentrate on a single area, rather than try to memorize the whole United States (this addresses a common criticism of the U.S. curriculum in general, "that it covers too many topics in too little detail.") The exercise also provided another means of assessing students besides a multiple-choice, computer-graded exam, because some students perform poorly in this format. Finally, the project gave students a taste of how scientists exchange information and ideas at professional meetings. Herrstrom's presentation was well received at the conference, with several people indicating that they would try the idea in their own classes and others suggesting ways to improve the project and to evaluate its effectiveness.

The conference also gave Herrstrom some very specific ideas that she will



"Three Sisters," a formation of erosional remnants form the Triassic Sandstone of the Sydney Basin. This photo was taken from Echo Point, in the Blue Mountains of Australia, by Eileen Herrstrom.

try in the future. One was to have students create a portfolio of breaking science news, summarize each article and then analyze which articles were the most interesting and why. A second project involved building a polarizing microscope from items normally thrown away, including a film canister and the lens of a disposable camera. The person who demonstrated the project had used this idea with junior high school students, who made their own individual microscopes for looking at thin sections. A typical polarizing light microscope costs \$5,000, whereas this version cost under \$5.

Herrstrom, who joined the department five years ago as an academic professional, is responsible for assigning TAs to courses, supervising 100-level labs, and lecturing for introductory courses. Geology is a popular option for non-majors at the University of Illinois seeking a science course, which is one reason Herrstrom was hired. Prior to her arrival, the faculty had developed several new entry-level courses, and the department now offers about 10 per semester. More recently, the largest class (Geology 100- Planet Earth) expanded from two to three lecture sections, which can accommodate 900 students. Total enrollment in 100-level classes is about 3,000 students per year.

Geology Department Participates in Engineering Open House, Again

This year geology students once again prepared geology displays for an "open house" in conjunction with the Engineering Open House (EOH). The EOH, an annual event, attracts thousands of school-age students to campus to learn about various aspects of science and engineering. Two years ago, the geology display was moved up to a more central area in the Engineering College. Now thousands of students visit the display. In the past, the displays have covered topics ranging from dinosaurs, volcanoes, floods and earthquakes. This year students also will put together a display of field and laboratory equipment from the beginning and the end of the last century.

Eileen Herrstrom served as the advisor for the Geology Open House this year. She says she'd like to see geology students doing even more community outreach. Last year Herrstrom participated in National Earth Science week by creating a display for the Champaign Public Library. She has been investigating having geology students teach elementary classes about earth sciences. "After all," she says, "the best way to learn is to teach. Geology is such a natural for drawing kids' interest, I'd like to see our students get out into local classrooms," says Herrstrom.

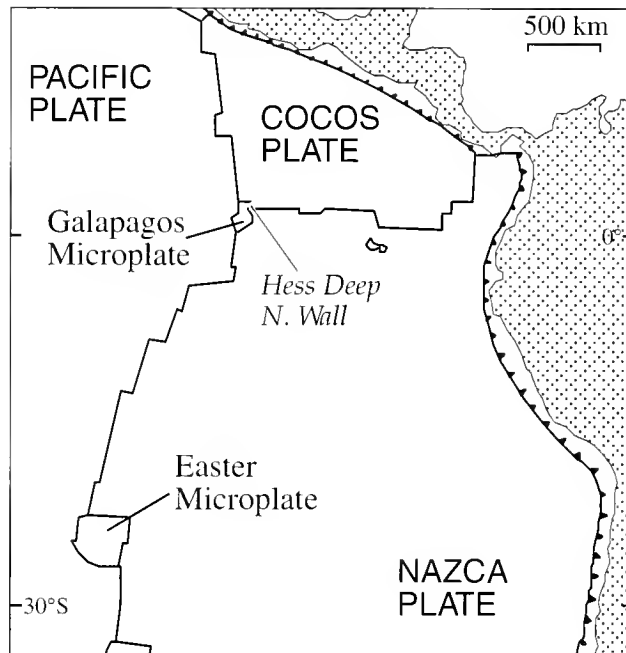


High-Caliber Research Is the Norm...for Undergraduates

Undergraduates in the geology department are—in some cases—going to the ends of the Earth to gain valuable research experience. Junior Anna Sutton went with research programmer Steve Hurst on a trip last March to study the fast-spreading oceanic crust exposed at the Hess Deep Rift. They traveled on the *R/V Atlantis*, which is owned by the Navy and operated by Woods Hole Oceanographic Institution. Using side-scanning sonar, ARGO (a remotely operated vehicle) and ALVIN (a three-person submersible), the scientists on the expedition (16 researchers from almost as many institutions) studied the sea floor and outcrops about 1.5 miles below the water surface. The team worked for one month, made 15 ALVIN dives, and took about 80,000 photographs with ARGO.

The Hess Deep Rift is located 101 degrees west and 2 degrees north, which is almost due south of Mexico City. It marks a spot where four tectonic plates, the Pacific, Nazca, Cocos, and the Galapagos, interact. The tectonic activity has resulted in a magnificent submarine chasm, providing great views of oceanic crustal structure at the East Pacific rise. The area is not well studied. Two other expeditions to the area logged only nine dives. Hurst was on a 1990 expedition to the area. The cruise last year was a follow up to that original one nine years ago.

"It is really special to be an undergraduate and to see something almost no one else has ever seen," says Sutton. "It was a great opportunity for me and a wonderful addition to my undergraduate career." Sutton put up with a little sea sickness (actually five days; three solid ones in bed!) and chunky milk (when it thawed out the globs of fat got all chunky), but



The Hess Deep Rift marks the spot where four tectonic plates interact.

beyond that the experience was nirvana. "I love being outside, I love being in the field," says Sutton.

"Being in the ALVIN itself is a little like being in a cave, although not as scary," says Sutton. "You have to shrink down your reality and create a really small mental world, which takes some mental agility. Even just living on the ship for one month took that agility. Ping Pong became very important," Sutton said.

The cruise occurred in the middle of the spring semester, forcing Sutton to miss four weeks of class and do some creative class planning, but it was worth it. "Going to sea fundamentally rearranges your entire view of the universe," says Sutton. "For that entire month the ship was always moving, it made me feel more connected to the rest of the world. I really sensed the passage of time."

Sutton, who was looking for a research project but hadn't settled on any particular topic, was thrilled with her ALVIN experience. For her senior thesis she is characterizing the uppermost crust in the extrusive section to understand the geologic processes involved. Much of her

work will be based on the samples collected and outcrops photographed during the expedition, and subsequent image processing primarily involving photomosaicking. "Working with Steve has been great," says Sutton. "He's really

smart and he expects a lot from me, which is good. It really pushes me."

Another faculty member who has received kudos from his undergraduate students is Jay Bass. Supported by supplementary grant money from the National Science Foundation's Research Experiences for Undergraduates Program, Bass helped several undergraduates over the last several years conduct original research. The University recognized his efforts recently by awarding him the Campus Award for Excellence in Guiding Undergraduate Research.

Two other juniors are being supported by the NSF's Research Experience for Undergraduates Program in Professor Wang-Ping Chen's lab. Frances (Frannie) Skomurski and Laura Swan are helping Chen and his graduate student, Mike Brudzinski, understand earthquakes beneath the Himalayas and the Tonga-Fiji islands.

UNDERGRADUATE ACTIVITIES

Swan is looking at digital data collected over the past 20 years regarding the Himalayas and Tibet, where earthquakes in the mantle portion of the continental lithosphere were discovered by Chen and his colleagues in 1979. A large amount of high-resolution, digital data collected in the past two decades make it possible to carry out a systematic study of these puzzling earthquakes. Swan is looking particularly at the depth at which the earthquakes occur, whether they are in the mantle or the lower crust, for example. "We hope these results will advance our understanding of how mountains are built and how the Indian craton is being destroyed in the process," says Chen.

Skomurski is looking at outboard earthquakes, a unique type of deep earthquake west of the Wadati-Benioff Zone of Tonga. Subduction along the Tonga Trench is exceedingly fast (more than 200 millimeters per year), with some of the oldest and coldest slab going down. "Outboard quakes are fairly rare, they don't occur at every subduction zone," says Skomurski. Skomurski modeled the rupture process of the biggest outboard earthquake to date using waveform inversion. She successfully modeled two major sub-events with changing fault plane solutions (this refers to a schematic way to define the orientation of a fault), as well as a precursor event. The results showed that the outboard earthquake shared characteristics with deep earthquakes, such as having multiple sub-events, changing fault plane solutions, relatively fast rupture speeds (as far as earthquake propagation goes), and a substantial source volume.

However, outboard earthquakes do not show down-dip compression, which is a characteristic of the Wadati-Benioff Zone. Instead, there seems to be a pattern among the outboard earthquakes that gradually changes from north-south compression to extension



over a distance of several hundred kilometers. "This suggests that we may be dealing with a large piece of coherent slab material that is experiencing deformation on a regional scale," says Skomurski.

"I was looking at different schools with good geology programs and I knew the University of Illinois had good research opportunities," says Skomurski of her decision to come to the University. "After my freshman year I talked to Mike Brudzinski—he's the best teaching assistant ever—about the chance to do research. A week later he asked me, 'how do you feel about earthquakes?'"

Skomurski signed on to work in Chen's lab and hasn't regretted it yet. "Both Laura and I have had lots of one-on-one contact with Mike and Professor Chen. It's really cool," she says. Skomurski presented her work at the fall annual meeting of the American Geophysical Union last December.

"What Frannie and Laura is doing is quite unusual, very high-level stuff, the real deal," says Brudzinski. "They are doing graduate-level work that could be part of a Ph.D. project." Brudzinski knows high quality: He was the first recipient of the Texas-Louisiana Fellowship from the department in recognition for his outstanding achievements as a graduate student.

Senior Kristine Mize is working with assistant professor Bruce Fouke to understand the diagenesis of Yellowstone hardgrounds and the sedi-

Junior Frannie Skomurski is looking at outboard earthquakes with Professor Wang-Ping Chen

mentology of the Chicxulub impact on the Yucatan Peninsula. Fouke also has an astrophysics major and three molecular biology majors doing projects in his lab.

In addition to working with Fouke, Mize has done two internships at the Illinois State Geological Society (ISGS), during which she has helped Hannes Leetaru study Benoit sandstone of south-central Illinois. Although it produces oil, the Benoit sandstone has not been very well studied. Mize and Leetaru are working on a regional map of the area that will help fill in the geological framework of the Illinois Basin.

"What Frannie and Laura is doing is quite unusual, very high-level stuff, the real deal," says Brudzinski. "They are doing graduate-level work that could be part of a Ph.D. project."

Mize, who transferred here as a junior, spent part of last summer working with Fouke on the Yellowstone samples. She learned about using the cathodoluminescence petrography technique. She and Fouke found an unusual formation of travertine that exhibits a bright cathodoluminescent character. However, instead of being a primary precipitate it may be a secondary product of diagenetic alteration. This finding is important for understanding how the hot spring water creates both physical and chemical changes in the travertine.

This spring Mize will begin helping Fouke with a project concerning the giant comet or asteroid that hit the Yucatan Peninsula and is thought to have caused the extinction of the dinosaurs. The impact left a crater five miles deep and 250 miles in diameter. The vapor clouds formed on impact



were very hot and full of water and gas. As they cooled, particles stuck to the water droplets in the atmosphere and formed marble-sized pebbles, known as lapilli. These pebbles are one of the few pieces of direct evidence of what happened in the atmosphere following the meteorite's impact. (For more on Fouke's research, see the Spring 1998 issue of *Geosciences*). Mize is working with Fouke to get a better understanding of the geological processes involved in that event.

"This research has given me a sense of what I want to do in the future," says Mize, who has been interested in geology since the beginning of high school. "It makes me feel more involved in what I want to do as opposed to just going to classes. And Bruce is really dedicated to his students and to his research at the same time. He is a really good motivator."

Susan Riggins is another undergraduate who has gained research experience at the ISGS. Riggins is working with Drew Phillips of the ISGS and Associate Professor Steve Altaner. Her project is being supported by a Special Undergraduate Research Experience grant from the Environmental Council, a campus group of 12 faculty from a cross-section of the sciences that works to promote an interdisciplinary approach to all scientific research. Riggins' senior thesis concerns the vertical facies changes in the sediments of the American Bottoms Floodplain. Her core sample is from St. Clair County in Illinois. By studying the vertical facies Riggins hopes to uncover potentially significant horizontal heterogeneities. "I'd like to both determine how this region was formed and understand what that implies for groundwater flow and possible remediation efforts," says Riggins of her project.

Rocks Are More Interesting Than People Think...

Just about any time of day a visitor wandering into the geology department lunch room will find a conglomerate of geology students hanging out, doing homework, or chatting over a snack or cup of coffee. Geology undergraduates, of which there are about 50, are a tight-knit group.

"There is a core of undergraduates that hang out together," says junior Anna Sutton. "Field trips more than any other activity brings us together."

Most geology majors share an interest in the outdoors and the environment and bond over field trip experiences and long hours spent in lab together.

"Among geology majors, there's an understanding that we share the same interest, we're all excited about rocks (which makes other people look at us funny), and we share respect for the earth and wanting to be part of it," says sophomore Laura Swan.

Sutton agrees, "Rocks are more interesting than most people think. They tell stories, you just gotta learn to listen."

"All the geologists I came in contact with were really neat, and I liked the idea of being a geologist," adds sophomore Frances Skomurski. "I've been interested in dinosaurs since kindergarten, and once I got into junior high school I became very interested in environmental issues. I want to use geology as a tool within the environmental field."



Junior Laura Swan is working with Professor Wang-Ping Chen to understand earthquakes in the mantle and how they might contribute to mountain building.

Swan's interest in geology was encouraged by her family trips out west, mainly to national parks. "I thought the geology of those areas was really cool."

Likewise, senior Kristine Mize knew she was interested in being a geologist in part because of her travels and her interest in rock collecting. "We'd go on family trips and I always enjoyed learning about the formations we were seeing," she

said. "Then I realized, hey! I can do this for a living!"

Another thing that appeals to many majors is the one-on-one interactions they get from faculty and graduate students. Many point to those experiences being the best part of their University of Illinois education.

Skomurski, for example, says she has gotten enormous amounts of help and guidance from both her advisor, Wang-Ping Chen, and graduate student Mike Brudzinski, who also is in Chen's lab.

Sutton points out that the relationships geology students have with their professors is very different from that in other departments. "After 12 hours of hard work in the field, you put up tents, start fire and drink beer. It's time to relax. This is when you see another side of your professors. That's not true of other departments."

Field Camp—the Tradition Continues

Most pre-1988 alumni fondly remember the Geology Department's field camp based in Sheridan, Wyoming, which operated from 1955-1988. Beginning in 1989, the department switched the camp's venue, and joined forces with four other schools to operate the Wasatch-Uinta Field Camp, based in Park City, Utah. Our colleagues in the camp include the University of Iowa, the University of Wisconsin, Michigan State University, and the University of Minnesota, Duluth. The 1999 summer field camp session marked the 10th anniversary of Illinois' participation in the Wasatch-Uinta Camp.

"Although there was a huge affection for the Sheridan field camp, the expense of such a solo operation required us to find an alternative," says Department Head Steve Marshak. "Fortunately, the tradition of excellent field camp experiences continues with the Wasatch-Uinta camp."

In spite of the location change, the key essentials of field camp remain the same—students work exceedingly hard, learn a heck of a lot, and develop lifetime friendships. Today's camp still focuses on the basics. Students



Taking a dip in the Great Salt Lake.

learn how to interpret field relations, how to do geologic mapping, how to take field notes and make field descriptions, and how to construct cross sections and stratigraphic columns. On a typical day, everyone heads to the field by 7:30 a.m. and maps until 5 p.m. After dinner, stu-

If you're visiting Sheridan, Wyoming, in the near future, take a close look at the new Grinnell Street Mall. One of the bricks in the Mall pavement commemorates the University of Illinois Geology Field camp, which was based in Sheridan from 1955 through 1988. Norb Cygan (B.S. '54, M.S. '56, Ph.D. '62) spearheaded the effort to buy and inscribe the brick. In addition to his long affiliation as a student in the geology department, Cygan taught at the field camp between 1955 and 1969. Thanks, Norb!

dents draw their office copies of maps and prepare geologic histories. And the obstacles—rattlesnakes, cow dung, cliffs, and cactus—still add excitement to every traverse. Some exercises cover hot terrain in desert-like conditions, while others involve taking students to 10,000-foot-high ridges, well above tree line. During the July 4 weekend, the camp takes a four-day regional trip up to the Grand Tetons. Not surprisingly, students still think of field camp as being a highlight of their college experience. They metamorphose from being geology students into being geologists.

At Park City, students stay at the Chateau Après, a ski lodge that becomes a dorm in the summer. The students sleep three to a room, and eat cafeteria style in the lodge's dining



A textbook example of a box fold near the crest of Bountiful Peak, Utah.

UNDERGRADUATE ACTIVITIES



Left: The University of Illinois contingent takes a break for a photo shoot.

Right: Judd Tudor climbing the Frontier Formation at Chalk Creek, Utah.

room. Accommodations aren't posh, but Park City is a fun place to be. A boom of building in anticipation of the Winter Olympics provide many places to visit on a Saturday night, and the scenery in the surrounding mountains is a marvel.

One bonus with the Park City program is that Illinois geology students get to meet many students from other geology programs—the Wasatch-Uinta camp has had between 55 and 85 students per year. The mix lets some students build professional relationships that will last their entire career. In addition, students have a chance to meet a broad selection of faculty and ideas.

"One of the things I liked best about field camp is that you meet all sorts of people," says graduate student Judd Tudor. Tudor attended field camp as an undergraduate and served as

teaching assistant for two years.

"When you see someone you first knew from field camp there is a very intense bond. It was great to see field camp friends at a GSA meeting. Some of my best memories of college come from field camp," says Tudor.

Though field camp is a great experience, it can be expensive for the students. Recognizing this, Ed Franklin (B.S. '56) established a generous endowment which will provide scholarships to help students defray the cost of the camp. Other GeoThrust funds also are used to help students out. The start of field camp can also

be a bit intimidating to students. To help remedy this problem, Marshak created a new class, called *Review of Field Techniques* (Geology 397), to help students get ready for field camp. In the class, students get practice with compass use, rock description, and map interpretation. They also discuss pointers about mapping techniques.

The view from Bountiful Peak.



Geology in the Early Years of The University of Illinois

by Ralph Langenheim

Although it was not an independent department at the start, geology was part of the University curriculum from its very founding in 1868. During the very first year of the "Illinois Industrial" University's existence, the Department of Science, Literature and the Arts taught mineralogy, and by the second year, the "Natural History Curriculum" included several geology courses (e.g. Principles of Geology; Lithological Geology; Paleontology, Historical and Dynamical Geology, and Geology of Illinois). By 1872 the University had been divided into four colleges: Agriculture, Engineering, Natural Science, and Literature and Science. Each college was subdivided into schools. Most geology courses were administered by the School of Natural History, but mineralogy was offered by the School of Chemistry (both schools were part of the College of Natural Science).

Don Carlos Taft, the first official geology professor, was hired in 1870 as Professor of Zoology and Geology in the College of Natural History. Since geology was taught only to third- and fourth-year students, the first classes would have been taught in 1870-71. Because these early years were a time of flux, we have three choices of birth-dates of geology at Illinois. It could be argued that the first year, 1868-69, was the beginning but that might better be thought of as the conception. The next year, 1869-70, with Taft in residence but no courses being taught, might be thought of as gestation. 1870-71, when the first classes were taught, was the birth year of geology.



Taft was a colorful, independent-minded eccentric. As a young man, he suddenly decided that he had to make something of himself. He worked his way through Amherst College and Union Theological seminary, and upon graduation, became a Congregational minister and teacher in an academy at Elmwood, Illinois. Soon his sermons proved too liberal for the church and

Taft, for example, was found with his pants rolled up and mopping the floor in his laboratory when the Regent brought a new Trustee around to introduce the staff (Solberg, 1968).

he was reduced to teaching geology in the local high school. Taft was brought to Illinois by Regent John Gregory. He quickly established a reputation as a good teacher and gained popularity with the students. Taft was well known

Don Carlos Taft, the first professor of geology at the University, was an eccentric and colorful character in the history of the department.

for entertaining students in his home and for his determinedly unkempt condition. He took so much pride in paying little attention to clothing and grooming, that students nicknamed him the "great uncombed."

Regent Gregory was eventually forced to resign, in large part because of his lenient administrative style. His replacement, Selim Peabody, was a stern disciplinarian with higher academic expectations. Peabody called on the Board of Trustees to evaluate the geology program and, after the report was in, Taft was granted a leave of absence to visit England and his chair was declared vacant. Taft claims that he resigned to save Peabody embarrassment over his (Taft's) eccentricities. Taft, for example, was found with his pants rolled up and mopping the floor in his laboratory when the Regent brought a new Trustee around to introduce the staff (Solberg, 1968). A directory published after Taft resigned stated that he had left the University to join a religious community in Kansas where he was training to become a missionary to Africa. However, a note in the University archives from Taft's son, Lorado (creator of the "Alma Mater" statue among other works of art), states instead that Taft had become a banker in Kansas.

Interestingly, John Wesley Powell, the famous one-armed explorer who



was the first to lead an expedition through the Grand Canyon, almost joined the University as its first geology professor. Powell had solicited the Illinois Industrial University in 1867 for \$500 in return for specimens from his forthcoming scientific expedition to the Rockies. One benefit of the association with Powell is that J.T. Burrill, of Burrill Hall fame, accompanied Powell on this expedition, collecting plants that became the beginning of the University herbarium. Then, in March, 1868, the Board of Trustees unanimously elected Powell to the professorship of Natural History, "his term of service to commence at such time as may be agreed upon between himself and the Committee on Faculty and Courses of Study." (Ill. Indust. Univ.,

1st Ann. Rep. Trustees, 1867-68, p. 127). Powell's salary was set at \$600 and, at his own request, he was sent to conduct his second expedition to the Grand Canyon, on the understanding that he would be representing Illinois Industrial University. However, on his return from his first Colorado River expedition (March 1869) Powell resigned his professorship ... never having taught a course. Powell went off to fame and glory, shaping the USGS into a premier research organization, and serving as director of the Bureau of Ethnology, leaving geology at Illinois Industrial University to fend for itself. We can only wonder what might have happened had Powell's energy and guile been devoted to the cause of geology at Illinois.

Professor Emeritus Don Henderson ("Hendy") adds this contribution: Geology was first organized as a department in 1919 and stayed that way up to 1934. At that point it was combined with geography to become the Department of Geology and Geography. This arrangement lasted until 1947, when Geology was once again made a separate department.

Faculty

Stephen P. Altaner, associate Professor
 Thomas F. Anderson, professor; Emeritus as of
 January, 2000
 Jay D. Bass, professor
 Craig M. Bethke, professor
 Daniel B. Blake, professor
 Chu-Yung Chen, associate professor
 Wang-Ping Chen, professor
 Bruce W. Fouke, assistant Professor
 Albert T. Hsui, professor
 Thomas M. Johnson, assistant professor
 R. James Kirkpatrick, professor and executive
 associate dean
 Craig C. Lundstrom, assistant professor
 Stephen Marshak, professor and head
 Alberto S. Nieto, professor
 Xiaodong Song, assistant professor

Visiting Faculty

Spencer Cotkin, visiting assistant professor
 Michael J. Handke, visiting assistant professor
 Laura Wasylenki, visiting assistant professor
 John Werner, visiting assistant professor

Academic Staff, Post-Docs, Visiting Scholars

Debby Aronson, yearbook editor
 George Bonheyo, post-doctoral researcher
 David Finkelstein, visiting teaching lab specialist
 Richard Hedin, research programmer
 Mitchell Herbel, post-doctoral researcher
 Eileen Herrstrom, teaching lab specialist
 Stephen Hurst, research programmer
 Andrey Kalinichev, visiting scholar
 Lalita Kalita, research programmer
 Alexander Kisliuk, post-doctoral researcher
 Ann Long, visiting teaching lab specialist
 Peter Michalove, assistant to the head
 Jieyuan Ning, visiting scholar
 Dawn Sandone, program coordinator
 Stanislav Sinogeikin, visiting scholar
 Frank Schilling, visiting scholar
 Ester Soriano, research programmer
 Melinda Tidrick, visiting teaching lab specialist
 Tiffany Tsou, resource and policy analyst
 Raj Vanka, resource and policy analyst
 Alan Whittington, post-doctoral researcher

Emeritus Faculty

David E. Anderson
 Albert V. Carozzi
 Carleton A. Chapman
 Donald L. Graf
 Arthur F. Hagner
 Richard L. Hay
 Donald M. Henderson
 George deV. Klein
 Ralph L. Langenheim
 C. John Mann
 Philip A. Sandberg

Adjunct Faculty

Keros Cartwright
 Heinz H. Damberger
 Leon R. Follmer
 Feng Sheng Hu
 Dennis Kolata
 Morris W. Leighton
 John McBride
 William Shilts
 M. Scott Wilkerson

Library Staff

Sheila McGowan, chief library clerk
 Lois Pausch, librarian
 Diana Walter, library technical specialist

Staff

Barbara Elmore, staff secretary
 Eddie Lane, electronics engineering assistant
 Brenda Polk, chief clerk
 Pamela Rank, account technician II
 Sue Standifer, clerk II

Graduate Students

Oswaldo Araujo
 Michael Brudzinski
 Dylan Canavan
 Andre Ellis
 Stephanie Gillain
 Keith Hackley
 Yoshie Hagiwara
 Michael Harrison
 Roberto Hernandez
 Xiaoqiang Hou
 Qusheng Jin
 Dmitry Lakshatanov
 Serena Lee
 Christopher Mah
 Peter Malecki
 Christopher McGarry
 Jungho Park
 George Roadcap
 Joseph Schoen
 Jian Tian
 Judd Tudor
 Richard Wachtman
 Matthew Wander
 Jianwei Wang
 Matthew Woltman
 Aubrey Zerkle
 Limei Zhou

Courses Taught in 1999

Geol 100	Planet Earth
Geol 101	Introduction to Physical Geology
Geol 104	Geology of the National Parks and Monuments
Geol 107	General Geology I
Geol 108	General Geology II
Geol 110	Planet Earth — Lab/Field
Geol 111	The Dynamic Earth (Honors)
Geol 116	Geology of the Planets
Geol 117	The Oceans
Geol 118	Earth and the Environment
Geol 143	History of Life
Geol 250	Geology for Engineers
Geol 301	Geomorphology
Geol 311	Structural Geology and Tectonics
Geol 315	Field Geology (field trip to the Rio Grande Rift)
Geol 317	Geologic Field Methods, Western United States (Field Camp)
Geol 320	Introduction to Paleontology
Geol 332	Mineralogy and Mineral Optics
Geol 336	Petrology and Petrography
Geol 340	Sedimentology and Stratigraphy
Geol 350	Introduction to Geophysics
Geol 351	Geophysical Methods for Geology, Engineering, and Environmental Sciences
Geol 352	Physics of the Earth
Geol 360	Geochemistry
Geol 370	Oceanography
Geol 380	Current Problems in Environmental Geology
Geol 397	Field Methods in Geological, Geotechnical, and Geoenvironmental Exploration
Geol 401	Physical Geochemistry I
Geol 415	Advanced Field Geology
Geol 432	Sedimentary Geochemistry
Geol 433	Isotope Geology
Geol 450	Principles of Engineering Geology
Geol 451	Practice of Engineering Geology
Geol 489	Geotectonics
Geol 493A1	Graduate Student Seminar
Geol 493E4	Biom mineralogy
Geol 493K2	Geodynamics
Geol 493Q1	Recent Developments in Thrust Tectonics



AMERICAN CHEMICAL SOCIETY- PETROLEUM RESEARCH FUND

A Time-Series Process Model Of Carbonate Diagenesis And Microbial Genetic Preservation In Hot Spring Travertine, Yellowstone National Park, Wyoming, And Gardiner, Montana.
Principal Investigator: Bruce Fouke

Origin, Architecture, & Thermal State of the Lackawanna Syncline, Pennsylvania.
Principal Investigator: Stephen Marshak

CENTER FOR ADVANCED CEMENT-BASED MATERIALS

NMR And MD Investigations of Chloride Sorption and Transport in Portland Cement Systems.
Principal Investigator: R. James Kirkpatrick.

DEPARTMENT OF ENERGY

Molecular Dynamics Modeling of Sorption on Mineral Surfaces.
Principal Investigator: R. James Kirkpatrick.

MD Modeling of the Thermodynamics and Material Properties of Water-Carbon Dioxide Fluids at High Pressures and Temperatures.
Principal Investigator: R. James Kirkpatrick.

WILLIAM AND FLORA HEWLETT FOUNDATION

Collaborative Research: Imaging Seismic Structures of the Crust and Upper Mantle Beneath China.
Principal Investigator: Xiaodong Song.

ILLINOIS COUNCIL ON FOOD AND AGRICULTURAL RESEARCH

Estimation of Denitrification Rates in the Shallow Groundwater Flow Systems of Big Ditch Watershed, Illinois - Isotope Assessment.
Principal Investigator: Tom Johnson

INSTITUTE OF GEOPHYSICS AND PLANETARY PHYSICS, LOS ALAMOS

Timescales of Crustal Level Differentiation: U-Series Measurements and Geophysical Monitoring at Arenal Volcano, Costa Rica.
Principal Investigator: Craig Lundstrom.

NASA

Core Angular Momentum and the International Earth Rotation Service Coordination Center/ Sub-Centers Activity for Monitoring Global Geophysical Fluids.
Principal Investigator: Xiaodong Song.

JET PROPULSION LABORATORY

Geochemistry of Carbonate Ejecta from the Cretaceous-Tertiary Chicxulub Impact Crater.
Principal Investigator: Bruce Fouke.

NATIONAL SCIENCE FOUNDATION

Transport of the Isotopes ^4He , ^{36}Cl , And ^{40}Ar , and the Relationship of the Distribution of these Isotopes to Groundwater Age.
Principal Investigator: Craig Bethke.

Seismic Reflection Profiles in Southern Illinois (funded through the Mid-America Earthquake Research Center).
Principal Investigators: John McBride, Stephen Marshak, and Wang-Ping Chen.

A Seismic Study of the Mantle Transition Zone and Subducted Lithosphere.
Principal Investigator: Wang Ping Chen.

Characterization of Seismic Sources in and Around the New Madrid Seismic Zone (funded through the Mid-America Earthquake Research Center).
Principal Investigators: Wang-Ping Chen and John McBride.

Tectonics of the AraAuaí/Ribeira Orogenic Tongue of Southeastern Brazil and its Significance to the Assembly of West Gondwana.
Principal Investigator: Stephen Marshak

Selenium Stable Isotopes as Indicators of Selenium Transport.
Principal Investigator: Tom Johnson

Constraining the Structure and Rotation of the Inner Core.
Principal Investigator: Xiaodong Song

Windows into MORB Petrogenesis: Measuring U-series Disequilibria in MORB From Transforms.
Principal Investigator: Craig Lundstrom

Proximal Carbonate Ejecta and Breccias from the Cretaceous-Tertiary Chicxulub Impact: Ballistic Sedimentation and Brecciation, $^{87}\text{Sr}/^{86}\text{Sr}$ Chronology and Diagenetic Alteration.
Principal Investigator: Bruce Fouke

The Asteroid (Echinodermata) Trichasteropsis from the Triassic of Germany: Its Taxonomy, Phylogeny and Paleocologic Significance.
Principal Investigator: Daniel B. Blake

Paleoecological Setting of Eocene Echinoderms at Seymour Island, Antarctic Peninsula.
Principal Investigator: Daniel B. Blake

Elasticity of Mantle Minerals Under High Pressures and Temperatures.
Principal Investigator: Jay Bass

Polyamorphism and Structural Transitions During Glass Formation.
Principal Investigators: Jay Bass and Jay Kieffer

Experimental NMR and MD Investigations of the Structure and Dynamics of Anionic Species in and Sorbed onto Mixed-Metal Layered Hydroxides.
Principal Investigator: R. James Kirkpatrick

U.S. GEOLOGICAL SURVEY

Mapping of the Pittston 7.5" Quadrangle, Pennsylvania.
Principal Investigator: Stephen Marshak

UNIVERSITY OF ILLINOIS CRITICAL RESEARCH INITIATIVE

Geological, Microbiological, and Biochemical Mechanisms of Microbial Fossilization: A Template for Interpreting the History of Life.
Principal Investigators: Bruce Fouke, A.A. Salyers, J. Sweedler.

UNIVERSITY OF ILLINOIS FACULTY FELLOWSHIP

Imaging the Earth's Converging Tectonic Plates
Principal Investigators: Wang Ping Chen and Ulrich Kruse

UNIVERSITY OF ILLINOIS RESEARCH BOARD

Simulation of Mantle Dynamics: To Simulate Mantle Flows to Understand the Deep Interior of the Earth as Revealed by Seismic Tomography.
Principal Investigator: Albert T. Hsui

Acquisition of a Single Collector Thermal Ionization Mass Spectrometer.
Principal Investigator: Craig Lundstrom.

LIST OF PUBLICATIONS FOR 1999

This list includes only peer-reviewed articles, chapters, or books.

- Jackson, J.M., Stanislav, S.V., and Bass, J.D., 1999, Elasticity of MgSiO₃ orthoenstatite: *American Mineralogist*, 84: 677-680.
- Blake, D.B., Hagdorn, H., and Tinitori, A., 1999, Echinoderm taphonomy of the Zorzino Limestone (Norian, Late Triassic), p. 35-38. In: S. Renesto (ed.), *Third International Symposium on Lithographic Limestones, Bergamo, Italy. Rivi sta del Museo Civico di Scienze Naturali 20 (supplement)*, 136 p.
- Finkelstein, D.B., Hay, R.L., and Altaner, S.P., 1999, Origin and diagenesis of lacustrine sediments of the Oligocene Creede Formation, southwestern Colorado: *Geological Society of America Bulletin*, 111: 1175-1191.
- Sinogeikin, S.V. and Bass, J.D., 1999, Single-crystal elasticity of MgO at high pressure: *Physical Review B* 59: 14141-14144.
- Bethke, C.M., Zhao, X., and Torgersen, T., 1999, Groundwater flow and the ⁴He distribution in the Great Artesian Basin of Australia: *J. of Geophys. Research*, 104: 12,999-13,011.
- Sinogeikin, S.V., and Bass, J.D., 1999, Elasticity of chondrodite and implications for water in the Earth's mantle: *Phys. Chem. Minerals*, 26: 297-303.
- Webster, G.D., Hafley, D.J., Blake, D.B., and Glass, A., 1999, Crinoids and stelleroids (Echinodermata) from the Broken Rib Member, Dyer Formation (Late Devonian, Famennian) of the White River Plateau, Colorado: *J. of Paleontology*, 73: 461-486.
- Bethke, C.M., van der Lee, J., and Schmitt, J.-M., 1999, The chemistry beneath our feet: Modeling reacting flow in the Earth's crust. In: C. Jablon, ed., *Scientific Bridges for 2000 and Beyond*, Académie des Sciences, Paris, 1-11.
- Chen, W.-P., Chen, C.-Y., and Nábelek, J.L., 1999, Present-day deformation of the Qaidam basin with implications for intra-continental tectonics: *Tectonophysics*, 305: 165-181.
- Nowack, R. L., Ay, E., Chen, W.-P., and Huang, B.-S.A., 1999, Seismic profile of the upper mantle along the southwestern edge of the Philippine Sea plate using short-period array data: *Geophys. J. Int.*, 136: 171-179.
- Özalaybey, S., and Chen, W.-P., 1999, Frequency-dependent analysis of SKS/SKKS waveforms observed in Australia: Evidence for null birefringence: *Phys. Earth Planet. Interior*, 114: 197-210.
- Nowack, R. L., and Chen, W.-P., 1999, Source-receiver reciprocity and empirical Green's functions from chemical blasts: *Bull. Seismol. Soc. Am.*, 89: 538-543.
- Jackson, J.M., Sinogeikin, S. V., and Bass, J.D., 1999, Elasticity of orthoenstatite: *Am. Mineralogist*, 84: 677-680.
- Toohill, K., Siegesmund, S., and Bass, J.D., 1999, Elasticity of cordierite and implications for lower crustal seismic anisotropy: *Phys. Chem. Minerals*, 26: 333-343.
- Johnson, T.M., Herbel, M.J., Bullen, T.D., and Zawislanski, P.T., 1999, Selenium isotope ratios as indicators of selenium sources and oxyanion reduction: *Geochimica et Cosmochimica Acta*, 63: 2775-2784.
- Macedo, J., and Marshak, S., 1999, The geometry of fold-thrust belt salients: *Geol. Soc. of America Bulletin*, 111: 1808-1822.
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Spring 1999

- January 19** Lianxing Wen Carnegie Institute
Seismology: New Technique, Fine Structures & New Insights into Earth's Dynamics
- January 22** Peter Reiners Caltech
(U-Th)/He Dating & Thermochronometry of Shallow Crustal Processes
- January 25** James Farquhar University of Calif.
What do oxygen & sulfur isotopes tell us about the Martian atmosphere & its interactions with the planet's surface?
- January 27** Veli-Pekka Salonen Finland
Use of Gypsum in rehabilitation of Eutrophic lakes
- January 29** Craig Bethke U of I
Groundwater flow and the 4He distribution in the Great Artesian Basin
- February 1** Stephen Zaitman UC-Berkeley
High Frequency Geomagnetism: The changing state of the earth's deep interior
- February 8** Stuart Rojstaczer Duke University
Hydrology of Yellowstone's Geysers
- February 9** Xiaogong Song Lamont-Doherty Earth Observatory
Structure & dynamics of the earth's core from seismic body-waves
- February 10** Kevin Mandernack Colorado School of Mines
Stable isotopes as indicators of microbial activity
- February 15** Paul Earle UCLA
Small-scale structure of the mantle & core from observations of high-frequency scattered energy
- February 17** Jan Amend Washington University
Unraveling geochemical bioenergetics in hydrothermal systems-A computational-experimental-analytical approach
- February 19** Feng Sheng Hu U of I, Plant Biology
Climate change & ecosystem response in Alaska: Snapshots of the last 12,000 years
- February 22** Ruth Blake Yale University
Oxygen isotope systematics of Microbial phosphate metabolism
- February 26** Mihai Duca Caltech
Vertical composition of continental arcs and the origin of batholiths
- March 4** Youngsook Huh MIT
Climate & weathering evidence from the rivers of eastern Siberia
- March 26** Kelly Warner USGS
Lower Illinois river basin-analysis of arsenic & pesticides in ground water
- April 9** Karen Haverholm University of Wisconsin
"What Are the National Science Education Standards and Why Should We Care?"
- April 16** Peter Keleman Woods Hole Oceanographic Institute
- April 30** Cassandra Coombs Charleston College
Volcanoes & resources of the Moon and Mars

Fall 1999

- September 9** Michael Manga University of Oregon
Microstructure in magmatic materials
- September 17** Alan Whittington U of I
Ancient histories of a young orogenic belt-Polymetamorphism in the Himalayas
- September 24** Alexander Alekseev Moscow St. University
Upper carboniferous of Moscow basin
- October 1** Tim Lyons University of Missouri Columbia
Recent advances in the S-isotope, Fe & Mo records of oxygen-deficient sedimentary systems: Examples from Precambrian to recent
- October 8** Dan Blake U of I
The evolution of starfish & the impact of climate decline on Antarctic invertebrate faunas: Paleobiology at Illinois
- October 15** Robert Wintsch Indiana University
Subduction & Ascent of Sanbaqawa Blueschist, SW Japan
- October 22** Tom Hickson University of Minnesota
Petrographic & textural constraints on deep-water sandstone deposition: They're not all turbidites anymore or: How to go blind doing point counts
- November 2** Mark Cooper AAPG
Oil & gas fields associated with inverted extensional faults: A global review
- November 5** Christina De La Rocha Harvard
Silicon isotope Biogeochemistry: Rivers, diatoms, & oceans, Present & past
- November 12** Jim Walters University of N. Iowa
Permafrost degradation caused by a warming climate in interior Alaska
- November 19** Louise Hose Westminster College
Geomicrobiological processes in a hydrogen sulfide-rich Karst environment
- December 3** Steven R. Bohlen USGS-Virginia
Federal science funding & the future of the Earth Sciences

Obituaries

Gerald Keith Anderson, B.A. '49, was killed in a car accident Dec. 22, 1998, in Midland, Texas. He was 73. Mr. Anderson taught geology at Miami University of Ohio and then was employed as a geologist by the Ohio Oil Company (now Marathon Oil). At the time of his retirement from Marathon Oil in 1986, Mr. Anderson was the chief geologist for the Yates Field in West Texas. He was a member of the American Association of Petroleum Geologists (AAPG). He is survived by three children and three grandchildren.

Terry W. Offield, M.S. '55, died Feb. 5, 1999, from complications following heart surgery. He was 65. In 1961 Mr. Offield joined the U.S. Geological Survey (USGS), working on regional geology and mineral resources of the outer Himalayas and on mineral surveys in northeastern Brazil. He went on to work in the USGS Branch of Astrogeology, serving as an advisor for lunar orbiter missions. Author of more than 100 scientific publications, Mr. Offield received the Department of the Interior's Meritorious Service Award and helped start the Geological Society of America's Congressional Science Fellow Program.

Donald J. Colquhoun, Ph.D. '60, died June 4, 1999.

Lois Kent, who taught in the department from 1955-1956, died last September in Champaign. Ms. Kent was a senior fellow in the GSA and a charter member of the Paleontological Research Institute in Ithaca, N.Y. From 1941-1945 she was a junior geologist and assistant geologist for the USGS in Washington, D.C. and from 1956-1985 she was a geologist emeritus for the ISGS in Urbana.

Class News

FIFTIES

Richard M. Winar, B.S. '53, M.S. '55, writes "Greatly enjoyed the articles about Harold Wanless. It was indeed an honor to know him ... Thanks for the fun of recalling him more clearly." Richard also has a new e-mail address: E-mail: rmwinar@aol.com

Bruce W. Nelson, Ph.D. '55, retired in June as professor of Environmental Sciences at the University of Virginia. In his 25-year career at the University, Bruce served as dean of continuing education, associate provost, professor ... and now professor emeritus! Bruce traveled to Malaysia and Mauritius in the 1980s on two separate Fulbright grants and attended a meeting in Beijing last September, which he followed with a trip through Southeast Asia. He writes, "I have enjoyed the newsletter and learning that U of I Geology is an active and vital place. Also, the recent articles on "old timers" are warm reminders of people I have known!" E-mail: bwn@virginia.edu

Barbara J. (Schenk) Collins, Ph.D. '55, is still teaching biology at California Lutheran University and thoroughly enjoying it. She now has a website with more than 550 color images of wildflowers of the chaparral in southern California. These are indexed according to common and scientific names at <http://ww1.clunet.edu/wf>
Note that this is *ww1* and not *www*.

Lorence G. Collins, Ph.D. '59 (and Barbara's husband), has been retired from California State University Northridge since 1993 and spends his time studying myrmekite and the origin of some granite bodies by K-metasomatism. He now has 35 articles on a website: <http://www.csun.edu/~vcgeo005>. He maintains another site in opposition to creation science at <http://www.csun.edu/~vcgeo005/creation.html>. This includes an article about a bogus Noah's Ark in Turkey. E-mail: lorenc@cs.com

SIXTIES

Margaret S. Leinen, B.S. '69, is the new assistant director for Geoscience at NSF. She assumes her duties at NSF after serving as provost for Marine Sciences and dean and director of the Graduate School of Marine Sciences at the University of Rhode Island.

John D. Sims, B.S. '62, retired from the U.S. Geological Survey (USGS) in January, 1999, to enjoy the restoration of his circa 1785 stone farm house near historical Harpers Ferry, W.Va. "The restoration is well underway with my partner, Jim Tower, and I doing almost all the work," John writes. Eventually, Willow Spring Farm, as it is named, will be a small bed & breakfast. John also is principal in a consulting firm specializing in earthquake hazard evaluation. He is currently working on three projects for the USGS. E-mail: jsims@ix.netcom.com

Ira Edgar Odom, M.S. '58, Ph.D. '63, worked at American Colloid Co. until December of 1999, as a research scientist. "It was an enjoyable 19 years," he writes. "I have become a bit of an expert on silica minerals in clays. I discovered that silica minerals in dusts, from bentonite and other dry clay processing are clay encapsulated. MSHA, OSHA and NIOSH believe this is very significant and explains why clay plant workers seldom, if ever, have silicosis. Before working for American Colloid, Ira taught at Northern Illinois University until 1981. "A wonderful experience!" Ira currently is a full-time consultant. "I'm going strong and looking forward to full-time consulting," he writes.

Paul L. Plusquellec, M.S. '66, Ph.D. '68, retired from CNG Producing Co. in 1996 where he was vice president of exploration and development. These days he is enjoying golf, cooking and traveling from his base in Montgomery, Texas. E-mail: pbplusque@aol.com



SEVENTIES

James W. Granath, B.S. '71, M.S. '73, has become a consulting structural geologist in Houston. He was previously a structural specialist for Conoco Advance Exploration in Houston.

William Ausich, B.S. '74, has stepped down as chair of the Department of Geological Sciences at Ohio State. "I look forward to life as a professor," he writes. E-mail: ausich.1@osu.edu

John C. Steinmetz, B.S. '69, M.S. '75, has become the director of the Indiana Geological Survey and Indiana state geologist, Bloomington, Ind. He was previously director and state geologist of the Montana Bureau of Mines and Geology in Butte, Mont., and adjunct professor of geology, University of Montana, Missoula.

Tim Rynott, B.S. '79, served as general chair of the Gulf Coast Association of Geological Societies annual convention. The 49th Annual GCAGS Convention was held in September, 1999, in Lafayette, La., where Tim has been working as a petroleum geologist for the past 19 years. He is a past president of the Lafayette Geological Society and considers himself very fortunate to have been able to spend his entire career in one "oil town." "Lafayette, the heart of Cajun Country, is one of the best kept secrets in the South," he writes. He invites fellow alums to come experience the "joie de vivre." E-mail: rynott@worldnet.att.net

EIGHTIES

Jim Cobb, B.S. '71, Ph.D. '81, was appointed the 12th State Geologist of Kentucky and director of the Kentucky Geological Survey on October 1. E-mail: cobb@fido.mm.uky.edu

M. Scott Mansholt, B.A. '82, works for Texaco in Bakersfield, Calif., as an environmental coordinator, primarily dealing with waste management, remediation, water issues, property reviews and Web page management. E-mail: manshms@texaco.com

Dean Rose, B.S. '83, has found a new career crafting metalwork. Based in Champaign, Dean was recently the subject of a feature article in the News-Gazette. Dean taught himself the craft by finding information at libraries and visiting museums and other places with fine examples of metalwork. His company, which he founded in 1992 after leaving the gas and oil business, is called Working Metal Customized Decorative Ironworks. Visit his website at www.soltec.net/blacksmith. E-mail: artsmith@soltec.com

William C. Dawson, B.S. '74, Ph.D. '84, has been awarded the 1999 Levorsen Award by the Gulf Coast Association of Geological Societies for a paper he presented at the 1999 Annual Meeting. The paper was titled "Top Seal Character and Sequence Stratigraphy of Selected Marine Shales in Gulf Coast Style Basins."

Stephen E. Laubach, Ph.D. '86, and co-author Eloise Doherty received the "Jules Braunstein Memorial Award" from the AAPG for the best poster presentation at the 1999 annual AAPG meeting in San Antonio, Texas. The paper was titled "Natural Fracture Analysis Using Drilled Sidewall Cores." The award was presented at the 2000 AAPG meeting in New Orleans, April 15-20. Stephen, a structural geologist, is a senior research scientist in the Texas Bureau of Economic Geology, at the University of Texas, Austin.

NINTIES

Rich Poskin, B.S. '91, has earned a master's degree in zoology and is now on the faculty of Wabash Valley College in Mt. Carmel, Ill. He teaches biology and geology.

Steven J. Hageman, M.S. '88, Ph.D. '92, has been designated a distinguished lecturer by the Paleontological Society. Each year the Paleontological society identifies six distinguished lecturers who are available to speak to a wide range of groups. Steven is a professor of geology at Appalachian State University. E-mail: hagemansj@appstate.edu

Ming Kuo Lee, M.S. '90, Ph.D. '93, just received tenure and promotion at Auburn University.

Bruce Miller, B.S. '94, M.S. '95, has become a Field Service Manager for Schlumberger, based in Louisiana. Bruce and his wife, Laura, are enjoying parenthood with their first child.

Steven Sroka, B.A. '80, Ph.D. '96, writes to say that he is now the park manager (equivalent to a director) of the Utah Field House of Natural History State Park Museum in Vernal Utah. The museum is devoted to natural history, especially paleontology, of the Uinta Basin and Uinta Mountains. The museum is 20 miles away from Dinosaur National Monument and is currently undergoing a major fund-raising drive for a much needed revitalization. The museum has over 130,000 visitors a year. All current and past alumni (and their families) are welcome to stop by. E-mail: nrdpr.ufsp@state.ut.us

Crystal Lovett, B.S. '97, just completed her master's degree in environmental management at Duke University. She is working one year for the Environmental Defense Fund in Raleigh, N.C. Her projects involve developing policy for forestry practices on private lands in North Carolina. In August of this year she'll attend University of Virginia School of Law. "I love getting the newsletter," she writes. "I like seeing how things change (or stay the same) and what people I knew are up to." E-mail: cgl2@duke.edu

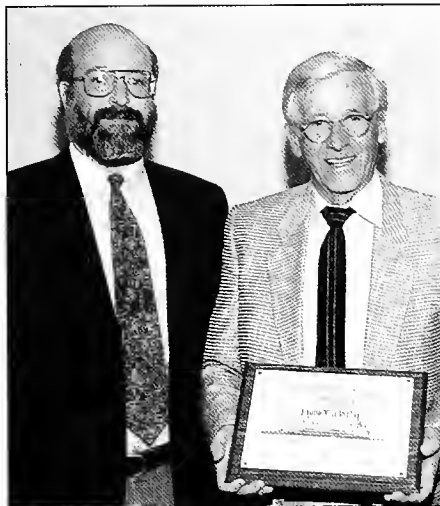
Tim Paulsen, Ph.D. '97, recently joined the faculty of the Geology Department at the University of Wisconsin-Oshkosh. He also is an adjunct assistant professor at Ohio State University. Tim, a structural geologist, conducts research in the Transantarctic Mountains. His research is part of a six-nation study that could shed light on future changes in the world's climate.

Former Faculty News

Ronadh Cox, former visiting professor of sedimentary geology, and her husband, Mark, announce the arrival of their son, Owen, who was born January 4 at 8 pounds 15 ounces. "All three of us are now home, doing well, and having fun!" she writes. Ronadh is now at the department of geology at Williams College. E-mail: Ronadh.Cox@williams.edu

Don U. Deere, a geologist and engineer and former faculty member, received the first Ralph B. Peck Award at the Third National Conference of the Geo-Institute of the American Society of Civil Engineers. Don is a member of the National Academy of Science and the National Academy of Engineering.

Bob Reynolds, an adjunct professor in the Geology Department from 1985-1998 while based at Dartmouth, won the Roebing Medal this year from the Mineralogical Society of America. The Roebing Medal is the highest award of the Mineralogical Society of America "for



scientific eminence as represented primarily by scientific publication of outstanding original research in mineralogy."

Frank Rhodes, who was a postdoctoral fellow, visiting lecturer, and professor at the University of Illinois from 1950-1956 gave the featured talk at the AAPG convention. The talk was titled "Summit on Early Science Education." The convention ran from April 15-20 in New Orleans. Frank was president of Cornell University for many years, and is now chair of the National Research Council.

Hans Laubscher, who was a visiting professor here in the 1960s, won the GSA Division of Structural Geology and Tectonics Career Contribution award for 1999. Steve Marshak, professor and department head, was chair of the division and presented Laubscher with the award.

Correction:

Elizabeth Brouwers, M.S. '77, associate regional geologist with the USGS in Denver writes to correct our mistake in the last issue of the newsletter. In the profile of Alex Glass, recipient of the Sohl award, we stated that Sohl spent most of his career with the Smithsonian Institution. Brouwers writes "Norm Sohl is proudly claimed by the U.S. Geological Survey, which he worked for his entire career ... in the early days of the Paleontology and Stratigraphy Branch of the USGS, staff were housed in the same building as the natural history staff of the Smithsonian, but this was always at the USGS." Thank you Ms. Brouwers!



George B. Grim (left; shown here with Jay Bass), nephew of the late Professor Ralph E. Grim, visited the Department to unveil a display case, donated by Mr Grim, containing some of Prof. Grim's several awards. Ralph Grim was a distinguished researcher in clay mineralogy.

Albert V. Carozzi, professor emeritus, was awarded the Prix Wegmann of the Société Géologique de France. The prize was awarded June 7 in Paris at the society's annual meeting. This honor, which is one of the highest awards the organization gives, was based on Carozzi's lifelong contribution to the history of geology.

Since 1960, Carozzi has translated and annotated more than 20 books on the history of geology. He has translated works from German, Latin and French, most of which were written in the 18th century.

"Basically, I make the publication or manuscript available in an English translation, often with the original text side by side. Then I annotate it in terms of what the work meant in the context of its time and in a modern context," says Carozzi.

Carozzi often travels to Europe to check the formations mentioned in the works. "I go in the field and try to re-check their observations," he says. "Of course sometimes those outcrops are now in the city dump or the city has grown onto it, but generally the outcrop is there. It can be something of a thrill to come upon the same outcrop discussed 200 years ago."

The history of geology was really a secondary interest for Carozzi, who taught and did research in carbonate petrography in the University's Department of Geology from 1955-1989. Upon retiring, the history of geology became his major field of research.

A LOOK BACK



Key to U of I Geology Faculty, Staff,
Graduate Assistants
Photograph April, 1952 west entrance NHB

Row 1

1. Rosa Nickell *
Executive Secretary
2. Secretary
3. William M. Merrill
Assistant Professor, stratigraphy
4. Secretary
5. Donald M. Henderson
Assistant Professor, mineralogy
6. Jack Luin Hough *
Associate Professor, oceanography,
engineering geology
7. Bernhead Kummel *
Associate Professor, paleontology
8. Frank C.? Foley
Visiting Prof, Kansas State Geological
Survey

Row 2

9. Harold R. Wanless *
Professor, stratigraphy
10. Harold W. Scott *
Professor, micropaleontology
11. Carleton A. Chapman
Professor, petrology
12. Ralph E. Grim *
Research Professor, clay mineralogy

13. Frank DeWolf *
Professor emeritus, Head Geology
and Geography
14. George W. White *
Professor, Geomorphology; Head
Geology
15. J. V. Harrison *
Visiting Professor; Reader, Oxford
University
16. Arthur F. Hagner
Associate Professor, mineral deposits
17. Paul R. Shaffer
Professor, geomorphology
18. William D. Johns
Graduate Assistant

Row 3

19. James Fisher
Graduate Assistant
20. Vincent Shepps *
Graduate Assistant
21. Graduate Assistant
22. John B. Droste
Graduate Assistant
23. Forest D. Etheredge
Graduate Assistant
24. Jane Gray
Graduate Assistant
25. Leonard Schultz
Graduate Assistant
26. John Wehrenberg
Graduate Assistant

27. Graduate Assistant
28. Graduate Assistant

Row 4

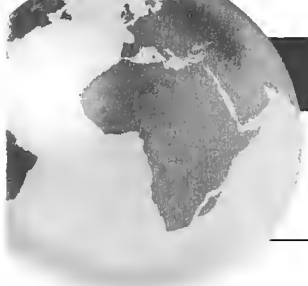
- 29.
30. Norman Sohl
Graduate Assistant
- 31.
- 32.
- 33.
34. Ronald (Mike) Lloyd
- 35.
- 36.
37. Robert Doehler
Graduate Assistant

Row 5

38. John C. Hathaway
Graduate Assistant
39. John Chapman ?
Graduate Assistant
40. Wilford F. Weeks
Graduate Assistant
41. Edwin Tooker
Graduate Assistant
- 42.
- 43.
- 44.

* deceased

*This photograph and identifications were
generously provided by Don (Hendy)
Henderson.*



Let's Keep in Touch

Please take a few minutes to let us and your classmates know what you've been doing. Send your news to the Department of Geology, 245 Natural History Building, 1301 West Green Street, Urbana, Illinois 61801; fax 217-244-4996; e-mail geology@uiuc.edu

Name _____

Address _____

(indicate if changed)

Home phone _____

E-mail _____

Degrees from Illinois (with year) _____



ILLINOIS

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Department of Geology

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

GeoScience 2005: The Next Era of Excellence

With bundles of fall-colored balloons, festive table decorations, down-home southern barbecue, and an enormous cake, the Geology Department kicked off its GeoScience 2005 Campaign on Oct. 14—Homecoming weekend.

Department head Stephen Marshak made a short speech stressing the importance of the campaign and its specific fundraising goals, after which everyone got down to some serious visiting and eating. The party, which was held in the Natural History Building, was attended by almost 100 alumni, students, faculty, staff and friends.

The campaign has been launched to establish an endowment that will help the department continue to maintain its stature and expand into new and productive fields of research, Marshak explained. The campaign's title, "GeoScience 2005: The Next Era of Excellence," reflects this goal.

"Endowments are a critical buffer for departments like ours that receive state support," said Marshak at the gathering. He noted that state support often fluctuates. In addition it often is not enough to cover the cost of new equipment and facilities needed to attract and retain the best and the brightest. By establishing an endowment, the department can benefit from donations for eons!

Before the campaign was launched, the department's endowment was about \$3 million. The decision was made—

with the help and support of the University, the Foundation and the College of Liberal Arts and Sciences' Office of Development and External Relations—to double this amount by launching a \$3 million campaign over the next five years.

The funds raised will support new professorships, student stipends, updated teaching and laboratory equipment, undergraduate student research, programs in field geology (including field camp and field trips), acquisition of new library materials and support of the colloquium series, which brings in respected experts to stimulate the synapses of students and faculty alike.

"We're off to a great start, with the establishment of the Johnson Professorship in memory of Hilt Johnson (see sidebar); the Franklin fund, established by Ed Franklin B.S. '56, for field camp; and the Wanless fund, established by Jim Baroffio, Ph.D. '64," said Marshak.

Keep an ear out for regional events in the coming years. These events will give you a chance to catch up with old chums, to learn more about department news, and get details about the campaign.

For more information, call Stephen Marshak, department head, at 217-333-7705 or Pam Christman, assistant dean for development at the College of Liberal Arts and Sciences, at 217-333-7108.

New professorship created

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A gift in excess of \$500,000 from **Eric and Katherine Johnson** of Los Altos, Calif., will create the **W. Hilton Johnson Professorship**

in Geology in the Department of Geology, College of Liberal Arts and Sciences, at Urbana-Champaign.

The W. Hilton Johnson Professorship honors Eric's father who was professor in geology at Urbana-Champaign and a research affiliate with the Illinois State Geological Survey.

Over a 30-year career at the U of I, Hilt Johnson was well known for his research and teaching, and for running the University of Illinois Geology Field Camp in Wyoming. His research interests included geomorphology, quaternary stratigraphy and glacial geology.

Professor Johnson, who received his master's and doctoral degrees from the University of Illinois, made important contributions to understanding the ice age history of the Midwest and was a popular teacher in his research disciplines, as well as in introductory geology and field geology. He served for a time as acting head of the Department.

Hilt's wife, Joyce, has recently established the W. Hilton Johnson Geologic Field Study Fund. It will support student geologic field work in the Department of Geology.

Hilt's son, Eric, received a master's degree in computer science from the U of I in 1989. He is a software engineer with Nortel Networks. Katherine, a certified public accountant, is a community volunteer.



Our "Year in Review"

The year 2000 has been an eventful one for the Department of Geology. Let's start with exciting new developments concerning support from alumni and friends. The family of the late Professor Hilton Johnson has been particularly generous. Eric and Kathy Johnson (Hilt's son and daughter-in-law) established an endowment for the W. Hilton Johnson Professorship in Surficial Geology. Their gift ensures that we will be able to continue the outstanding tradition of teaching and research established by Hilt over his three decades at the University of Illinois. Hilt's wife, Joyce, has established the W. H. Johnson Field Geology Fund, which will make it possible for our students to continue benefiting from the field experiences that Hilt so delighted in offering. We encourage friends and colleagues of Hilt to help this fund grow. This field geology fund, along with other funds, like the Franklin Field

Camp fund established by Ed Franklin (B.S. '56), will allow the Department to help defray the rising costs of field work for our students. These funds are the beginning of Geoscience 2005, a campaign to double the size of the Department's endowment.

Thanks to strong support and encouragement from the College of Liberal Arts and Sciences, this year has been very active on the recruiting front. We are continuing our searches for the R. E. Grim Professor and a geomicrobiologist and we are now engaged in the search for the W. H. Johnson Professor. With these additions and more beyond, we anticipate that the Department will grow by at least 30 percent in the near future.

This past year has also been notable for the awards and recognition that people affiliated with the department have achieved. Professor Craig Lundstrom won the Clarke Medal of the Geochemical

Society and Professor Jay Bass has been made a Fellow of the Mineralogical Society of America. In 2000, GSA honored Emeritus Professor George Klein with the Sloss Award in sedimentary geology, Emeritus Professor Richard Hay with the Rip Rapp Award in archaeological geology, and alumna Susan Mahlburg Kay with the Distinguished Service Medal. In addition, alumna Sharon Mosher has become president of GSA.

Within the Natural History Building things are changing too. We are undertaking over \$600,000 worth of laboratory space renovations in the building, including construction of a laboratory for research in geomicrobiology. Professors Craig Lundstrom and Tom Johnson have set up a mass spectrometer in the department, and Craig has also set up a high-pressure petrology laboratory. Faculty are also actively developing field projects in exotic places. For example, Wang-Ping Chen is directing a multi-disciplinary study of the Himalayas in Tibet, Dan Blake completed an expedition to Antarctica, Steve Hurst visited the floor of the Atlantic Ocean in Alvin, and I've been investigating Precambrian Geology in Eastern Brazil. Our teaching program is evolving as well, with Steve Altaner offering a new course in natural hazards and Xiaodong Song offering a new course in seismology. Also, Adjunct Assistant Professor Hannes Leetaru taught Petroleum Geology for a second time.

I could go on but space won't permit it. So please enjoy the details by reading our *Year in Review* and learn even more by visiting the department's receptions at APG and GSA. And most important, please let us know what you're up to by sending in the form on the back page.

I wish you all the best for the coming year!

— Stephen Marshak

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Year in Review is published once a year by the Department of Geology, University of Illinois at Urbana-Champaign, to summarize the activities and accomplishments within the department and news from alumni and friends.

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College of Liberal Arts and Sciences
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Sharon Mosher Receives Alumni Achievement Award

Sharon Mosher, B.S. '73, Ph.D. '78, has been awarded the Geology Department's Alumni Achievement Award for 2001.

Mosher, Wilton Scott Centennial Professor of structural geology at the University of Texas, Austin, primarily studies past plate tectonic movement in order to understand similar processes today. In the course of her research she has done field work as close as Texas' Llano Uplift and as far away as Tierra del Fuego. Mosher also has been appointed president of the Geological Society of America (GSA).

For much of the last decade, Mosher has worked in the Precambrian of Texas, studying an ancient plate boundary. "About 1.26 billion years ago, a volcanic arc formed on the southern margin of the North American continent," says Mosher. "Then much later, at about 1.05 billion years ago, an exotic island volcanic arc and another continent collided with North America forming a major mountain belt."

Most recently, Mosher and her students have been studying an active plate boundary between the Australian and Pacific plates. This area has a very complex deformation history. Mosher estimates that 40 million years ago this was a spreading plate boundary, with magma coming up to form new sea floor. At 33 million years the boundary began pulling apart obliquely and by about 10 million years ago the plates were moving almost parallel to each, making a transform fault. Today this boundary is one of the most active in the world.

"This is the only place in the world with a record of both spreading plates and transform faults," says Mosher.

Mosher's research will help her understand how plate boundaries behave

as they go from spreading to transform faulting; what chemical or mechanical properties influence the translation from one process to another; and whether the changes occurred sequentially or whether some occurred simultaneously. Ultimately, Mosher wants to understand the mechanisms behind changing from one type of plate boundary to another.

In addition, Mosher hopes to understand the processes involved when magmatism shuts off.

"We know a lot about spreading ridges, but we don't know much about how spreading stops," she says.

What Mosher learns about the behavior of this particular plate boundary



Sharon Mosher and friends visit on Macquerie Island. She is using data from the island to field check marine geophysical data.

she hopes to apply to other boundaries around the world.

Mosher and her students also have been able to conduct field investigations on a tiny island, Macquerie (ma-qwair-EE), which is on the boundary between the Australian and Pacific plates. The island, which is about 4 km wide and 34 km long, is about halfway between Antarctica and New Zealand. A piece of rock jutting out from the boundary got lifted up as the plates slid past each other,

creating Macquerie. The island is part of the ocean floor that was uplifted and preserved.

Macquerie is home to millions of penguins and about 100,000 elephant seals ... and not much else. In fact, Mosher estimates that only about one dozen geologists have ever made it to the island. She and her students were the first non-New Zealanders and the first structural geologists to visit the island.

"We can use the geology of the island to field check our marine geophysical data," says Mosher. "You can see great geology on the island. There are sea mounts, lava hills and fault topography, all of which are cut by faults that occurred in our lifetime."

In addition to these research activities and teaching responsibilities, Mosher has taken on the presidency of the Geological Society of America (GSA). Mosher had previously served as vice president of GSA where she became involved in finding ways for members to become more effective in influencing public policy. Prior to this role, Mosher served three years as annual program chair and oversaw the reorganization of the Annual Meeting program.

As president, Mosher envisions GSA working to help members become more effective at influ-

encing public policy, to facilitate the interaction of scientists across disciplines, and to join forces with other geoscience societies to concentrate resources when addressing similar problems and goals.

"GSA has the potential to make an impact in professional development, public outreach and public policy," asserts Mosher.

With Almost a Century of Combined Research Experience, Four Senior Faculty Going Strong

The four most senior Geology Department faculty—Daniel Blake, R. James Kirkpatrick, Albert Hsui, and Wang-Ping Chen—have all been at the Department for at least 20 years and none of them is showing any signs of slowing down.

Daniel Blake

Blake, who has been on the faculty since 1967, currently has a National Science Foundation (NSF) grant to study molluscan evolution associated with climatic change on Seymour Island in the Antarctic Peninsula. This project is the continuation of research he has conducted with Rich Aronson, a marine ecologist at the Dauphin Island Sea Lab.

In 2000, Blake and his team took a reconnaissance trip that lasted five days. In 2001, he'll go down for five weeks. The Seymour Island formations are important because they are the only Cenozoic fossil records in Antarctica. Blake hopes that this record, which brackets the period during which the Earth cooled dramatically, will help researchers understand how individual animals, communities of animals, and community structure change when the environment changes.

"In the contemporary world, it has been argued that global warming can disrupt water currents and lead to cold-water upwelling," says Blake. "Cooling in the early Cenozoic can be used to suggest possible biological impacts resulting from cold upwelling events."

John Werner, a post-doctoral fellow who specializes in mollusks and



Blake and the rest of the team relax during an arduous day. Pictured, from left to right, are Linda Avany, John Evans, Alex Glass, Dan Blake, and Rich Aronson.

statistical applications in paleontology, will conduct the statistical analysis, and Syracuse University geologist Linda Ivany will conduct the geochemical analysis. Aronson also is joining Blake on this project. Both Aronson and Blake have been to Antarctica before. Blake conducted research in Antarctica in 1986 and 1994. Blake's graduate student Alex Glass also went on the expedition.

"It's very important for students to go on such field expeditions," said Blake. "In addition to the adventure, they can learn an aspect of geology that they just can't learn in the laboratory."

Glass agrees. "I got to see new types of geology I'd never seen and I learned a lot about bivalves and gastropods. It was an awesome experience for me," he said.

Glass notes that he'd like to return next year with Blake, but having undergone a rigorous medical exami-

nation, he knows that he'd have to get all four wisdom teeth extracted in order to be allowed to return to Seymour Island. He has about a year to decide if the trip is worth the pain.

Although Blake is the most senior faculty member in the department, he is not slowing down one iota. Blake also remains excited about his teaching responsibilities. He feels a strong need to pass his very specialized knowledge on to younger scientists. Being able to see evolutionary change in starfish is a very detailed and specialized knowledge that can't really be taught through books. It takes untold hours of looking at starfish to start to discern morphological differences that others with less experience would overlook.

"You need a lot of time to look at lots of fossils," says Blake, who also received NSF funding to spend the summer of 1999 in Germany, Italy, and the Netherlands studying Triassic starfish, crucial to the derivation of modern starfish.



Image by Andrey Kalinichev

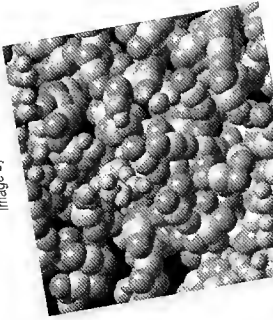


Photo by Thompson-McClellan

Kirkpatrick, surrounded by his research team, investigates all kinds of molecular modeling.

R. James Kirkpatrick

Kirkpatrick, who is second-most senior to Blake, received his Ph.D. from the University of Illinois in 1972 and joined the faculty in 1978. He has been using NMR spectroscopy since the early 1980s. He is one of the few geologists in the country to use this technique, which can reveal both how atoms are arranged and the speed and kinds of motion of those atoms within crystals, glasses and aqueous solutions.

Shortly after beginning to use this technique, Kirkpatrick shifted from igneous petrology (his original field of expertise) into the geochemistry of low temperature and hydrous systems. These systems have traditionally been difficult to study, but are well suited to NMR approaches. In the course of his career, Kirkpatrick has worked with clay minerals, glasses and melts, basic mineralogy, man-made cement, and industrial minerals.

"Science changes and you always need to be open to changing the problems you work on," says Kirkpatrick, explaining his wide range of projects.

Most recently, Kirkpatrick has been looking at what can be done about the increase of carbon dioxide in the atmosphere, the major cause of global warming. His goal is to see if "sequestering" carbon dioxide by injecting it deep into the ocean or an underground aquifer is a feasible way to remove that excess carbon dioxide in the atmosphere.

In collaboration with senior research scientist Andrey Kalinichev, an expert in modeling molecular behavior in hydrous systems, Kirkpatrick is

working to understand the physical and chemical properties of water and carbon dioxide solutions and how they interact with their surroundings. By creating molecular dynamics models of carbon dioxide and other chemical species as they dissolve in water, as well as models of that water-carbon dioxide solution as it interacts with mineral surfaces, Kalinichev and Kirkpatrick hope to determine if it will be safe to sequester the carbon dioxide. These simulations are being run on the National Center for Supercomputing Applications SGI Origin2000 supercomputer.

create a quantitative, dynamic model to explain trench curvatures. Subsequently, working with Stephen Marshak and his students, Hsui also developed models for the curvature of mountain ranges.

In recent years, his research interests have focused on the effects of crystallization within dynamic fluid systems. This study has direct applications to magma chamber dynamics and formation of igneous rocks, as well as in the solidification of the liquid outer core and the growth of the solid inner core. In addition, he has examined the effects of variable buoyancy within planetary interiors. His investigation suggests that dynamic layering is possible within the icy mantle of Europa, a Jovian satellite, if its mantle is indeed operating at a near freezing state, as

Albert Hsui

Hsui also has used modeling (mathematical, in his case) extensively and in a wide range of projects, from basin history modeling to understanding the behavior of seismic waves within the Earth's interior and comparing the structure of Earth to its sister planet, Venus. Hsui, who joined the faculty in 1980, is an expert in geodynamics ("the mother of all geology," as he likes to say). He was the first to

Geology 116 - Geology of the Planets

[The above picture was modified from a JPL/ESA image]

General Information	Class Notes	Home work
Review Sheets	Class Slides	Campus Gradebook
Other WWW Links	FAQ	

Hsui's web site for "Geology of the Planets" gives students an interactive way learn the material.

strongly implied by recent NASA observations.

Hsui incorporates this and other NASA data in his classes, and is taking a web-based approach to teaching and learning. For example, he created an elaborate web site for Geology of the Planets, a 100-level course with about 55 students. Using the web site, students can learn the course materials with abundant images from various NASA missions, and also can submit homework, which is then automatically graded to provide instant feedback. Hsui has also started to incorporate collaborative learning in the web site, since some students prefer to learn in groups. He has created website pages for Introduction to Geophysics (Geology 350) and Geophysical Methods for Geology, Engineering, and Environmental Sciences (Geology 351).

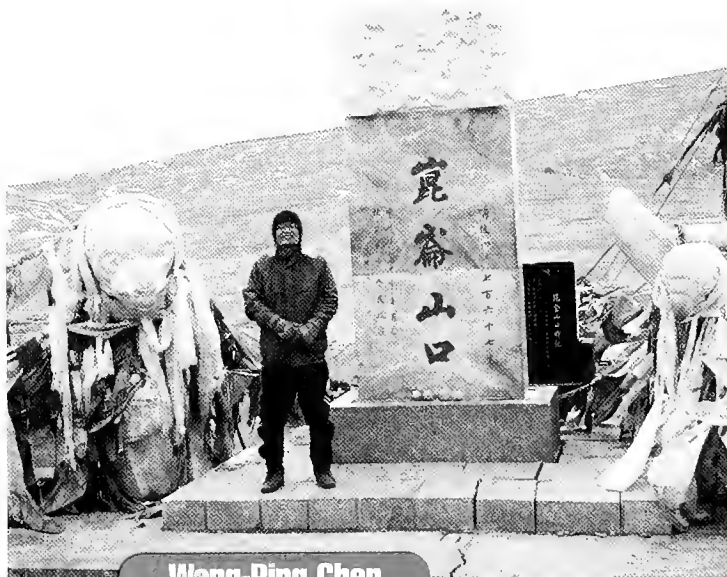
"It's harder these days, since we have many different types of learners," says Hsui, "but I'm trying to accommodate the different learning styles into how I teach."

Hsui emphasizes that class time is still key to the course.

"This type of web site doesn't replace face-to-face contact, especially since that's a big part of the college experience," says Hsui, "but I see the web site as just another way to help students learn the material."

The feedback from students has been, for the most part, positive. Of course, there have been the usual hardware glitches as the sites were first put up.

"We've had our share of growing pains," says Hsui, with a smile.



Wang-Ping Chen

Chen, who has been at the University of Illinois since 1981, is directing an international project to study mountain building along the Himalayan-Tibetan zone of continent-continent collision. Funded by the National Science Foundation over a five-year period starting in 2001, Project Hi-CLIMB (Himalayan-Tibetan Continental Lithosphere during Mountain Building) is a multi-disciplinary effort to integrate results from seismology, geophysics, metamorphic and igneous petrology, structural geology, geochronology, magnetotellurics, gravity and geodesy. Participants come from a dozen institutions in the United States, Nepal, China, France and Germany.

The project will address a number of key issues in continental dynamics, including lithospheric deformation during orogeny, the fate of the Indian shield and crustal evolution, and crustal/mantle delamination and mantle dynamics.

Chen at Kun-Lun pass in northern Tibet—elevation 4,767 meters.

Large-scale deformation is known to involve both the crust and the upper mantle, but currently there are several hypotheses about how these two layers deform during mountain building. Each hypothesis suggests different mechanisms of coupling between the upper crust and the uppermost mantle. The Himalayan-

Tibetan collision zone is ideal for addressing these issues because "there is strong evidence that both thin-skinned and mantle-involved deformation are occurring," says Chen. "By studying active orogeny along this collision zone we hope to understand the dynamics of continental convergent zones in general," he adds.

The proposed field experiments will be the first to extend investigations along a complete profile from the foreland where the deformation front is located, across both the Lower and the Higher Himalayas, then onto the central Tibetan Plateau. Dense spacing—about five kilometers apart—of the broadband, high-resolution seismic array will provide unprecedented resolution for imaging deep-seated structures, particularly those in the enigmatic lower crust, below the Moho, and throughout the transition zone of the mantle. These structures are likely to be key elements for understanding the dynamics of building the Himalayas and the Tibetan plateau, says Chen.



Departmental Advances in Geomicrobiology

Several department members reported advances in geomicrobial studies at the GSA meeting in Reno, Nevada, last November. Graduate student Qusheng Jin and Craig Bethke, professor of geology, announced a new, unified theory of microbial kinetics. Bruce Fouke, assistant professor of geology, announced new findings regarding microbial transport in hot springs at Yellowstone National Park.

Bethke has been studying the rates at which microbial populations metabolize in the natural environment. That work has been limited by the lack of a general theory about those rates. Bethke and Jin have derived a rate law that is based on the internal mechanisms of microbial respiration. This rate law accounts for the thermodynamics of the metabolization process and the energy required to produce ATP. Bethke and Jin also take into account the abundance of microbes and the concentrations of substrate species and reaction products in solution.

"The growth of microbial populations can have profound effects on the chemistry of groundwater, from acid-mine drainage in the West to arsenic poisoning in Bangladesh," said Bethke. "The bulk of the world's microbial biomass operates by eating rocks—taking inorganic chemicals and using them to produce energy. By constructing quantitative models of that reaction process, we might find more

effective solutions and control measures to groundwater problems."

In other microbial research, Fouke and post-doctoral fellow George Bonheyo have looked at the relationship of microbes to their environments and how they might travel between environments. Working at Mammoth Hot Springs in Yellowstone National Park, the team, which also includes microbiologist Abigail Salyers and students Beth Sanzenbacher and Janki Patel, has collected water, rock and air samples. They then used the polymerase chain reaction (PCR) technique on microbial ¹⁶Sr RNA to

detect the presence and type of microbes. The next step is to determine where the microbes came from and how they got there.

"Hot springs are complex ecosystems of interacting microbes, geochemistry and mineralogy," says Bonheyo. "The source of the microbes, and the means by which they colonize new springs, has remained unknown."

Bonheyo points out, for example, that bacteria that exist at 73 degrees centigrade cannot simply travel across open land to another spring. This observation led him to wonder how bacteria travel.

The rapid precipitation of calcium carbonate in hot springs often results

in shifting flows, the sealing off of some springs, and the eruption of new vents. Last year, the researchers got a chance to investigate five new springs that erupted at Angel Terrace, part of the Mammoth Hot Springs complex. The team did find bacteria in the new springs. They theorize that while some bacteria got there via the subterranean water system, others hitched a ride on the steam rising from surrounding springs.

"When we witnessed the birth of those new springs, the water flowing through the ground from the new springs initially was only 45 degrees centigrade," says Bonheyo. "And the only bacteria initially detected by PCR in the new spring waters were those that we normally find living in cooler sections of mature springs. But after about 18 hours, the temperature had risen to 73 degrees, where it has

remained. And as the temperature rose, new bacteria were detected that are found only in the hotter regions of the mature springs."

Bonheyo suggests that this second group of bacteria that need warmer temperatures to survive probably traveled by steam from a mature spring, but further study is needed to prove this conclusively.

This research was funded by a University of Illinois Critical Research

Initiatives grant and the

American Chemical Society Petroleum Research Fund.

"The growth of microbial populations can have profound effects on the chemistry of groundwater, from acid-mine drainage in the West to arsenic poisoning in Bangladesh..."

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Hurst Participates in Undersea Discovery

Stephen Hurst, research programmer in the Department, was part of a group of scientists to discover a field of hydrothermal vents with “chimneys” of carbonate and silica that are nearly 200 feet tall—the tallest ever found. This finding was reported extensively in newspapers and television during December 2000.

Hurst, a structural geologist, studies fast-spreading ocean crusts exposed at the Hess Deep Rift. Using side-scanning sonar, ARGO (a remotely operated vehicle), and Alvin (a three-person submersible), scientists like Hurst study the seafloor and outcrops almost two miles below the water surface. This was Hurst’s third voyage on board the *Atlantis*, a research vessel owned by the U.S. Navy and operated by Woods Hole Oceanographic Institute.

This particular expedition’s goal was to study the Atlantis Massif, an exceptionally high, flat-topped mountain east of the Mid-Atlantic Ridge. The massif is a mass of mantle rock thrust up by faulting high above the Atlantis transform fault and Mid-Atlantic Ridge.

“The massif appears to have similar features and probable genesis to mountain chains in our western states



Photomosaic of an inactive, eight-meter-tall carbonate chimney in the eastern portion of the Lost City Field. The calcite, aragonite, and brucite chimneys form delicate yet massive pinnacles that reach up to 60 meters (180 feet) in height.

called ‘metamorphic core complexes,’ that are due to extension of the crust,” says Hurst. Hurst looked for evidence that would help identify the timing and geologic history of the mountain formation. He gathered and interpreted high-resolution side-scan sonar data and electronic images. The latter were collected using the ARGO II remotely operated vehicle. Hurst also went on three Alvin dives that collected samples and structural data on the massif. The chimneys, the most surprising finding of the expedition, were found at the very top of the mountain, a very unlikely place for these formations. In addition, the chimneys are made of carbonate and magnesium minerals rather than sulfur- and iron-based minerals, and the water spewing from them, while scalding, is far cooler than that found at other chimney sites.

The structures also were found miles west of what would be the normal heat source for such vents.

“The size and extent of the field of the chimneys (there are at least 20 and possibly many more) suggests that they have been around a long time—tens if not hundreds of thousands of years,” says Hurst.

Lundstrom, Hu and Bass Honored

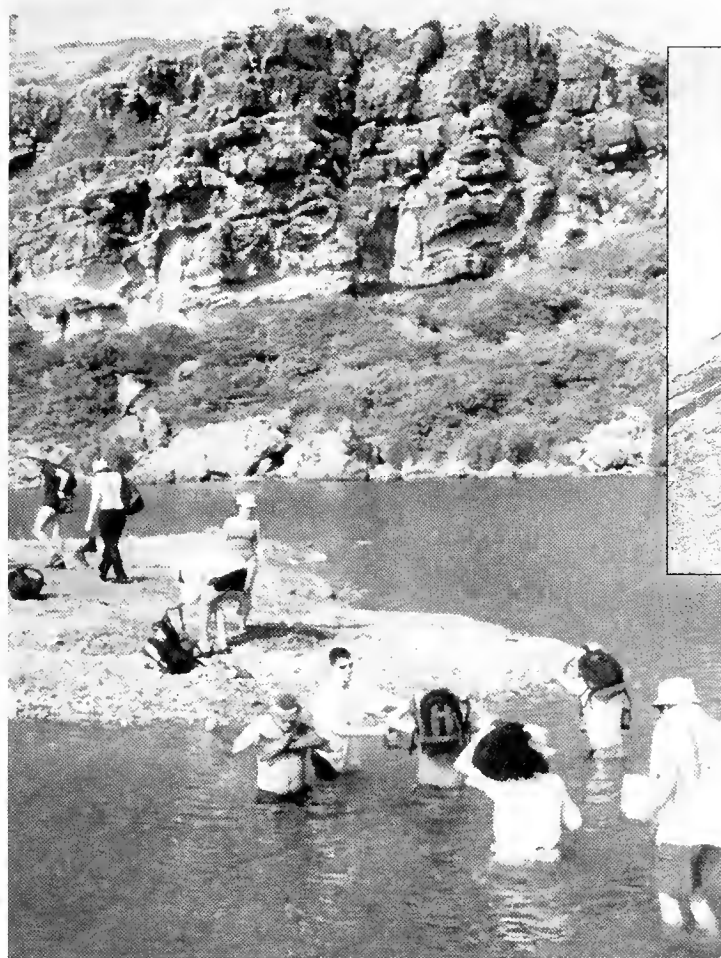


Craig Lundstrom, assistant professor of geology, has won the F.W. Clarke Medal of the Geochemical Society. The

Clarke Award is a major award made annually at the V. M. Goldschmidt Conference to an early-career scientist for a single outstanding contribution to geochemistry or cosmochemistry, published either as a single paper or a series of papers on a single topic. Lundstrom has won this award for his groundbreaking work in the understanding of magmatic processes at mid-ocean ridges.

Feng Sheng Hu, assistant professor of plant biology and an adjunct professor of geology, received the prestigious Packard Fellowship. The \$625,000, five-year award will support his work on global climate change. Hu studies how ecosystems and biogeochemical processes are affected by global change over a long-term, geologic time-scale. In addition to studying such indicators as pollen and the chemical composition of sediments, Hu is helping to develop a new area of study, called molecular paleoecology. This technique uses molecular genetics to help identify plant species represented by the pollen grains found in sediments. Hu was among 24 U.S. researchers named 2000 Packard Fellows in science and engineering. Packard grants are given by the David and Lucile Packard Foundation.

Professor Jay Bass has been inducted as a “Fellow” of the Mineralogical Society of America in recognition of his achievements in mineral physics.



Top: Students clamber over desert terrains to learn the geology of the American Southwest during the spring 2000 offering of Geology 315/415, led by Professor Steve Marshak.

Left: Students in Geology 315/415 wading to get a closer look at a geological feature during a field trip to Curaçao led by Professor Bruce Fouke in December, 2000.

Geochemist's Workbench Software Program Used

A computer software program written by Professor Craig Bethke and his research team has taken the geochemistry field by storm.

The Geochemist's Workbench, which has been described as "*Mathematica* for geochemists," makes quick work of chores such as balancing reactions, calculating equilibrium constants, constructing Eh/Ph diagrams, and tracing even very complicated reaction processes. The software works graphically, so users can solve problems on their PCs and then paste the resulting diagrams directly into their documents. The latest release, version 3.2, also solves microbiological problems.

"We needed this software to do

our own work," says Bethke, who studies geochemical questions concerning remediation of contaminated groundwater, safety of injection wells, effects of microbes on groundwater quality, and the mobility of heavy metals in acid mine drainage, among other things. "By making the software available to others we could hire professional programmers to continue to develop and refine it."

The program is clearly filling a strong need. Researchers, in countries as diverse as Brazil, South Africa, Egypt, Israel, India, China, Taiwan, Japan, Korea, Australia, New Zealand, and even Slovenia, have licensed the software. The program is applied extensively in the energy, mineral and environmental industries. Bethke is particularly gratified

that many university departments use the software for teaching subjects such as environmental science, "green chemistry" and geology.

"People are using the software for applications we never even imagined, like designing longer-lasting roadways," says Bethke.

The Geochemist's Workbench also is being adopted as the standard software at most national labs, such as Sandia and Lawrence Livermore, as well as government agencies such as the USGS and EPA.

The first line of *Geochemist's Workbench* was written in 1978 when Bethke was a undergraduate student. The completed program was first made available in 1991. It has been updated periodically ever since.

Hands-On Course for Non-Majors Is a Success



Geology 110: Exploring Planet Earth in the Field is a field-based course for non-majors. It appears to be wildly popular among those that take it. The course, which has been taught by Steve Altaner for the past few years, has an average enrollment of about 30-40 students.

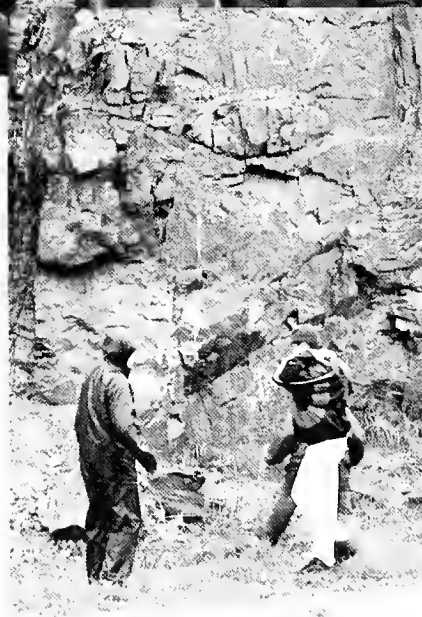
The one-credit course includes a three-day camping trip to the Ozarks in southeast Missouri and a one-day trip to the Starved Rock area of northern Illinois.

"This course has everything that geology can offer," says Altaner. "We go to very scenic areas in Missouri and Illinois; the geology in both places is extraordinary; and we start very simple and work our way to increasingly complex concepts."

The three-day camping trip is the high point for many students.

"Everyone helps, we set up tents, cook together, and sit around the campfire together. Very close friendships grow from this," says Altaner.

"The most important part of this course was that the class actually got to know each other by name, something that is extremely rare in a University course," one student wrote in an evaluation.



Altaner's goal, in addition to teaching basic geological concepts to non-majors, is to get students to apply scientific methods in the field. The students first make observations, then they interpret those observations, (i.e., if there is sandstone then perhaps the area was once a beach), and then pull all the observations and interpretations together into a geologic history of the area.

"For me it's remarkable that more than 90 percent of the students get it. I don't get anywhere near that success rate

Here Comes the Fun! Students gather for a group shot during their Ozark camping trip. The African-American student at front, center wearing the knit cap is Terrell Washington, who plays on the defensive line of the football team. Luckily, the fall camping trip is always scheduled for the only non-football weekend in the semester, so Washington could take the course. Washington, a St. Louis native, would occasionally stop to sign autographs for youngsters in the campground.

Students examine a textbook example of an intrusion at Johnson Shut-Ins in the Ozark Mountains. Photo courtesy of Claudette Roulou.

in other 100-level courses," says Altaner, who also teaches Geology 100: Earth and Geology 118: Environmental Geology, as well as several upper-level courses.

During the Ozarks trip students get to see the Johnson Shut Ins—a narrow, steep-walled canyon—where they can see stratigraphy, intrusions, and other geologic features. Here they begin to learn to interpret what they see. During the Starved Rock trip, students get to see some fantastic gorges and try to understand how they may have been formed. In addition to Starved Rock itself, students go to Matthiesson State Park, which has 100-foot cliffs of pure sandstone; and Buffalo State Park, an old strip mine.

Altaner said over the years a few students have changed their major to geology as the result of taking Geology 110, but perhaps even more satisfying is how many education majors have taken his course. Those students that go into education have a very good basic geology education after having taken Geology 110, says Altaner.



Honors Students Get Introduction to Earth Sciences

Faculty in the Department of Geology are striving to introduce all undergraduates, not just geology majors, to the basics of earth sciences. Just as Geology 110 gives non-majors an introduction to geology, so Geology 111 gives students in the honors program the same opportunity.

The Campus Honors Program (CHP) is a small program within the university for exceptional students looking for a more individualized and challenging undergraduate experience. Classes are generally limited to about 18 students. From more than 10,000 applicants to the University each year, the honors program accepts only 125 new students. They are expected to fulfill some general education requirements with honors courses, which are typically small, seminar-sized classes that rely more on interacting with one another than on a large lecture format.

"It has been a real pleasure, the students are highly motivated and quite smart," says Jay Bass, professor of geology, who has taught *Geology 111: The Dynamic Earth* twice so far.

The course includes a lab and a three-day (camping) field trip to the Ozarks where students can see geological formations first hand. Bass notes that the students have a wide range of majors, from music to astronomy. The course has proved quite popular with those who've taken it.

"The best part of the class was the field trip to Johnson Shut Ins (in the Ozarks), says senior Kara Barnes. "We were exposed to many of the geologic structures that we had talked about in

the class. Although I haven't taken another geology course, Professor Bass was one of the main reasons I chose the ceramic engineering specialization in my major (materials science & engineering)."

"The way that I judge a good class is by how much material I remember after all of the tests are over," says junior Valerie Funk. "I still find myself looking at the layers in the outcrops along the interstate, and my family got more than a little tired of my geological comments on our trip to the Grand Canyon. Overall, the class was an

extremely positive learning experience, and I have highly recommended it to my friends in the Campus Honors Program."

A department that wants to offer an honors course has to apply to the CHP, give a sample talk and provide a syllabus for the proposed course. Only a fraction of CHP course proposals are accepted, and the selection process is very competitive. Courses need to have some innovative aspects, and must be taught by an experienced faculty member.

Alumnus David Johnston Remembered on Mount St. Helens Anniversary

The year 2000 marked the 20th anniversary of the eruption of Mount St. Helens, which flattened 230 square miles of forest with the force of 5,000 tons of TNT, making this one of the strongest volcanic eruptions in the history of the nation.

David Johnston, B.S. '71, was manning a United State Geological Survey (USGS) post five miles northwest of the mountain when the volcano erupted. He sent the now-famous radio transmission to the world announcing the eruption.

At 8:32 a.m. on Sunday, May 18, 1980, Johnson called, "Vancouver! Vancouver! This is it."

Those were his last words.

Johnston, who specialized in volcanoes, was one of 61 people killed in the eruption. Though only 30 years old, Johnston had become one of the world's experts on explosive composite volcanoes. The USGS has named several of its properties after Johnston, including the post at which he stood watch during the eruption.

Many articles have been written about the eruption and Johnston's role, most recently in the *C-U News-Gazette* and in *National Geographic* magazine. More information about Mount St. Helens is available at www.nationalgeographic.com

Alberto Nieto, Engineering Geologist, Retires

"Engineering geologists are a very interdisciplinary breed and provide support to engineering projects that is essential," says Alberto Nieto, an engineering geologist who retired from the Department last September. "I have been primarily concerned with solving engineering problems that involve slopes, underground excavations, dams and mines."

Engineering geologists learn to take into account factors that can't always be put into equations, such as the degree of weathering, fractures and permeability in soil and rock. Their contributions are particularly important in projects such as dams, tunnels, and mines, where taking geological factors into an engineering project is critical to a project's cost and safety.

Nieto, who taught at the University for 26 years, started out as a petroleum geologist. After earning his master's degree in geology from Washington University in St. Louis, he worked for an affiliate of Esso for several years, primarily in South America. In the course of that work, Nieto became interested in some of the practical aspects of engineering geology. He became particularly concerned for the victims of natural and man-made disaster, in countries such as Peru, where he is originally from.

Nieto has contributed to a wide range of projects throughout his career. He has examined deep-well injection sites for liquid hazardous waste, studied the stability of mines and slopes,

and helped design various damsites both in the U.S. and in Mexico and South America. Nieto's skills are much in demand in these major building projects. His clients have included the U.S. Army Corps of Engineers, as well as governments in other countries and several private companies.

In addition, Nieto has provided a key link between the departments of civil engineering and geology.

"Alberto really made major contributions linking engineering with geology in his teaching," says Edward Cording, professor of civil and environmental engineering at the University and a member of the National Academy of Engineering. "He has often encouraged civil engineering students to go on to take other geology courses, such as structural geology, groundwater geology or geomorphology. And he's done a good job taking students into the field, teaching them how to map geological features and learn what these characteristics mean to the stability of a given project."

"Professor Nieto is really popular

...Nieto has provided a key link between the departments of civil engineering and geology.

with the students," says Todd Cole, B.S. '92, M.S. '94, who studied with Nieto for his bachelor's, master's and now doctorate degrees. "He's also very enthusiastic about his field. He's a really good teacher. Professor Nieto is also very friendly and likes to spend time with graduate students even outside of class."

Although he is now retired, Nieto plans to continue teaching part time in the department of civil and environmental engineering and continue his consulting work. Nieto also would like to do more traveling. Recently he returned from a four-month trip to eastern Europe. While based in Bratislava, Slovakia, he traveled to Italy, Romania, the Czech Republic, Hungary and Austria, where he did some lecturing and pro-bono consulting.

Nieto would also like to work on some research projects of particular interest to him. One is the development of structural units for construction that would be comparable in strength to concrete, but less expensive. He hopes this would provide third-world countries, where concrete is very expensive, a safe, alternative building material.

Alberto Nieto in Cinque Terre, Italy, where he was investigating landslides.



Photo courtesy of Nancy Benson.



Alumna, Emeritus Faculty Honored at GSA Meeting



Two professors emeriti and an alumna of the department were honored for their contributions at the annual Geological Society of America (GSA) meeting in Reno, Nevada. **Richard**

Hay, professor emeritus in the Department of Geology, received the Rip Rapp Archaeological Geology Award. The award, given by the archaeological geology division of GSA, honors Hay's work from 1962-2000 at two important archaeological sites: Laetoli and Olduvai Gorge in East Africa. Hay's work helped define the stratigraphy of these sites, which are important because they contain the earliest known hominid remains. The award, established in 1983, honors outstanding career contributions to the interdisciplinary field of archaeological geology.

Hay served as the Ralph Grim Professor of Geology at the University of Illinois from 1983-1997. While at Illinois, he made significant contributions to the understanding of authigenic feldspar formation and taught popular courses in petrology. Hay and his wife, Lynn, now live in Tucson, Arizona, where Hay continues his work in geology.

Suzanne Mahlburg Kay, B.S. '69, M.S. '72, professor of geology at Cornell University, was awarded the GSA Distinguished Service Award for her work as *GSA Today* science editor from 1996-1999. Faith Rogers, managing editor at GSA, said in her citation

that Kay, "with her record of achievement in working where logistics are challenging (the Aleutians and the Andes) accomplished the nearly impossible—getting authors with interesting stories to put those stories into readable form, with eye-catching graphics and submit them in time to be reviewed, revised, and edited for the next issue of *GSA Today*. ... We are fortunate that she accepted the challenge of fitting *GSA Today* editorial tasks into her already packed life."



Emeritus professor **George D. Klein** won the Laurence L. Sloss award for Sedimentary Geology from the Geological Society of America. Klein is only the second winner of this annual award.

The Sloss award was established to celebrate those who emulate the outstanding achievements of Laurence Sloss in the field of sedimentary geology and in exemplary service to GSA. **Kathleen M. Marsaglia**, B.S. '79, M.S. '82, delivered the citation.

Klein, who was on the faculty from 1970-1993, is best known and most widely cited for his work in tidal processes and facies, having published two books and more than 30 journal articles on tidal processes and modern and ancient tidalites, a term he coined. Tidalites are sediments deposited by tidal currents and associated processes. More recently, he has made significant contributions to the literature on the origin of cyclothems and the tectonics of sedimentary basins.

Klein has been a very active member of the GSA. He has attended and presented papers at approximately 30 GSA annual meetings, edited two GSA Special Papers, published nine articles in the *Bulletin*, and eight articles in *Geology*. Klein also served as the founding chair and past-chair of the GSA Sedimentary Geology Division. During his service as chair, membership jumped from 5 to 1,500, making this the fourth largest division within GSA.

In his acceptance speech, Klein said, "I tell all of you very frankly that if it weren't for the fact that I accepted a faculty appointment at the University of Illinois at Urbana-Champaign, I would not be accepting the Laurence L. Sloss Award today. I want to thank the University of Illinois for having offered me a position on its faculty because in certain respects, that university is a very unique place. First, the administration there knew how to foster, encourage and facilitate faculty research. Second, I had some great colleagues there, including one with whom I wrote several research papers. Third, the University of Illinois has what I call "institutional momentum." I discovered that wherever I went in the USA and the world and whenever I introduced myself as a professor of geology at the University of Illinois, doors opened, access was provided, appointments were scheduled and met, opportunities were opened up to me, and opportunities to do things were accepted."

Geology Moves on at Illinois: Benjamin C. Jillson and Charles Wesley Rolfe

By Ralph Langenheim, Emeritus Professor

Regent Peabody's removal of Don Carlos Taft as professor of Geology and Zoology in 1881 (see article in the 1999 Department of Geology Year in Review) set off an extended search for a replacement. Stephen Forbes, then at Normal (now Illinois State), was the first offered the position but declined because arrangements could not be made to transfer the State Laboratory of Natural History and the State Entomologist's Office, headed by him, from Bloomington to Urbana. (In 1884 these were transferred to Urbana, at which time Forbes accepted the professorship in zoology and went on to a distinguished career.)

Peabody's next offer went to David Starr Jordan, a prominent ichthyologist then at Indiana University. Jordan also declined, saying he "was very little pleased with the (University's) surroundings, geographically speaking ..."

Peabody's third choice, Benjamin C. Jillson, accepted the professorship of zoology and geology in 1882. Jillson had an M.D. from the University of Nashville and a Ph.D. from Lafayette College. He also had attended the Sheffield Scientific School and had published at least one geologic paper. *Geology of Allegheny Co., Pa., 1886, Trans. Med. Soc. Pa., vol. 4 No. 2, p. 42-46.* Jillson's main contribution to University of Illinois geology was initiating laboratory instruction, the lack of which had been one of Peabody's reasons for "evicting" Taft.

However, Jillson was not well respected by the students. In spring, 1883, an anonymous student publication declared, "'Blasted Crank' Jillson ignorant of the subjects he taught" and suggested that a "change of climate would be good for his health." Whether



Charles Wesley Rolfe was an energetic administrator and teacher.

related to this or not, Jillson retired in 1884 ... to become an Army surgeon.

Peabody then appointed Charles Wesley Rolfe, a member of the University's first graduating class (1872) and a student of Taft's. After graduating, Rolfe had worked for a year as "Assistant in the Natural History Department" and then held positions in several Illinois public and private schools.

In 1881 Rolfe returned to the University. For three years, he taught mathematics and assisted Thomas Jonathan Burrill. Burrill, one of the three original members of the faculty, taught algebra, natural history, botany, and horticulture. In 1884, Rolfe was appointed assistant professor of natural history, and was responsible for teaching geology and many other courses. He remained head of the geology program until his retirement in 1917.

From 1897 until his death, Rolfe lived in Taft's former house at 601 E. John St., which he had purchased from Taft's son, Lorado. More recently, the house was moved to 1401 S. Maryland Ave., near Mt. Hope Cemetery, to make way for the Swanlund Administration Building. Still standing, the Taft/Rolfe house now is used by the 4-H Foundation and the College of ACES (Agricultural, Consumer and Environmental Sciences).

Rolfe was an energetic administrator and teacher. In the early years of his tenure, he taught, with some assistance, all of the geology courses then offered, including (in modern terms) physical and historical geology, paleontology, mineralogy, geomorphology, field geology, structural geology and economic geology. In addition, he taught physiology, veterinary science, and bookkeeping, and, for several years, was the University librarian. When President Draper persuaded the Trustees to fund a project to domesticate the squirrels on campus, Rolfe added the post of "squirrel master" to his list of responsibilities.

As head of the geology program, Rolfe eventually presided over a staff of three professors—William S. Bayley, T.E. Savage, and John Rich—each of whom were or became prominent national figures in their respective fields. In addition, a series of assistants included several who became prominent national figures in geology. Thus, the Department of Geology had evolved from a strictly undergraduate, largely service organization to an embryonic graduate program with an active research program.

Rolfe published five scientific papers between 1889 and 1908 and one in 1931. His first paper was a 16-page

1952 GROUP PHOTO REVISITED



comment on the characters of distribution of brachiopods. This was followed by two papers on hydrogeology and an additional two on the geology of clays and the distribution of paving brick material in Illinois. Rolfe's final paper was an historical account of geologic studies in Illinois prior to establishment of the present State Geological Survey. In 1892, the tireless Rolfe also created a model of the topography of the state, county by county. The plaster relief model, which was displayed at the Chicago World's Fair of 1893, took him 18 months to complete.

Rolfe also was instrumental in initiating the university's program in ceramics, actively promoting legislation to establish the program and serving for eight years as the first head of what later became the Department of Ceramic Engineering. He facilitated the development of an active research program in ceramic engineering.

From 1894 on, Rolfe advocated establishing the present Illinois State Geological Survey (ISGS) and was a significant participant in negotiations toward that goal, which was achieved in 1905. Rolfe also pushed to locate the ISGS on the Urbana campus.

Even when retired, Rolfe remained on campus, maintaining contact with the University until his death in 1934 at the age of 83. At the time of his death, Rolfe was the oldest living faculty member and one of a handful of survivors of the University's first graduating class. He can, perhaps, be seen as the true "father" of the Illinois Geology Department's programs in clays, groundwater and, perhaps Pleistocene geology and geomorphology.



We have had many responses to the photo we published in the last Yearbook with several people contributing more identifications.

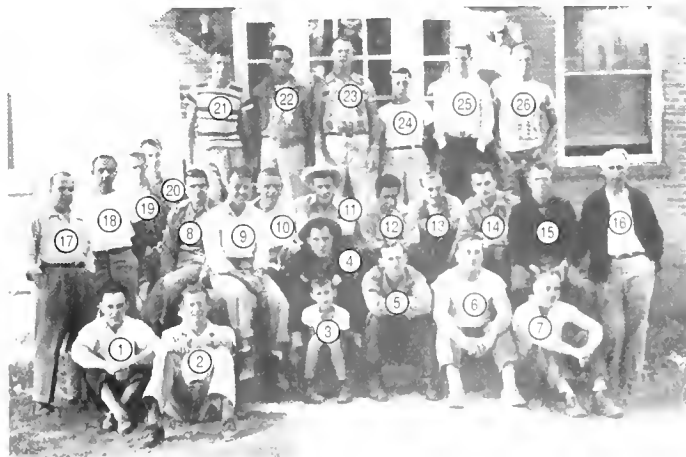
Jack Burgess, B.S. '49, writes that no. 29 is Frank Staplin and no. 31 is Byrd Berman.

Robert Doehler, B.S. '51, M.S. '53, Ph.D. '57, writes, "I feel certain that no. 27 is Patrick Byrne, who worked in clay minerals with Professor Grim. No. 36 is Eugene Williams, who was the graduate assistant in optical mineralogy when I took the course. No. 42 is Robert Fox and no. 43 is Robert Fuchs. I believe, though I'm not 100 percent certain that no. 21 is Jack Shelton and no. 35 is Bob Brockhouse." "Please convey my thanks to Professor Henderson for supplying this photo along with the identifications. Here's hoping that one day soon it will be completed."

Lyle Eberly, M.S. '57, (number 28 in the photo) writes that no. 21 is John Shelton, no. 27 is Patrick Byrne, no. 28 is himself, no. 31 is Byrd Berman, graduate assistant, no. 32 is Charlie Hardie, graduate assistant, no. 33 Eugene Frund, graduate assistant, no. 35 Robert Brockhouse, no. 36 Eugene Williams, graduate assistant, no. 42 Robert Fox, no. 44 John Burgener, graduate assistant.

Lou Putler, Ph.D. '69, writes, "the 1952 photo of the faculty is grand ... Hough, Wanless, Scott, Chapman, Grim and White ... but most memorable is ROSA NICKELL!!" (*Editor's note: Rosa Nickell (number 1 in the photo) was the Geology Department legendary secretary for many years in the mid-20th century. In fact, most would say that she ran the department!!*)

John W. Shelton also added some identifications to the group photo. In addition to those listed above, Shelton identified no. 39 as John Chapman. Shelton also provided the following photograph from the 1950 Field Camp at Ft. Lewis A & M College, Hesperus, CO. Those who would like to fill in the blanks, please do so!



2. Leonard Schultz
3. Hal Wanless
4. Warren Ziebell
6. ____ Spangler
9. Wade McCormick
11. Charlie Hardie
12. Stuart Grossman
15. John Hathaway
16. Dr. Wanless
17. Dr. Mervil
20. Don Baird
22. Don Sprouse
23. ____ Sellards ??
24. Bob Zirkle
25. John Shelton
26. Andy Seslak



Photo courtesy of Russ Jacobson of the ISGS

Steve Sroka in Dinosaurland

Steve Sroka on top of the Salt Wash dip slope with Brushy Basin Member in the background.

Vernal, Utah, population 7,000, is tucked in the northeastern corner of Utah, but Steve Sroka, Ph.D. '96, aims to make it a magnet for people interested in the geology and paleontology of the Uinta Basin.

"Our goal is to be *the* interpretive center for the entire Uinta basin and mountain region with an emphasis on the geology and paleontology of the area," says Sroka, director of the Utah Field House of Natural History in Vernal.

The museum staff is in the process of raising money to enlarge the museum's exhibit space from 14,000 to 22,000 square feet and to improve the exhibits so that anyone interested in the natural history of the region will know to come to the Field House. The museum averages about 115,000 visitors annually and also houses the Northeastern Utah Visitor Center where information on other area attractions is given out.

As director, Sroka is responsible for general administration tasks, including budgets, funding, public relations and marketing. He also oversees the interpretive programs and collection work, including redesign of the collections to make them more relevant and interesting to visitors. Sroka supervises a staff of three full-time employees and five seasonal workers.

One way Sroka is working to make the Field House the best regional museum is by forming partnerships with other institutions. For example, Sroka has established a partnership with Dinosaur National Monument, which is just 20 miles to the east. Sroka, along

with museum curator Sue Ann Bilbey, are working with monument scientists on joint research projects involving dinosaurs from the Morrison Formation. In addition, the monument and museum staff are planning a combined state-of-the-art curation facility. This facility will be a repository of specimens excavated at the monument, as well as other federal land. The museum may also be a place where specimens collected at the monument could be displayed. This is the first such partnership for both the monument and the field house.

Sroka also is in the process of creating a summer program for college teachers, in conjunction with colleague Russ Jacobson (a.k.a. "Dino Russ"), acting head of the Coal Section of the Illinois State Geologic Survey. One program would involve field work in vertebrate and invertebrate paleontology. Ultimately Sroka and Jacobson hope to have a quarry setting where teachers and students can gain hands-on dinosaur excavating experience. Sroka and Jacobson have run such digs for the past decade in South Dakota and Wyoming.

The second type of program is a tour of the "Dinosaur Diamond," an area in eastern Utah and Colorado demarcated by Grand Junction, Moab, Price and Vernal. The tour would look at both the dinosaurs and the geology of the region and is open to both teachers and students. Sroka and Bilbey also are working to expand the geology curriculum of the Utah State University campus branch at Vernal, ultimately establishing a field program based in Vernal.

Although it is not part of his official duties, Sroka gets out the field about

once a month. Currently Sroka is excavating what he thinks is a bipedal camp-tosaurus and Bilbey is working on a brand-new species of sauropod.

"Vernal is a geologist's and paleontologist's dream area," says Sroka. I can go out to the field, be back for lunch and have seen 13 geologic units in that time."

Sroka credits the University of Illinois with giving him a great experience.

"I came to Illinois to study with Dan Blake, who is one of the world's leading paleontologists and an excellent advisor."

While here, Sroka worked in the Natural History Museum helping with the collections and some computer work. He also worked at the Illinois State Geological Survey in the coal, oil and gas sections. After getting his doctorate, working for about a year as an associate editor for the *Journal of Paleontology*, and helping with the department's paleontology collections, Sroka headed to the Grand River Museum in South Dakota. He worked there for nearly two years helping the community establish a brand-new museum.

After his stay in South Dakota, Sroka was hired as the director for the Field House. Sroka is the first paleontologist with museum experience and a Ph.D. to be director of the museum. Because the Field House is part of the Utah state park system, prior directors have been law enforcement officers. "I'm the first director who hasn't had to go through formal law enforcement training," says Sroka.

Sroka urges all alumni, faculty, students and staff to visit Vernal. "It's basically on the way to field camp," he notes. "Everyone is welcome."



Obituaries

Prasada C. Rao, Ph.D. '70, a student of Albert Carozzi's, died in September, 1999. He was 62. Rao was born in India and studied at the University of Mysore. He then moved to Illinois where he received his Ph.D. His dissertation concerned the microfacies and statistical petrography of carbonates from the Ste. Genevieve Formation (Mississippian of Illinois). After working for two years at the Illinois State Geological Survey, Rao joined the Department of Geology at the University of Tasmania, Hobart, where he rose to the rank of Professor. Rao worked on both modern and ancient carbonates in a variety of environments. He is perhaps best known for his work on cold-water periglacial carbonates related to Permian Gondwana glaciations in Australia and Tasmania, and for his work on modern cold-water carbonate sediments in the Tasman Sea. In addition to publishing scholarly papers, he published two

books: *A Colour Illustrated Guide to Sedimentary Textures: Cold Cool Warm Hot*, and *Modern Carbonates: Tropical Temperate Polar*.

Margaret Frances Harper Lehde, B.S. '34, died November 9, 2000. Lehde taught geology at the University of Illinois and worked for the Illinois State Geological Survey. She was a member of the University of Illinois Geology Department Alumni Association and the University of Illinois Alumni Association.

Lehde, who was born Margaret Frances Harper, was married in 1939 to Arthur W. Lehde, the first blind student to graduate from the University of Illinois. The two met when Arthur Lehde took a geology course Margaret Lehde was teaching in the University's Department of Geology.

In 1943, Lehde established, with her husband, a very successful insurance agency. They worked together in it until Lehde's husband died in 1988.

Lehde never lost her love of geology. She enjoyed telling friends and fami-

ly of her experiences on geology field trips with Dr. Harold Wanless, especially to the Black Hills of South Dakota; of her years studying and teaching geology at both Smith College and the University of Illinois; and her experiences at the Illinois Geological Survey. Even while gardening she kept a sharp eye out for interesting rocks.

Lehde's children, Anthony Lehde and Neva Lehde Fulton, wrote, "Mom had many warm memories of the University of Illinois and the Department of Geology and never lost sight of the impact both had on her life."

Maxwell Gage, a visiting professor in the Geology Department in 1952-53 died on June 1, 2000. He was living in New Zealand. His wife, Molly Rose, died in 1999.

Paul Shaffer, geology professor from 1947-1965, died last November at his home in Marysville, Ohio. He was 90 years old.

Seventies

Owen L. White, Ph.D. '70, has edited a book, titled *Urban Geology of Canadian Cities*, with P.F. Karrow, who is also a graduate of the department. Contributors to the book include department graduates John S. Scott and E.A. Christiansen. White has been retired from the Ontario Geological Survey since 1991. E-mail: owen.white@sympatico.ca

Eighties

Jim Haslett, B.S. '81, has moved to back to Flagstaff from southern California. He is self-employed, working as an environmental consultant to companies in Arizona and California. "I get to work out of my home, and I'm only minutes from the greatest geology on

Class News

Margaret Leinen, B.S. '69, has been named the head of the National Science Foundation (NSF) geosciences directorate. She began this position in January 2000. Leinen, who was dean of the Graduate School of Oceanography and vice provost for Marine and Environmental Programs at the University of Rhode Island, will be responsible for coordinating environmental science and engineering programs within NSF, and for environmental cooperation and collaborations between NSF and other federal agencies. She will manage an annual budget of approximately \$470 million.

Leinen is a well-known researcher in paleoceanography and paleoclimatology. Her work focuses on the history of biogenic sedimentation in the oceans and its relationship to global biogeochemical cycles and the history of eolian sedimentation in the oceans and its relationship to climate. Leinen replaced Robert W. Corell, who held this position since 1987.



Leinen in the field circa 1967

Photo courtesy of George Klein

Earth," he writes. E-mail: geologygod@aol.com

Lee Hirsch, B.S. '81, is now embarking on a two-year volunteer assignment teaching physics for the Peace Corps in Tanzania. "Tanzania is a really beautiful country and I am very excited as I begin this adventure," he writes. Lee's mailing address is: c/o Peace Corps Tanzania, 36 Zambia Road, Box 9123, Dar es Salaam, TANZANIA

Kathleen M. Marsaglia, B.S. '79, M.S. '82, is now assistant professor at the department of geological sciences at California State University, Northridge. She was previously senior reservoir petrologist/geologist at Westport Technology Center International in Houston.

After 25 years as geologist at the Illinois State Geological Survey in Champaign/Urbana, **Janis Treworgy, Ph.D. '85**, and her husband, Colin, have moved to St. Louis. Treworgy has joined the faculty at Principia College in Elsah, Ill. "This is an exciting new opportunity for the whole family!" she writes. E-mail: janisdt@principia.edu

Nineties

Alex Glass, B.S. '98, has returned from The Ohio State University (where he earned his master's degree) to continue his paleontological work on brittlestars and starfish with Dan Blake. While at Ohio, Glass studied with Bill Ausich, B.S. '74. "Bill was a great advisor, he was very enthusiastic about sharing his knowledge and love for crinoids with me," says Glass.

Jennifer Jackson, B.S. '98, a math education major and a geology minor, has returned to the Department for her doctoral program. Jackson went to Notre Dame for master's degree. While there she worked with Peter Burns (who was a visiting professor at the University of Illinois from 1996-97). Jackson is working with Professor Jay Bass.



Seniors Frannie Skomurski (center) and Megan Elwood are pictured receiving departmental awards from Stephen Marshak, department head, last spring. Skomurski received the Estwing Award and Elwood received the Geology Alumni Award for Outstanding Senior. Senior Laura Swan also received the Midwest Research Scholarship Award last spring. In addition, several graduate students received awards. Joe Schoen received outstanding teaching assistant, Aubrey Zerkle and Jennifer Jackson were named outstanding woman graduate students, and Serena Lee, Mike Harrison, Tony Gibson, and Zerkle received Morris M. and Ada B. Leighton Memorial Fund awards.

Degrees Conferred in 2000

Bachelor of Science Degrees

January

David John Beedy
Andrew Michael Collins
Steven Michael Rick

May

Rebecca Henszey Ashton
Kelcey Emma Dalton
Jolene Elizabeth Einhouse
Megan Erica Elwood
David Michael Kulczycki
Lisa Marie Noe
Christy Marie Palmer
Susan Gardner Riggins
Yuki Jamie Shinbōri

August

Philip Michael Johaneck
Kristine Lynn Mize

Master of Science Degrees

January '00

Roberto Hernandez, *Geometry and Kinematics of Thrust-Related Deformation Between the Petrolea and Aguardiente Structures, in the Catatumbo Subbasin, Colombia* (Stephen Marshak)

Christopher S. McGarry, *Regional Fracturing of the Galena-Platteville Aquifer in Boone and Winnebago Counties, Illinois: Geometry, Connectivity and Tectonic Significance* (Stephen Marshak)

May '00

Dylan Pierce Canavan, *Early Meteoric Calcite Cementation in Pleistocene Sands of the Banner Formation, Mahomet Valley Aquifer, Central Illinois, USA* (Bruce Fouke)

August '00

Yoshie Hagiwara, *Selenium Isotope Ratios in Marine Sediments and Algae - A Reconnaissance Study* (Tom Johnson)

Judd Sun Tudor, *Regional Deformation Analysis in the Devonian Catskill Formation Surrounding the Lackawanna Synclinorium, NE Pennsylvania* (Stephen Marshak)

HONOR ROLL OF DONORS FOR 2000



The following is a list of friends and alumni of the Geology Department who have donated to the University during the calendar year 2000. We regret not publishing a similar list in the 1999 "Year in Review." We hope to make this a regular feature of all future annual newsletters.

Glen P. Anderson	Robert E. Fox	Richard W. Lahann	Mr. and Mrs. Bruce E. Phillips	Carleton W. Weber
Thomas F. Anderson	Mr. and Mrs. Edwin H. Franklin	Michael B. Lamport	Dr. and Mrs. Jack W. Pierce	W. F. Weeks
Franklin Andrews	Gordon S. Fraser	Rik E. Lantz	Dr. and Mrs. Robert I. Pinney	Jack L. Wilber
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Margaret H. Bargh	Richard A. Gilman	Margaret Frances Lehde Estate (DEC)	Mr. and Mrs. Richard K. Rapp	Lawrence Wu
Dr. and Mrs. David K. Beach	Robert N. Ginsburg	Morris W. Leighton	Paul J. Regorz	Mary Yarnell
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Abigail E. Bethke	Dr. and Mrs. Albert L. Guber	Robert W. Leonard	Mr. and Mrs. George S. Roadcap	Robert A. Zebell
Marion E. Bickford	Tom Guensburg	William D. Lieb	Nancy M. Rodriguez	
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Bruce F. Bohor	Brian T. Hamilton	Crystal G. Lovett	Jeffrey A. Ross	AlliedSignal Inc.
Eugene W. Borden Sr.	Edwin E. Hardt	Michael T. Lukert	Mark D. Russell	American Chemical Society
Joseph E. Boudreaux	Catherine L. Harms	Bernard W. Lynch	Suzanne J. Russell	BP Amoco Foundation
James C. Bradbury	Richard L. Hay	Rob Roy Macgregor	Tim Rynott	Charitable Gift Fund
Mr. and Mrs. Allen S. Braumiller	Daniel O. Hayba	Mr. and Mrs. John W. Marks	Gayla F. Sargent	Chevron Matching Grants Program
Annette Brewster	Darrell N. Helmuth	Stephen and Kathryn Marshak	Michael L. Sargent	Chevron Petroleum Technology Company
Mr. and Mrs. Ross D. Brower	Mark A. Helper	James L. Mason Jr.	Jay R. Scheevel	Dominion Resources Services, Inc.
Robert L. Brownfield	Lee M. Hirsch	Mr. and Mrs. Alan R. May	Mark H. Scheihing	The Elizabeth Morse Charitable Trust
Glenn R. Buckley	Henry A. Hoff	Robert S. Mayer	Detmar Schnitker	ExxonMobil Foundation
Susan B. Buckley	Mr. and Mrs. Mark F. Hoffman	E. Donald McKay III	Dr. and Mrs. Leonard G. Schultz	GeoCrown, Inc.
Mr. and Mrs. Edwin F. Bushman	Eric J. Holdener	Cheryl B. Miller	David C. Schuster	H. H. Murray & Associates, Inc.
Mr. and Mrs. Richard J. Cassin	John C. Horne	James A. Miller	Franklin W. Schwartz, PhD	Harris Bank Foundation
James W. Castle	Mr. and Mrs. Glen A. Howard	Linda A. Minor	Diana P. Schwartz	Hewlett-Packard Company
Dr. and Mrs. Thomas L. Chamberlin	Arthur M. Hussey II	David B. Mitcheltree	Martha G. Schwartz	Idaho National Engineering and National Semiconductor Corporation
Charles J. Chantell	Roscoe G. Jackson II	Laurie D. Benton	Paul R. Seaber	Orion International Limited
Mr. and Mrs. Lester W. Clutter	Joseph M. Jakupcak	John D. Mitchler	Dr. and Mrs. John W. Shelton	Pacific Geology Consultants, Inc.
Lorence G. Collins	Steven F. Jamrisko	John S. Moore	Jack A. Simon	Peoples Energy Corporation
Barbara J. Collins	Martin V. Jean	Prof. and Mrs. Wayne E. Moore	D. Leroy Sims	Petroleum Research Fund
Virginia A. Colten-Bradley	John E. Jenkins	Sharon Mosher	Roger A. Sippel	PG&E
Michelle M. Corlew	William D. Johns Jr.	Ernest H. Muller	Stephen A. Smith	Shell Oil Company Foundation
Thomas E. Covington	Bruce A. Johnson	Robert E. Murphy	Eric P. Sprouls	Tetra Tech EM Inc.
Lucinda E. Cummins	Donald O. Johnson	Haydn H. Murray	Gary D. Stricker	Texaco Foundation
Norbert E. Cygan	Mr. and Mrs. Eric M. Johnson	Robert E. Myers	Daniel A. Textoris	Texaco Incorporated
George H. Davis	Kenneth S. Johnson	Mr. and Mrs. Mike S. Nash	Dr. and Mrs. J. Cotter Tharin	Union League Club of Chicago
Itham Demir	Edward C. Jonas	Howard R. Naslund	David S. Thiel	Union Pacific Resources Group Inc.
Mr. and Mrs. M. Peter deVries	Dr. and Mrs. Frank R. Karner	Bruce W. Nelson	Mr. and Mrs. Jack C. Threet	USX Foundation Inc.
Richard E. Dobson	Suzanne Mahlburg Kay	W. John Nelson	Edwin W. Tooker	
Sophie M. Dreifuss	George H. Keller	Mr. and Mrs. Brian D. Noel	Kenneth M. Towe	
William W. Dudley Jr.	John P. Kempton	Charles H. Norris	Mark J. Triebold	
Mohamed T. El-Ashry	Mark L. Kerasotes	William A. Oliver Jr.	John B. Tubb Jr.	
John S. Esser	Dr. and Mrs. John D. Kiefer	Phillip G. Orozco	Robert G. Vanderstraeten	
Harold H. Falzone	R. James Kirkpatrick	Edmond G. Otton	Robert W. Von Rhee	
Kenneth T. Feldman	Theodore A. Koelsch	Mrs. Lucile F. Otton (DEC)	Dr. and Mrs. F. Michael Wahl	
Mr. and Mrs. Dale C. Finley Jr.	Christopher P. Korose	Michael R. Owen	Harriet E. Wallace	
Gary M. Fleeger	Paul Kraatz	Roderick J. Padgett	James G. Ward	
Richard M. Forester	Robert F. Kraye	Norman J. Page	Michael R. Warfel	
Jack D. Foster	Thomas E. Krisa	Katherine A. Panczak		
	Mr. and Mrs. Scott R. Krueger	Dr. and Mrs. Richard R. Parizek		
	Jean B. Kulla	Corinne Pearson		
	Willard C. Lacy	Russel A. Peppers		
		Mr. and Mrs. Charles E. Pflum		

Faculty

Stephen P. Altaner, associate professor
 Jay D. Bass, professor
 Craig M. Bethke, professor
 Daniel B. Blake, professor
 Chu-Yung Chen, associate professor
 Wang-Ping Chen, professor
 Bruce W. Fouke, assistant professor
 Albert T. Hsui, professor
 Thomas M. Johnson, assistant professor
 R. James Kirkpatrick, professor and executive associate dean
 Craig C. Lundstrom, assistant professor
 Stephen Marshak, professor and head
 Xiaodong Song, assistant professor

Visiting Faculty

Richard Beane, visiting assistant professor
 Michael J. Handke, visiting lecturer
 John Werner, visiting assistant professor

Academic Staff, Post-Docs, Visiting Scholars

Deb Aronson, yearbook editor
 George Bonheyo, post-doctoral researcher
 Marguerite Carozzi, research associate
 Richard Hedin, research programmer
 Eileen Herrstrom, teaching lab specialist
 Stephen Hurst, research programmer
 Andrey Kalinichev, senior research scientist
 Lalita Kalita, research programmer
 Joanne Kluessendorf, research associate
 Ann Long, visiting teaching lab specialist
 Hiroaki Noma, visiting scholar
 Stanislav Sinogeikin, visiting scholar
 Frank Schilling, visiting scholar
 Frank Tepley, post-doctoral researcher
 Raj Vanka, resource and policy analyst
 Alan Whittington, post-doctoral researcher
 Xinong Xie, visiting scholar

Emeritus Faculty

David E. Anderson
 Thomas F. Anderson
 Albert V. Carozzi
 Carleton A. Chapman
 Donald L. Graf
 Arthur F. Hagner
 Richard L. Hay
 Donald M. Henderson
 George deV. Klein
 Ralph L. Langenheim
 C. John Mann
 Alberto S. Nieto (beginning August 2000)
 Philip A. Sandberg

Adjunct Faculty

Keros Cartwright (ISGS)
 Heinz H. Damberger (ISGS)
 Leon R. Follmer (ISGS)
 Feng Sheng Hu (Plant Biology)
 Dennis Kolata (ISGS)
 Morris W. Leighton (ISGS)
 John McBride (ISGS)
 William Shilts (ISGS)
 M. Scott Wilkerson (DePauw University)

Library Staff

Sheila McGowan (Chief Library Clerk)
 Diana Walter (Library Technical Specialist)
 Greg Youngen (Acting Head Librarian)

Staff

Michelle Campbell (Clerk)
 Barbara Elmore (Administrative Secretary)
 Eddie Lane (Electronics Engineering Assistant)
 Pamela Rank (Account Technician II), until June 2000
 Michael Sczerba (Clerical Assistant)
 Sue Standifer (Clerical Assistant), until November 2000

Graduate Students

David Beedy
 Peter Berger
 Michael Brudzinski
 Kurtis Burmeister
 Dylan Canavan
 Amanda Duchek
 Andre Ellis
 Michael Fortwengler
 Anthony Gibson
 Stephanie Gillain
 Alex Glass
 Keith Hackley
 Yoshie Hagiwara
 Michael Harrison
 Xiaoqiang Hou
 Jennifer Jackson
 Qusheng Jin
 Dmitry Lakshitanov
 Serena Lee
 Christopher Mah
 Peter Malecki
 Jungho Park
 George Roadcap
 Joseph Schoen
 Xinlei Sun
 Jian Tian
 Tai-Lin Tseng
 Richard Wachtman
 Matthew Wander
 Jianwei Wang
 Xiaoxia Xu
 Zhaohui Yang
 Aubrey Zerkle
 Juanzuo Zhou

Courses Taught in 2000

Geol 100 - Planet Earth
 Geol 101 - Introduction to Physical Geology
 Geol 104 - Geology of the National Parks and Monuments
 Geol 107 - General Geology I
 Geol 108 - General Geology II
 Geol 110 - Planet Earth - Lab/Field
 Geol 116 - Geology of the Planets
 Geol 117 - The Oceans
 Geol 118 - Earth and the Environment
 Geol 143 - History of Life
 Geol 233 - Earth Materials and the Environment
 Geol 250 - Geology for Engineers
 Geol 311 - Structural Geology and Tectonics
 Geol 315 - Field Geology (field trip to Arizona and California)
 Geol 317 - Geologic Field Methods, Western United States (Field Camp)
 Geol 320 - Introduction to Paleontology
 Geol 332 - Mineralogy and Mineral Optics
 Geol 336 - Petrology and Petrography
 Geol 340 - Sedimentology and Stratigraphy
 Geol 351 - Geophysical Methods for Geology, Engineering, and Environmental Sciences
 Geol 355 - Introduction to Groundwater
 Geol 360 - Geochemistry
 Geol 380 - Current Problems in Environmental Geology
 Geol 397 - Field Methods in Geological, Geotechnical, and Geoenvironmental Exploration
 Geol 401 - Physical Geochemistry I
 Geol 415 - Advanced Field Geology
 Geol 432 - Sedimentary Geochemistry
 Geol 433 - Isotope Geology
 Geol 440 - Petroleum Geology
 Geol 451 - Practice of Engineering Geology
 Geol 458 - Geochemical Reaction Analysis
 Geol 493A1 - Graduate Student Seminar
 Geol 493II - Current Topics in Paleobiology and Earth History
 Geol 493K1 - Continental Lithosphere
 Geol 493K3 - Interior of the Earth
 Geol 493R1 - Data Analysis in Geosciences
 Geol 493V1 - Geochronology

RESEARCH GRANTS ACTIVE IN 2000



American Chemical Society Petroleum Research Fund

A Time Series Process Model of Carbonate Diagenesis and Microbial Genetic Preservation in Hot Spring Travertine, Yellowstone National Park, Wyoming, and Gardiner, Montana.
Principal Investigator: Bruce Fouke

Development of Selenium Isotope Ratios as Indicators of Sedimentary Paleoenvironments.
Principal Investigator: Thomas Johnson

Origin, Architecture, & Thermal State of the Lackawanna Syncline, Pennsylvania.
Principal Investigator: Stephen Marshak

Department of Energy

Computational & Spectroscopic Investigations of Water-Carbon Dioxide Fluids & Surface Sorption Processes.
Principal Investigator: R. James Kirkpatrick

Illinois Council on Food and Agriculture Research

Estimation of Denitrification Rates in the Shallow Groundwater Flow Systems of Big Ditch Watershed, Illinois - Isotope Assessment.
Principal Investigator: Thomas Johnson

Institute of Geophysics And Planetary Physics, Los Alamos

Timescales of Crustal Level Differentiation: U-Series Measurements and Geophysical Monitoring at Arenal Volcano, Costa Rica.
Principal Investigator: Craig Lundstrom

NASA

Core Angular Momentum and the International Earth Rotation Service Coordination Center / Sub-Centers Activity for Monitoring Global Geophysical Fluids.
Principal Investigator: Xiaodong Song

National Science Foundation

Elasticity of Mantle Minerals Under High Pressures and Temperatures.
Principal Investigator: Jay Bass

Polyamorphism and Structural Transitions During Glass Formation.
Principal Investigators: John Kieffer and Jay Bass

Development of Laser Heating for Sound Velocity Measurements at High P & T.
Principal Investigator: Jay Bass

Global Climate Change & The Evolutionary Ecology of Antarctic Mollusks in the Late Eocene.
Principal Investigator: Daniel B. Blake

The Asteroid (Echinodermata) *Trichasteropsis* from the Triassic of Germany: Its Taxonomy, Phylogeny, and Paleocologic Significance.
Principal Investigator: Daniel B. Blake

A Seismic Study of the Mantle Transition Zone and Subducted Lithosphere.
Principal Investigator: Wang-Ping Chen

Seismic Reflection Profiles in Southern Illinois (funded through the Mid-America Earthquake Research Center).
Principal Investigators: John McBride, Stephen Marshak, and Wang-Ping Chen

Proximal Carbonate Ejecta and Breccias from the Cretaceous-Tertiary Chicxulub Impact: Ballistic Sedimentation and Brecciation, ⁸⁷Sr/⁸⁶Sr Chronology and Diagenetic Alteration.
Principal Investigator: Bruce Fouke

Selenium Stable Isotopes as Indicators of Selenium Transport.
Principal Investigator: Thomas Johnson

Development of Cr Stable Isotopes for Cr Transport Studies and Other Geoscience Application.
Principal Investigator: Thomas Johnson

Investigation of Mineral Structure & Dynamics.
Principal Investigator: R. James Kirkpatrick

NMR Quantum Chemical Computational Study of Silicate-Based Materials.
Principal Investigator: R. James Kirkpatrick

Measuring Trace Element Partition Coefficients Between Minerals and Basaltic Melt.
Principal Investigator: Craig Lundstrom

Windows into MORB Petrogenesis: Measuring U-Series Disequilibria in MORB from Transforms.
Principal Investigator: Craig Lundstrom

Tectonics of the Araçuaí/Ribeira Orogenic Tongue of Southeastern Brazil and its Significance to the Assembly of West Gondwana.
Principal Investigator: Stephen Marshak

Constraining the Structure and Rotation of the Inner Core.
Principal Investigator: Xiaodong Song

Office of Naval Research

The Role of Shipyard Pollutants in Structuring Coral Reef Microbial Communities: Monitoring Environmental Change and the Potential Causes of Coral Disease.
Principal Investigator: Bruce Fouke

State Of Illinois Board Of Higher Education
Evolution of the Martian Surface: A Cooperative Learning Module for General Education in Science.
Principal Investigator: Albert Hsui

U.S. Geological Survey
Mapping of the Pittston 7.5" Quadrangle, Pennsylvania.
Principal Investigator: Stephen Marshak

University Of Illinois Critical Research Initiative:
Geological, Microbiological, Biochemical Mechanisms of Microbial Fossilization: A Template for Interpreting the History of Life.
Principal Investigators: Bruce Fouke, A.A. Salyers, J. Sweedler

University Of Illinois Research Board
Acquisition of a Single Collector Thermal Ionization Mass Spectrometer.
Principal Investigator: Craig Lundstrom

Geothrust Members for 2000

J. William Soderman - Chair
M.S. '60, Ph.D. '62

James R. Baroffio
Ph.D. '64

David K. Beach
B.S. '73

Marion "Pat" Bickford
M.S. '58, Ph.D. '60

Lester W. Clutter
B.S. '48, M.S. '51

James C. Cobb
B.S. '71, Ph.D. '81

Norbert E. Cygan
B.S. '54, M.S. '56, Ph.D. '62

Edwin H. Franklin
B.S. '56

John R. Garino
B.S. '57

James W. Granath
B.S. '71, M.S. '73

Morris W. Leighton
B.S. '47

Patricia Santogrossi
B.S. '74, M.S. '77

Jack C. Threet
A.B. '51

LIST OF PUBLICATIONS FOR 2000

This list includes only peer-reviewed articles, chapters, and books.

- Lundstrom, C.C., 2000, Rapid diffusive infiltration of sodium into partially molten peridotite: *Nature*, 403: 527-530.
- Kao, H., and Chen, W.-P., 2000, The Chi-Chi earthquake sequence: Active, out-of-sequence thrust faulting in Taiwan: *Science*, 288: 2346-2349.
- Carozzi, Albert V., 2000, Manuscripts and Publications of Horace-Bénédict de Saussure on the Origin of Basalt (1772-1797): 769 pp. Editions Zoé, Geneva.
- Ylagan, R.F., Altaner, S.P., and Pozzioli, A., 2000, Reaction mechanisms of smectite illitization associated with hydrothermal alteration from Ponza Island, Italy: *Clays & Clay Minerals*, 48: 610-631.
- Finkelstein, D.B., Altaner, S.P., and Hay, R.L., 2000, Alteration history of volcanoclastic sediments in the upper Oligocene Creede Formation, southwestern Colorado: in Bethke, P.M. and Hay, R.L. eds., *Ancient Lake Creede - Its volcano-tectonic setting, history of sedimentation, and relation to mineralization in the Creede Mining District, Colorado*: Geological Society of America Special Paper 346: 209-232.
- Song, X.D., 2000, Joint inversion for inner core rotation, inner core anisotropy, and mantle heterogeneity: *J. Geophys. Res.*, 105: 7931-7943.
- Blake, D. B., Janies, D.A., and Mooi, R. J., 2000, Evolution of starfishes: Morphology, molecules, development, and paleobiology (Introduction to the Symposium on Starfishes): *American Zoologist*, 40: 311-315.
- Sinogeikin, S.V., Jackson, J.M., O'Neill, B., Palko, J.W., and Bass, J.D., 2000, Compact high-temperature cell for Brillouin scattering measurements: *Rev. Sci. Instruments*, 71: 201-206
- Carozzi, Marguerite, 2000, H.-B. de Saussure: James Hutton's Obsession: *Archives Scientifique Genève*, 53: 77-158.
- Huff, W. D., Bergstrom, S. M., and Kolata, D. R., 2000, Silurian K-bentonites of the Dnestr Basin, Podolia, Ukraine: *Journal of the Geological Society of London*, 157: 493-504.
- Song, X.D. and Li, A.Y., 2000, Support for differential inner core superrotation from earthquakes in Alaska recorded at South Pole station: *J. Geophys. Res.*, 105: 623-630.
- Edwards, M.E. et al. including Hu, F.S. 2000, Plant-based biomes for Beringia 18,000, 6,000, and 0 ¹⁴C yr B.P.: *Journal of Biogeography*, 27: 521-554.
- Berger, A. and Bethke, C.M., 2000, A process model of natural attenuation at a historic mining district: *Applied Geochemistry*, 15: 655-666.
- Blake, D. B., 2000, An *Archegonaster*-like somasteroid (Echinodermata) from Pomeroy, Co. Tyrone, Northern Ireland: *Irish Journal of Earth Sciences*, 18: 89-99.
- Fouke, B.W., Farmer, J.D., Des Marais, D.J., Pratt, L., Sturchio, N.C., Burns, P.C., and Discipulo, M.K., 2000, Depositional facies and aqueous-solid geochemistry of travertine-depositing hot springs (Angel Terrace, Mammoth Hot Springs, Yellowstone National Park, USA): *Journal of Sedimentary Research*, 70: 565-585.
- Bethke, C.M. and Brady, P.V., 2000, How the *Kd* approach undermines groundwater cleanup: *Groundwater*, 38: 435-443.
- Brueckner, H.K., Cunningham, W.D., Alkmim, F.F., and Marshak, S., 2000, Tectonic implications of Precambrian Sm-Nd dates from the southern São Francisco craton and adjacent Araçuaí and Ribeira Belts, Brazil: *Precambrian Research*, 99: 255-269.
- Blake, D. B., 2000, The class Asteroidea (Echinodermata): Fossils and the base of the crown group: *American Zoologist*, 40(3): 316-325.
- Scott, R.W., Fouke, B.W., Schlager, W., and Nederbragt, A.J., 2000, Are Mid-Cretaceous eustatic events recorded in Middle East carbonate platforms?, Middle East models of Jurassic/Cretaceous carbonate systems: *SEPM Special Publication*, 69: 77-88.
- Bethke, C.M., Torgersen, T., and Park, J., 2000, The "age" of very old groundwater: Insights from reactive transport models: *Journal of Geochemical Exploration*, 69: 1-4.
- McArthur, J.M., Fouke, B.W., Donovan, D.T., and Thirlwall, M.F., 2000, Strontium isotope stratigraphy in the Jurassic: Early Toarcian-Late Pleinsbachian timescale revision and its implications: *Earth and Planetary Science Letters*, 179: 269-285.
- Kavner, A., Sinogeikin, S.V., Jeanloz, R., and Bass, J.D., 2000, Strength and equation of state of natural majorite: *J. Geophys. Res.*, 105: 5693-5971.
- Jackson, J.M., Sinogeikin, S. V., Bass, J.D., and Weidner, D.J., 2000, Sound velocities and elastic properties of Δ -Mg₂SiO₄ to 873 K by Brillouin spectroscopy: *Am. Mineralogist*, 85: 296-303.
- Brudzinski, M. R., and Chen, W.-P., 2000, Variations of *P*-wave speeds and outboard earthquakes: Evidence for a petrologic anomaly in the mantle transition zone: *J. Geophys. Res.*, 105: 21,661-21,682.
- McBride, J. H., 2000, Geophysical signatures of Caledonian and Variscan deformation in the North Atlantic realm, in Díaz García, F., González Cuadra, P., Martínez Catalán, J., Arenas, R., eds., *Basement Tectonics 15, A Coruña, Spain, Program and Abstracts*, Universidad de Oviedo, Spain: 13-16.
- Sinogeikin, S.V. and Bass, J.D., 2000, Single crystal elasticity of pyrope and MgO to pressures of 20 Gpa by Brillouin scattering in the diamond cell: *Phys. Earth Planet. Interiors*, 120: 43-62.
- Brady, P.V. and Bethke, C.M., 2000, Beyond the *Kd* approach: *Groundwater*, 38: 321-322.
- Sinogeikin, S.V., Schilling, F.R., and Bass, J.D., 2000, On the Bulk Modulus of Lawsonite: *Am. Mineral.*, 85: 1834-1837.
- Johnson T. M., Roback, R. C., McLing, T. L., Bullen, T. D., DePaolo, D. J., Doughty, C., Hunt, R. J., Murrell, M. T., and Smith, R. W., 2000, Groundwater 'Fast Paths' in the Snake River Plain Aquifer: Radiogenic isotope ratios as natural groundwater tracers: *Geology*, 28: 871-874.
- Herbel, M.J., Johnson, T.M., Oremland, R.S., and Bullen, T.D., 2000, Fractionation of selenium isotopes during bacterial respiratory reduction of selenium oxyanions: *Geochim. Cosmochim. Acta*, 64: 3701-3709.
- Blake, D. B., Tintori, A., and Hagdorn, H., 2000, A new asteroid (Echinodermata) from the Norian (Triassic) Calcare di Zorzino of northern Italy: its stratigraphic occurrence and phylogenetic significance: *Rivista Italiana di Paleontologia e Stratigrafia*, 106:141-156.
- Kalinichev, A. G., Kirkpatrick, R. J., and Cygan, R. T., 2000, Molecular modeling of the structure and dynamics of the interlayer and surface species of mixed-metal layered hydroxides: Chloride and water in hydrocalumite (Friedel's salt): *Amer. Mineral.*, 85: 1046-1057.
- Johnson, T. M., Bullen, T. D., and Zawislanski, P. T. 2000, Selenium stable isotope ratios as indicators of sources and cycling of selenium: Results from the northern reach of San Francisco Bay: *Env. Sci. Technol.*, 34: 2075-2079.
- Katz, A., Brough, T., Kirkpatrick, R. J., Struble, L. J., and Young, J. F., 2000, Effect of solution concentration on the properties of cementitious grout wastefrom for low level nuclear waste: *Journal of Nuclear Technology*, 129: 236-245.
- McBride, J. H. and Nelson, W. J., 2000, Origin and style of middle-to-late Paleozoic deformation beyond the Appalachian foreland, Central USA, in Díaz García, F., González Cuadra, P., Martínez Catalán, J., Arenas, R., eds., *Basement Tectonics 15, A Coruña, Spain, Program and Abstracts*, Universidad de Oviedo, Spain: 129-132.



Spring 2000

- Lundstrom, C.C., 2000, Models of U-series disequilibrium generation in MORB: the effects of two scales of melt porosity: *Physics of the Earth and Planetary Interiors*, 121: 189-204.
- Marshak, S., Karlstrom, K., and Timmons, J.M., 2000, Inversion of Proterozoic extensional faults: An explanation for the pattern of Laramide and ancestral Rockies intracratonic deformation, *United States: Geology*, 28: 735-738.
- Kirkpatrick, R. J., 2000, Nuclear magnetic resonance spectroscopy, in Ramachandran, V. S., and Beaudoin, J. J., eds., *Handbook of analytical techniques in concrete science and technology*: 205 - 230.
- Gates, W. P., Komadel, P., Madejova, J., Bujdak, J., Stucki, J. W., and Kirkpatrick, R. J., 2000, Electronic and structural properties of reduced-charge montmorillonites: *Applied Clay Science*, 16: 257-271.
- Fischer, M. P., and Wilkerson, M. S., 2000, Predicting the orientation of joints from fold shape: Results of pseudo-three-dimensional modeling and curvature analysis: *Geology*, 28(1): 15-18.
- Chen, W.-P., and Kao, H., 2000, Evidence for dual, out-of-sequence thrust faulting during the Chi-Chi (Taiwan) earthquake sequence of 1999: *Int. Workshop on Annual Commemoration of the Chi-Chi Earthquake*: 71-81.
- Hou, G., Kirkpatrick, R. J., and Kim, Y., 2000, ¹⁵N NMR study of the structure and dynamics in hydrotalcite-like compounds (HTs): *Amer. Mineral.*, 85: 173 - 180.
- Zhou, L.-M., Chen, W.-P., and Özalaybey, S., 2000, Seismic properties of the central Indian shield from broadband P-SV conversions at Hyderabad: *Bull. Seismol. Soc. Am.*, 90: 1295-1304.
- Leetaru, H.E., 2000, Sequence stratigraphy and economic resources of the Aux Vases Sandstone: A major oil producer in the Illinois Basin: *AAPG Bulletin*, 84 (3): 399-422.
- Lundstrom, C.C., Williams, Q, and Gill, J., 2000, A geochemically consistent hypothesis for MORB generation: *Chemical Geology*, 162: 105-126.
- Hou, X., and Kirkpatrick, R. J., 2000, Solid state ⁷⁷Se NMR and XRD study of the structure and dynamics seleno-oxyanions in hydrotalcite-like compounds (HTs): *Chemistry of Materials*, 12: 1890-1897.
- Montgomery, S.L., and Leetaru, H. E., 2000, Storms Consolidated Field, Illinois Basin: Identifying new reserves in a mature area: *AAPG Bulletin*, 84 (2): 157-173.

- Jan. 28** **Tom Guensburg, Rock Valley College**
Environmental change & the emergence of the Paleozoic Evolutionary Fauna
- Feb. 2** **Todd Anderson, University of Massachusetts**
The natural attenuation & engineered bioremediation of benzene in petroleum-contaminated aquifers under anaerobic conditions
- Feb. 4** **Richard Beane, Tucson, Arizona**
Tracking the evolution of a geothermal system
- Feb. 7** **Hailiang Dong, Princeton University**
Bacteria-solid surface interactions: implications for microbial Fe reduction & bacterial transport
- Feb. 9** **John Coates, Southern Illinois University**
The microbiology, biogeochemistry and bioremediation potential of (per)chlorate-reducing bacteria
- Feb. 14** **Ena Urbach, Oregon State University**
Bacterioplankton ecology: New molecular approaches
- Feb. 16** **Volker Bruchert, Max Planck Institute, Germany**
What controls the stable sulfur isotopic fractionation during bacterial sulfate reduction: Rate, phylogeny or bioenergetics
- Feb. 25** **Frank Schilling, U of I, Department of Geology**
Fluid transfer from a downgoing slab: Insights from the Andes
- Mar. 1** **Peter C. Burns, University of Notre Dame**
The Importance of mineralogy to the disposal of nuclear waste
- Mar. 3** **Larry Braile, Purdue University**
Science education: Why should we care?
- Mar. 28** **Kevin Bohacs, AAPG Distinguished Speaker**
1. Sequence stratigraphy of lake basins or 2. Lake-basin type source potential & hydrocarbon character
- April 7** **Mousumi Roy, University of New Mexico**
Evolution of fault systems at a strike-slip plate boundary: A viscoelastic model
- April 14** **Sherilyn Fritz, University of Nebraska**
Environmental dynamics on geological & ecological time scales in lakes of the northern Great Plains
- April 21** **John Parise, SUNY Stony Brook**
Some new mineralogy: Solutions using tools available at national facilities
- April 28** **Shun-ichiro Karato, University of Minnesota**
Voyage au Centre de la Terre: Anisotropy & dynamics of Earth's inner core

Fall 2000

- Sept. 1** **Steve Marshak, U of I, Department of Geology**
Precambrian deformational styles and the tectonic assembly of west Gondwana: The view from the São Francisco Craton (Brazil)
- Sept. 8** **Ray Russo, Northwestern University**
Slabs, continental roots and upper mantle flow
- Sept. 15** **Robert Bodnar, Virginia Tech**
Fluid inclusions in meteorites: Evidence for water in the solar system & implications for extraterrestrial life
- Sept. 22** **Jay Stravers, Northern Ill. Univ**
Quaternary marine geology of fjords in southern Chile & the eastern Canadian Arctic: Interhemispheric correlations for the last deglacial cycle
- Sept. 29** **Craig Bethke, U of I, Department of Geology**
The paradox of groundwater age
- Oct. 12** **John Warme, AAPG Distinguished Lecturer**
Anatomy of an anomaly: Catastrophic Devonian Alamo impact breccia, Nevada
- Oct. 13** **Martin Schoonen, SUNY Stony Brook**
Fooling around with fool's gold: Surface chemistry and reactivity of pyrite
- Oct. 20** **Page Chamberlain, Dartmouth College**
Reconstructing the paleotopography of mountains from isotopes of clay minerals
- Oct. 27** **Crawford Elliott, Georgia State University**
Clay mineralogy, K-Ar & stable isotope data of illitic clays in the Kupferschiefer: Implications for genesis of Cu-Ag mineralization
- Oct. 31** **Lee Krystinik, AAPG Distinguished Lecturer**
Sequence stratigraphic variability in foreland basins: An example from the Cretaceous western interior seaway of North America
- Nov. 17** **Emile Okal, Northwestern University**
Recent advances in tsunami studies: Papua, New Guinea, 1998 and the role of underwater slumps
- Dec. 1** **Charles Gammie, U of I, Department of Astronomy**
The formation of planets
- Dec. 8** **Everett Shock, Washington University**
Abiotic organic synthesis in hydrothermal systems, volcanic gases, meteorite parent bodies and the solar nebula



Meet Us In Denver!



The Geology Department caters a private party at each annual AAPG and GSA meeting. At the last GSA meeting the room was packed for most of the evening. It's a great chance to catch up with classmates, professors, and other alumni. You can also hear about the latest departmental activities.

Next Gatherings:

- **AAPG Meeting**, June 3-6, 2001, in Denver, Colo.
- **GSA Meeting**, November 5-8, 2001, in Boston, Mass.

Let us know if you're coming!
E-mail Barb Elmore at b-elmore@uiuc.edu or call her at 217-333-3542.

Let's Keep in Touch

Please take a few minutes to let us and your classmates know what you've been doing. Send your news to the Department of Geology, 245 Natural History Building, 1301 West Green Street, Urbana, Illinois 61801; fax 217-244-4996; e-mail geology@uiuc.edu

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Faculty Make Scientific Advances in 2001

In 2001, department faculty were involved in a wide range of research projects, from understanding the significance of groundwater age near the Earth's surface to investigating the nature of anisotropy in the Earth's core. Here are a few examples of what researchers have been up to.

Recent work by Professor Craig Bethke and Assistant Professor Thomas Johnson shows that groundwater in aquifers is generally older than one might expect, if one were to estimate age based only on the velocity of flow. These findings have important implications in situations where hydrogeologists use radiometric methods to estimate the sustainable yield of a water supply, or to predict the rate at which a contaminant will migrate through the ground.

Groundwater tends to flow through aquifers that are constrained by layers of

less permeable rock called aquitards. Hydrologists commonly figure that a groundwater's age reflects the time it takes to migrate along the aquifer. But water molecules don't see an aquifer as a pipe. Some water mixes between the aquitards and aquifers, and the water in aquitards is generally very old.

Bethke and Johnson have shown that the effect of aquitards on the age of groundwater depends only upon the ratio of water mass in aquitards to that in aquifers, not on the mixing rate. At low mixing rates, very old water is supplied to the aquifer, but the water in the aquitard remains old. At high mixing rates, less-old water is supplied to the aquifer, because younger water is moving into the aquitard. While mixing increases the age of water in aquifers, it also has the counter-balancing effect of decreasing the age in aquitards. The two effects exactly cancel.

Another faculty member, Assistant Professor Xiaodong Song, has collected new evidence that may solve a long-standing mystery of the Earth's inner core. The data offers new support for a layered inner core model, with an isotropic upper inner core overlying an anisotropic lower inner core. Song and Professor Don Helmberger of Caltech proposed this layered inner core model in 1998. For a decade, researchers have observed that seismic waves traversing the solid inner core along a north-south path have a much smaller amplitude and a more complex waveform than those waves that travel east-west. Song suggests that the layered inner core structure is the cause. Because the anisotropy in the lower inner core is aligned in the north-south direction, seismic waves traveling this path speed up and spread out, resulting in smaller amplitudes and com-

(continued on page 4)

Jackson Studies Earth's Interior

When the three intrepid explorers in Jules Verne's science-fiction classic, *Journey to the Center of the Earth*, set off on their adventure, they carried crowbars, pick axes, ropes and hatchets. In the absence of being able to take such a trip, geologists instead focus on the behavior of various minerals at the Earth's interior under different conditions of temperature and pressure. Graduate student Jennifer Jackson, B.S. '99, for example, has been focusing on orthoenstatite, an orthopyroxene, since it is believed to be abundant in the crust and upper mantle. Jackson is investigating the elastic properties of orthoenstatite at high temperature. Her high-temperature experiments were conducted using the department's Brillouin spectroscopy lab with a high-temperature furnace. Jackson was able to make measurements of temperature dependence on elasticity up to 800° C, the highest temperature achieved for such studies.

(continued on page 23)

Sun Honored

Graduate student Xinfu Sun won an Outstanding Student Paper Award for her presentation at the 2001 fall meeting of the Tectonophysics section of the American Geophysical Union. Sun is working with Assistant Professor Xiaodong Song to understand the structure of the Earth's core. Sun used seismic wave data and looked in particular at subtracting out possible effects of the lowermost mantle structure to get a clearer picture of the structure of the core.



Our "Year in Review"

Welcome to our "Year in Review" for 2001. This was a busy year for the Department in a variety of ways. The pace of research activity in the Department has been picking up—in fact, the amount of external grant money received by faculty tripled in 2001, as compared with 2000! Such research funds are used primarily to support graduate student research assistants, post-doctoral associates, and their projects—they keep the climate active. As described on page 1, departmental research projects have yielded exciting new results. We've also been maintaining our high level of teaching, with literally thousands of students taking our classes every year. Several of our staff are routinely listed on the "list of teachers rated excellent by their students." And, our new course in Natural Hazards has been catching on.

The Department's facilities have also been undergoing renovation year by year. In the past few years, we've redone the mineralogy/petrology teaching laboratory, transformed an old lab into a new classroom with built-in computer technology, and spruced up a number of hallways and offices. New laboratories in mass-spectrometry and experimental petrology have been constructed. And this year, we have been building a new geomicrobiology research facility, complete with incubator rooms and cold rooms. The Department continues in its efforts to hire new faculty. We've been searching in the areas of surficial geology, geobiology/low-temperature geochemistry, and mineral science. Hopefully, we'll have some new faces to introduce next year. All this helps to keep the Department at the forefront of teaching and research.

Generous support of alumni and friends of the Department have continued to bolster our optimism for the future. This year, we are very pleased to acknowledge the incredibly generous support of Ed and Alison Franklin, who have made a large six-figure bequest to the Department's endowment, as part of our GeoScience 2005 endowment campaign. This gift will help the Department to continue to grow by providing a recurring source of funds for obtaining teaching and research resources. The Franklins have already established themselves as major benefactors of the Department by endowing our field camp scholarship fund, which already has helped immensely in making the cost of field camp attainable by our students. The GeoScience 2005 campaign is well on its way towards reaching its \$3 million goal.

2001, of course, has also had its down side. The tragedies of September 11 stunned the Department. As in most institutions, the shock led to a very somber time. In the immediate aftermath, we cancelled some classes, but faculty and teaching assistants did their best to make sure that students were able to keep up with their work, and deal with the emotions of the day. The Department was also saddened to hear of the deaths of three popular emeritus faculty. The economic downturn that has taken hold in recent months has also had an impact, in that the University's budget has decreased significantly, a stunning change of affairs considering the sizable increases that we have seen in recent years. But, the structure of the University remains sound, and we anticipate that our long-term prospects remain positive.

I hope you enjoy reading about the goings-on in the Geology Department today, as well as hearing about what former members of the Department are up to. All the best for the coming year!

—Stephen Marshak

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Year in Review is published once a year by the Department of Geology, University of Illinois at Urbana-Champaign, to summarize the activities and accomplishments within the department and news from alumni and friends.

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ALUMNI AWARD

Jack C. Threet Receives Alumni Achievement Award

Jack C. Threet, B.S. '51, has received the 2002 Department of Geology Alumni Achievement Award. Threet devoted his entire 36-year career to Shell Oil Company. He entered the oil business at a time of great expansion and became a key player in Shell's search for and production of oil and gas, rising in 26 years from junior stratigrapher to vice president and head of exploration, which was widely recognized as the industry's premier exploration outfit.

"The Department is proud to have played a role in starting Jack Threet into his prominent career in geology," says Steve Marshak, professor and head of the department.

Threet became interested in geology after his older brother, Dick, got his master's degree in geology from the University of Illinois. Threet became particularly interested in fossils, which led him to the late Professor Harold Scott's door.

"Harold Scott was a fine professor," says Threet. "I really looked to him as a mentor."

In the spring of 1951, Threet, newly married to Katy Hall of Tolono, began work on his master's degree with Scott. But later that year Threet took what was supposed to be a summer job with Shell. That summer position blossomed to full-time employment and he rose quickly through the managerial ranks, from district to division to area exploration manager at several locations, then upward to general manager and vice president. He never did go back for his master's degree.

"I have no regrets," says Threet. "Shell convinced me that time on the job was more important."



In the course of his career, Threet moved his family (which soon included daughters Linda and Judy) more than 30 times, living everywhere from Australia to Canada, Holland to North Africa, and New York City to Los Angeles. His last

assignment was in Houston, where for 10 years until his retirement in 1987, he was vice president and head of exploration.

In the course of these assignments he led Shell Oil Co. in the discovery of major oil and gas fields, the most notable of which were in the deep water Gulf of Mexico—where for many years Shell held world water-depth drilling records—the northwest shelf of Australia, onshore Syria, and offshore Malaysia,

Cameroon and Brazil.

During his long career, Threet served actively in various professional organizations. He is a member of the American Association of Petroleum Geologists, and chair of the board of the AAPG Foundation. He was a member and direc-

tor of the National Ocean Industries Association and was vice chair of the Offshore Technology Conference for several years. He has served on special committees of the National Academy of Sciences and the National Science Foundation. Threet also is on the board of trustees of the American Geological Institute Foundation, where he chairs a committee to raise \$2 million for K-12 education in earth science.

Ten years ago, Threet renewed his interest in the Geology Department at the University of Illinois and became an active member of the GeoThrust committee, co-chairing a small group which four years ago raised \$300,000 for the Texas-Louisiana graduate fellowship endowment fund. Last year, Threet and his brother Dick established the Jack C. and Richard L. Threet endowed professorship in sedimentary geology in honor of Harold Scott.

"I have really fond memories of my time at Illinois," says Threet. "In addition to Professor Scott, I remember so many other professors, like Dr. White and Dr. Henderson, who inspired me, as well as my brief period in graduate school with Haydn Murray and John Shelton."

Threet has come a long way from his humble beginnings and is an inspiration himself to many. He has been listed in the Who's Who in America for the last 12 years and is very active in his community, both in Houston and in Pagosa Springs, Colo., where he and Katy spend their summers.

"I readily credit whatever success I've had to my wife, Katy, of 51 years, my family, friends and professional colleagues, my solid education in the basics at the University of Illinois, my faith in God and lots of good luck along the way."

"I readily credit whatever success I've had to my wife, Katy, of 51 years, my family, friends and professional colleagues, my solid education in the basics at the University of Illinois, my faith in God and lots of good luck along the way."

Faculty Make Scientific Advances in 2001

(continued from page 1)

plicated waveforms. Based on this new data, it appears that the anisotropy in the lower inner core is much higher than previously believed, about 8 percent rather than the 2 or 3 previously suggested.

In other work concerning the Earth's interior, Professor Jay Bass and Research Scientist Stanislav Sinogeikin, Ph.D. '99, have obtained the first elasticity measurements of the very high-pressure phase of olivine (the spinel phase) at high pressures and high temperatures. This enables them to determine how fast seismic waves travel through this mineral in the transition zone between the upper and lower mantle of the Earth. Their results strongly suggest that the composition of the transition zone is not the same as that of the upper mantle.

Back on the Earth's surface, Professor Dan Blake's Antarctic research continued with another field season at Seymour Island. Antarctic weather unfortunately was bad this year, and much time was spent in tents. However, important collections were made and ongoing research is documenting significant changes in molluscan faunas and faunal structures correlated with Cenozoic global cooling. Results have implications for current concerns on global warming. Blake also finished papers on the late Paleozoic-Mesozoic transition in starfish evolution. Extinction events eliminated Paleozoic-type starfish, and groups very different from those of the Paleozoic evolved. Interestingly, life habits do not appear to have changed significantly through the crisis. Blake has now turned his attention to Early Devonian and more ancient intervals in starfish evolution.

Professor Steve Marshak, work-

ing with Post-Doc Alan Whittington and two Brazilian colleagues, conducted fieldwork in the remote highlands of eastern Brazil during the past two summers. They have discovered that the mountain range which formed between Brazil and Africa at the end of the Precambrian, as Gondwana assembled, effectively collapsed under its own weight during the final stages of orogeny. This process, known as "extensional collapse," has been observed in younger mountain ranges, such as the Himalayas. Collapse of the Brazilian example produced new fabrics in the rocks of the orogen, and decompression accompanying collapse probably triggered crustal melting, which produced large quantities of granitic magma.

Professor Wang-Ping Chen, and graduate students Michael Brudzinski, Tai-Lin (Ellen) Tseng, and Zhaohui Yang, continue to investigate the interaction between subducted lithosphere, the transition zone of the mantle, and deep earthquakes. Chen's interests have also taken him to the other side of the planet, where his project Hi-CLIMB, an international effort to understand the lithospheric deformation of the Himalayas and Tibet, is in full swing. Hi-CLIMB is complemented by a collaborative project between Honn Kao (Ph.D. '93) and Chen to study the nascent Taiwan orogen. Closer to home, adjunct Professor John McBride, graduate student Amanda Duchek, and Chen also have been working on seismic-reflection profiles across the Cottage Grove fault system of southern Illinois.

Faculty Serve Many "Extra-Curricular" Roles

Since the summer of 2001, Craig Bethke has served as a "subject matter expert" in geochemistry and hydrogeology on the Department of Energy (DOE) peer panel. This panel is writing the report to Congress about the technical suitability of the Yucca Mountain site. Since the DOE has shifted its focus from using geologic barriers to keep the spent waste from migrating from the site, it is now looking at the feasibility of man-made containers that would not fail within 10,000 years. In order to determine possible causes of corrosion to the "engineered barrier," panel members needed to learn about the chemistry of the local groundwater, which Bethke provided. "The fun part was that, while they learned a little geochemistry, I learned a lot of corrosion chemistry," says Bethke.

During the fall of 2001 Dan Blake served as acting director of Spurlock Museum while director Douglas Brewer was on leave. During that semester he worked with the other museum staff to prepare the museum for its official opening in September, 2002. Because the building had just been completed, Blake's role included overseeing the calibration of the building's cooling system and other basic tasks. Blake also helped direct the fabrication of exhibit cases and other items related to the building's mission.

Jay Bass has been named as Center for Advanced Study (CAS) associate for fall semester 2002 and **Bruce Fouke** has been named CAS fellow for the same semester. The Center brings together scholars from diverse disciplines and backgrounds, encouraging and rewarding excellence in all areas of academic inquiry. Fellows and associates are temporary appointments and are selected in an annual competition.

Lura Joseph is New Geology Librarian

The next time a department member is having trouble finding information, they can turn to the new geology librarian, Lura Joseph, for help. Joseph, who became the librarian on August 1, is both a librarian and a geologist—in this regard, she follows in the footsteps of Harriet Wallace (see related article on page 8). Joseph served as the physical sciences librarian at North Dakota State



University for six years before coming to Champaign-Urbana.

Joseph has been a great addition to the department, says Steve Marshak, professor and department head. “Lura has been wonderfully interactive with the faculty in making us aware of opportunities to improve the collection, and she is an excellent resource for locating research and teaching materials available on the web.”

Part of the reason that Joseph understands the research needs of geology faculty and students is that before she became a librarian, she spent many years as a geologist herself. After receiving her bachelor’s in anthropology at the University of Oklahoma and her master’s in geology from the same place, she worked in the petroleum industry for 15 years. Because of the fluctuations in that industry, she got a master’s degree in psychology (at University of Central Oklahoma) while working full time. In the course of working toward that degree, Joseph realized that what she really liked was working with information, so she headed for a library degree (MLIS) at the University of Oklahoma.

“I like to be a helpful person, to link people up with the information that they need, whether those information sources are texts or other people,” says Joseph. “I love geology and I love finding information.” Information retrieval is a kind of a science, says Joseph. It takes two kinds of logic, one looking for forests and the other looking for trees. What makes being a geology librarian so fulfilling is having a love of and interest in both geology and information retrieval, says Joseph. Joseph would not be nearly as satisfied in her work if she worked in the business or law libraries, for example.

Joseph particularly likes stepping in to help with complicated questions. “Academic librarians really don’t fit the librarian stereotype,” says Joseph. “We are really information specialists. Geology blends over into so many disciplines,” says Joseph. “Having that geology background helps me figure out where to go for information.”

As part of her information specialist role, Joseph has worked extensively on the geology library web site to expand links to various research tools. Within the library site, Joseph has created a link titled “Geoscience Information Resources on the Internet,” which lists links to everything from “Afghanistan Geology” to “Volcanology” and “Weather.”

Joseph sees three major projects for the coming year: preparing to shift material to various storage facilities; helping to migrate to a new system-wide on-line catalog; and determining how to make her shrinking budget dollars stretch as far as possible.

Michael Sczerba Joins Department

Michael Sczerba, clerical assistant, has the kind of behind-the-scenes responsibilities that are easy to take for granted but that are critical to a smoothly functioning department. He sorts mail; hands out and keeps track of department keys; organizes, keeps track of and orders supplies; produces many exams for professors; makes and mails posters publicizing visiting speakers, especially for the weekly colloquium series; makes travel arrangements for colloquium speakers; and “most critical of all,” he orders pizza and cookies for the weekly colloquium.

Outside the halls of the Natural History Building, Sczerba juggles even more activities. He is on track to finish his dissertation in music composition with an ethnomusicology minor spring 2002, he has hosted a weekly *Music of India* program on WEFT Radio for the last 12 years, and he is an avid hiker. Sczerba’s dissertation focuses on the work of composer Stefan Wolpe (1902-1972). He also has composed jazz and what he calls “contributive new music” works for several ensembles. Several of his works have been published.



Michael Sczerba hikes with stepdaughter Robin in Forest Glen

Ann Long Joins Department in Permanent Position



Ann Long has been promoted from visiting to permanent teaching specialist in the department. Long, who has been at the department since 1999, supervises undergraduate labs in some of the larger lecture courses. From 1987 until she came to Urbana-Champaign, Long held a teaching position at Colchester Institute in England.

Long brings a combination of geology and teaching expertise to the department. She received a B.S. from the University of Reading in geography, which included geology courses in geomorphology and hydrology as well as planning, surveying and cartography. She also earned a post-graduate certificate of education in geography and in 1981 she received a master’s degree in education.

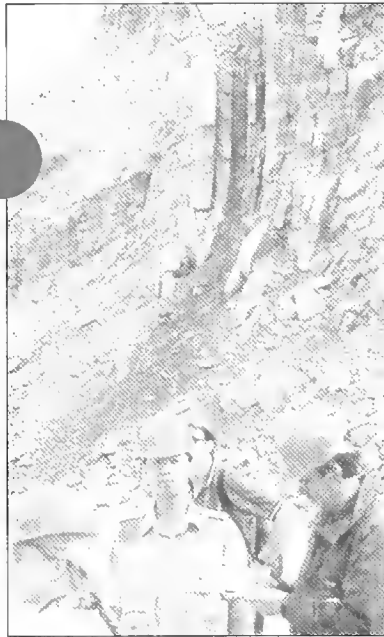
Long also has done research on the vegetation and geomorphology of moraines of the Okstindan Glacier in northern Norway.

Long moved to Champaign-Urbana with her husband, Stephen, a professor at the University of Illinois, who does research on the impact of rising ozone and carbon dioxide levels in the atmosphere on plant productivity.

Field Trip

Since 1993, the department has held an annual fall field trip to several interesting sites within Illinois and Indiana. The field trip, organized and led by Steve Altaner since 1996, typically includes one bedrock and one glacial stop. In 2001 the group went to Thornton Quarry near Chicago and Indiana Dunes

National Lakeshore. This year, the trip was particularly memorable since it included pouring rain, lightning and thunder at Thornton Quarry. Typically 30-35 people participate. In addition to undergraduates, graduate students and faculty, ISGS geologists often join the trip. The previous year, Altaner took the group to Kentland Quarry, a meteorite impact site in western Indiana; and Kickapoo State Park. Other trips have included Starved Rock State Park and the National Coal Museum in southern Illinois, and Cagle's Mill Spillway, Turkey Run State Park and Montezuma, all in Indiana.



Steve Altaner and other members of the field trip at Thornton Quarry

Oil Industry Recruits Successfully at Illinois

Although geology graduates work in an ever-broadening range of fields, the traditional fields of oil and gas continue to attract many students. Over the last few years, several oil companies have successfully recruited many Illinois geology graduates.

In 2001 alone, four students were hired by oil companies: Richard Wachtman, M.S. '01, is working for ExxonMobil in Houston; Anthony Gibson, M.S. '01, is working for Mervin Oil Co. in Ulny, Ill.; Serena Lee, M.S. '01, is working for Schlumberger in Houston; and Hugo Gonzalez, B.S. '01, is working for Schlumberger in Rock Springs, Wyo.

Schlumberger has clearly been finding Illinois to be a fruitful recruiting ground. Judd Tudor, '00, Andrew Collins, '99, Megan Potter, '99, and Bruce Miller, B.S. '94, M.S. '95 also work for Schlumberger. Miller is now based in Norway, while the others are in the United States.

Revised Course is a Big Hit

Enrollment in **Geology 118** has doubled and many other interested students had to be turned away, thanks to some fine tuning by Steve Altaner. Originally called *Earth and the Environment*, the course had a stagnant enrollment between 50-60 for about 10 years.

"I never could understand why it didn't take off. Natural disasters are extremely relevant to people and society, and they're interesting," says Altaner. In an effort to boost interest, Altaner revised the course and re-titled it *Natural Disasters*. The course is now more focused on natural disasters and includes meteorological factors like floods, severe weather and astronomical factors like meteorite impacts.

Natural Disasters is targeted for non-majors fulfilling a general education/science requirement, and represents another effort by members of the department to introduce non-majors to geologic principles. In addition, students majoring in Earth and Environmental Sciences, which is a sub-major within Geology, take the course.

"The class has been a lot of fun, nobody is asleep, there are lots of questions and the attendance rate is much higher than in Geology 100" (the other introductory course Altaner teaches), says Altaner.

Altaner has been able to use the University's computer-linked classrooms to add visual images to the class. For example, in his discussion of meteor impacts, he can show an animation of a meteorite impact. To illustrate the speed that a meteorite travels, in terms students would understand, Altaner points out it would take a meteorite nine seconds to travel from Champaign to Chicago. This elicits some oohs and aahs. He uses a lot of humor, including cartoons, to encourage participation, and gently pokes fun at himself to encourage students to feel comfortable participating and asking questions. In addition to conventional teaching tools like video and overhead projection, Altaner makes use of an overhead microscope in the lecture hall, which enables him to show geologic samples to the whole class without having to pass them around the room.

Altaner talks to the students about the scientific principles behind each disaster: its causes, possible locations, frequency, ability to predict and how to mitigate damage and death. He also discusses case histories, trying to use examples relevant to Illinois when possible.

Enrollment in the course will continue to grow, as the class will move into a larger lecture hall next year. The natural hazards course is one of several appealing general education courses offered by the Department. Together, they introduce over 3,500 students per year—10% of the University's student body—to the wonders of the Earth.



New Geomicrobiology Laboratory Under Construction in NHB

A new state-of-the-art geomicrobiology lab is being built in the basement of the Natural History Building. Construction began in November and will be completed by the summer of 2002. The new laboratory will include not only micro-drilling apparatus and other typical geology equipment, but also gel electrophoresis stations, "PCR" machines (PCR stands for "polymerase chain reaction," a way to amplify gene sequences in order to study them), and autoclave sterilizers, equipment that is normally found in a microbiology laboratory. These facilities will enable researchers in the Department of Geology to undertake analytical methods, such as polymerase chain reaction amplification of ¹⁶S rRNA, to map the distribution and composition of microbial communities and understand their interactions with geology processes.

One of the prime users of the new facility will be Bruce Fouke, assistant professor of geology. Fouke conducts work that integrates molecular microbiology with sedimentary geology and hydrogeology. For example, one of Fouke's current projects investigates whether study of ancient microbes found entombed in ancient limestone deposits can yield information about ancient environmental conditions.

Fouke's work, and other work to be carried out in the lab, is part of an exciting new field, known as geobiology. Geobiologists study the interplay between biological and geological processes that have shaped the Earth and all its life forms. By examining this interplay, geobiologists address questions concerning the origin and evolution of life, the way in which environmental conditions influence life, and the way in which life influences environmental conditions. The field has many practical applications as well, mainly in the area of environmental geology, for microbes play an important role in digesting contaminants.

2001 Departmental Banquet—An Elegant Affair

The 2001 Geology Department banquet was held April 27, in the Colonial Room at the Illini Union. About 100 people attended. After dinner, Professor Bruce Fouke presented a slide show of the Geology 315/415 field trip to Curaçao. Then, Professor and Department Head Steve Marshak presented awards.

Sharon Mosher, B.S. '73, Ph.D. '78, received the alumni achievement award. Steve Marshak cited Mosher for her research contributions in structural geology and tectonics (see 2000 Year in Review for related story) and her national service role as past president of the Geological Society of America (see story p. 8).

In addition to the alumni achievement award, numerous student awards also were presented:

Adam Gibbons, Brandon Haist and Andrew Parrish each received a Franklin Field Camp Scholarship. The scholarship fund, created by Ed Franklin, enables the department to provide partial financial support to students attending summer field camp.

Parrish also received the Estwing Award—a classic Estwing rock pick—that is donated by the Estwing Company to an outstanding undergraduate student.

Frances Skomurski received a Brunton compass as the Outstanding Senior Award.

Kurt Burmeister, Michael Fortwengler and Alex Glass received the Morris M. and Ada B. Leighton Award. This award, established by Brud Leighton, B.S. '47, was established to honor his parents and supports student research in geology.

Alex Glass and Chris Mah received the Norman Sohl Memorial Award in Paleontology. The Sohl award was established to honor the late Norman F. Sohl, B.S. '49, M.S. '51, Ph.D. '54. Sohl was chief of paleontology at the USGS and was a leading authority on Cretaceous gastropods and biostratigraphy.

Jennifer Jackson was named Outstanding Woman Graduate Student. She received a cash award. The award was established by an anonymous donor in order to encourage women to pursue studies in geology.

Two students were named outstanding teaching assistants. Dave Beedy received the award for the Spring 2000 semester and Alex Glass received the award for the Fall 2000 semester.

Students scramble over formations during a recent Geology 415 field trip to west Texas and southern New Mexico.



Illinois Alumni in Top Positions of GSA

Illinois alumni have been very well represented in the leadership of GSA in the last several years. In 2001 **Sharon Mosher, B.S. '73, Ph.D. '78**, was president, **Dave Stevenson, Ph.D. '65**, was acting executive director and **Suzanne Mahlburg Kay, B.S. '69, M.S. '72**, served on the GSA council. In addition, **Brud Leighton, B.S. '47**, served as president of the Board of Trustees of the GSA Foundation (a separate and independent entity).

"It gave me great pride to notice such a good representation of Illinois alumni at those levels at the GSA meeting in Boston last November," said Leighton. "It pleased me to see participation in the society, which is one of the leading scientific societies for the profession."

GSA was founded in 1888 by James Hall, James D. Dana and Alexander Winchell in New York. As a descendent of the American Association for the Advancement of Sciences, GSA is the first enduring society for the geosciences in America. It has been headquartered in Boulder, Colorado, since 1968. GSA has more than 16,000 members worldwide.

Mosher's term as president ended in December, and Leighton, who had served as foundation president of the board for four years, and Stevenson stepped down from their respective positions. Kay continues to serve on the GSA council.

Harriet Wallace, Geologist and Librarian

Harriet Wallace, librarian emerita, served in the Geology Library in the 1960s and 70s. Wallace received her bachelor's degree in geology from Northwestern in 1936 and a master's degree in teaching from Columbia University's Teachers College. In spite of Wallace's outstanding teaching credentials, teaching jobs were hard to find.



Eventually Wallace managed to get a position at the mining division of Allied Chemical and Dye Company. While in that position she attended the first GSA meeting held after World War II.

At first, Wallace worked at a private consulting company that advised mining companies about various mineral deposits in Illinois. Wallace did literature searches for the owner, and wrote research papers for him. The company eventually was closed down and Wallace decided she'd like to become a librarian.

"I really liked doing literature searches—this was before computers!" says Wallace. "I didn't want to clerk in a dime store, so I went to library school. I thought any job in a library would be better than that."

Wallace got her master's in library and information science from the University of Illinois in 1962 and was immediately hired as the geology librarian.

"I hadn't thought about working full time," says Wallace, "but with all my background it would have been stupid not to take the job. So I came over and went to work."

While many aspects of librarianship haven't changed over the years, there are some differences. For example, Wallace remembers having lots of money to spend, in part because the Geology Library, having recently split from the Geography

Library, was considered a new library unit.

"We had lots of money, we spent it as fast as we could," Wallace says.

The library also had a separate budget for rare geology books. Of course, the biggest difference was computers, which were first used in the

Geology Library in 1978, just before Wallace retired. In Wallace's day, records were all kept on index cards. Indexes were bound every year, which meant to do a thorough search on a single topic, one had to go to that subject in every issue of each bound index. The position of librarian, both in Wallace's day and today, is a tenure-track position, so librarians are expected to publish papers in their professional journals.

During her tenure, Wallace worked to get topographic and geological maps transferred from the main library to the Geology Library. Previously, the Geology Library had no maps.

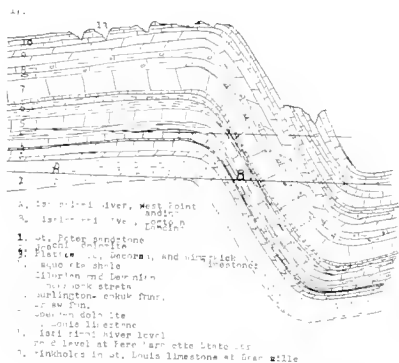
In 1965 Wallace also was a founding member of the Geoscience Information Society (GIS), a national organization which facilitates the exchange of information in the geosciences through cooperation among scientists, librarians, editors, cartographers, educators, and information professionals. GIS is still in existence and is a member society of the AGI.

Wallace retired as full professor in 1979. "I had a very satisfying, and fulfilling career," says Wallace. Wallace continues to live in the Champaign-Urbana area and still occasionally visits the Department. She generously donates funds to the Department to help women who wish to pursue careers in geology.

GEOLOGY 415 — Then and Now

Geology 415, the Department's graduate-level field course, has been in existence for more than 50 years. During this time it has undergone some dramatic changes, but it still serves the goal of allowing students to synthesize their geologic knowledge to create a geologic image of a region. In recent years, there are three versions of the course, all run jointly with Geology 315, allowing both undergraduates and graduates to benefit from the experience. Jim Kirkpatrick runs the course in west Texas and southern New Mexico, Steve Marshak takes the group to Arizona and southern California, and Bruce Fouke teaches on islands in the southern Caribbean. In the 1940s, '50s and '60s, on the other hand, the course entailed many weekends of driving in four-van caravans throughout Wisconsin, Indiana and the western edges of Missouri. For many years, Professor Harold Wanless, a distinguished sedimentary geologist, ran the course, and trained the students well.

"What did I learn?" says Bill Soderman, M.S. '60, Ph.D. '62, of Geology 415. "It was the most comprehensive way to assimilate the recent and ancient elements of what makes the Midcontinent what it is today. There's just an enormous variety of rock types, depositional environments and structural situations visible within a day's drive of campus. We could see it, and argue



A sample drawing from Bill Soderman's Geology 415 notebook.

about it. I also learned a lot about Harold Wanless, and how observant and patient he was. The field trips were kind of a slide show of the things Wanless learned and observed and deciphered throughout his many years of fieldwork and teaching at Illinois.

"And the camaraderie between students and staff during the trips just made it feel even more like Illinois was a great place to be. Geology 415 was one of the high points of my education."

Soderman's notes from the trip fill a book over 100 pages long. The pages include detailed stratigraphic columns, cross-sections, and outcrop sketches, as well as carefully worded rock descriptions. By covering a broad region in the course, it was possible for students like Soderman to see regional correlations and patterns.

Regardless of the decade that it was taught, Geology 415 was a course worth remembering.

Where Are They Now?



Pat Lane

Those who were in the Geology Department in the 1980s and 90s might be wondering whatever happened to Pat Lane and Murle Edwards, staff members who played a key role in everyone's interactions with the Department and University. Well, both are enjoying their retirement and using their time to travel extensively.

Pat and her husband Eddie, have taken many long trips in their motor home. Last summer they traveled the AL-CAN (Alaska-Canada) Highway.

Along the way they passed through Sheridan, Wyoming, a place many geologists have fond memories of because the Department's field camp used to be headquartered there. That trip was "proof that two people really could live in a 25-foot motor home on a long trip and still be compatible," says Lane. The Lanes continue to use Champaign as a base, in part because Eddie now works part time for the Engineering Continuing Education program.

Murle, who served in the department as chief clerk from 1977-1998, has also traveled extensively since her retirement. Many of her driving trips have been undertaken because she is national chair of the historic landmarks and memorials committee of the National Society Daughters of the American Colonists. That committee works to

place markings and plaques at places of historical significance throughout the United States. During these trips and many others,

Murle has enjoyed many of the breathtaking geological formations of the country, and has indulged her interest in history and geography. "A special thrill to me was my trip to Point Barrow, Alaska, north of the Arctic Circle," says Murle. "I continue to use my residence in southeast Urbana as my home base." She sends her "best personal regards to all."



Murle Edwards

Geology Entrepreneurs Make Champaign-Urbana Home Base

We tend to think of geology-based entrepreneurs as living in Houston or Denver, but two major success stories prove this assumption wrong. Some entrepreneurs have remained in town and have found the local environment to be supportive of their efforts. For example, two companies founded in Champaign-Urbana by geology department alumni, while vastly different, are both thriving. *Applied Pavement Technology*, co-founded by **Margaret (Maggie) Broten, B.S. '85**, grew 60 percent last year alone, and *Isotech Laboratories*, founded by **Dennis Coleman, Ph.D. '76**, grew 30-40 percent in the last year in both sales and staff.

Applied Pavement Technology, or APTech, was founded by Broten, Kathryn (Katie) Zimmerman and David Peshkin in 1995. It is one of fewer than a dozen companies worldwide that specializes in pavement engineering. Pavement engineering pertains to both highway and airport pavements and involves evaluation, design, pavement management, training and research.

Broten, who is a vice president and principal, received a joint degree in geology and civil engineering, as well as a master's in civil engineering. She has worked in the field of airport pavement management most of her career.

"Pavement engineering is a very stable field," Broten notes. "Although just now airports are funneling more of their money into security, safe pavements are critical both to highways and airports."

While Broten's day-to-day responsibilities (which include about 12 days of

travel per month) don't always rely on her geology background, that program did provide a "wonderful balance" to her civil engineering program.

"Engineering involved big classes, very tense students and a focus on numbers and equations," says Broten. "Geology involved smaller groups, I felt that I knew everyone, and some of the classes involved extensive writing. The communication skills I learned through geology have been very helpful in communicating what our company does and in actually getting contracts."



Maggie Broten

Although the company has moved to larger quarters, its headquarters have always been—and always will be—based in Champaign-Urbana. Zimmerman, president of the company, has strong personal ties to Champaign-Urbana. Peshkin, vice-president and principal, grew up in Champaign-Urbana and his late father was on the University faculty. Both Zimmerman and Peshkin have civil engineering degrees from the University of Illinois. The multimillion dollar company has 30 employees (many of them University of Illinois graduates) and has branch offices in Downers Grove, Ill., Burlington, Vt., and Reno, Nev.

"You'd be surprised how many employees choose to work in this office," says Broten. "Champaign-Urbana is a nice community."

Broten also notes that she and others at the company benefit from their relationship with the university and the abili-

ty to use its outstanding library facilities.

Coleman's company, *Isotech*, grew out of the Ph.D. research he did at the University of Illinois with Tom Anderson, now professor emeritus. His thesis included using isotopic analysis to identify natural gas that had leaked from underground gas storage fields. Coleman found that natural gas has an isotopic "fingerprint" not unlike a DNA fingerprint. The isotopic composition of methane, for example, can tell whether the gas was thermogenic or microbial, which can help determine whether it is naturally occurring or has leaked from an underground storage area.

That work led to several consulting contracts, particularly with gas companies. Because Coleman was a full-time employee of the ISGS, he could only consult with companies outside Illinois. By the early 1980s, the demand for his services demonstrated the need for a commercial laboratory, so he and three colleagues bought equipment and set up an independent lab, which they named *Isotech Laboratories*.

Isotech very quickly established itself for the quality of its data. By 1991, the group had enough steady work that they could hire full-time staff. Coleman has worked full time at *Isotech* since 1995, when he took early retirement after 25 years at the ISGS. Today there are 19 people on the payroll, including three of the original founders. The fourth founder opted to remain at the ISGS.

Until recently about one third of the company's business was with oil companies, one third was gas companies and one third was environmental. Now the major oil companies make up more than half *Isotech's* business. The company had over \$1.6 million in sales in 2001.

Isotech also was recently in the news for an innovative packaging sys-



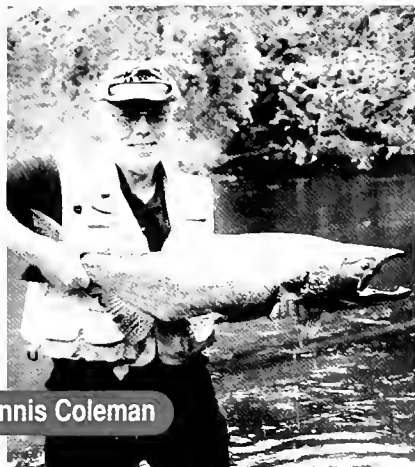
GeoScience 2005—Well on Its Way!

Last year, the Department initiated a five-year, \$3 million endowment campaign, because increasing our endowment is essential if we are to maintain our prominence as a teaching and research institution in geoscience. We're pleased to announce that the campaign has gotten off to a great start! We have received several lead gifts so far, and would like to highlight a few of these. Ed and Alison Franklin have endowed the Franklin field-camp fund, and have made a bequest for the Franklin

Geology Development Fund. Eric and Kathy Johnson have endowed the W.H. Johnson Professorship of Surficial Geology, Jack and Richard Threet are endowing the Threet Professorship of Sedimentary Geology in honor of Harold Scott, Bill Soderman is endowing the Bluestem Graduate Fellowship, Brud Leighton is substantially increasing the funding of the endowment for the Morris and Ada Leighton Research Fund, Jim Baroffio has established the endowment for the Wanless Fund for graduate-student support, and Joyce Johnson has endowed the W.H. Johnson field fund. We are also pleased to announce that funds donated by friends of Norman Sohl a number of years ago have grown sufficiently to endow the Sohl Endowment to support graduate-student research in paleontology. In the fall of 2001, Steve Marshak and Bruce Fouke traveled to Houston to meet and visit with alumni. During that visit Fouke gave a talk to alumni on the future of geomicrobiology, a growing field. We wish to thank our benefactors profoundly, and encourage all alumni and friends of the Department to participate in building our future through GeoScience 2005.

Ed and Alison Franklin Make Major Bequest

Ed and Alison Franklin have made a bequest of \$800,000 to the Department of Geology as part of the GeoScience 2005 campaign. The Franklin Endowment, when established, will provide funds to support the teaching and research goals of the Department. This gift is on top of their already amazingly generous donation of \$200,000 to support our field camp. The Franklins are truly friends of the Department, par excellence! Ed Franklin received his B.S. in 1956.



Dennis Coleman

tem. Much of the company's business requires sending and receiving highly flammable mud-gas samples. The company developed a long, thin metal pipe, dubbed IsoTube, that made it easier to collect samples, and was reusable and less expensive. Previously, 10,000 gas samples (about the number Isotech analyzes per year) generated 10,550 pounds of waste. With the IsoTube™ system, the same number of samples generates 675 pounds of waste. Isotech recently was one of 17 Illinois companies that received the Governor's Pollution Prevention Award.

Coleman is happy to be based in Champaign, although the avid outdoorsman loves being in the mountains. Overhead cost in Champaign-Urbana is low and, like Broten, Coleman values the good association he has with both the university, as well as the ISGS in his case. While it has been difficult to recruit people to Urbana-Champaign, he has been able to hire many good chemists and other scientists from University of Illinois graduates.

"The quality of the people is a significant factor for staying here," says Coleman.

Illinois Faculty are Authoring Books

In recent years, faculty in the Department of Geology have directed some of their efforts into writing books or chapters in books. For example, Craig Bethke published *Geochemical Reaction Modeling, Concepts and Applications* with Oxford University Press. Jim Kirkpatrick wrote the chapter on Nuclear Magnetic Resonance Spectroscopy for the *Handbook of Analytical Techniques in Concrete Science and Technology*, and Jav Bass wrote the chapter on Elasticity of Minerals, Glasses, and Melts for the *Handbook of Physical Constants*. Steve Marshak's introductory geology textbook, *Earth: Portrait of a Planet*, published by W.W. Norton, appeared in 2001. This is Marshak's third textbook. He's working on second editions of the other two (*Basic Methods of Structural Geology*, published by Prentice-Hall, and *Earth Structure, an Introduction to Structural Geology and Tectonics*, published by McGraw-Hill).



Pat Domenico

Pat Domenico, a faculty member from 1967-1982, died August 1, 2001, near his summer home in Montana.

Domenico joined the Department shortly after

completing his doctorate at the University of Nevada in 1967. In 1982 he moved to Texas A&M University, where he became the David B. Harris Professor of Geology. He retired in 1988.

Domenico received numerous awards, including the GSA's O.E. Meinzer Hydrogeology Award; the Basic Research Award of the U.S. National for Rock Mechanics; the Excellence in Science and Engineering Award from the Association of Ground Water Scientists

and Engineers; and the Distinguished Teaching Award College of Geosciences at Texas A&M University. President George H. Bush appointed Domenico to the U.S. Nuclear Waste Technical Review Board.

Domenico contributed basic research in areas of consolidation resource optimization and mass and energy transport. His work was inventive, provocative, eclectic and often pioneering. It commonly featured the elegant application of analytical mathematics to explore physical and chemical processes. Domenico was the author of two major textbooks: *Concepts and Models in Groundwater Hydrology* and *Physical and Chemical Hydrogeology*. He participated actively at GSA's annual meetings and in numerous Penrose Conferences, he served as the Birdsall Distinguished Lecturer and contributed to the *Decade of North American Geology* series.

Domenico served in the Navy and enjoyed hunting and fishing. As a professor, he helped educate many outstanding students who went on to be leaders in their various fields.

"Pat had very high standards," says Tom Anderson, professor emeritus. "But he didn't have a stuffy academician's demeanor. He used to tell me, 'Teaching sure beats working for a living!'"

Those who know Pat well will miss his keen sense of humor and wry observations on the state of our science and humanity. Through the years he helped to shape the direction of modern hydrogeology. Many individuals were touched in a personal and special way by Pat's life and career.

Based on an article by F.W. Schwartz, Ph.D. '72, that appeared in The Hydrologist, newsletter of the hydrogeology division of GSA



Dave Anderson

Dave Anderson, professor emeritus, died June 29, 2001. He was 63 and had been suffering from Alzheimer's disease. Anderson, a native of Australia, was

professor of geology at the University from 1967 until he retired in 1996. He was department head from 1983-1988. As department head, Anderson hired several of the faculty who are still in the Department today. As a teacher, he taught courses in petrology, thermodynamics, structural geology, field geology, and introductory geology.

Anderson came to Illinois after completing a post-doctoral position with James B. Thompson at Harvard University. He was an expert in nonequilibrium thermodynamics as applied to metamorphic rocks. Anderson mentored

many students, both undergraduate and graduate, and played a major role in steering students into successful careers. Sue Mahlberg-Kay, B.S. '69, M.S. '72, professor of geology at Cornell University, credits Anderson with instilling in her an excitement for geology.

Sharon Mosher, B.S. '73, Ph.D. '78, Scott Professor of Geological Sciences at the University of Texas, Austin, and former President of the Geological Society of America, says, "Dave's understanding of diffusion and the effects of nonequilibrium thermodynamics was way ahead of his time. He instilled in his students a deep appreciation for geologic processes, and the insights we learned from him have been invaluable. He, more than anyone else, is the person who inspired me to continue for a Ph.D., and to return to the U. of I."

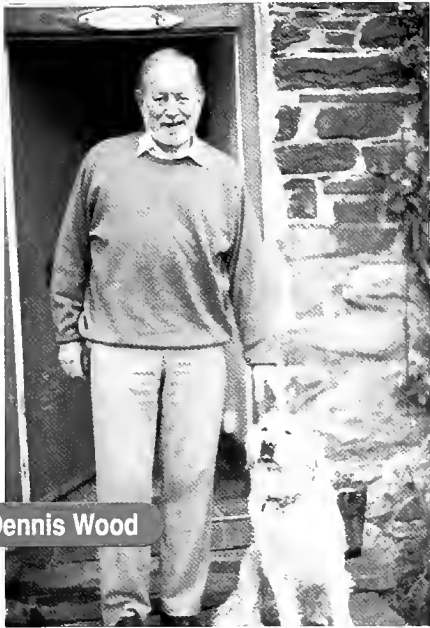
Chuck Simonds, M.S. '69, Ph.D. '71, remembers gathering for long discussion sessions in Anderson's office in the basement of the Natural History Building or the cafeteria in the Illini Union.

"Dave was a risk taker and passed that instinct to his students," says Simonds.

Anderson also had a reputation for excellence in field work, and was an instructor at the University of Illinois Summer Field camp in Sheridan, Wyo., during the summers of 1967, 1968 and 1970. During the summer of 1972, Anderson taught at the University of Illinois field camp in northern Scotland.

As anyone who has participated in field work knows, sometimes these trips don't always go as smoothly as they could. Professor Wang-Ping Chen remembers co-leading a structural geology field trip with Anderson in the early 1980s. The group, including 54 students, went to the upper peninsula of Michigan in late September. They were greeted with snow and sleet at their campsite. The next morning Anderson and Chen realized four students were missing and they combed the campsite. They almost tripped on a heap of canvas on the

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Dennis Wood

Dennis Wood, a well-known and highly respected geologist from North Wales died on April 20, 2001. Wood was a professor at the University of Illinois from 1967-1980.

At Illinois, Wood carried out insightful research into the process of slaty cleavage formation, the development of strain in rock, and issues of global tectonics. He also collaborated with Fred Donath, professor of geology, whose laboratory-based experiments in rock mechanics perfectly complemented Dennis' enthusiasm and flair in the field. Together with Wood's eloquent classroom lectures and epic field courses, this provided a heady cocktail that inspired a generation of Illinois students. Many students inspired by Wood now occupy senior positions around the world—in industry as well as in academia.

In 1980 Wood returned to Britain as Chief Scientist with Robertson Research and remained there until 1990. In 1993, he served as chair of the Earth Science Committee for NERC (Britain's equivalent for NSF). In the last few years, Wood was extensively involved in geological conservation, becoming Chair of the Gwynedd and Môn RIGS Group, where he exercised his many talents in

conserving, recording and developing sites for use by the general public, researchers and schools. Such was Woods' ability to convey enthusiasm for his subject, that he was in huge demand with academic audiences and amateur groups alike.

Throughout his career, Wood's interests bridged both industry and academia. While working in industry, for example, he accepted an Honorary Chair at the University of Wales, taught for a period at Aberystwyth and lectured at Bangor. He was an inspiring teacher who loved working with students, especially in the field, and was unstinting with his time and energy.

"I think it's true to say he brought a breath of fresh air to the department in the late sixties," says Alex Maltman, M.S. '71, Ph.D. '73. "He had charisma and brought inspiration to many. He made geology FUN."

Wood's interests ranged well beyond geology. He was an accomplished organizer and held passions for cricket, rugby, and genealogy. He also loved parties both at home and in the field. According to Maltman, "The parties at his house were legendary. Even Francis Crick, the DNA Nobel laureate, attended one."

In 1970, Wood began teaching a summer field course in the United Kingdom. These trips also became legendary, mostly for the geology, and partly for their raucous good fun—they attracted students from all over the United States. Logistics on these trips, however, did not always go as planned. On the first trip, Wood's little red MG sports car became submerged by the incoming tide as the party visited a tidal island. But all in all, the trips were a wonderful geological experience and provided outstanding training, founded on Wood's great breadth and depth of geological knowledge.

At his funeral, in Bangor, North Wales, one of the eulogists remarked that no one could pretend that Dennis was a saint. But no one could deny that

he was a great teacher in his day, an inspiration to many.

"I know practicing geologists who today readily acknowledge that their having followed that profession was due to one man, the cultivated yet wild Englishman who sadly died at his adopted home in Wales last year," says Maltman.

Sharon Mosher, B.S. '73, Ph.D. '78, and recipient of the 2001 Distinguished Alumni award, says, "Dennis taught me far more than academics; he taught me how to be a professional, everything from how to supervise students to how to present my research to the larger scientific community. He was a major influence on my early career; he was a true mentor."

Wood died of a heart attack on stage while accepting applause for a public lecture. In recognition of Wood's achievements, the Welsh RIGS movement is planning to place a plaque at his favorite field site, Rhoscolyn, in Anglesey.

Anderson

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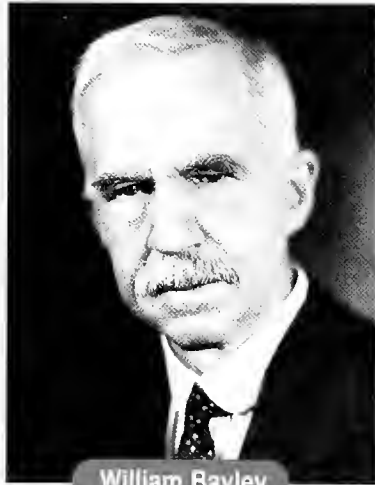
ground. "Some irresponsible people left the extra tents here," said Dave as he bent to pick the tent up. Then Dave burst into laughter—there were four warm bodies, still sound asleep, under what was a collapsed tent soaked with freezing rain.

Professor Steve Marshak remembers going to Scotland with Anderson to field check the thesis work of two graduate students. Together, they rented a small dinghy with an outboard motor and traversed a stormy loch. Then they climbed a small mountain called the Stack of Glencoul, in the pouring rain. "At the top, Dave gave me a superb tour of a classic exposure of deformed worm burrows. I still remember him, radiating delight in a geologic discovery, despite the rain," says Marshak.

At the Turn of the (20th) Century— Research and Graduate Education Become the Focus

At the turn of the 20th century, the president of the University of Illinois was Andrew Sloan Draper, and the head of the Department of Geology (a unit which included geography) was Charles Wesley Rolfe. The climate of the University, in those days, did not support research. In fact, according to W. Solberg's (2000) history of the University, Draper "disparaged disinterested research and made no significant contribution to its development on campus." This was epitomized by Draper's assigning Rolfe the duty of domesticating campus squirrels. Thus, when Draper quit in 1904 and returned to public school administration, it had to be good news for the Geology Department. Edmund J. James became President of the University in 1905.

James immediately began upgrading faculty in "weak" departments, such as geology. Rolfe remained as head (and also served as a consultant to the State Geological Survey in clay investigations), but was joined by William Shirley Bayley and Rufus Matthew Bagg. Both of these geologists held Ph.D. degrees from Johns Hopkins University. A Yale doctoral candidate, Thomas Edmund Savage, also joined the Department. Thus, a 19th-century department of one professor, devoted almost entirely to undergraduate instruction, suddenly became a 20th-century department of four professors, with interests in research and graduate education. The list of graduate degree recipients began to increase steadily—between 1905 and 1919, 15 master's



William Bayley

UNIVERSITY OF ILLINOIS ARCHIVES



Eliot Blackwelder

BIOGRAPHICAL MEMOIRS OF THE NATIONAL ACADEMY OF SCIENCES

degrees and two doctorates were granted in fields such as stratigraphy, economic geology, Quaternary geology, paleontology, and petroleum geology.

Before coming to Illinois, Bayley had taught at Colby College for 16 years, and since 1887 had an affiliation with the United States Geological Survey. Bayley was author or co-author of 63 publications, as well as a three textbooks (*Elementary Crystallography*, 1910); *Minerals and Rocks*, 1915; and *Descriptive Mineralogy*, 1916). He worked primarily on the geology of iron ore deposits, particularly in Minnesota and Michigan, but late in his career, he also studied kaolin deposits in North Carolina, presaging later specialization in the Department of Geology.

T. E. Savage, appointed as an assistant professor in 1906 and, concurrently, as a "geologist" in the Illinois State Geological Survey, came to Illinois from Leander Clark College in Toledo, Iowa. He was also assistant state geologist of Iowa from 1904 to 1907. Savage continued graduate study as he began teaching at Illinois, and finished a doctorate at Yale in 1909. Between 1910 and 1919, Savage, under the auspices of the IGS,

did quadrangle mapping and stratigraphic reports. Savage remained with the Department of Geology and the Survey until his retirement in 1934.

Rufus Bagg came to Illinois as an instructor after having held positions at Colorado College and the

New Mexico School of Mines. He also spent a year as "Honorary Mineralogist" in charge of an exhibit of sulfide minerals at the Paris Exposition in 1900. Bagg published extensively on fossil and living foraminifera and in economic geology and mineralogy. He left Illinois in 1911 to join the faculty of Lawrence College in Appleton, Wisconsin. When Bagg left, John Lyon Rich came to Illinois as an instructor. While he was at Illinois, 1911 through 1918, he published more than twenty papers in a wide diversity of geological fields. His experimental study of the physical properties of ice was a 'first' in its field, but Rich is remembered mostly as a stratigrapher-sedimentologist and petroleum geologist. After leaving Illinois, Rich went on to national fame as professor at the University of Cincinnati.

The World War I era also saw the hiring of Francis M. Van Tuyl, who joined the Department of Geology briefly, as an instructor from 1914 - 1917. Tuyl completed his doctorate at Columbia University in 1915, and during the summer of 1916 he was a member of the University of Illinois Hudson Bay Exploring Expedition led by Savage.



In 1917 he left for the Colorado School of Mines.

When Rolfe retired in 1916, Elliot Blackwelder succeeded to the headship. Blackwelder only stayed at Illinois for three years, for he resigned in 1919 to join the faculty at Stanford. Blackwelder was a very prominent geologist at a national level, as recognized by his appointment to the National Academy of Sciences, the presidency of the Geological Society of America (1940), and the presidency of the Seismological Society (1947).

In addition to senior staff, Illinois' Department of Geology in the early 20th century hired a number of junior staff members—as many as four in any given year. University records list 20 “assistants” in the Department between 1906 and 1919. One of these assistants eventually received a graduate degree from the Department, but most appear to have been at Illinois for teaching purposes only.

At the time of Blackwelder's departure in 1919, as the world recovered from World War I, all of the professors in the Department had their Ph.D.s, even though some had been hired while still working on their doctorates. In addition, all of these faculty had gained their doctorates at universities other than Illinois, reflecting President James and Dean Kinley's prescription for reforming

the University, and all were active in research, publishing in national journals. The Department was actively granting graduate degrees. The Department's first Ph.D. went to Merle Louis Nebel in 1917, for his study of the contact metamorphism in the iron-bearing rocks next to the Duluth gabbro in Minnesota. Nebel was appointed as a professor of geology in West Virginia University, but sadly died in 1918. Our second doctorate, granted in 1919, went to Clarence Samuel Ross, whose 1919 dissertation also was a study of contact metamorphism near Duluth. Ross went on to a long and distinguished career in the U. S. Geological Survey.

The Geology Department entered the “roaring 20's” as a vital, active teaching and research program, already boasting prominent alumni, and already contributing new information on a variety of geologic issues.

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- Solberg, Winton U., 2000, University of Illinois, 1894-1904, The Shaping of the University, University of Illinois Press, Urbana and Chicago, 415 p.
- Annual Report of the Trustees of the University of Illinois: University of Illinois Annual Register.
- Files for Bayley, Rolfe, Savage, held by the Department of Geology in the University of Illinois Archives.

Degrees Conferred in 2001

Bachelor of Science Degrees

January

David Cecil Lampe

May

David Andrew Fike
Sean Paul Fisher-Rohde
Kristin Ann Gazdziak
Hugo Gonzalez
Erin E. Gutierrez
Kristen M. Hasenjager
Stacey Day Kocian
Bryan J. Luman
Jill Erin Pine
Frances Nakai-Skomurski
Anna Lee Sutton
Laura Elizabeth Swan

August

Tyler Patrick Jones
Erik Nicholas Schultz

December

Adam Robert Gibbons
Brandon Craig Haist

Master of Science Degrees

May

Joseph Matthew Schoen (teaching of earth science degree)

Anthony Charles Gibson, *Three-dimensional Geometries and Porosity Trends of Subsurface Ooid Shoal Hydrocarbon Reservoirs in the Mississippian Ste. Genevieve Formation of the Illinois Basin, USA* (Bruce Fouke)

Serena Lee, *Physical and Chemical Controls on Carbonate Precipitation in Surficial Hot Springs and Subterranean Cold Springs* (Bruce Fouke)

Richard J. Wachtman, *Sedimentology, Stratigraphy, and $\delta^{17}\text{O}$ / $\delta^{18}\text{O}$ SR Geochemistry of KT Ejecta Deposited in Central Belize 485 KM from the Chicxulub Crater* (Bruce Fouke)

Aubrey Lea Zerkle, *Microbial and Environmental Influences on Black Band Disease in Scleractinian Corals of Curacao, N.A.* (Bruce Fouke)

October

Matthew Carlton Fredrick Wander, *Development and Implementation of An Isotopic Model for Quantifying Groundwater Denitrification* (Thomas Johnson)

Doctor of Philosophy Degrees

December

Xiaoqiang Hou, *Structure and Dynamics of Layered Double Hydroxides* (R. James Kirkpatrick)

Flash from the past: Il's 1972 and Dan Blake is lecturing to students at the Badlands.



Obituaries

Editor's Note: Although Paul Shaffer died in 2000, we were unable to include a complete obituary in the 2000 issue of the newsletter. The following is a more complete description of his life and achievements.



Paul Shaffer died November, 2000, at his home in Maryville, Ohio. He was 90 years old. Shaffer, a professor of geology from 1947 until 1968, was an expert in glacial geology and geomorphology.

His research focused on a series of glacial deposits in Iowa and Illinois. Most notably, he demonstrated conclusively that an early Wisconsin ice sheet advanced much further west than formerly supposed, and dated the time of this advance. Shaffer also wrote a book on rocks and minerals for laymen, published by Simon & Schuster. It was the preeminent book in the field and gained him a national reputation.

Shaffer received his bachelor's degree from the college of Wooster in 1935, his master's and doctorate from The Ohio State University in 1937 and 1945, respectively. Prior to coming to the University of Illinois, Shaffer was chair of the geology department at Ohio Wesleyan and served as chief geologist at Ranney Water Collector Corporation. His success in developing huge underground water supplies essential for wartime use was well known at the time in the profession.

Shaffer met George White, later department head and professor at Illinois, when they were both at The Ohio State University. Shaffer was there as a student and White was on sabbatical from the University of New Hampshire. When White came to the University of Illinois, he brought Shaffer with him.

White described Shaffer as, "utterly and absolutely honest, both intellectually and personally. This deep sense of integrity is not flaunted, but it is always present. People like to work with him and for him, he is generous in giving credit to his associates for successful performance of joint operations."

In addition to his academic and administrative duties at the University, which included serving as associate provost and acting department head, Shaffer cared deeply and was very involved in undergraduate education. In addition, he was an active member of the Association of Geology Teachers. He served as vice president of that organization from 1946-47 and president from 1951-52.

Shaffer was a natural organizer, of both people and space and his skills were on demand by many organizations. He was selected to organize and lead a group of six U.S. teachers on a trip to Nigeria in 1962 at that country's request. Also in the 1960s he was asked to help NSF organize an interagency program in international science education, focused primarily in India. His services also were used by the National Association of State Universities and Land Grant Colleges, where he served as director of the International Programs office. In 1964 Shaffer received the Orton Award from The Ohio State University. This award honors a distinguished geology alumnus.

In 1968, Shaffer resigned from the University to pursue international science education full time.

W.A. (Bill) Meneley, Ph.D. '64, died in 2000. Dr. Meneley was born in Saskatchewan, Canada, in 1933. He earned his bachelor's degree in geological engineering and master's degree in geology from the University of Saskatchewan. He worked at the Research Council of Alberta as a groundwater hydrologist before enrolling at the University of Illinois for a Ph.D. in geology. Following his doctorate, Meneley joined the Saskatchewan Research Council where he was in charge of the groundwater hydrology program. In 1976 he established W.A. Meneley Consultants Ltd. He

retired in 1991. "Bill will be remembered for his clarity of thought and expression, his unabated interest in science, and his love for the application of science to engineering practice," writes his colleague, Earl A. Christiansen, Ph. D. '59.

(This information contributed by Philip Sandberg, faculty member from 1965 to 1995)

Yang Baoxing, a postdoctoral research associate in the Department of Geology from 1983-85 died July 14 of cancer. Dr. Yang worked with Professor George Klein during her time at the University. Dr. Yang was on the faculty of the Chengdu College of Geology (now known as the Chengdu Institute of Technology) from 1960-2001. She served as host for the summer lecture visits from professors Tom Anderson in 1987, Philip Sandberg in 1988 and Dan Blake in 1989.

In addition to being a successful geologist she was a talented dancer and singer, especially in her youth. She was a charming, good-humored individual given to animated conversation and strong championing of her geological views, backed up by extensive experience in the field and laboratory. Her work in sedimentary geology was very broad temporally, lithologically and geographically, ranging from the extreme northwest of China to the South China Sea. She worked in sedimentary geology and hydrocarbon reservoir geology in many part of China, including Tarim basin, Xinjiang Province, and the Changqing gas field (the largest gas field in China).

"Thinking about Baoxing evokes vivid memories of our times with her in China, including a trip by train across the loess plains of northern China from Beijing to Xian, where we saw the Terracotta Army," writes Philip Sandberg, now dean of the College of Natural Sciences at Dakota State University. "Those of us who had the good fortune to know Baoxing will miss her greatly."



Class News

1930s

Last July **Willis (Bill) M. Decker, B.S. '39**, spent a week with 17 of his family at the Gulf Shore of Alabama, and in October he attended the sixth reunion of VPB 23 (a Navy Patrol Bomber Squadron). Bill retired from the Navy as commander in 1945, spent 39 years with Cities Service Oil Co., and five years as Vice President of Exploration with Jet Oil Co. in Tulsa, Oklahoma.

1950s

Haydn H. Murray, B.S. '48, M.S. '50, Ph.D. '51, attended the 12th International Clay Conference last August in Bahia Blanca (on the Argentine coast in Buenos Aires Province). At the opening ceremonies he was presented with an Honorary Doctorate from the Universidad Nacional Del Sur. "I knew about this about a month before the conference, but I didn't tell my wife or my 10 former students who were in attendance, so it was a very great surprise to them when this was presented," writes Haydn, who is emeritus professor at Indiana University Department of Geological Sciences. The Haydn Chair in Applied Clay Mineralogy has been endowed at Indiana University. Haydn writes that they hope to have the position filled by September of 2002.



Haydn Murray (center) accepts honorary doctorate from Dr. Edgardo Güichal, vice chair of the Universidad Del Sur. On the right is Dr. Eduardo Dominguez, general chair of the 12th International Clay Conference and chair of the geology department at the Universidad Del Sur.

Robert N. Grinnell, B.S. '51, M.S. '52, writes that he and his wife are still dividing their time between the Texas Hill country and Jackson Hole, while trying to keep up with 12 grandchildren.

Robert E. Fox, M.S. '53, has received the Distinguished Lifetime Achievement Award from the American Institute of Professional Geologists. The award recognizes Fox's decades of international pioneering oil exploration, production and consulting. In 1960 Fox surveyed and recommended the Libyan concession area. The area proved to be the largest oil field in Africa. Fox also contributed to the discovery and development of the first offshore gas field in the Netherlands. He received an Honorary Doctor of Science degree from the University of Edinburgh, Scotland, for his contributions to the international oil industry. Fox is now president of TERM Energy, Oil and Gas Corporation, which operates primarily in West Virginia. He is based in Lexington, Kentucky.

Hal Rasmussen and John D. Shafer, both 1954 graduates, had not seen each other for 44 years until they met up at the Department of Geology homecoming celebration (that kicked off the Geoscience 2005 campaign) in October 2000 (see cover story in Geoscience 2000 newsletter). Rasmussen lives in Acme, Mich., and Shafer lives in Olney, Ill. Both are still active in business. They are trying to track down a classmate, Ron Mink, who worked for 30 years in South America.

Milton Langer, B.S. '53, M.S. '55, writes to say he was saddened by the death of Professor Paul Shaffer (see obituary in this issue). "Paul Shaffer was my first geology professor in 1949 (physical geology 101) and he served as my master's

thesis advisor... I found him to be a very understanding, excellent, dedicated and always supportive person." Langer retired in 1992 after more than 30 years of teaching geological and various physical science courses at 10 different colleges, mainly at the junior college level. At the very beginning of his career he worked for five years in the oil fields. Langer also served as a colonel in the Army Reserves, from which he retired in 1995. Since retiring, Mr. Langer, who lives in Morton Grove, Ill., has been involved in politics and many community activities, including the local historical society and the forest preservation society. "With my current activities, I do not understand how I ever had time to be employed." Both of Langer's sons live in Oklahoma: Erich is an environmental ecologist and Marcus is a high school teacher of history and English.

1960s

Karl R. (Dick) Krauss, B.S. '62, is semi-retired, co-principal at DiMa-Med Corporation. Krauss wonders, "Do you still have a summer course in Sheridan, Wyo.? I attended summer of 1960. Norb Cygan was one of the instructors. We also had classes with Dr. White, Dr. Hay and Dr. Henderson. I believe Hilt Johnson ran that camp, or perhaps several labs I was in...."

Editor's note: The Department still runs a summer geology field camp, but it's now based in Park City, Utah. See story in the 1999 Year in Review newsletter, page 12.

Chris Heath, M.S. '63, Ph.D. '65, is running for vice president of AAPG. He is an independent researcher, having spent his career with Caltex and Amoco and later as an honorary professor at the University of British Columbia, Canada. Heath, a native of England, has been a member of AAPG since 1966. He received the AAPG Distinguished Service Award in 1992 and the Certificate of Merit in 1997.



Douglas Anderson (left) and David Miller at the Kingdome site the morning before the implosion.

Douglas A. Anderson, B.S. '69, is a senior consultant with Schnabel Engineering Associates, Inc., where he is a demolition expert. He has been working on blast vibration and fragmentation since 1980. His most enormous project so far has been to help demolish Seattle's Kingdome. The Kingdome's roof was the world's largest thin-shell concrete dome structure. Now that it no longer exists, the largest unsupported roof is the University of Illinois' Assembly Hall. Although there was enormous concern about the impact on neighboring structures as the Kingdome fell, the demolition was very successful. Final result: only five broken windows and a lot of dust. The resulting rubble pile was expected (and required by contract) to be less than 70 feet and it ended up being only 23 feet high. Anderson likes to work on predictive models for vibration and fragmentation for "those projects that are a bit out of the ordinary," he writes.

John Steinmetz, B.S. '69, M.S. '75, was elected treasurer for the Association of American State Geologists. He is state geologist and director of the Indiana Geological Survey in Bloomington, Ind.

1980s

Scott R. Krueger, M.S. '85, lives with his wife, Kimberly, in Sugar Land, Tex. Scott is Senior Geologist for Duncan Oil, Inc. in Houston.

Stephen E. Laubach, Ph.D. '86, senior research scientist at the Bureau of

Economic Geology, University of Texas, Austin, is serving in the AAPG Education Department Visiting Geologists Program (VGP). The goal of the VGP is to provide better communication among students, faculty, university administrators and geology professionals. Laubach's talk is titled *Targeting Natural Fractures: Opportunities for the Domestic Petroleum Industry*. Laubach also is an instructor for AAPG's Fractured Reservoir Characterization and Modeling School.

1990s

M. Scott Wilkerson, Ph.D. '91, and his wife Beth, are the proud parents of Benjamin Scott Wilkerson, who was born November 16, 2001. Benjamin has a big brother, Zachary, who is four. Wilkerson just received tenure and promotion to associate professor at DePauw University, and will become chair of their Department of Geology in the Fall. He also recently published an article on fold-thrust belts that was the cover story of the AAPG Bulletin, and is editing an upcoming special issue of the Journal of Structural Geology. Wilkerson also is an adjunct professor in our Department of Geology.

Sharon (Horstman) Qi, B.A. '89, M.S. '93, stopped by the University in December. She was in town to teach a short course for the USGS office in Urbana. Sharon works at the USGS in Denver, primarily with GIS data. She commutes from Fort Collins, where her husband is an engineer with Hewlett-Packard. Sharon and her husband have two children and enjoy the mountain views.

Melinda Legg Ylagan, M.S. '94 and **Robert Ylagan, Ph.D. '96**, announce the birth of their son, Renan Robert Ylagan. He arrived January 4, 2001. They recently moved to Rochester, New York.

Eric Holdener, M.S. '91, Ph.D. '97, is the proud father of Chase Alexander Holdener, who was born on August 9, 2001, in Mount Vernon, Ohio. Eric writes that "Chase is cute and (so far) very well-

behaved. Mother (Judy) and baby are both doing well. I am just amazed."

Steve Schimmrich, 93-98, and his wife Jennifer are the proud parents of twins: Lucas Michael and Emily Joanne, born on February 5, 2001. Steve teaches geology at a community college in the Hudson Valley of New York.

2000s

David Fike, B.S. '01, is spending the academic year 2001-02 at the Scott Polar Research Institute at Cambridge's Churchill College. Fike is in Cambridge on a prestigious Winston Churchill Foundation Award. These scholarships, which provide tuition, fees, living expenses and travel, support 10 students per year for graduate study in engineering, math and science. Students are chosen from 57 universities and colleges nationwide.

Fike's goal is to join in the search for life on Mars. The polar regions are the most similar Earth environments to the surface of Mars. Fike, who triple majored in geology, engineering physics and astronomy, studied microbial populations in Yellowstone's hot springs for his undergraduate thesis. Fike spent the summer of 2001 at the NASA Ames Astrobiology Academy, which accepts 12 students each year to work on research projects and learn about NASA.

Faculty

George D. Klein, emeritus professor, was elected by the Houston Geological Society to the House of Delegates of the AAPG. The House of Delegates is the governing legislative council of the AAPG. Dr. Klein's consulting company, SED-STRAT Geoscience Consultants, Inc., is thriving.

Mike Hanke, visiting professor 1998-2000, and his wife have a new addition to their family: Madeline Anne was born June 5, 2001. "Madeline has a full head of dark brown hair and is so beautiful and sweet that we can hardly contain ourselves," writes Mike.

HONOR ROLL OF DONORS FOR 2001



The following is a list of friends and alumni of the Department of Geology who have donated to the department during the calendar year 2001.

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 Jay D. Bass (Professor)
 Craig M. Bethke (Professor)
 Daniel E. Blake (Professor)
 Chu-Yung Chen (Associate Professor)
 Wang-Ping Chen (Professor)
 Bruce W. Fouke (Assistant Professor)
 Albert T. Hsui (Professor)
 Thomas M. Johnson (Assistant Professor)
 R. James Kirkpatrick (Professor and Executive Associate Dean)
 Craig C. Lundstrom (Assistant Professor)
 Stephen Marshak (Professor and Head)
 Xiaodong Song (Assistant Professor)

Department Affiliate

Feng-Sheung Hu (Assistant Professor)

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 Sheila McGowan (Chief Library Clerk)
 Diana Walter (Library Technical Specialist)

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Shelley Campbell (Staff Clerk)
 Barb Elmore (Administrative Secretary)
 Eddie Lane (Electronics Engineering Assistant)
 Michael Sczerba (Clerical Assistant)

Graduate Students

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David Beedy	Christopher Mah
Peter Berger	Peter Malecki
Michael Brudzinski	Jungho Park
Kurtis Burmeister	George Roadcap
Dylan Canavan	Joseph Schoen
Scott Clark	Eric Sikora
Amanda Duchek	Xinlei Sun
Andre Ellis	Anna Sutton
Michael Fortwengler	Jian Tian
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Michael Harrison	Jianwei Wang
Xiaoqiang Hou	Jingyun Wang
Jennifer Jackson	Blaine Watson
Qusheng Jin	Xiang Xu
Matthew Kirk	Xiaoxia Xu
James Klaus	Zhaohui Yang
Dmitry Lakshtanov	Aubrey Zerkle
Chuntao Liang	Juanzuo Zhou

COURSES TAUGHT IN 2001

Geol 100 - Planet Earth
 Geol 101 - Introduction to Physical Geology
 Geol 104 - Geology of the National Parks and Monuments
 Geol 107 - Physical Geology
 Geol 108 - Historical Geology
 Geol 110 - Exploring Planet Earth in the Field
 Geol 116 - Geology of the Planets
 Geol 117 - The Oceans
 Geol 118 - Natural Disasters
 Geol 143 - History of Life
 Geol 233 - Earth Materials and the Environment
 Geol 250 - Geology for Engineers
 Geol 280 - Environmental Geology
 Geol 311 - Structural Geology and Tectonics
 Geol 317 - Geologic Field Methods, Western United States (Field Camp)
 Geol 320 - Introduction to Paleontology
 Geol 332 - Mineralogy and Mineral Optics
 Geol 336 - Petrology and Petrography
 Geol 340 - Sedimentology and Stratigraphy
 Geol 350 - Introduction to Geophysics
 Geol 351 - Geophysical Methods for Geology, Engineering, and Environmental Sciences
 Geol 355 - Introduction to Groundwater
 Geol 360 - Geochemistry
 Geol 381 - Modeling Earth and Environmental Systems
 Geol 397A - Introduction to Field Methods
 Geol 397B - Introduction to Seismology
 Geol 401 - Physical Geochemistry
 Geol 431 - Structural Mineralogy
 Geol 455 - Hydrogeology
 Geol 459 - Isotope Hydrogeology
 Geol 491 - Graduate Student Seminar
 Geol 49312 - Special Problems in Paleontology
 Geol 493K4 - Center of the Earth
 Geol 493K7 - Earth's Interior
 Geol 493J1 - Analytical Geochemistry

Father of Marine Geology

Francis Parker Shepard (1897-1985) was featured in the December 2001 issue of *GSA Today* in the "Rock Stars" section. Shepard, who taught at the University of Illinois from 1922-46, is considered the father of marine geology. While at the University of Illinois, Shepard advised two of the leading marine geologists from the United States, Kenneth O. Emery, B.S. '35, M.S. '39, Ph.D. '41, and Robert S. Dietz, A.B. '37, M.S. '39, Ph.D. '41.



American Chemical Society Petroleum Research

A Time Series Process Model of Carbonate Diagenesis and Microbial Genetic Preservation in Hot Spring Travertine, Yellowstone National Park, Wyoming, and Gardiner, Montana.
Principal Investigator: Bruce Fouke

Development of Selenium Isotope Ratios as Indicators of Sedimentary Paleo-Environments.
Principal Investigator: Thomas Johnson

Origin, Architecture, & Thermal State of the Lackawanna Syncline, Pennsylvania.
Principal Investigator: Stephen Marshak

Department of Energy

Computational & Spectroscopic Investigations of Water-Carbon Dioxide Fluids & Surface Sorption Processes.
Principal Investigator: R. James Kirkpatrick

Federal Highway Administration

Predicting Aggregate Reaction Based on Chemistry and Nanostructure of Alkali-Silica Gels.
Principal Investigators: Leslie J. Struble and R. James Kirkpatrick

Illinois Council On Food And Agriculture Research

Estimation of Denitrification Rates in the Shallow Groundwater Flow Systems of Big Ditch Watershed, Illinois—Isotope Assessment.
Principal Investigator: Thomas Johnson

Institute Of Geophysics And Planetary Physics, Los Alamos

Timescales of Crustal Level Differentiation: U-Series Measurements and Geophysical Monitoring at Arenal Volcano, Costa Rica.
Principal Investigator: Craig Lundstrom

NASA

Core Angular Momentum and the International Earth Rotation Service Coordination Center / Sub-Centers Activity for Monitoring Global Geophysical Fluids.
Principal Investigator: Xiaodong Song

National Science Foundation

Polyamorphism and Structural Transitions During Glass Formation.
Principal Investigators: John Kieffer and Jay Bass

Development of Laser Heating for Sound Velocity Measurements at High P & T.
Principal Investigator: Jay Bass

Sound Velocities & Elastic Moduli of Minerals Mantle Pressures and Temperatures with Laser Heating.
Principal Investigator: Jay Bass

Workshop on Phase Transitions and Mantle Discontinuities.
Principal Investigator: Jay Bass

CSEDI: Collaborative Research: Composition and Seismic Structure of the Mantle Transition Zone.
Principal Investigator: Jay Bass

Global Climate Change & The Evolutionary Ecology of Antarctic Mollusks in the Late Eocene.
Principal Investigator: Daniel B. Blake

The Asteroid (Echinodermata) Trichasteropsis from the Triassic of Germany: Its Taxonomy, Phylogeny, and Paleoeologic Significance.
Principal Investigator: Daniel B. Blake

A Seismic Study of the Mantle Transition Zone and Subducted Lithosphere.
Principal Investigator: Wang-Ping Chen

Seismic Reflection Profiles in Southern Illinois (funded through the Mid-America Earthquake Research Center).
Principal Investigators: John McBride, Stephen Marshak, and Wang-Ping Chen

A Seismic Study of the Taiwan Orogen.
Principal Investigator: Wang-Ping Chen

Collaborative Research: Lithospheric-Scale Dynamics of Active Mountain Building Along the Himalayan-Tibetan Collision Zone.
Principal Investigator: Wang-Ping Chen

Proximal Carbonate Ejecta and Breccias from the Cretaceous-Tertiary Chicxulub Impact: Ballistic Sedimentation and Brecciation, ⁸⁷Sr/⁸⁶Sr Chronology and Diagenetic Alteration.
Principal Investigator: Bruce Fouke

Development of Cr Stable Isotopes for Cr Transport Studies and Other Geoscience Application.
Principal Investigator: Thomas Johnson

Collaborative Research: Field Investigation of Se Oxyanion Reduction & Se Sources in Wetlands: Application of Se Isotopes.
Principal Investigator: Thomas Johnson

Measuring Trace Element Partition Coefficients Between Minerals and Basaltic Melt.
Principal Investigator: Craig Lundstrom

Windows into MORB Petrogenesis: Measuring U-Series Disequilibria in MORB from Transforms.
Principal Investigator: Craig Lundstrom

Observational Constraints on Melt-Rock Reactions During Melting of the Upper Mantle.
Principal Investigator: Craig Lundstrom

Tectonics of the Araçuaí/Ribeira Orogenic Tongue of Southeastern Brazil and its Significance to the Assembly of West Gondwana.
Principal Investigator: Stephen Marshak

Structure and Dynamics of Earth's Core and Lowermost Mantle.
Principal Investigator: Xiaodong Song

Constraining the Structure and Rotation of the Inner Core.
Principal Investigator: Xiaodong Song

Office of Naval Research

The Role of Shipyard Pollutants in Structuring Coral Reef Microbial Communities: Monitoring Environmental Change and the Potential Causes of Coral Disease.
Principal Investigator: Bruce Fouke

State of Illinois Board of Higher Education

Evolution of the Martian Surface—A Cooperative Learning Module for General Education in Science.
Principal Investigator: Albert Hsui

University of Illinois Research Board

X-Ray Diffraction on Minerals of the Earth's Interior.
Principal Investigator: Jay Bass

Seed Money for Research Initiative in Aquifer Microbiology.
Principal Investigator: Craig M. Bethke

Airbrasive Unit for Paleontological Research.
Principal Investigator: Daniel B. Blake

Geology of Precambrian Fault Systems in Southern Norway: A Pilot Study.
Principal Investigator: Stephen Marshak

Structure of Crust and Mantle beneath China From the New Chinese Broadband Digital Seismic Network.
Principal Investigator: Xiaodong Song

Geothrust Members for 2001

J. William Soderman—Chair
M.S. '60, Ph.D. '62

James R. Baroffio, Ph.D. '64

David K. Beach, B.S. '73

Marion "Pat" Bickford, M.S. '58,
Ph.D. '60

Lester W. Clutter, B.S. '48, M.S. '51

Norbert E. Cygan, B.S. '54, M.S. '56,
Ph.D. '62

Edwin H. Franklin, B.S. '56

John R. Garino, B.S. '57

James W. Granath, B.S. '71, M.S. '73

Morris (Brud) W. Leighton, B.S. '47

Patricia Santogrossi, B.S. '74, M.S. '77

Jack C. Threet, A.B. '51

LIST OF PUBLICATIONS FOR 2001

- Kalinichev, A., Wang, J., Kirkpatrick, R. J., and Cygan, R. T., 2001, Molecular dynamics simulation of layered double hydroxides, in Cummings, ed., *Foundations of Molecular Modeling and Simulations: AIChE Symposium Series* No. 325, 97: 251-255.
- Kelley, D.S., Karson, J.A., Blackman, D.K., Früh-Green, G., Gee, J., Butterfield, D.A., Lilley, M.D., Olson, E.J., Schrenk, M.O., Roe, K., Lebon, G., Rizzigno, P., Cann, J., John, B., Ross, D.K., Hurst, S.D., and Sasagawa, G., 2001 (July 12 issue), An off-axis hydrothermal vent field near the Mid-Atlantic Ridge at 30° N: *Nature*, 412: 145-149.
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*This publication was inadvertently left off last year's list.



Spring 2001

- Jan. 19 Michael Wyession, Washington University**
Investigating (deep) North American mantle structure with a broadband seismic array
- Feb. 9 Steve Ingebritsen, USGS, 2000-2001 Birdsall-Dreiss Lecture**
Land subsidence in the United States
- Feb. 16 Joseph DiPietro, University of Southern Indiana**
Geology and metamorphism of the Indian plate hinterland in Pakistan and tectonics of India-Kohistan collision, NW Himalaya
- Feb. 23 Stephen Hasiotis, Indiana State**
The invertebrate invasion and evolution of Mesozoic soil ecosystems—The antiquity of soil engineers and their innovations
- Mar. 9 Arild Andresen, University of Oslo**
Syn- or post-collisional orogenic collapse in the East Greenland Caledonides?
- Mar. 30 Mary Elliot, Lamont-Doherty Earth Observatory**
Millennial-scale climate oscillations during the last glacial, links between Northern Hemisphere ice sheet instabilities and the Dansgaard-Oeschger cycles
- Apr. 6 Charles Onasch, Bowling Green University**
Paleozoic seismicity in the eastern Midcontinent: Evidence from the sedimentary record
- Apr. 13 Bruce Rittman, Northwestern University**
Adaptation of anaerobic communities to chlorinated aromatics
- Apr. 20 Daniel Hausermann, Argonne National Laboratory**
HPCAT at the Advanced Photon Source: A new national facility for high-pressure research
- Apr. 27 Sharon Mosher, University of Texas, Austin: University of Illinois Distinguished Alumni Award Lecture**
Death of a spreading ridge: transition of the Pacific-Australian plate boundary from a divergent to transform margin along the Macquarie Ridge Complex

Fall 2001

- Sept. 7 Katrina Edwards, Woods Hole Oceanographic Institution**
Microbial rock and mineral transformations: Implications for carbon cycling
- Sept. 14 Sam Panno, ISGS**
Late Pleistocene and Holocene climatic effects on speleogenesis in southern Illinois based on the age of redeposited glacial sediment in Fogelpole Cave
- Sept. 21 Robert Nowack, Purdue University**
Imaging of seismic attributes with application to the 3-D tomography experiment at Mt. Vesuvius, Italy
- Sept. 28 Diane McKnight, University of Colorado**
Humic substances as electron acceptor: An important feedback in aquatic ecosystems
- Oct. 5 Andre Pugin, ISGS**
Imaging glacial basins in 2-D and 3-D using water- and land-based shallow seismic reflection examples from the Alps, Canada, and Illinois
- Oct. 12 Ho-Kwang (David) Mao, Geophysical Laboratory, Carnegie Institute of Washington**
New windows on the Earth's deep interior
- Oct. 19 Alexis Templeton, Stanford University**
X-Ray spectroscopy investigations of bacteria-mineral-metal interactions
- Oct. 26 Lupei Zhu, St. Louis University**
Raising the Tibetan plateau
- Nov. 2 Jean-Francois Gaillard, Northwestern University**
Heavy metal blues: Chemical speciation in contaminated sediments
- Nov. 9 Pat Bickford, Syracuse University**
Are the Paleoproterozoic rocks of central Colorado accreted arcs or melt products of rifted older crust?: Implications for the southward growth of Laurentia between 1.8 and 1.6 Ga
- Nov. 30 Jim Walker, Northern Illinois University**
HFSE depletions in central Nicaragua
- Dec. 7 Guillaume Fiquet, University of Paris VI**
High-pressure synchrotron measurements and composition of the deep Earth

Jackson

(continued from Page 1)

Jackson, in collaboration with Professor Jay Bass and Research Scientist Stas Sinogeikin (Ph.D., '99), and graduate students Dima Lakshtanov and James Palko, also has looked at volume changes that orthoenstatite undergoes at high temperatures. Jackson notes that previous studies of thermal expansivity have been inconclusive since values ranged widely. The team did thermal expansion measurements at the Cornell High Energy Synchrotron Source (Cornell University). Jackson presented the high-temperature elasticity and thermal expansion measurements at the 2001 AGU meeting in San Francisco. Her findings have implications for understanding the chemistry of the upper mantle.

In another project, Jackson is collaborating with researchers at the Advanced Photon Source of Argonne National Laboratory in Chicago, to investigate a new technique, called nuclear resonance inelastic X-ray scattering (NRIXS) to measure the density of states of an iron-bearing magnesium-silicate perovskite (perovskite is perhaps the dominant mineral phase in the Earth's lower mantle) at lower mantle pressures. Findings from this study may have major implications for understanding the chemistry of the Earth's lower mantle.



Let's Keep in Touch

Please take a few minutes to let us and your classmates know what you've been doing. Send your news to the Department of Geology, 245 Natural History Building, 1301 West Green Street, Urbana, Illinois 61801; fax 217-244-4996; e-mail geology@uiuc.edu

Name

Address (indicate if changed)

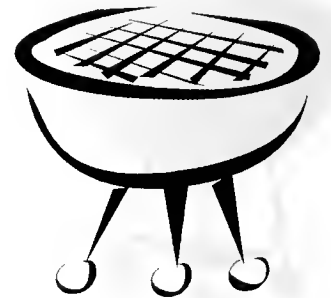
City State Zip

Home phone

E-mail

Degrees from Illinois (with year)

Notes _____



You're invited

Alumni are invited to a tour of Dinosaur Ridge and barbecue on October 27, 2002, which will be held in conjunction with the GSA meeting in Denver. The tour is scheduled to begin at 1:30 p.m. and the barbecue at 4 p.m. Look for a postcard in July with more details.



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2002

PROFESSOR Susan Kieffer Joins Faculty



The Walgreen Chair— A Mark of Distinction

The Walgreen Chair, now held by Susan Kieffer in the Department of Geology, is a major honor at the University of Illinois, not just for the faculty member who receives it, but for the Department that hosts it as well. Any department on any of the three University campuses can compete to host the position by submitting nominees. There are only two Walgreen Chairs in the entire University—the second current Chair holder is in the Law School.

Funding for the Chair comes from the Charles R. Walgreen Jr. Endowment fund, established by Charles R. Walgreen Jr., the retired chairman of the board of the Walgreen Drug Store company. Mr. Walgreen stipulated that candidates for the Chair must display intellect and accomplishment that places them among those most distinguished people in their field. This distinction must be affirmed by such recognition as Nobel or Pulitzer Awards or by evidential works. Among her other accomplishments, Kieffer has won the MacArthur "genius" award.

compared to most geological processes.

"My geologic interests parallel my music interests," Kieffer has said. "When I had to practice as a kid, I skipped the slow movements and went right for the scherzos."

Culminating with a Ph.D. from Cal Tech, Kieffer holds degrees in physics, math, geological sciences, and planetary sciences. This background gives her the technical expertise to pursue any question that catches her eye. While some questions may appear to others to be unrelated to what she's been working on, there's usually a unifying thread. "My career could be summarized by saying I look at complex and catastrophic events," says Kieffer.

Kieffer feels that UIUC is a good fit for her interests. "When I visited Urbana-Champaign, the possibility for interactions among geology and several other campus departments was wonderful."

Kieffer's professional accomplishments are reflected in part by her various high-level honors and achievements. For example, she is a recipient of the John D. and Catherine T. MacArthur Fellowship (the prestigious "genius award"), a member of the National Academy of Sciences, a recipient of the Spendiarov Award from the USSR Academy of Sciences (the second American ever to receive this honor), and recipient of the Day Medal from the Geological Society of America.

Over the years, Kieffer has served several institutions including the U.S. Geological Survey, Arizona State

The Department of Geology is pleased to announce that Dr. Susan Werner Kieffer has been hired as Walgreen Chair and Professor of Geology at the University of Illinois. She is the first to hold this prestigious position.

Kieffer, who describes her primary research interest as geological fluid dynamics, has had a widely varied research career. She developed a theory for predicting the thermodynamic properties of minerals, work that earned her the Mineralogical Society of America's award for distinguished work in mineralogy. Later, she started to look at geysers as analogs for volcanoes. When geysers were discovered on Jupiter's satellite, Io, she applied her earthbound research to interpret those phenomena. For many years, Kieffer studied rapids on the Colorado River in the Grand Canyon. She has also studied the eruption of Mount Saint Helens and developed a theory of the devastating lateral blast.

"I had to teach myself rocket nozzle theory to explain the tree-blow-down pattern that we observed at the mountain," says Kieffer.

More recently, she has focused on the 5-million-year-old Chicxulub (Mexico) impact crater and the 1.8 billion-year-old Sudbury (Canada) crater. Using shock-wave theory, Kieffer and colleagues hypothesize that the former was formed by an asteroid impact and the latter a comet. All these projects involve understanding processes that can occur at very high speeds — sometimes even supersonic —

"My geologic interests parallel my music interests," Kieffer has said.

"When I had to practice as a kid, I skipped the slow movements and went right for the scherzos."

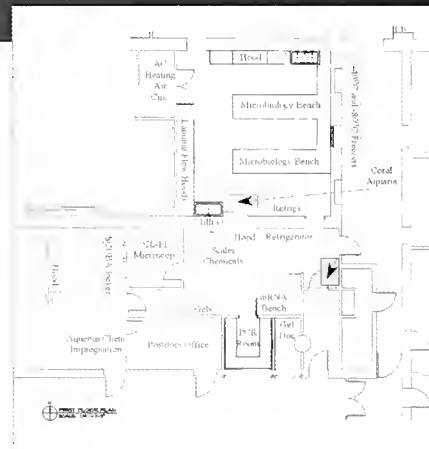


GREETINGS

Letter From The Head

2002 has been a year of change in the Department and in the University as a whole. We have been fortunate to have Prof. Susan Kieffer (Ph.D., Cal Tech), joins our ranks as the Walgreen Chair. Sue brings great distinction to the Department, for she is world renowned for her work in geological fluid dynamics, and has received many significant honors, including election to the National Academy of Sciences, and a MacArthur "genius" award. Already, Sue has been building links between the Department and other units across campus. As this issue goes to press, another new faculty member, Prof. Jackie Li

(Ph.D., Harvard), has also joined us. She will begin teaching mineralogy in the fall, and will be building a lab for high-pressure mineral research. We have also been growing by the addition of research scientists to our staff. Andrey Kalinichev and Stas Sinogeiken are immersed in their studies of mineral science, and by next fall, Holger Hellwig will commence research in crystallography, while Rob Sanford will join the geomicrobiology group. The Department has been fortunate to see the completion of a state-of-the-art laboratory in geomicrobiology and carbonate sedimentology, under the supervision of Prof. Bruce Fouke. And . . . our



Construction of the new geomicrobiology facility is now complete and the lab open for business. Carved out of former office space in the basement of the Natural History Building, the 2000-square-foot geomicrobiology lab enables researchers to conduct DNA and RNA analyses of microbial communities in order to understand their interactions with geologic processes. Students and postdocs from the Fouke, Bethke, Johnson, and Lundstrom research groups in the department are now actively engaged in conducting research in the facility. Rob Sanford will also be using this facility when he joins the department next fall.

GeoScience 2005 endowment campaign also continues to charge ahead — we are well on the way toward our \$3 million goal!

But the good news is tempered with the not so good. The University of Illinois, like most state universities across the country, has been hit hard with budget cuts in response to deficits at the state and federal levels. As a consequence, the rate of growth that we have enjoyed in the past few years will be slowing, and the Department will face new challenges in the coming year. But with continued support of alumni and friends, we hope to continue on a positive track, providing outstanding education for undergraduates and graduates, and contributing new ideas to the broadening field of geosciences.

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Year in Review is published once a year by the Department of Geology, University of Illinois at Urbana-Champaign, to summarize the activities and accomplishments within the department and news from alumni and friends.

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Leinen Receives Alumni Achievement Award

Margaret Leinen, B.S. '69, assistant director of the National Science Foundation for Geosciences, has been awarded the Outstanding Alumni Achievement Award in the Department of Geology.

Leinen, who has been at NSF since 2000, administers all NSF programs in earth, atmosphere and ocean sciences. She is also in charge of a new interdisciplinary program in environmental research and education. In this role, she works with people from such diverse disciplines as biology, chemistry, engineering, and social, behavioral, and economic sciences to fashion environmental research programs.

Prior to taking a senior position at NSF, Leinen was a professor of oceanography and dean of two colleges (the Graduate School of Oceanography and the College of the Environment and Life Sciences) at the University of Rhode Island. In addition, she served as vice provost, with the responsibility of coordinating marine and environmental programs for the entire university.

Leinen's own research has focused on paleoceanography, paleoclimatology and the present-day processes that are responsible for the formation of the sedimentary record. She has had a very active sea-going research program, having been on 24 research cruises, including three cruises of the Ocean Drilling Program. She has led two ALVIN diving expeditions to the Juan de Fuca Ridge and Mariana back-arc environments to study the sedimentation from hydrothermal vents and has published widely on the record of biological sedimentation in the oceans.

In addition to her bachelor's degree from the University of Illinois, Leinen has a master's in geological oceanography from Oregon State University in 1975, and a Ph.D. in geological oceanography from the University of Rhode Island in 1980.



MICHAEL SALERNO

...it was muddy and it was cold, and they were right there with us. So when we were all freezing on the outcrop, they were freezing on the outcrop...I had never had that type of relationship with a scientist or with a teacher. They were actually doing the same thing I was doing. It was very, very exciting."

Leinen has very fond memories of geology at Illinois. She had come intending to be a biochemist, but those classes were so large they were alienating. The only class smaller than 400 students was Leinen's geology class, with an enrollment of 100.

"I actually got to know the faculty member and I got to know the graduate student who was assisting," Leinen recalls. "And they took us out on field trips on the weekend. We all went out and our professor was there, and five or six graduate students were there to keep us all in line. It was fall term, it was winter in Illinois, and it was snowing, and it

was muddy and it was cold, and they were right there with us. So when we were all freezing on the outcrop, they were freezing on the outcrop. When we were all sitting in the bus huddled with our lunches, they were right there with us. I had never had that type of relationship with a scientist or with a teacher. They were actually doing the same thing I was doing. It was very, very exciting."

Leinen will return to the Urbana-Champaign campus during the Fall of 2003 to receive the award.

Susan Kieffer *Continued from page 1*

University, Cal Tech, and the University of British Columbia. Just prior to coming to Illinois, she ran her own consulting firm in Canada, S.W. Kieffer Science Consulting, Inc., to develop nonlinear data analysis and prediction techniques. She also has founded the Phoenix-based Kieffer Institute for Development of Science-Based Education, which focused on teaching science to at-risk 7th to 12th graders.

Recently, Kieffer has been concerned about issues of sustainability and the role of Earth sciences and Earth scientists in getting our planet through the next 50 years in a healthy condition. She hopes to teach a course in this area.

"We scientists tend to be relatively ineffective politically," says Kieffer, "so I was thrilled when asked to become an affiliate in the Institute for Government and Policy Affairs on this campus. We are discussing how we can bring issues of natural sciences to the table with lawyers, political scientists, economists, and social scientists."

Kieffer's passion for research and teaching will benefit our students and the university community as a whole. The Department is delighted to welcome Susan and her husband, Charles Harwood, to the Urbana-Champaign community.

Albert Hsui Develops New Course

The Geology Department is offering a new course for non-majors. Geology 103 (Planet Earth-Quantitative Reasoning) will use the study of geology as a vehicle to introduce mathematics and computers to non-science students and to show them how quantitative reasoning can be used to understand and describe natural phenomena. The course was designed to fulfill a new University requirement.

The course will be taught by Prof. Albert Hsui in the spring 2003. In addition to the two lectures students receive a week, they will have one session per week in a new state-of-the-art computer lab. Using the facilities of the lab, they will work with geologic data using spread sheets and graphing programs. Geologic problems provide an excellent base for teaching quantitative reasoning, because they are very tangible and intuitive.

Bass Elected as First President of COMPRES

In May of 2002, the National Science Foundation launched the Consortium for Materials Properties Research in Earth Sciences (COMPRES), a community infrastructure organization for Earth science research and education, focusing on high-pressure experiments designed to understand Earth and planetary interiors. Jay Bass, professor of geology, was elected as the new consortium's President, a full-time salaried job. The offices of the consortium are housed at SUNY Stony Brook, so Bass took a one-year leave of absence for the 2002-2003 academic year and is shuttling back and forth between Stony Brook and Champaign-Urbana.

"It is very exciting, and quite an honor to be chosen to get the consortium off the ground in its first year," said Bass.

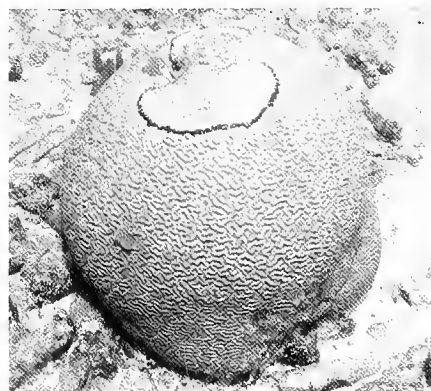
The goal of the consortium is to facilitate high-pressure research in Earth and planetary sciences using advanced instrumentation at centralized facilities, education and outreach, and connections with other Earth science subdisciplines. COMPRES will identify and address common research needs, present a unified vision of the high-pressure Earth sciences, work to provide access to synchrotron beamlines and other community facilities, coordinate the management of large centralized facilities, and advocate the field of high-pressure research within the broader Earth and planetary sciences community. The consortium hopes to determine, as a community, where multi-million dollar research resources can most wisely be placed and used.

Chromium in Groundwater Studied

Professor Tom Johnson and graduate student Andre Ellis have developed a way to monitor the mobility of chromium in groundwater. Chromium, a heavy metal commonly used in industrial applications such as electroplating and leather tanning, is the second-most abundant inorganic groundwater contaminant at hazardous waste sites. The oxidized, hexavalent state of Cr, Cr (VI), is toxic and soluble, so it can move easily in groundwater. The reduced state, Cr (III) can form a solid, precipitating out of solution, thus limiting its mobility. Also, Cr (III) is less toxic, and is a nutrient at low levels.

Johnson and Ellis's new work relies on measurements of the $^{53}\text{Cr}/^{52}\text{Cr}$ isotope ratio—to determine this ratio the researchers had to develop new laboratory techniques. They found that the $^{53}\text{Cr}/^{52}\text{Cr}$ ratio increases systematically as Cr (VI) is reduced. Their observation was published in the March 15, 2002, issue of *Science*, and has captured the attention of consultants trying to characterize chromium-contaminated sites.

National Geographic Visits Geology Department



Bruce Fouke's research on black band disease, which is a bacterial infection in coral, caught the attention of the National Geographic Society this year. Writers for the magazine first contacted him last spring, having surfed the web

for researchers working on coral disease. An underwater photograph of diseased coral taken by the Fouke research group was published in the map insert of the September 2002 issue of the magazine. The writers and a film crew then visited Urbana-Champaign last fall where they were given a full tour of the department's new geomicrobiology lab facility. A documentary is now being assembled describing the newly emergent field of geomicrobiology and the work being done in the Fouke lab on the hot springs of Yellowstone National Park and the coral reefs of the Caribbean and Indo-Pacific. Fouke's research is funded by the Office of Naval Research Environmental Toxicology and Genetic Markers program and by the National Science Foundation Biocomplexity in the Environment program.



Project "Hi-Climb" Rises in Nepal

Professor Wang-Ping Chen spent two and a half months in late 2002 installing 75 seismometer stations throughout Nepal as the first phase of Project HI-CLIMB kicked in. (see *Geoscience 2000* for details on Chen's research). Ultimately, the project will collect data from 250 stations throughout Nepal and Tibet.

HI-CLIMB examines how the lithosphere deforms over its entire thickness during orogeny; specifically how the upper crust couples with the mantle portion of the continental lithosphere. Chen's project will provide the first complete profile of the Himalayan-Tibetan collision zone, extending from the the deformation front across both the Lower and the Higher Himalayas, then onto the central Tibetan Plateau. Dense spacing—about five kilometers apart—of the broadband, high-resolution seismic array provides unprecedented resolution for imaging deep-seated structures, particularly those in the enigmatic lower crust, below the Moho, and throughout the transition zone of the mantle down to depths of about 1,000 km.

Installing seismic arrays is back-breaking work. By the end of his stay in Nepal, Chen lost about 15 pounds and his work pants were in shreds—he ultimately cut them into shorts, then tossed them. Setting up a single station took a team of three or four people at least one day. The group had carry all the instruments (including two or more 50-pound batteries) over rugged ground. Then, they dug an enormous pit to bedrock, laboriously leveled both the pit and the instrument, installed and insulated the instrument, and dug a drainage ditch. Finally, they covered everything back up with plywood, tarp and dirt.

For each station, Chen also had to get permission from the government and to negotiate with whoever owned the land. One time Chen and his party walked into a village entirely controlled by Maoist insurgents. Luckily, the Nepali scientists on the team managed to extricate the group.



Professor Chen with undergraduate Nathan VanHoudnos at site H0230, elevation 7,500 ft.

"We skipped that site. We were just happy to be alive," notes Chen.

The project has been successful, for the stations are continuously recording ground vibrations, and will accumulate several terabytes of information in three years. That data is assembled in Katmandu, sent to a dedicated machine at the University of Illinois to be processed by two of Chen's students, Tai-Lin (Ellen) Tseng and Zhaohui Yang. Chen plans to go to Tibet in the spring of 2003 to continue the installations.

"We're either incredible heroes or incredible fools," said Chen, with a grin.



The 2002 annual banquet featured, for the first time, a poster session by geology students. Over 25 students presented posters describing their research, during the cocktail hour. In this photo, Chuntao Liang asks a question, while Ellen Tseng smiles for the photographer.



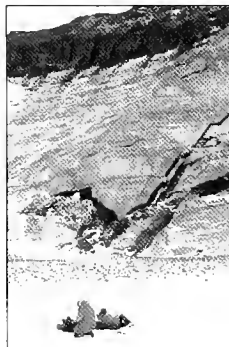
Geologists' tent camp on a glacier, with a nunatak (isolated hill) in the background.

Winter "Break" in Antarctica

A second faculty member (Dan Blake is the first) has crossed the Antarctic Circle in the past two years. Steve Marshak visited Antarctica during the 2002-2003 winter break as part of a research group led by Tom Fleming of the University of Southern Connecticut. Their purpose was to study the emplacement of the Ferrar Dolerite, an extensive system of 184 million-year old dikes and sills. In addition to Marshak and Fleming, the group included Alan Whittington (a former post-doc in the Department, now an assistant professor at the University of Missouri), a professional mountaineer, and two undergraduate students. The Ferrar Dolerite, a system of sills and dikes formed in association with the break up of Pangaea, was first recognized during Captain Scott's ill-fated trip to the South Pole in the early 20th century.

"The outcrops we studied were in the Transantarctic Mountains, a 2- to 4-km high range that divides the continent into East and West Antarctica," says Marshak. "We were flown in a small plane from McMurdo Station (the main American base) to a site on a glacier at the boundary between the Polar Plateau and the Mountains. There, we set up a six-person tent camp. We had to keep rebuilding snow walls to keep drifts from burying our camp, but otherwise it was reasonably comfortable."

The group used snowmobiles and sledges to get to nearby outcrops, where the mountaineer helped them climb, set ropes and avoid crevasses. For outcrops far from camp the group had helicopter support. The helicopter would drop them at a site, and would then hopefully return about eight hours later. One time the helicopter was grounded in McMurdo by bad weather



Marshak points out that "many people think that Antarctica is completely covered by snow and ice. But there are good exposures in the Transantarctic Mountains, and there's no vegetation to hide the rocks, so it's possible to see contacts quite clearly. Exposures are good, but getting to them can be difficult. Working in Antarctic conditions turns any field work into an adventure."

Geology Club Re-established

The Geology Club has been re-established by undergraduates Amy Luther (president) and Roger Bannister (vice president and treasurer). This past semester undergraduate Meghan Ward joined the club as secretary. The club is both academic and social and is intended for "any student with a thirst for knowledge about the planet Earth and the impact geology has on our everyday lives," says Bannister. It encourages interactions between faculty, graduate students and undergraduates.

The club sponsors weekly talks by department professors that are presented at a more relaxed and less intimidating level than the Friday colloquium lectures. The group has organized a rock climbing field trip. Future plans include camping trips and helping at the Science Olympiad.

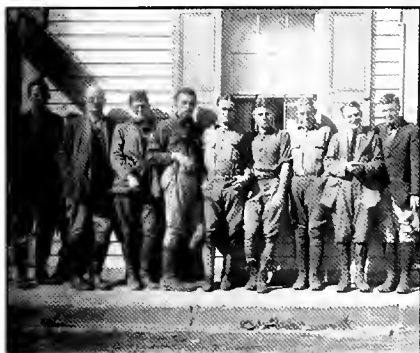


Jim Granath, Ted Labotka and Dianne Moore cooking breakfast, Monument Valley, UT, 1971 Geology Club field trip.



Graduate Student Following in Wanless' Footsteps

Kurt Burmeister, a Ph.D. student in structural geology under the supervision of Prof. Stephen Marshak, is following in some mighty big footsteps. He is studying the along-strike relationships between changes in the relative thickness and strength of stratigraphic units involved in deformation and transitions in the geometry of structures in fold-thrust



Left: Harold Wanless (first on left) with his work party (1920) standing in front of Mrs. Schinnen's Lodging and Boarding House on Main Street in Rosendale. Right: (left to right) Professor Russell Waines of SUNY, New Paltz, Dietrich Werner, President of the Century House Historical Society, and Kurt Burmeister standing in front of the same building, which is now a cigar making company (2002).

belts. As part of this research, Kurt mapped a region in the Appalachian fold-thrust belt of eastern New York State historically known as the Rosendale natural cement region. This region is famous because of its dolomitic limestone, which

was a primary source of high-quality natural cement from 1850s-1950s. Rosendale natural cement, which is much stronger than Portland cement, lines the Panama Canal, forms the pedestal of the Statue of Liberty, and supports the wings of the US

quarries that have since become overgrown. Burmeister has had fun identifying sites from Wanless's old photos—in some cases, the photos show critical geologic relationships that are no longer exposed and thus are of great help.

Capitol building. Coincidentally, this region is where the legendary Prof. Harold Wanless conducted some of his earliest field studies. In the early 1920s, Wanless wrote a voluminous master's thesis on the stratigraphy of the Silurian and Devonian strata of the Rosendale area. Wanless' thesis includes numerous photographs of many of the long-abandoned cement

Important Discoveries by Jin and Bethke

Graduate student Qusheng Jin and Professor Craig Bethke have developed an important new equation to predict how fast bacteria can degrade contaminants in natural environments such as groundwater. Their work was published in the *Biophysical Journal*.

"If you want to predict how fast a common groundwater contaminant can be degraded, you could run an experiment in the lab. But the experiment would not necessarily indicate how fast the reaction would occur in nature. I am trying to answer the second question with my work," says Jin.

The new equation allows laboratory data to be extrapolated to explain phenomena in real-world environments by taking into account the fact that in real-world environments there is not always an abundant energy supply available for bacterial metabolism. To develop the

equation, they had to take into account geochemical reaction mechanisms, chemiosmotic theory, and non-equilibrium thermodynamics. Chemiosmotic theory explains how respiration proceeds in microorganisms, and non-equilibrium thermodynamics how reaction rates are controlled by the amount of energy that is available.

"The thermodynamic part is very important because energy availability is a key difference between lab and natural environments," notes Jin.

Jin and Bethke were able to test their theory by predicting reactions that could be compared with data sets collected in nature. Since publishing the paper, Jin has received numerous telephone calls from researchers interested in applying the equation to specific environmental conditions. Jin and Bethke have several additional papers scheduled

for publication in which they show how the equation can be applied.

Work on this project was a major change in research direction for Jin, who originally came to Illinois intending to work on traditional groundwater modeling. But with Bethke's encouragement, Jin took extra classes in biochemistry, civil engineering, and microbiology. These classes have allowed him to undertake groundbreaking interdisciplinary research projects. He also took advantage of the diversity of faculty on the UIUC campus and found people in several departments with whom he could discuss his research.

"I was helped by many professors on this campus," says Jin, "especially Robert Sanford in Civil Engineering and James Imlay in Microbiology. They encouraged me and spent hours talking to me. Their help was indispensable."



T.T. Quirke

The First World War profoundly affected geology at Illinois. Both staff and resources were diverted to the war effort, checking growth in the Department's programs. In fact, five faculty (J.L. Rich, H.F. Crooks, L.E. Kennedy, F.M. Van Tuyl, and C.W. Tomlinson) undertook war-related work, and some of these left the University to do so. On the home front, Departmental staff members were assigned to teach military training classes. For example, before leaving to join the Marine Corps air service, Tomlinson co-taught "Military Mapping and Reconnaissance" with Eliot Blackwelder. Blackwelder, who was Head of the Department, also offered "War Issues" and "Map Reading and Navigation." Tomlinson did not return after the war, but joined the Gypsy Oil Company and went on to a distinguished career in industry, ultimately becoming president of AAPG.

Unfortunately, the war, coupled with stiff competition for new staff, crippling college regulations, and anti-German and anti-Bolshevik bias, blocked Blackwelder from building the Department he wanted. In one case, a professional Chinese Geological Survey geologist was denied admission as a graduate student simply because he had not taken prescribed liberal arts courses. Frustrated, Blackwelder wrote a strongly worded letter of resignation to the President of the University, and left the Department at the end of the 1919 spring term. Two years later he

World War I, Crisis for Geology at Illinois, and T.T. Quirke

By Ralph Langenheim

was Head of the Geology Department at Stanford.

With Blackwelder's resignation, the Department had to find a new leader on short notice. Amadeus W. Grabau, a prominent geologist at Columbia University, voiced an interest, but, perhaps because of his reputed pro-German sentiment, the University did not reply. Grabau went on to Peking University where he became a prominent researcher in tectonics. Finally, in November 1919, the University trustees re-organized the Department as a committee. They then appointed Terence Thomas Quirke chairman and associate professor.

Quirke, led the Department for the next 10 years. He was born in England but emigrated to the United States, where he received university training in North Dakota and Chicago. He then became a geology professor at the University of Minnesota, a position he held for four years. After joining Illinois, Quirke spent 15 summers working in the field for the Geological Survey of Canada. His research on the Huronian, Grenville and Killarney proved essential to unraveling the Precambrian history of North America. Quirke also contributed papers on mineralogy and on the origin of granite,

and wrote two introductory geology textbooks. Together, Quirke and fellow faculty member William Bayley built a strong program in "hard rock" geology" at Illinois, balancing Savage's strong program in stratigraphy and paleontology.

The Department began a period steady growth and enhancement after the Great War. In 1920, the Department had a staff of nine (professors Bayley, Rolfe and Savage; associate professor and chairman Quirke; assistant professor M.M. Leighton (later, Chief of the ISGS); instructors Yeaton and Hanson; a laboratory helper and a stenographer), and the annual budget was only \$21,500, including salaries. But between 1923 and 1930, the staff grew to 21 people. But even though the War was a shock to the Department, students continued to work towards their degrees and between 1905 and 1922 the Department granted 15 master's degrees (11 of them directed by Savage) and three doctorates. After the war, student numbers increased, so that between 1923 and 1930, 23 received master's degrees and two received Ph.D.s. Throughout these years, the Department covered both the disciplines of Geology and Geography.

Haydn Murray Elected to National Academy of Engineering

Haydn Murray, B.S. '48, M.S. '50, Ph.D. '51, has just been elected to the National Academy of Engineering. Colleagues consider Murray a pioneer in the area of clay mineralogy. The election recognizes Murray's "important contributions to engineering theory and practice," specifically his "pioneering work on the mineralogy and industrial applications of clays." Election to the academy is one of the highest honors an engineer can achieve. Congratulations Haydn!



Former Faculty and Alumni Receive Major Awards



Norb Cygan (left) presents the Ian Campbell medal (AGI's highest honor) to Frank Rhodes at the GSA annual meeting last October.

Frank Harold Trevor Rhodes received the Ian Campbell Medal, the AGI's most prestigious award. The medal, presented at the GSA Presidential Awards Ceremony in Denver, October 27, 2002 is awarded to a person who exemplifies the accomplishments and widespread influence of that remarkable geoscientist.

Rhodes was a post-doctoral fellow Fulbright Scholar at the University of Illinois from 1950-51, assistant professor from 1954-55 and associate professor from 1955-56, when he moved to the University of Wales. From Wales, he moved to the University of Michigan, and then Cornell, where he served as President for 18 years. He has published widely in the fields of geology, paleontology, evolution, education and the history of science. His publications include *Fossils: An Introduction to Pre-Historic Life and The Creation of the Future: The Role of the American University*. He also has been a participant in the BBC television series, *The Planet Earth* and the BBC radio series, *Science, Philosophy and Religion*, has served as Chair of the National Research Council, and a director of the General Electric Corporation.

At the AAPG meeting in May, 2003, three Illinois geologists will be honored. Prof. Emeritus Albert Carozzi will be recognized as a Distinguished Educator, alumnus Jack Threet, who received the geology department's alumni achievement award in 2002, will receive the Robert Dott Sr. Award, and alumnus Norb Cygan will be honored for distinguished service.

During his tenure at the University of Illinois, Carozzi was recognized by students and the geoscience profession as an outstanding and inspirational educator, researcher, and mentor. He supervised 34 Ph.D. and 16 M.S. thesis projects, and his research resulted in the publication of more

than 300 articles in scientific journals, and 19 textbooks. In recent years, Prof. Carozzi has focused his energy on writing books concerning the history of geology. He is known throughout the international petroleum industry for excellence in teaching and research on carbonate microfacies.

"The continuing professional success of his former students is a clear tribute to Dr. Carozzi's exceptional abilities and dedication to the advancement of geoscience education," says William Dawson, B.S. '74, Ph.D. '84, senior research geologist at ChevronTexaco.

Threet, who spent his entire 36-year career with Shell Oil Company, led exploration and discovery efforts in the deep water of the Gulf of Mexico, the northwest shelf of Australia, onshore Syria and offshore Malaysia, Cameroon and Brazil. He eventually became Vice President of the company. The Robert H. Dott, Sr., Memorial Award honors and rewards Threet for original articles published by the AAPG. Threet received last year's Alumni Achievement Award.

Cygan's generous service to AAPG spans 35 years. Over the last 25 of those he has been particularly dedicated to AAPG educational activities. For a number of years, he worked to develop an AAPG teachers and students program at annual AAPG conventions. The first of these took place in 1990, with the first Teachers/Students Educational and Field Trip program. This program, as well as several others Cygan has organized, has continued ever since. Cygan was honored with the AAPG Certificate of Merit in 1990 and 2001, and in 1995 was presented with the Public Service Award for his contribution as an AAPG member in Public Affairs.

Degrees Conferred in 2002

Bachelor of Science Degrees

May

Adrienne Jay Gandhi
Andrew Russell Parrish
Deanna Marie Warkins

August

James Sophocles Cokinos
Brian Robert Hacker
Scott William Lepley

Master of Science Degrees

May

David John Beedy (Teaching of Earth Science Degree)

Dylan Pierce Canavan (Teaching of Earth Science Degree)

Peter Raymond Malecki (Teaching of Earth Science Degree)

Michael Russell Fortwengler—*Distribution and Frequency of Black Band Disease and Partial Mortality of Diploria Strigosa on Curacao, Netherlands Antilles* (Bruce Fouke)

Dmitry Leonidovich Lakshatnov—*Experimental Investigation of High-Temperature Acousto-Elastic Properties of Natural Crystalline Silica (SiO₂)* (Jay Bass)

Xinlei Sun—*PKP Travel Times at Near Antipodal Distances: Implications for Inner-Core Anisotropy and Lowermost Mantle Structure* (Xiaodong Song)

Xiaoxia Xu—*Evidence for Inner Core Super-Rotation from Time-Dependent PKP Travel Times Observed at Beijing Seismic Network* (Xiaodong Song)

October

Amanda Beth Duchek—*Geophysical Investigation of the Cottage Grove Fault System, Southern Illinois Basin* (Wang-Ping Chen)

Doctor of Philosophy Degrees

May

Keith C. Hackley—*A Chemical and Isotopic Investigation of the Groundwater in the Mahomet Bedrock Valley Aquifer: Age, Recharge and Geochemical Evolution of the Groundwater* (Thomas F. Anderson)

October

Michael R. Brudzinski—*Seismic Studies of Subducted Lithosphere Beneath Fiji: Evidence for a Petrologic Anomaly* (Wang-Ping Chen)

Michael Joseph Harrison—*Origin, Architecture, and Thermal State of the Lackawanna Synclinorium, Pennsylvania: Implications for Tectonic Evolution of the Central Appalachians* (Stephen Marshak)

CORRECTION:

The picture on page six of the 2001 Year in Review is incorrectly labeled as Thornton Quarry. It was in fact Kentland Quarry.

Obituaries

Richard F. Mast, B.S. '57, died June 22, 2002, after a valiant struggle with cancer. Mast was born in Chicago and served in the U.S. Army. He was a pioneer in oil and gas resource assessment, working as a geologist for the Illinois Geological Survey from 1957-1973 and the U.S. Geological Survey from 1973-1995. He served the USGS as the chief of the Branch of Oil and Gas Resources and as Regional Geologist of the central Region. He coordinated the USGS 1992 National Oil and Gas Resource Assessment for which he received the Department of Interior Distinguished Service Award. He is survived by his wife, Joyce Ablinger Mast, B.S. '57, five children and four grandchildren.

Richard M. Winar, B.S. '53, M.S. '55, died September 6, 2002, of esophageal cancer. He was 71. Winar was a geologist and environmental engineer who worked most recently at the Oakland County Road Commission of Michigan. He was a member of the AIPG and a veteran of the U.S. Army. A memorial service was held September 15. Winar is survived by his wife of 49 years, Lois Winar, and his daughters, Susan Winar, Gail Winar and Nancy Winar Cracknell, as well as four grandchildren and a brother.

Dick Benson, M.S., '53, Ph.D. '55, Senior Scientist and Curator of Ostracodes at the Smithsonian NMNH, passed away in February, 2003, from an apparent heart attack. Dick had a profound impact upon our conceptualization and understanding of ostracodes and, as those of you who knew him, was an incredible character on many levels. He will be greatly missed.

1940s

Allen F. Agnew, A.B. '40, M.S. '42, writes "I am happy to see the continued excellent quality of programs and people in our department. At age 84, nostalgia has replaced my cutting-edge fervor, but I do make one geologic meeting each year (AAPG) and take vicarious pleasure in the activities of all of you who truly are at the cutting edge of your subfields! What a marvelous issue of the "Annual Review" of the Department this is! Thanks, Deb and Steve!"

1950s

Norb Cygan, B.S. '54, and his wife, Royann, met up last September with Bob Leonard (B.S. '55) his wife Joan ('56) at the Roosevelt Rendezvous in Yellowstone Park. "We enjoyed seven-mile hikes, rides, etc. to view and study to flora, fauna and geological phenomena of Yellowstone Park (just before the first snow). Lots of bear, bison, birds, wolves, and volcanics. Bob seemed to have some problems controlling his horse, Widdermaker, while I had no problem with Pokey!"

Carl Davis, B.S. '59, wrote us a note reminiscing about field camp in the summer of '58. "It was a great experience for me ... a once-in-a-lifetime event," he writes. Davis remembers getting caught in a thunderstorm while he was in a canyon and taking cover under an overhanging bank with his feet still in the stream. Lightning hit about a half-mile away, based on the time between flash and sound. He got the shock at the exact time of the stroke. "I think I got about 400 volts but only a small amount of current. So that was an interesting experience." During the same storm Davis remembers Martin Jean coming face-to-face with a brown bear. "I heard the scream a mile away."

1960s

Bruce M. Nichols, B.S. '68, is living in Mermaid Waters, Australia, where he is developing a high-grade limestone resource in N.S.W., and "loving life."

1970s

Andrew M. Gombos Jr., M.S. '73, is working in Abu Dhabi where he is a geophysicist working on the Bu Hasa field, a large rudistid reef. He can be reached at agombos@adco.co.ae

Patricia A. Santogrossi, B.S. '74, M.S. '77, has become chief geologist at Knowledge Reservoir, Houston. Prior to that she was chief geologist at Chroma Energy in Houston.

1980s

Dr. Stephen Laubach, Ph.D. '86, a senior research scientist at the University of Texas Bureau of Economic Geology, completed a national speaking tour of university geology departments and an AAPG Hedberg Research Conference as part of the AAPG Visiting Geologist program.

Karen Fryer, M.S. '82, Ph.D. '86, is chair of the Ohio Wesleyan department of Geology and Geography. She attended the GSA geology department cocktail during the GSA meeting in Denver last October with her son, Gavin, and her husband Cameron Begg. Cameron ran the microprobe lab here and is doing similar work at Ohio State University.

Dave Watson, M.S. '88, is now working as a senior geologist at Unocal and lives in the Houston area.

1990s

University of Texas Bureau of Economic Geology Research Fellow **Dr. Linda Bonnell, Ph.D. '90**, has been named as an AAPG Distinguished Lecturer for 2003-2004. The title of her presentation is "Diagenetic Effects on Fracture Development." Linda is one of the principals of Geocosm, an Austin-based reservoir consulting group.

Christine Clark McCracken, M.S. '97, successfully defended her thesis in June. She has headed to Ypsilanti, Michigan, where she is assistant professor of mineralogy and petrology at Eastern Michigan University. She ran into **Doug Tinkham, M.S. '97**, at the Geologic Association of Canada/Mineralogical Association of Canada meeting last spring in Saskatoon. Doug is a post-doc in Calgary.

Shayne Pasek, B.S. '98, married Erick Staley last September. Erick was a UC Berkeley student who spent a semester at the University of Illinois studying with Bruce Fouke. The couple first met on a field trip to Bonaire led by Fouke. Shayne and Erick are living in Portland, Oregon.

Sharon (Horstman) Qi, B.A. '89, M.S. '93, and her family are moving to Oregon, where she will continue to work for the U.S.G.S.

2000s

Judd Tudor, B.S. '97, M.S., '00, is getting married in western Scotland in July '03. He is still working for Schlumberger Wireline as a field engineer and was recently transferred to Edinburg, TX.

Anthony (Tony) Gibson, M.S. '01, has returned to Olney, Ill., and has joined his family-owned oil company, Murvin Oil, as executive vice president and petroleum geologist. Tony is the third generation of his family to work at the company. In 2002, Tony also established Gibson Supply, Inc. to provide local access to oilfield equipment and supplies.

Former Faculty News

Peter Burns, who was a visiting assistant professor in Geology at UIUC from 1996-1997, has been appointed Massman Chair of the Department of Civil Engineering and Geological Sciences at the University of Notre Dame. He was also promoted to professor in November. While at Illinois, Peter taught courses in mineralogy, geology of the planets, and oceanography.

John McBride, who was an adjunct faculty member since 1997, has moved to Utah to teach at Brigham Young University. "Leaving Champaign was not an easy decision," he writes. John has developed some new courses and purchased equipment to support a geophysics program at BYU. John can be reached at john_mcbride@byu.edu or (801) 422-5219.

HONOR ROLL OF DONORS FOR 2002



The following is a list of friends and alumni of the Department of Geology who have donated to the department during the calendar year 2002.

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Jay D. Bass (Professor)
Craig M. Bethke (Professor)
Daniel B. Blake (Professor)
Chu-Yung Chen (Associate Professor)
Wang-Ping Chen (Professor)
Bruce W. Fouke (Assistant Professor)
Albert T. Hsui (Professor)
Thomas M. Johnson (Assistant Professor)
Susan W. Kieffer (Walgreen Professor)
R. James Kirkpatrick (Professor and Executive Associate Dean)
Craig C. Lundstrom (Assistant Professor)
Stephen Marshak (Professor and Head)
Xiaodong Song (Assistant Professor)

Department Affiliate

Feng-Sheng Hu (Associate Professor)

Academic Staff & Research Staff

Deb Aronson (Yearbook Editor)
George Bonheyo (Post-Doctoral Researcher)
Jorge Frias-Lopez (Post-Doctoral Researcher)
Richard Hedin (Research Programmer)
Xiaoqiang Hou (Post-Doctoral Researcher)
Stephen Hurst (Research Programmer)
Andrey Kalinichev (Senior Research Scientist)
Lalita Kalita (Research Programmer)
Ann Long (Teaching Lab Specialist)
Laura Rademacher (Post-Doctoral Researcher)
Stanislav Sinogeikin (Research Scientist)
Frank Tepley (Post-Doctoral Researcher)
Raj Vanka (Resource and Policy Analyst)
John Werner (Visiting Assistant Professor)
Alan Whittington (Post-Doctoral Researcher)

Emeritus Faculty

Thomas F. Anderson
Albert V. Carozzi
Carleton A. Chapman
Donald L. Graf
Arthur F. Hagner
Richard L. Hay
Donald M. Henderson
George deV. Klein
Ralph L. Langenheim
C. John Mann
Alberto S. Nieto
Philip A. Sandberg

Adjunct Faculty

Leon R. Follmer
Dennis Kolata
Morris W. Leighton
Hannes Leetaru
William Shilts
M. Scott Wilkerson

Library Staff

Lura Joseph (Librarian)
Sheila McGowan (Chief Library Clerk)
Diana Walter (Library Technical Specialist)

Staff

Shelley Campbell (Staff Clerk)
Barb Elmore (Administrative Secretary)
Eddie Lane (Electronics Engineering Assistant)
Michael Sczerba (Clerical Assistant)

Graduate Students

Will Beaumont	Chuntao Liang
David Beedy	Christopher Mah
Peter Berger	Peter Malecki
Sarah Brown	Brent Olson
Kurtis Burmeister	Jungho Park
Dylan Canavan	George Roadcap
Scott Clark	Eric Sikora
Amanda Duchek	Xinlei Sun
Andre Ellis	Anna Sutton
Michael Fortwengler	Jian Tian
Alex Glass	Tai-Lin Tseng
Brian Hacker	Jianwei Wang
Keith Hackley	Jingyun Wang
Chris Henderson	Jackie Welch
Fang Huang	Jackie Welch
Jennifer Jackson	Xiang Xu
Qusheng Jin	Xiaoxia Xu
Matthew Kirk	Zhaohui Yang
James Klaus	Juanzuo Zhou
Dmitry Lakshantov	

Congratulations

Craig Lundstrom and his wife, Lara, are the proud parents of Nathaniel Powell Lundstrom, who was born December 18th at Carle Hospital. He weighed 8 lbs., 3 oz. at birth. Nathaniel also has a big brother, Evan, who is four.

Barb Elmore, administrative secretary, announces the arrival of her fifth grandchild. Tyler Christopher Junkins was born on November 4. Tyler's parents (Barb's son and daughter-in-law) live in Ashkum, Ill.

COURSES TAUGHT IN 2002

Geol 100	Planet Earth
Geol 101	Introduction to Physical Geology
Geol 104	Geology of the National Parks and Monuments
Geol 107	Physical Geology
Geol 108	Historical Geology
Geol 110	Exploring Planet Earth in the Field
Geol 116	Geology of the Planets
Geol 117	The Oceans
Geol 118	Natural Disasters
Geol 143	History of Life
Geol 233	Earth Materials and the Environment
Geol 250	Geology for Engineers
Geol 311	Structural Geology and Tectonics
Geol 315	Field Geology
Geol 317	Geologic Field Methods, Western United States (Field Camp)
Geol 320	Introduction to Paleontology
Geol 332	Mineralogy and Mineral Optics
Geol 336	Petrology and Petrography
Geol 340	Sedimentology and Stratigraphy
Geol 350	Introduction to Geophysics
Geol 351	Geophysical Methods for Geology, Engineering, and Environmental Sciences
Geol 352	Physics of the Earth
Geol 355	Introduction to Groundwater
Geol 360	Geochemistry
Geol 381	Modeling Earth and Environmental Systems
Geol 415	Advanced Field Geology
Geol 433	Isotope Geology
Geol 440	Petroleum Geology
Geol 452	Geodynamics
Geol 454	Physics of the Earth's Interior
Geol 489	Geotectonics
Geol 491	Current Research in Geoscience
Geol 493K6	Chemistry & Petrology of the Mantle
Geol 493Q3	Practical Petrology

RESEARCH GRANTS ACTIVE IN 2002



American Chemical Society Petroleum Research

Development of Selenium Isotope Ratios as Indicators of Sedimentary Paleo-Environments.

Principal Investigator: Thomas Johnson

Department of Energy

Field-Constrained Quantitative Model of the Origin of Microbial

Principal Investigator: Craig M. Bethke

Computational & Spectroscopic Investigations of Water-Carbon Dioxide Fluids & Surface Sorption Processes.

Principal Investigator: R. James Kirkpatrick

Federal Highway Administration

Predicting Aggregate Reaction Based on Chemistry and Nanostructure of Alkali-Silica Gels.

Principal Investigators: Leslie J. Struble and R. James Kirkpatrick

Illinois Council On Food And Agriculture Research

Estimation of Denitrification Rates in the Shallow Groundwater Flow Systems of Big Ditch Watershed, Illinois – Isotope Assessment.

Principal Investigator: Thomas Johnson

Institute Of Geophysics And Planetary Physics, Los Alamos:

Timescales of Crustal Level Differentiation: U-Series Measurements and Geophysical Monitoring at Arenal Volcano, Costa Rica.

Principal Investigator: Craig Lundstrom

NASA

Core Angular Momentum and the International Earth Rotation Service Coordination Center / Sub-Centers Activity for Monitoring Global Geophysical Fluids.

Principal Investigator: Xiaodong Song

NSF

Polymorphism and Structural Transitions During Glass Formation.

Principal Investigator: Jay Bass

Development of Laser Heating for Sound Velocity Measurements at High P & T.

Principal Investigator: Jay Bass

Sound Velocities & Elastic Moduli of Minerals Mantle Pressures and Temperatures with Laser Heating.

Principal Investigator: Jay Bass

Workshop on Phase Transitions and Mantle Discontinuities.

Principal Investigator: Jay Bass

CSEDI: Collaborative Research: Composition and Seismic Structure of the Mantle Transition Zone.

Principal Investigator: Jay Bass

Consortium for Material Property Research in the Earth Sciences.

Principal Investigator: Jay Bass

Collaborative Research: Elasticity Grand Challenge of the COMPRES Initiative.

Principal Investigator: Jay Bass

Global Climate Change & The Evolutionary Ecology of Antarctic Mollusks in the Late Eocene.

Principal Investigator: Daniel B. Blake

A Seismic Study of the Mantle Transition Zone and Subducted Lithosphere.

Principal Investigator: Wang-Ping Chen

Seismic Reflection Profiles in Southern Illinois (funded through the Mid-America Earthquake Research Center).

Principal Investigators: John McBride, Stephen Marshak, and Wang-Ping Chen

A Seismic Study of the Taiwan Orogen.

Principal Investigator: Wang-Ping Chen

Collaborative Research: Lithospheric-Scale Dynamics of Active Mountain Building along the Himalayan-Tibetan Collision Zone.

Principal Investigator: Wang-Ping Chen

Proximal Carbonate Ejecta from Cretaceous-Tertiary Chicxulub Impact Crater: $^{87}\text{Sr}/^{86}\text{Sr}$ Chronology, Ballistic Sedimentation, & Diagenetic Alteration.

Principal Investigator: Bruce W. Fouke

Geobiology & The Emergence of Terraced Architecture During Carbonate Mineralization.

Principal Investigator: Bruce Fouke

Development of Cr Stable Isotopes for Cr Transport Studies and Other Geoscience Applications.

Principal Investigator: Thomas Johnson

Collaborative Research: Field Investigation of Se Oxyanion Reduction & Se Sources in Wetlands: Application of Se Isotopes.

Principal Investigator: Thomas Johnson

Measuring Trace Element Partition Coefficients between Minerals and Basaltic Melt.

Principal Investigator: Craig C. Lundstrom

Observational Constraints on Melt-Rock Reactions During Melting of the Upper Mantle.

Principal Investigator: Craig C. Lundstrom

Windows into MORB Petrogenesis: Measuring U-Series Disequilibria in MORB from Transforms.

Principal Investigator: Craig Lundstrom

Collaborative Research: Investigating the Processes and Timescales of Andesite Differentiation: A Comprehensive Petrological and Geochemical Study of Arenal Volcano, Costa Rica.

Principal Investigators: Frank J. Tepley III and Craig C. Lundstrom

Collaborative Research: Emplacement of the Ferrar Mafic Igneous Province: A Pilot Study of Intrusive Architecture and Flow Directions in Southern Victoria Land.

Principal Investigators: Stephen Marshak and Alan Whittington

Tectonics of the Araçuaí/Ribeira Orogenic Tongue of Southeastern Brazil and its Significance to the Assembly of West Gondwana.

Principal Investigator: Stephen Marshak

Structure and Dynamics of Earth's Core and Lowermost Mantle.

Principal Investigator: Xiaodong Song

Constraining the Structure and Rotation of the Inner Core.

Principal Investigator: Xiaodong Song

ONR

The Role of Shipyard Pollutants in Structuring Coral Reef Microbial Communities: Monitoring Environmental Change and the Potential Causes of Coral Disease.

Principal Investigator: Bruce Fouke

State Of Illinois Board Of Higher Education
Evolution of the Martian Surface—A

Cooperative Learning Module for General Education in Science.

Principal Investigator: Albert Hsui

University Of Illinois Research Board

Seed Money for Research Initiative in Aquifer Microbiology.

Principal Investigator: Craig M. Bethke

Airabrasive Unit for Paleontological Research.

Principal Investigator: Daniel B. Blake

Structure of Crust and Mantle beneath China from the New Chinese Broadband Digital Seismic Network.

Principal Investigator: Xiaodong Song

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- Hu, F.S., Lee, B.Y., Kaufman, D.S., Yoneji, S., Nelson, D.M., and Henne, P.D., 2002, Response of tundra ecosystem in southwestern Alaska to Younger Dryas climatic oscillations: *Global Change Biology*, 8: 1156-1163.
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- Hou, X., and Kirkpatrick, R.J., 2002, Structure and Dynamics of ClO_4^- in Layered Double Hydroxides: *Chemistry of Materials*, 14: 1195-1200.
- Wilkerson, M.S., Fischer, M.P., and Apotria, T.G. (editors), 2002, Fault-related folds: Transition from two dimensions to three dimensions, special issue of the *Journal of Structural Geology*: 24(4).
- Song, X.D., 2002, The Earth's Core, *International Handbook of Earthquake and Engineering Seismology* (Lee, W.H.K., Kanamori, H., Jennings, P.C., and Kisslinger, C., eds.), Volume 1, Chapter 56, Academic Press, San Diego.
- Blake, D.B., 2002, Evaluation of the Mississippian asteroid (Echinodermata) *Compsaster formosus* Worthen and Miller: A Paleozoic homeomorph of the post-Paleozoic *Asteriidae*: *Paleontologische Zeitschrift*, 76:357-367.
- Park, J., Bethke, C.M., Torgersen, T., and Johnson, T.M., 2002, Transport modeling applied to the interpretation of groundwater ^{36}Cl age: *Water Resources Research*: 38, 1-15.
- Wilkerson, M.S., Apotria, T.G., and Farid, T.A., 2002, Interpreting the geologic map expression of contractional fault-related fold terminations: Lateral/oblique ramps versus displacement gradients: Wilkerson, M.S., Fischer, M.P., and Apotria, T.G. (ed.), *Fault-related folds: Transition from two dimensions to three dimensions*, special issue of the *Journal of Structural Geology*: 24(4), 593-607.
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- Apotria, T.G., and Wilkerson, M.S., 2002, Geometry and kinematics of a fault-related fold termination: Rosario structure, Maracaibo Basin, Venezuela: Wilkerson, M.S., Fischer, M.P., and Apotria, T.G. (ed.), *Fault-related folds: Transition from two dimensions to three dimensions*, special issue of the *Journal of Structural Geology*, 24(4), 671-687.
- Jin, Q., and Bethke, C.M., 2002, Kinetics of electron transfer through the respiratory chain: *Biophysical Journal*: 83, 1797-1808.
- Song, X.D., 2002, Three-dimensional structure and differential rotation of the inner core: *AGU monograph on Core Dynamics, Structure and Rotation* (Dehant, V.M., Creager, K.C., Zatman, S., and Karato, S., eds.).
- Kao, H., Liu, Y.-H., Liang, W.-T., and Chen, W.-P., 2002, Source parameters of regional earthquakes in Taiwan (1999-2000) including the Chi-Chi earthquake sequence: *Terr. Atmos. Ocean. Sci.*: 13, 279-298.
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- Frias-Lopez, J., Zerkle, A.L., Bonheyo, G.T., and Fouke, B.W., 2002, Partitioning of bacterial communities between seawater and healthy, black band diseased, and dead coral surfaces: *Applied and Environmental Microbiology*, 68 (5): 2214-2228.
- Sun, X.L., and Song, X.D., 2002, PKP travel times at near antipodal distances: Implications for inner core anisotropy and lowermost mantle structure: *Earth Planet. Sci. Lett.*, 199: 429-445.
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- Herbel, M.J., Johnson, T.M., Tanji, K. K., Gao, S., and Bullen, T.D., 2002, Selenium stable isotope ratios in California agricultural drainage water: *Journal of Environmental Quality*: 31(4), 1146-1156.

Geothrust Members for 2002

- J. William Soderman—Chair,
M.S. '60, Ph.D. '62
- James R. Baroffio, Ph.D. '64
- David K. Beach, B.S. '73
- Marion "Pat" Bickford, M.S. '58,
Ph.D. '60
- Lester W. Clutter, B.S. '48, M.S. '51
- Norbert E. Cygan, B.S. '54, M.S. '56,
Ph.D. '62
- Edwin H. Franklin, B.S. '56
- John R. Garino, B.S. '57
- James W. Granath, B.S. '71, M.S. '73
- Morris (Brud) W. Leighton, B.S. '47
- Patricia Santogrossi, B.S. '74, M.S. '77
- Jack C. Threet, A.B. '51

COLLOQUIUM SPEAKERS FOR SPRING AND FALL 2002



Spring 2002

- Jan. 25 Miguel Goni, University of South Carolina**
Compound Specific Stable Carbon Isotopic Analysis to Trace Organic Matter in Ocean Margin Sediments
- Feb. 1 Edwin Schauble, California Institute of Technology**
Predicting the Stable-Isotope Geochemistry of Heavy Elements
- Feb. 8 Todd Ehlers, California Institute of Technology**
Climate, Tectonics, and Topographic Evolution of the Washington Cascade Mountains
- Feb. 12 Timothy Ku, University of Michigan**
New Insights into Tropical Shelf Carbonate Preservation and Authigenic Clay Formation: Evidence from Sediment and Pore Water Geochemistry
- Feb. 15 Jonathan Stock, University of California, Berkeley**
Valley Incision by Debris Flows: Evidence for a Widespread Topographic Signature and the Form of a New Erosion Law
- Feb. 19 Timothy Rozan, Simon Fraser University**
Trace Metal Speciation in Freshwaters: Organic Versus Inorganic Complexation. Part I. Multidentate Metal-Organic Complexation Part II. The Role of Reduced Sulfur
- Feb. 22 Andrew Jacobson, University of Michigan**
Silicate Versus Carbonate Weathering in Uplifting Orogenic Belts
- Feb. 25 Gerd Steinle-Neumann, Carnegie Institution of Washington**
Earth's Deepest Secrets—Iron in the Inner Core
- Feb. 28 Jie Li, Carnegie Institution of Washington**
Experimental Constraints on the Earth's Core
- Mar. 4 Sang-Heon Shim, University of California at Berkeley**
Phase Diagram and Equation of State of $MgSiO_3$ Perovskite in Earth's Mantle
- Mar. 11 Guoyin Shen, University of Chicago**
Experimental Approaches Towards an Understanding of Earth's Mantle and Core Materials
- Mar. 26 Susan Kieffer**
Geologic Nozzles: Old Faithful Geyser, Mount St. Helens, the Rapids of the Colorado River...and Other Shocking Phenomena!
- Apr. 5 Holger Hellwig, Carnegie Institution of Washington**
Nonlinear Optical Studies of the Relationship Between Structure and Properties
- Apr. 8 Jonathan Tomkin, Yale University**
Quantitative Testing of Bedrock Incision Models, Clearwater River, WA
- Apr. 10 Elizabeth Hearn, Massachusetts Institute of Technology**
Space Geodetic Studies of Active Crustal Deformation: Moving from "How" to "Why"
- Apr. 12 Hong Wang, ISGS**
Millennial and Centennial Scale Climate Changes in the Middle Mississippi Valley During the Last Glaciation
- Apr. 15 Gwen Daley, University of Wisconsin, Madison**
Why Paleoenvironment Matters: Evolutionary and Paleocological Examples from the Ordovician and Pleistocene
- Apr. 18 Charly Bank, University of British Columbia**
Teleseismic Investigation of the Moho Beneath Canada and the Upper Mantle Beneath the Archean Slave Craton in NW Canada
- Apr. 19 Wang-Ping Chen, UIUC Department of Geology**
Project Hi-CLIMB: An Integrated Study of the Himalayan-Tibetan Continental Lithosphere during Mountain Building
- Apr. 22 Julie Maxson, Gustavus Adolphus College**
Reconstructing Rivers: Answering Big Questions About Life, Death, Tectonics, and Climate
- May 2 John Werner, University of Illinois at Urbana-Champaign**
Creeping into the Icehouse: Morphological Change in Gastropods of the Eocene La Meseta Formation (Seymour Island, Antarctic Peninsula) in Response to the Onset of Cenozoic Cooling
- May 6 John Dawson, University of Iowa**
The Morphology and Evolution of the Azooxanthellate Coral Genera *Anomocora* and *Asterosmilia*

Fall 2002

- Sept. 6 Tom Johnson, UIUC Department of Geology**
Chromium Isotopes and the Fate of Hexavalent Chromium in the Environment
- Sept. 13 Andrey Kalinichev, UIUC Department of Geology**
Molecular Modeling of Geochemical Fluids and Fluid/Mineral Interfaces
- Sept. 20 Ken Lepper, Los Alamos**
Luminescence Dating: A Light From the Past Brightens the Future of Quaternary Geochronology
- Sept. 27 Meenakshi Wadhwa, Field Museum of Natural History and University of Chicago**
Time Scales of Planetsimal Accretion and Differentiation Based on the Mn-Cr Chronometer
- Oct. 4 Aldo Shemesh, Weizmann Institute, Israel**
Holocene Climate Change Inferred From Oxygen Isotope Records of Lacustrine Biogenic Silica
- Oct. 11 Charlie Werth, UIUC Environmental Engineering**
Analysis of Nonaqueous Phase Liquid Volatilization in Heterogeneous Porous Media
- Oct. 18 Louise Kellogg, University of California, Davis**
Journey to the Center of the Earth: Structure and Dynamics of the Deep Mantle
- Nov. 8 Renata Wentzcovitch, University of Minnesota**
First Principles Thermoelasticity of Mantle Materials
- Nov. 15 James Conder, Washington University, St. Louis**
Across-Axis Mantle Flow and Asymmetric Melt Production at the East Pacific Rise
- Dec. 4 Libby Stern, University of Texas, Austin**
Geochemical and Ecological Evidence of Massive Central Texas Holocene Soil Erosion
- Dec. 13 Georges Poupinet, LGIT-CNRS, Grenoble, France**
Seismic Tomography Beneath Stable Tectonic Regions and the Dual Origin of the Continental Lithosphere

Recent Activity in Petroleum Geology at Illinois

Back in 1998, Hannes Leetaru, Ph.D. '97, a geologist at the ISGS and an adjunct faculty member in the Department, joined with Prof. Steve Marshak to establish a new course in petroleum geology. Five years later, the course is still going strong and is continuing to grow in enrollment. Because of Marshak's other teaching responsibilities, Leetaru now runs the entire course, bringing to bear his many years of experience working in the industry. Not only do students learn how to interpret seismic-reflection profiles and well logs, but the course includes exercises that involve Landmark™ computer software, one of the principal programs used by the petroleum industry for modelling geologic features in three dimensions.

This past fall, students interested in petroleum geology had the added benefit of being able to attend the eastern section meeting of the AAPG, which was hosted by the ISGS and took place in Champaign-Urbana. At the meeting, students attended talks, met with recruiters and industry representatives, and saw exhibits of software and geophysical companies. Prof. Bruce Fouke and his group presented research at the meeting. Fouke also hosted an open house for meeting participants to visit the new geomicrobiology lab in the Department.



Join us in Utah!

Come join Geology Department friends and colleagues at a special reception Monday, May 12, at the AAPG meeting (in Salt Lake City). The reception will honor three Illini — Albert Carozzi, Jack Threet and Norb Cygan — who have received major AAPG awards. Details will follow soon!



Professor Craig Lundstrom organized a raft trip down the Colorado River, in the Grand Canyon. Here Professors Craig Bethke and Tom Johnson (second and third from left) enjoy a quieter moment on the river.



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Department of Geology

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

2003



Professor Jie Li Joins Department

The Department has added a new mineral scientist to the faculty by hiring Jie Li (JEE-uh Lee), as an assistant professor. Li received her Ph.D. from Harvard— as did Emeritus Professor Don Henderson, who taught mineralogy at Illinois from 1948-1989. After finishing at Harvard, Li held a post-doctoral research position at the Carnegie Institution in Washington. She arrived on campus in March 2003 with her husband, Holger Hellwig (see related story on page 5). This fall, she taught Geology 332 (Mineralogy).

Li conducts experiments to investigate the nature and dynamics of the Earth's core. These experiments involve measurements at extremely high pressures and temperatures, which can only be achieved using diamond anvils and lasers. While everyone agrees that most of the Earth's core consists of iron, there are many theories about what makes up the non-iron part. Li has been looking at the melting relations in the Fe-O-S iron-alloy system. This work will help determine whether this system is an accurate model for the core composition.

Li's research lab is in the northeast corner of the Natural History Building (NHB) basement. In order to meet modern building codes, the lab had to be completely renovated and new air conditioning, plumbing, and electricity had to be installed.

"Most of NHB is quite old, but you go into the new space and suddenly you are in a different world—it's all modern!" says Li.

She is particularly pleased with the lab's light-blue tile floor, not because of its appearance, but because she works with extremely small samples.

"It's like carrying a speck of dust in your hand," says Li, of her samples. "Once, as a postdoctoral researcher, I was carrying a sample to a colleague's office, only to have it fall from my hand onto a shag carpet. I spent hours on my hands and knees, looking through the carpet inch by inch, but I never found it," says Li. "The sample had taken untold hours to prepare. Since then, I dreamed of having a light-colored, smooth floor without a pattern, so if you drop a sample, you can find it easily."

Kirkpatrick Receives Dana Medal

R. James Kirkpatrick, professor of geology and executive associate dean of the College of Liberal Arts and Sciences, has been awarded the Dana Medal from the Mineralogical Society of America (MSA).

The Dana Medal, which was first awarded in 2000, recognizes continued outstanding scientific contributions through original research in the mineralogical sciences by an individual in the midst of their career. The award is named in honor of the legendary contributions by James Dwight Dana (1813-1895) and Edward Salisbury Dana (1849-1935) to the science of mineralogy. Kirkpatrick, who is only the fourth recipient of the honor, will be recognized at an awards session during an MSA meeting in Copenhagen, Denmark. The recipient of the Dana Medal receives a bronze, engraved medal and gives a special scientific presentation that is published in *American Mineralogist*.

Kirkpatrick was recognized for being among the first to apply kinetic theory in igneous petrology. His studies of the kinetics of crystallization are the classic papers in this field. In more recent years, he established a preeminent lab (with Eric Oldfield in the Chemistry Department) for applying "magic-angle spinning NMR spectroscopy" to the study of earth materials such as glass and clay. His work on the internal ordering of minerals again was at the forefront of the field. Most recently, he has worked to understand the natural chemical reactions that occur on mineral surfaces and to bridge the gap between Earth science and materials sciences. This work involves a variety of materials, including clay, glass, and even concrete.



GREETINGS

Letter From The Head

As each year passes, we see new and exciting growth in the Department of Geology. During 2003, we have added a new professor, Jie Li, in mineralogy, two new research scientists, Holger Hellwig and Rob Sanford, and a lecturer, Michael Stewart. Prof. Li and Dr. Hellwig have moved into a new state-of-the-art lab for the study of mineral properties at high pressures in the lower level of the Natural History Building. Dr. Sanford works in the area of environmental microbiology, a fast-growing discipline in geoscience. Dr. Stewart, an igneous petrologist and geochemist, teaches large-enrollment introductory courses, and also contributes to graduate courses in tectonics.

But the passage of time also means retirements, and 2003 has, unfortunately, also seen Prof. Dan Blake, a prominent paleontologist, leave the faculty after 36 years of outstanding scholarship and teaching. The good news is that Dan is staying in town, and will continue his research.

We are also developing in a new academic direction at Illinois. Specifically, the Geology Department is involved in a joint search with the Department of Atmospheric Science and the Department of Geography to bring in new faculty who have interests in the role of water in the Earth system. This search is part of an effort to explore the creation of an alliance among the three departments, perhaps in the form of a

new School of Earth and Environment on campus.

We are now entering the final phase of our endowment campaign, GeoScience 2005, and we're approaching our goal of raising \$3 million, the income from which will help ensure that the Department continues on a positive trajectory. We hope that the many alums and friends of the Department can help play a role in the future of the Department by becoming involved in the GeoScience 2005 effort.

Please feel free to stop by for a visit, and see some of the renovations in NHB, or join us at our receptions at GSA and AAPG. I wish you all the best for the coming year.

Research Highlights

Professors Craig Lundstrom and Tom Johnson are pleased to report that they have placed an order for a new isotope ratio mass spectrometer. The \$700k instrument is funded mostly from the National Science Foundation, with matching funds provided by the department and the university administration. It will be used to measure isotope ratios of strontium, uranium, lead, chromium, selenium, mercury, calcium, and many other elements. The data will be used in studies involving age dates of rocks, chemical reactions affecting the mobility of contaminants in water, the processes involved in magma generation and ascent, chemical reactions in sedimentary environments, and a variety of other geoscience areas.

Prof. Bruce Fouke took 15 students from the University of Illinois to the Caribbean during winter break. They visited Curaçao, in the Netherlands Antilles, to study the formation of carbonate rocks and the geology of coral reefs. Students worked both offshore and onshore, to see all the steps involved in forming reefs, and eventually transforming them into limestone.

Prof. Wang-Ping Chen is supervising a multinational research project in the Himalayas and Tibet. The project, known as HiCLIMB, is designed to understand the geologic evolution of the highest mountain range on Earth, and the crust beneath it, and to determine the cause of earthquakes in the region. He has been setting up seismic arrays in Nepal and China.

Prof. Jay D. Bass has been conducting research in mineral physics at the École Normale Supérieure de Lyon (France), working with their high-temperature Raman spectroscopy group. This collaboration is part of the CNRS-UIUC Partnership, a link that connects UIUC to major institutions in France. Prof. Bass is also establishing connections with universities in Prague and Budapest.

Over spring break, a group of students will travel to northern Scotland as part of a field course run by the University of Leicester (UK). There they will study the rocks and structures in the birthplace of geology. They will visit many of the classic rock outcrops at which the fundamental principles of geology were first established.

Prof. Xiaodong Song is working with research groups in China to understand the crustal structure of eastern Asia.

Prof. Craig Lundstrom is conducting research on volcanoes in Costa Rica. He recently spent time in the field sampling volcanic rocks, which he then melts in his laboratory at the Department to understand the controls on the chemical composition of the rock.

Prof. Susan Kieffer, Walgreen Professor of Geology, is working on the dynamics of geothermal systems in New Zealand. She recently spent six weeks in New Zealand conducting measurements in geothermal wells.

Year in Review is published once a year by the Department of Geology, University of Illinois at Urbana-Champaign, to summarize the activities and accomplishments within the department and news from alumni and friends.

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Hayden Murray Receives Alumni Achievement Award

Haydn Murray, B.S. '48, M.S. '50 and Ph.D. '51, has received the 2003 Department of Geology Alumni Achievement Award.

Murray, a highly regarded clay mineralogist and sedimentologist, split his career between the Indiana University and the Georgia Kaolin Company. Murray, who has made important contributions to mineralogy and industrial applications of clays, first taught and did research at Indiana from 1951-56. Then he was hired away by Georgia Kaolin where he worked from 1957-73. At that point, Indiana University asked him to return to campus as professor and chair of the geology department. Murray served as chair until 1984, then continued to teach and do research for another 10 years, when he retired.

In recognition of his achievements, Murray was elected last year into the National Academy of Engineering. In addition, he has received the lifetime achievement award from the Professional Geologists of Indiana and an honorary doctorate from the University of the South, in Bahia Blanca, Argentina. In the spring of 2004 he will receive an honorary degree from Indiana University.

Murray also has been very active in various professional organizations, serving, at various times, as president of the Clay Mineralogy Society (of which he was also one of three founding members), the Ceramic Association of New Jersey, the Society for Mining, Metallurgy and Exploration, American Institute of Professional Geologists and the International Association for the Study of Clays (AIPEA).

Murray came to the attention of Georgia Kaolin because of his dissertation work on kaolinite. The company, which was having problems with the flow properties of kaolin from one of their sites, asked Murray if he could determine which deposit was causing the problem. After he did so, they offered him a full-time position.



"Georgia Kaolin tried to hire me starting in 1953," says Murray. "Once their salary offer became three times my salary at Indiana I decided to take the leap."

But another reason Murray took the job was to see whether he could "make it" in industry. In fact, Murray was quite successful, ultimately moving from director of applied research all the way to executive vice president and COO. While working for Georgia Kaolin, Murray continued to research and write papers, so the shift back to academia in the 1970s

was not a difficult transition. "It was an easy move," he says. "We both (he and his wife, Juanita) liked Bloomington (Indiana) very much. It was easier to shift also because of my management experiences at Georgia Kaolin. I also found that the graduate students migrated toward me because of my practical experience."

Born and raised on farm near Kewanee, Ill., Murray thought he might be a mining engineer. After serving as an officer with the Army Corps of Engineers in the South Pacific, he enrolled at the University of Illinois. There, he discovered he enjoyed the geology courses more than the engineering. He also found several wonderful mentors and advisors within the Department, including Harold Wanless, Ralph E. Grim, and Carleton Chapman.

"Dr. Chapman was the best teacher I ever had and Dr. Grim, who was considered the father of clay mineralogy, was the most ethical and the best clay mineralogist I ever met. I had a really good experience at the University of Illinois."



Margaret Leinen (center) receives the 2002 Alumni Achievement Award. Pictured here with Leinen are (from left), Professor Susan Kieffer, Professor Dan Blake, Bill Sullivan, director of the Environmental Council, Leinen, Professor R. James Kirkpatrick, Don Wuebbles, head of the Department of Atmospheric Sciences, and Professor and Department Head Steve Marshak.

Undergraduate Research

One of the advantages of being an undergraduate at a research university is the opportunity to participate in active research programs. The experience of two of our seniors this year illustrates this point.

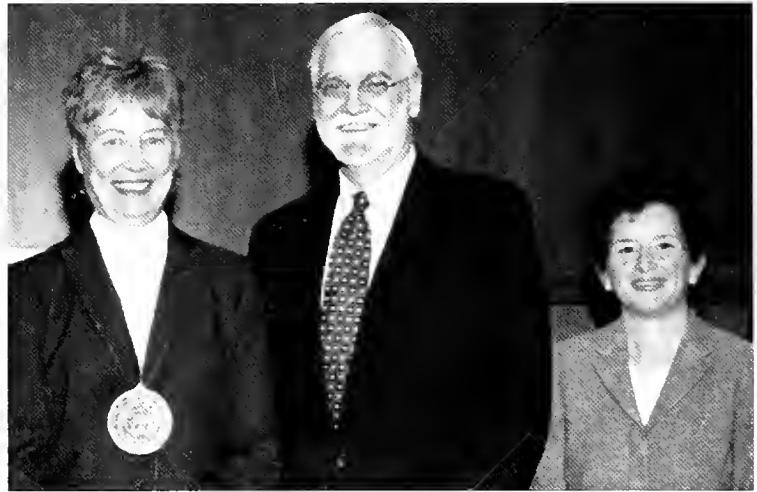
Amy Luther, who graduated in December 2003 with a B.S. in geology, collaborated with Prof. Dan Blake and John Werner, a former visiting assistant professor, on a project using computer analysis to see if Antarctic bivalves changed shape during the Eocene, a time of dramatic climate change.

"I was interested in working with fossils to see what paleontologists do," said Luther. "Plus, I learned how to write a scientific paper, do research, and had the opportunity to go to professional meetings. I saw how the process works."

Roger Bannister, a senior, worked with Ph.D. student Kurt Burmeister (see Year in Review 2002) and Prof. Stephen Marshak on a project involving the development of structures in the Appalachian fold-thrust belt of New York. In particular, Bannister is looking at microscopic deformation in sandstone by documenting the amount of finite strain that has developed in association with folding. Using photomicrographs and a computer program, he measures subtle changes in the distances between the centers of neighboring grains to see if grains have been preferentially stretched in a given direction.

"It's really neat to quantify deformation," says Bannister. "On field trips, students are used to hearing professors ask, 'Do you see the fold?' But to learn how folding affects rock at the grain scale makes the whole process more interesting."

Both Luther and Bannister are planning to begin graduate work in geology next year.



Sue Kieffer, Dean Jesse Delia, and Chancellor Nancy Cantor at Kieffer's investiture as Walgreen Professor.

Bethke Elected AAAS Fellow

Craig Bethke, professor of geology, has been elected to the rank of Fellow in the Division of Geology and Geography of the American Association for the Advancement of Science. This honor is bestowed on AAAS members who have made distinguished efforts on behalf of the advancement of science or its applications. Bethke was selected for his fundamental discoveries in the forces that drive brines across sedimentary basins, migration of petroleum reserves, the thermodynamics of reacting geochemical systems, and microbial metabolism.

Founded in 1848 to represent all disciplines of science, AAAS is the world's largest scientific society. The organization's tradition of electing fellows began in 1874. This year, only 13 members were honored by promotion to fellowship in the Geology-Geography Division.

Bethke obtained his Ph.D. from the University of Illinois in 1985, and has been on our faculty ever since. He received the Presidential Young Investigator Award in 1986, the Lindgren Award from the Society of Economic Geologists in 1987, and the Meinzer Award from the Geological Society of America in 1992.

Four Faculty Receive Tenure

We are delighted to announce that last year saw the granting of tenure to four of our faculty. **Bruce Fouke**, **Tom Johnson**, and **Xiaodong Song** have become associate professors of geology, and **Feng-Sheng Hu** has become an associate professor of plant biology and geology. Tenure review is a very high bar to cross at the University of Illinois; the process of evaluation takes place at the Department, College, and University levels. Success in achieving tenure emphasizes the vigor of teaching and research efforts of our faculty. The Department congratulates our newest associate professors!



Research Scientists Strengthen Department

Research scientists are vital to the growth of the Department. With the hiring of Holger Hellwig and Rob Sanford, the Department now has five research scientists on staff. In addition to Hellwig and Sanford, they include George Bonheyo (geomicrobiology), Andrey Kalinichev (molecular dynamics), and Stanislav Sinogeikin (mineral physics).

Research scientists focus entirely on research, and their positions are supported entirely by research grants. Thus, they add to the vitality of the Department and provide additional expertise. Also, the overhead component of grants that they obtain contributes significantly to covering the cost of Departmental operations.

"We can focus entirely on research," says Sanford. "With a pool of research scientists, the

amount of research and the number of papers coming from the Department increases. Our productivity raises the institution's visibility."

Sanford, a geomicrobiologist, is working on two projects funded by the Department of Energy. One is in collaboration with Craig Bethke, professor of geology, and looks at the microbiology of aquifers. The other is looking at possible microorganisms that can be used to neutralize uranium. In Spring 2004, he is also teaching a course in "Laboratory Methods for Geomicrobiology," which is a boon for students wanting to work in the growing field of geomicrobiology.

Holger Hellwig arrived on campus, with his wife, Jie Li, in March of 2003 (see cover story). Hellwig, a mineral physicist, traces his interest in crystals to playing with Legos as a child.

Right now, Hellwig is "playing" with high pressure, diamond-anvil cell tech-

niques. Since arriving at the University of Illinois, he has begun to focus on the properties of water under high pressure. The use of a diamond anvil cell "opens the window into certain properties of the material we couldn't look at before," he says.

Another project Hellwig has worked on is high-pressure behavior of tin dioxide. Tin dioxide acts as a proxy for silica, which is an important component of the Earth's interior.

Hellwig completed his Ph.D. in his native Germany, then went to the Carnegie Institution in Washington D.C. where he did projects relating to nitrogen, and met Jie Li, the newest assistant professor in the Department of Geology. At Illinois, Hellwig is building a lab for laser crystallography, and is teaching an upper-level course in X-ray crystallography.

Michael Stewart Joins Department

Michael Stewart, Ph.D., joined the Department of Geology last August as a lecturer. Stewart earned his B.S. and M.S. degrees from Indiana University. He then worked for three years as an environmental geologist in Chicago, before going to Duke University for his Ph.D. At Duke, Stewart investigated volcanic systems along mid-ocean ridges and how they related to the construction of the oceanic crust.

Stewart's position is designed to address teaching needs in the Department, and has him in front of a

class for much of his time. In the fall semester Stewart taught two classes: Geology 103, a course that teaches quantitative methods in the context of introductory geology; and Geology 117, an introductory oceanography course for non-science majors. In the spring, 2004 semester, Stewart is teaching three courses: Geology 100 (Introductory Geology); Geology 108 (Historical Geology); and Geology 489 (Geotectonics).

"I really like teaching and dealing with students," says Stewart. "I only interviewed for positions with a large teaching component."

Stewart adds that he is very glad to be part of the Geology Department.

"This is an excellent department with a history of important contributions to geologic sciences," he says. "Also, the University continues to impress me, with its recent and past Nobel Prize winners, and the quality of students, among other things."

Stewart and his wife, Carol, and two-and-a-half-year-old son, Maxwell, came to Champaign-Urbana from Durham, North Carolina. Both he and Carol are from the Midwest, and they are glad to be closer to family.

Susan Kieffer Teaches a Sustainability Seminar

During spring semester 2004, Susan Kieffer is offering a new 300-level course, titled "The Challenge of a Sustainable Earth," that has attracted both undergraduate and graduate students from both Geology and other departments.

"First we'll review the state of the world," says Kieffer, Walgreen Chair and Professor of Geology. "What does sustainability mean and what is the difference between that and sustainable development?"

Kieffer and the students are exploring the current and future states of crucial resources such as water, soil, energy, minerals and the ecosystem. They begin by examining the concept of an "ecological footprint," which is a quantitative way to talk about the number of acres of land per person the world would need to support the number of people on the planet. It turns out that if the entire world consumed as much as most North Americans, the world



Prof. Kieffer (shown here with several Galapagos Island school children) spent six weeks in the Galapagos Islands, working with teachers and developing materials for a new seminar on "Sustainability" that she is teaching this spring.

would need to be three times its current size. This discussion uses the pre-history of the Easter Islands as a microcosm for the world. On this small, remote island,

the original inhabitants used up all the resources and descended into warfare and cannibalism. The students also will be looking at inequities from a geographical perspective and an intergenerational one. Kieffer points out that current generations are harvesting the most easily accessed resources, leaving the difficult, expensive ones for later generations.

"This course is unique within the University in the way it weaves the study of Earth systems — particularly geology — with ethics, economics, philosophy, religion and ecology," says Kieffer. Kieffer has wanted to teach a course like this for quite a while, and is pleased to be able to present it as her first course at Illinois. She

feels that attaining sustainability is the challenge facing everyone, and we must address it not only with science, but with values and moral perspectives.

Hu Leads Climate Study

(This article is based on information from the University of Illinois News Bureau)

A research project led by Feng Sheng Hu, associate professor of geology and plant biology, suggests that variations in the Sun's intensity have affected climate and ecosystems over the last 12,000 years. The findings were reported in the September 26, 2003, issue of the journal *Science*.

The data, from geochemical and biological evidence collected from Alaskan lake sediment, help to explain past changes on land and in freshwater

ecosystems in northern latitudes and may provide information to help project the future. The scientists identified cycles lasting 200, 435, 590 and 950 years during the Holocene Epoch. The pattern of environmental variations they found also matches nicely with cyclic changes in solar irradiance and the extent of sea ice in the North Atlantic

"We found natural cycles involving climate and ecosystems that seem to be related to weak solar cycles, which, if verified, could be an important factor to help us understand potential future changes of Earth's climate," Hu said.

"Will changes in solar irradiation in the future mitigate or exacerbate global warming in the future? They may do both," Hu notes. "A period of high solar irradiance on top of high levels of greenhouse gases could result in unprecedented warming. Naturally, the big question is whether human activity is causing the current warming."

While the study can't answer that question directly, it provides baseline information on natural climatic variability that will allow researchers to pursue a variety of climate-related questions in the future.



Dan Blake Retires

Dan Blake, professor of paleobiology, retired in 2003. Blake, who received his B.S. from the University of Illinois in 1960, his master's from Michigan State in 1962, and his Ph.D. from Berkeley in 1966, has been a member of the department since 1967. On April 9, 2004, Professor Blake gave a valedictory colloquium, after which the Department hosted a reception in his honor. During his nearly four-decades-long career, Blake became the world's expert on starfish fossils, and for many years has served as editor of the discipline's leading journal. In recent years, he has also played a major role in the University's Spurlock Museum. Blake has also left a legacy of appreciative students.

Dennis Kolata, Ph.D. '73, Blake's first doctoral student and now principal geologist with the Illinois State Geological Society, said: "What impresses me about Dan is the life-long bond that he has forged with his students. For many of us, Dan's role in our life has evolved from teacher and mentor to friend and colleague to brother-like bond. His serious, quiet demeanor belies an inner warmth, humor, and down-to-earth manner."

"It is fair to say that I wouldn't be a paleontologist if it were not for Daniel B. Blake," writes Danita Brandt, B.S. '78, now a senior academic specialist in the Department of Geological Sciences at Michigan State University. "Invoking Edward Lorenz's 'butterfly effect' of historical contingency: if not for Dan I wouldn't have gone to Cincinnati for grad school, which led to Yale, which led to meeting my husband, and eventually, to two great kids as well as a professional involvement in paleontology. So Dan's impact on my life has been profound, to say the least! Dan mentored many grad students, but I count myself as especially fortunate to be among the more exclusive group of undergraduates that came under his tutelage. In the summer of 1975 Dan was looking to hire a lab lackey, and I,

just having completed freshman year, got the job. I also got a tiny office in the "catacombs" (a maze of underground student offices) a pair of "older-brothers-in-paleontological-training" (Ed Snyder and Tom Guensburg), an extended family of Dan's former students (Dennis Kolata, Jim Risatti, Bill Ausich, Frank Ettensohn), as well as a mentor. For the remainder of my undergraduate days, my academic and social life centered on my paleontological family. When it came time to think about grad schools, it was Dan who suggested that I apply to the University of Cincinnati and work with Dave Meyer. At the time, I did not know there WAS a university in Cincinnati. Dan's intuition was right—Cincinnati and I were a good fit, and from there it was on to Yale and the rest of my life, which, happily, has included a steady and cherished correspondence with my first mentor and long-time friend."

"When I originally came to the department in the mid-1980s, my plan was to get a master's and then move on to another school," writes Steve Hageman, M.S. '88, Ph.D. '92, now on the faculty of Appalachian State

University. "I stayed at Illinois for my Ph.D. because of Dan. I knew that for my needs, I could not find a better advisor, mentor and ultimately friend. Over the years Dan's professional demeanor has delighted his graduate students. All are impressed by his encyclopedic knowledge of his field and his high personal and professional standards."

"Dan was a wonderful, helpful, and generous advisor," says Janis Treworgy, Ph.D. '85, now on the Earth Science faculty at Principia College in Elsah, Ill. "He accepted my dissertation one chapter at a time and gave me feedback, and then he turned around the entire dissertation in less than a week. He knew I was under a deadline that wouldn't wait — I was eight months pregnant with my first child at that point. He knew I wanted to finish before the baby came if at all possible. He was super in helping me meet that goal!"

Though Dan has technically retired, his commitment to research and mentoring continues unabated. Dan is currently supervising three graduate students, has an active research program in Antarctica, and is working on a monograph concerning the evolution of starfish.

Microbes Thriving in Slag Dumps

This article is courtesy of a GSA press release

Sometimes the most extreme environment for life isn't at the bottom of the ocean or inside a volcano. It's just south of Chicago. Illinois groundwater scientists, including several Geology Department members, have found microbial communities thriving in the slag dumps of the Lake Calumet region of southeast Chicago. The water there can reach extraordinary alkalinity of pH 12.8, which is comparable to caustic soda and floor strippers and far beyond known naturally occurring alkaline environments. The closest known relatives of some of the microbes are in South Africa, Greenland, and in the alkaline waters of Mono Lake, California.

George Roadcap, along with Professor Craig Bethke, Research Scientist Rob Sanford, Qusheng Jin (a graduate student of Bethke's now a post-doc at Berkeley) and Jose Pardinias (formerly of the university's biotechnology center), came upon the microbes while studying contaminated groundwater created by more than a century of industrial iron slag dumping in southern Illinois and northern Indiana.

Illinois Geology Roars Ahead in the Jazz Age

Ralph L. Langenheim

The “Roaring Twenties” saw the Illinois Geology Department rise to national stature. Illinois was ranked 13th among 39 existing geology doctoral programs by the first American Council of Education evaluation of doctoral programs. This report, published in 1925, was based on the opinions of 68 “distinguished American scholars.” Ten years later, the Council’s second survey rated Illinois 11th among 55 geology doctoral programs.

Illinois’ reputation grew from graduate programs established prior to 1920 by William S. Bayley and T. E. Savage in, respectively, igneous and metamorphic geology and stratigraphy-paleontology. In 1919 Terrence T. Quirke added strength in hard-rock geology. During the Jazz Age other notable faculty joined the department. These included Morris M. Leighton, who served as an assistant professor from 1919 to 1923, before leaving to become a full-time member of the State Geological Survey, of which he ultimately became the chief; Arthur Bevan, who joined the staff in 1921 as an assistant professor specializing in stratigraphy structural geology and geomorphology and later joined the Virginia Geological Survey; and Arle Sutton, a stratigrapher-paleontologist who came in 1927.

Francis Shepard, who would become one of the world’s preeminent marine geologists, came to Illinois in 1922 after receiving his Ph.D. from Chicago. Shepard started out teaching engineering geology, but soon turned his attention to marine geology, studying the sediments of the continental shelf and the nature of submarine canyons. Happily, Shepard’s father owned a Boston-based shipping line and Shepard used his father’s yacht as a research base. He began conducting research at the Scripps Institution of Oceanography at La Jolla, California, in

1933 and in 1937 took a leave of absence to move to Scripps whilst retaining his position at Illinois. Shepard worked at Scripps through World War II and finally resigned from Illinois in 1946. Historians of geology view Shepard as the father of “marine geology,” a discipline conceived, gestated, and born at land-locked Illinois!

The arrival of Harold Rollin Wanless, a Princeton Ph.D., proved pivotal in establishing a strong sedimentary geology program at Illinois. Wanless, who arrived in 1923 as an instructor, started out teaching vertebrate paleontology. He also was appointed an associate in the Illinois State Geological Survey, and, with a young Ph.D. from Chicago, Marvin Weller, began a comprehensive study of the Pennsylvanian System in Illinois. Wanless undertook detailed mapping in the Western Illinois coal field while Weller embarked on statewide stratigraphic and paleontological studies. Recognizing cyclicity in Pennsylvanian rocks throughout the Illinois Basin they proposed that the strata recorded widespread, repeated rise and fall of sea level; the “Cyclothems Theory.” Weller ascribed the cycles to repeated depression and uplift of the earth’s crust. Wanless, however, in conjunction with Shepard, proposed worldwide fluctuation of sea level caused by repeated episodes of continental glaciation. The nature of cyclothems and their explanation became a dominant theme in Carboniferous stratigraphy for decades, and Wanless’ views eventually dominated.

Waldorf Vivian Howard, appointed instructor in 1926, became a nationally known pioneer in the new discipline of carbonate petrology and porosity. Howard also was an early investigator of the origin of oil. After achieving prominence in carbonate studies, he left the Department in 1936 for work in industry.

Forty-two graduate degrees in geology were granted at Illinois between 1920 and 1934. Savage advised 16 candidates in stratigraphy, paleontology and mapping — approximately one every year. Between 1926 and 1934 Howard supervised 12 theses on limestones, about one and one-half per year. Thus, excepting two projects in Precambrian crystalline rocks, one on tectonics and one on marine geology; graduate research at Illinois from 1920 through 1934 dealt entirely with sedimentary rocks.

Quirke remained chairman through 1928, when William S. Bayley became head of the Department. In 1931, Bayley retired and was replaced by Frank Walbridge DeWolf. DeWolf, chief of the Illinois State Geological Survey, had previously directed successful oil exploration programs in Texas and Louisiana.

In 1920, the Department comprised five senior staff geologists — Rolfe, Bayley, Savage, Quirke, and Leighton. The total budget stood at \$31,100. In 1934 there were seven senior staff; DeWolf, Savage, Quirke, Howard, Shepard, Sutton and Wanless, and the budget had essentially doubled.

Bruns Named Assistant Development Director



David Bruns is the new assistant director of development for the College of Liberal Arts and Sciences, responsible for building relationships with alumni and friends that will help secure financial support for the Department of Geology. “It is an absolute privilege for me to work with the alumni of the department to ensure that this legacy continues for future generations of geology faculty and students for many years to come,” he says.



GeoScience 2005 Update

The Department's GeoScience 2005 endowment campaign is approaching its goal, but we still have a way to go. So far, we have raised \$ 2.7 million of the \$3 million target. Once completed, the campaign will help fund new professorships, graduate fellowships, facilities and equipment, field-trip and field-camp support, student research support, the geology library, and the geology colloquium series.

We're pleased to announce that generous contributions from many alums to the Wanless Fund, initiated by Jim Baroffio (Ph.D. '64), has allowed the fund to grow enough to warrant a match from the University and become a full graduate student fellowship. We're also pleased to announce that Roscoe Jackson (M.S. '73, Ph.D., '75) has established a new fund for the support of graduate research. Shell Oil Company made a donation to the department in 2003 for research support. The Department has been chosen as one of a select group of geology departments across the country that Shell plans to support.

Roscoe Jackson Establishes Research Fund

Roscoe Jackson, M.S. '73, Ph.D. '75, has established a graduate student research fund as part of the GeoScience 2005 campaign.

Jackson wanted to establish a fund for students who might need a little extra support, students who might otherwise have to get a second job or get a loan from mom or dad.

"I'm not interested in buildings or bricks," says Jackson. "But I know budgets are tight. I always felt that one problem a lot of graduate students have was getting money for miscellaneous expenses that are so important to their research, things like field research and going to meetings, for example."

Jackson remembers a time in his school career when such a fund would have helped him a lot. It involved using a flume for his study of sediment flow in

"One of the most gratifying things about the campaign has been the large number of alumni, friends, and faculty that have been donating," says Stephen Marshak, professor and department head. "The level of support that our department receives sets us apart from almost all other departments in the LAS College."

2005 is fast approaching, and it would be wonderful if we could reach our target. We're hoping that alumni and friends who have not contributed previously will consider doing so, and that those who have might consider increasing their gift in the spirit of the campaign. If you are interested in helping to establish the financial foundation that the Department needs to continue remaining strong in the 21st century, please take advantage of the form in the back of this Year in Review and of the enclosed business reply envelope. We have listed various specific funds, if you wish to direct your support to a specific goal. Thank you!

the Wabash River Valley. The department head of civil engineering was happy to lend Jackson the flume and technical support, but he needed to supply the sand and pay for the electricity to run the flume. He just didn't have the funds and had to abandon the idea.

Jackson, who taught at Northwestern University for several years, returned in 1981 to his native Kansas to help run his family's small oil and gas production business.

Some of his best memories of Illinois involve his adviser, George Klein. "George was very sharp and very professional. To his everlasting credit, he was supportive of me and of my idea of a thesis project even before I had really figured out what it was I wanted to do."

The fund that Jackson has established will be available for students starting in 2004.

In Memoriam

Carleton Chapman, an igneous, metamorphic petrologist who was on the faculty from 1937-1977, died in September 26, 2003. He was just two weeks short of his 92nd birthday. Chapman received his master's and doctorate degrees from Harvard and wrote more than 60 journal articles on petrography, structural geology, and the geochemistry of igneous rocks. "His meticulous attention to petrographic detail was a hallmark of his work," remembers Ralph Langenheim, emeritus professor. Haydn Murray, B.S. '48, M.S. '50, Ph.D. '51, a former student of Chapman's, agrees. "Carleton was a meticulous geologist, a very respected igneous petrologist, and an excellent teacher, but he also liked to play pranks on people. Marlon Billings once told us that Carleton would put smelly things, like Limburger cheese, on radiators when he was a graduate student at Harvard!" Marion "Pat" Bickford, M.S. '58, Ph.D. '60, says, "The most important thing Carleton did for me was to teach me to write clearly. He did this by patiently going through every word of every sentence I wrote, pointing out how I could clarify what I was saying. This is a real gift from teacher to student, for it is really the only way to learn proper scientific writing. I have tried to do this for my own students for the last 40 years, often sharing with them what Carleton did for me." Bickford remembers Chapman's humor as slightly more subtle. "Carleton loved puns," says Bickford. "I can remember him standing by the window in April saying, 'April is such a sad time. All the trees are leaving.'"

Obituaries

Raymond Charles Gutschick, M.S. '39, Ph.D. '42, died October 22, 2003. He was 89. Raymond received the Moore Medal in 1992 for "excellence in paleontology" from SEPM.

Paul Robert Seaber Sr., Ph.D. '62, died August 23, 2003. Paul was a hydrogeologist who began his career with the U.S. Geological Survey's Alaska terrain and permafrost section in 1955. From 1987-1990 he was senior hydrologist and head of the groundwater section for IGS. He worked all over the world, including Oman, Kuwait and Pakistan. He was senior hydrologist and head of the Kuwait Institute for Scientific Research when Iraqi forces invaded the country in 1990.

1940s

Allan F. Agnew, A.B. '40, M.S. '42, writes, "Your 2002 Year in Review is another winner ... to hire Susan Kieffer is superb! {see 2002 Year in Review} T.T. Quirke was an exciting lecturer for us soft-rock people. He also taught us how to build a canoe in the north woods of Canada!"

"One thing I'll never forget is how those floors in the Natural History building squeaked," remembers **Charles Summerson, B.S. '38, M.S. '40 and Ph.D. '42**. "They have not changed in 50 years. I'd like to come over and hear them one more time." Charles also remembered sneaking into the mineralogy labs after the building was closed to study with fellow student K.O. Emery, who died in 1998. "We had keys because we did drafting for some of the professors," he confesses. "We'd go into the labs, sit our chair on top of the lab bench and a tray of specimens in our lap and toss them to one another. If you couldn't identify the specimen by the time you caught it you weren't up to snuff." Charles remembers Emery as a very fine person. "He was extremely competitive but he'd turn right around and help you any way he could."

1950s

Norb Cygan, B.S. '54, gained two more grandchildren in 2003. Grandson Colin Reid Gardner was born in Castle Pines, Colo., and granddaughter Lauren Nicole Butler was born in Ottawa, KS. Now he has six grandchildren.

1960s

Since he retired in 1993, **Bill Soderman, M.S. '60, Ph.D. '62**, has become quite involved in various community projects. Those include an educational program about wetlands for fifth-grade students and a scholarship program for students leaving junior college and heading for their final undergraduate years at a major university. Bill also is involved in two projects relating to the Texas coastline. One, for which an NSF grant proposal has been submitted, involves studying the subsidence in the Houston ship-channel area, which has been caused by water withdrawal from an aquifer. The second project involves serving on an advisory council of the Coastal Texas 2002 ini-

tiative. That initiative is looking closely at the impact and possible solutions of dramatic beach erosion, rising sea levels, increased shoreline development, as well as natural threats posed by hurricanes and tropical storms. Bill also is enjoying traveling. He and Mina have recently been to Utah and Arizona and have plans to spend time on the Pacific Coast, as well as Florida's Gulf Coast. And, of course, he continues to serve on the Department's GeoThrust committee and is dedicated to helping the Department meet its goal of \$3 million by 2005. "It is a good feeling to give something back to the school where I completed my formal geologic education," Bill says.

1970s

In addition to the three alumni receiving awards at the 2003 AAPG meeting (see Newsletter 2002), **Dag Nummedal, Ph.D. '74**, Institute for Energy Research, Department of Geology and Geophysics, University of Wyoming received the Jules Braunstein memorial award for the best poster at the meeting. His poster was titled, "Reservoir Characterization of the South Timbalier 26 Field: The Importance of Shelf Margin Deltas as Reservoirs in the Gulf of Mexico."

John Steinmetz, B.S. '69, M.S. '75, has been elected president by the Association of American State Geologists. Steinmetz is state geologist and director of the Indiana Geologic Survey.

1980s

Bob Babb, Ph.D. '81, and **Laurie Hartline Babb, M.S. '81**, have moved to Pleasanton, Calif. Bob works for ITC and writes, "I keep getting further from my geological roots, but I'm still working for an oil company (ChevronTexaco). ITC is the computer support for the company. Laurie has worked part-time as a contractor for ChevronTexaco doing geologic and engineering stuff."

The Coal Geology Division (of the GSA) Management Board includes alumni **Steven Greb, B.S. '82**, of the Kentucky Geological Survey, as chair and **Russell Jacobson, M.S. '85**, of the IGS, as member-at-large.

John Rakovan, B.S. '88, is an assistant professor of mineralogy at Miami University (OH).

Don Von Bergen, Ph.D. '88, is in his third year at Kansas State University in Salina, KS. He is the department head of the Arts, Sciences and Business Department at the College of Technology and Aviation. In addition to his administrative duties, Don teaches an introduction to geology course. Don and his family enjoy riding horses in their spare time on their ranch in rural Kansas.

1990s

Linda M. Bonnell, Ph.D. '90, president and scientific adviser of Geocosm LLC of Austin, Texas, is a domestic Dean A. McGee Distinguished Lecturer. Her topics are: "Sealed, Bridged or Open — a New Theory of Quartz Cementation in Fractures;" and "Reservoir Quality Prediction in Deep Water to Tight Gas Sandstones Using a Process/Stochastic Modeling Approach."

Jennifer Wilson, B.S. '92, stopped by the Department to visit. She is in geologic consulting in Pennsylvania, and is working on her Professional Geologist certification.

Laura Becker, B.S. '94, is working as the regulatory coordinator for the New York State Department of Environmental Conservation (DEC), Division of Air Resources in Albany, NY. She coordinates New York State air pollution regulations between DEC staff, the Governor's Office of Regulatory Reform and the New York State Department of State.

Theresa Croak-Mueller, B.S. '96, lives in Naperville, Ill., where she is a consultant for BP and a real estate agent. She and her husband, Keith Mueller, are proud parents of Stefan Denni, who was born Nov. 1, 2003.

Doug Tinkham, M.S. '97, received his Ph.D. from the University of Alabama, and is a post-doc at the University of Calgary in Canada.

Crystal Grace Lovett-Tibbs, B.S. '97, married Aaron Tibbs on September 20, 2003, in Fredericksburg, Virginia. University of Illinois alumni in attendance were matron of honor Melanie Choate (née Meads) (attended '92-'96 FAA) and Jennifer Klomans ('96 COM). Crystal graduated from the University of Virginia School of Law in 2003 and has been admitted to the Missouri Bar. She is currently serving as a federal law clerk to the Honorable Henry Coke Morgan, Jr. in the United States District Court for the Eastern District of Virginia. She and Aaron live in Virginia Beach with their three cats, Sara, Nala, and Tia.

Joel Johnson, M.S. '98, finished up his doctorate at Oregon State University. He got married in September, and had a quick little honeymoon in the San Juan Islands offshore Washington. "I am mostly working on the tectonic controls on seafloor gas hydrate stability these days and still

HONOR ROLL OF DONORS FOR 2003



making good use of the structure and the fold thrust belt stuff I learned from Steve Marshak, as I have been working in the accretionary wedge offshore Oregon for about 5 years now.”

2000s

James Cokinos, B.S. '02, received the outstanding new staff member award from ISCS. James is a geologist/GIS specialist at the Illinois State Geological Survey in the oil and gas section. He works on using GIS and improving oil recovery in the Illinois Basin. This work involves designing and coordinating multiple databases, and overseeing the input of historical and recent waterflood data for more than 2,000 waterflood units dating back to the 1940s, among other things.

Former Faculty News

Alan Whittington, former postdoctoral fellow, and his wife, Angela Speck, announce the arrival of their first child, a son named Xander Alan Kaj Whittington-Speck. Xander was born on Friday, the 13th of February, 2004. Arriving about six weeks early, he was 5 pounds, 10 ounces. Everyone is doing fine, Alan (now assistant professor at the University of Missouri) reports.

George D. Klein, emeritus professor, has been selected by the Society of Independent Professional Earth Scientists (SIPES) as a “distinguished lecturer” for the year 2004. He will talk about “The Sequence and Seismic Stratigraphy of the bossier Play (Tithonian), western part of the East Texas basin.” Klein also has been awarded the Rising Star Award from the Houston Geological Society (HGS) for his tireless work as technical program co-chair for the HGS International Explorationists Committee, as well as his service and encouragement as a mentor to students and colleagues.

We'd love to hear from you



Send us your personal and professional updates by emailing us at geology@uiuc.edu or Department of Geology University of Illinois at Urbana-Champaign 245 Natural History Building 1301 W. Green St. Urbana, IL 61801

Please include degree(s) earned and year, along with your current affiliation.

The following is a list of friends and alumni of the Department of Geology who have donated to the department during the calendar year 2002.

- | | | | |
|-----------------------------------|---------------------------|------------------------------|-------------------------|
| Prof. Thomas F. Anderson | Ms. Sharon Geil | Dr. Sharon Mosher | Mr. Robert W. Von Rhee |
| Dr. Robert W. Andrews | Ms. Christine M. Griffith | Mr. Robert E. Myers | Dr. F. Michael Wahl |
| Dr. Robert F. Babb II | Dr. Stuart Grossman | Mr. Bruce W. Nelson | Ms. Harriet E. Wallace |
| Mr. Robert S. Barnard | Dr. Albert L. Guber | Mr. William A. Newton | Ms. Jeanette G. Walters |
| Dr. David K. Beach | Ms. Nancy Anderson Guber | Mr. Brian D. Noel | Mr. Carleton W. Weber |
| Ms. Gail M. Beach | Dr. Tom Guensburg | Ms. Lynn E. Noel | Dr. John E. Werner |
| Dr. William M. Benzel | Mr. Edwin E. Hardt | Mr. Charles H. Norris | Mr. Jerry T. Wickham |
| Dr. Craig M. Bethke | Ms. Catherine L. Harms | Michael R. Owen, PhD | Ms. Susan S. Wickhan |
| Dr. Marion E. Bickford | Dr. Henry J. Harris | Ms. Katherine A. Panczak | Mr. Harold T. Wilber |
| LTC Ronald E. Black (RET) | Ms. Joyce T. Harris | Dr. Walter E. Parham | Mr. Jack L. Wilber |
| Ms. Heidi Blischke | Dr. Richard L. Hay | Mr. Howard L. Patton | Mr. Don R. Williams |
| Dr. Bruce F. Bohor | Dr. Darrell N. Helmuth | Ms. Corinne Pearson | Ms. Jennifer A. Wilson |
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| Mr. Joseph E. Boudreaux | Mr. Mark F. Hoffman | Dr. Russel A. Peppers | Mr. Roland F. Wright |
| Mr. Allen S. Braumiller | Ms. Maureen F. Hoffman | Ms. Betty R. Pflum | Dr. Valentine E. Zadnik |
| Ms. Patsy L. Braumiller | Ms. Cathy S. Hunt | Mr. Charles E. Pflum | |
| Ms. Annette Brewster | Dr. Stephen R. Hunt | Mr. Bruce E. Phillips | |
| Ms. Margaret R. Broten | Dr. Roscoe G. Jackson II | Ms. Sarah Phillips | |
| Ms. Carolyn Brower | Mr. Steven F. Jamrisko | Ms. Beverly A. Pierce | |
| Mr. Ross D. Brower | Mr. Martin V. Jean | Dr. Jack W. Pierce | |
| The Reverend Robert L. Brownfield | Dr. Allen H. Johnson | Dr. Robert I. Pinney | |
| Dr. Glenn R. Buckley | Mr. Bruce A. Johnson | Ms. Vonna B. Pinney | |
| Dr. Susan B. Buckley | Dr. Donald O. Johnson | Dr. Paul L. Plusquellec | |
| Dr. Thomas C. Buschbach | Dr. Kenneth S. Johnson | Richard J. Powers | |
| Ms. Susan C. Chamberlin | Mr. Robert R. Johnston | Dr. Elizabeth P. Rall | |
| Dr. Thomas L. Chamberlin | Dr. Edward C. Jonas | Mr. Raymond W. Rall | |
| Dr. Charles J. Chantell | Mr. Roy A. Kaelin | Mr. Paul J. Regorz | |
| Mr. Lester W. Clutter | Dr. Suzanne Mahlburg Kay | Mr. Donald O. Rimsnider | |
| Ms. Virginia K. Clutter | Mr. Donald A. Keefer | Mr. David P. Ripley | |
| Dr. Barbara J. Collins | Ms. Laura L. Keefer | Dr. Nancy M. Rodriguez | |
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| Mr. George H. Davis | Dr. R. James Kirkpatrick | Dr. Detmar Schnitker | |
| Dr. Ilham Demir | Mr. Christopher P. Korose | Ms. Julia Schnitker | |
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| Mr. Bruce E. Dollahan | Mr. Michael B. Lampion | Dr. John W. Shelton | |
| Mr. James D. Donithan | Mr. Rik E. Lantz | Dr. Charles H. Simonds | |
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| Ms. Sophie M. Dreifuss | Mr. Stephen C. Lee | Mr. Roger A. Sippel | |
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| Dr. Mohamed T. El-Ashry | Mr. Bernard W. Lynch | Dr. J. William Soderman | |
| Ms. Patricia R. El-Ashry | Mr. Andrew S. Madden | Dr. Ian M. Steele | |
| Dr. Frank R. Ettensohn | Ms. Megan Elwood Madden | Dr. Ronald D. Stieglitz | |
| Mr. Joseph P. Fagan Jr. | Mr. John W. Marks | Dr. John E. Stone | |
| Ms. Inez Fagin | Ms. Kathryn G. Marshak | Dr. C. H. Summerson | |
| Mr. Kyle Marshall Fagin | Prof. Stephen Marshak | Ms. Catherine Threet | |
| Dr. Harold H. Falzone | Ms. Joyce C. Mast | Mr. Jack C. Threet | |
| Mr. Gary M. Fleeger | Ms. Kathryn R. Mayer | Ms. Linda J. Tollefson | |
| Ms. Marian F. Ford | Mr. Robert S. Mayer | Dr. Edwin W. Tooker | |
| Dr. Richard M. Forester | Dr. Murray R. McComas | Mr. Robert G. Vanderstraeten | |
| Mr. Jack D. Foster | Mr. Kendall W. Miller | Mr. William L. Vinevard | |
| Ms. Alison Franklin | Ms. Linda A. Minor | | |
| Mr. Edwin H. Franklin | Ms. Ethel P. Moore | | |
| Mr. Barry R. Gager | Mr. John S. Moore | | |
| Ms. Carol E. Garino | Mr. Wayne E. Moore | | |
| Mr. John R. Garino | | | |

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- BP Amoco Foundation
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- Northwestern University
- Peoples Energy Corporation
- Shell Oil Company
- Shell Oil Company Foundation
- Sims Consulting, Inc.
- Tetra Tech EM Inc.
- Whiting Petroleum Corporation, an Alliant Company

Faculty

Stephen P. Altaner (Associate Professor)
 Jay D. Bass (Professor)
 Craig M. Bethke (Professor)
 Daniel B. Blake (Professor)
 Chu-Yung Chen (Associate Professor)
 Wang-Ping Chen (Professor)
 Bruce W. Fouke (Associate Professor)
 Albert T. Hsui (Professor)
 Thomas M. Johnson (Associate Professor)
 Susan W. Kieffer (Walgreen Professor)
 R. James Kirkpatrick (Professor and Executive Associate Dean)
 Jie Li (Assistant Professor)
 Craig C. Lundstrom (Assistant Professor)
 Stephen Marshak (Professor and Head)
 Xiaodong Song (Associate Professor)

Department Affiliate

Feng-Sheng Hu (Associate Professor)

Academic Staff, Post-Docs, Visiting Staff

Deb Aronson (Yearbook Editor)
 George Bonheyo (Research Scientist)
 Jorge Frias-Lopez (Post-Doctoral Researcher)
 Richard Hedin (Research Programmer)
 Holger Hellwig (Research Scientist)
 Xiaoqiang Hou (Post-Doctoral Researcher)
 Stephen Hurst (Research Programmer)
 Andrey Kalinichev (Senior Research Scientist)
 Ann Long (Teaching Lab Specialist)
 Laura Rademacher (Post-Doctoral Researcher)
 Marc Reinholdt (Post-Doctoral Researcher)
 Bidhan Roy (Post-Doctoral Researcher)
 Rob Sanford (Senior Research Scientist)
 Stanislav Sinogeikin (Research Scientist)
 Michael Stewart (Lecturer)
 Raj Vanka (Resource and Policy Analyst)
 Carine Vanpeteghem (Post-Doctoral Researcher)
 John Werner (Visiting Assistant Professor)

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Thomas F. Anderson
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 Carleton A. Chapman
 Donald L. Graf
 Arthur F. Hagner
 Richard L. Hay
 Donald M. Henderson
 George deV. Klein
 Ralph L. Langenheim
 C. John Mann
 Alberto S. Nieto
 Philip A. Sandberg

Adjunct Faculty

Leon R. Follmer
 Dennis Kolata
 Morris W. Leighton
 Hannes Leetaru
 John McBride
 William Shiels
 M. Scott Wilkerson

Library Staff

Lura Joseph (Librarian)
 Sheila McGowan (Chief Library Clerk)
 Diana Walter (Library Technical Specialist)

Staff

Shelley Campbell (Staff Clerk)
 Barb Elmore (Administrative Secretary)
 Eddie Lane (Electronics Engineering Assistant)
 Michael Sczerba (Clerk)

Graduate Students

Will Beaumont	Chuntao Liang
Peter Berger	Christopher Mah
Jon Brenizer	Jorge Marino
Sarah Brown	Lei Meng
Kurtis Burmeister	Brent Olson
Scott Clark	Junggho Park
Andre Ellis	George Roadcap
Alex Glass	Tom Schickel
Brian Hacker	Eric Sikora
Chris Henderson	Xinlei Sun
Fang Huang	Anna Sutton
Jennifer Jackson	Jian Tian
Qusheng Jin	Lisa Tranel
Matthew Kirk	Tai-Lin Tseng
Jacquelyn Kitchen	Jianwei Wang
James Klaus	Jingyun Wang
Man Jae Kwon	Xiang Xu
Dmitry Lakshtanov	Zhaohui Yang
Qiang Li	Juanzuo Zhou
Yingchun Li	Zuihong Zou

George and Asta Bonheyo's little bundle of joy, Alyssa Ardickas Bonheyo, was born Tuesday, February 17th, 7:12 am. She weighed 7 lb. 1 oz. George is a research scientist with Bruce Fouke's group.

COURSES TAUGHT IN 2003

Geol 100 -	Planet Earth
Geol 101 -	Introduction to Physical Geology
Geol 103 -	Planet Earth (QR II)
Geol 104 -	Geology of the National Parks and Monuments
Geol 107 -	Physical Geology
Geol 108 -	Historical Geology
Geol 110 -	Exploring Planet Earth in the Field
Geol 111 -	The Dynamic Earth (Honors)
Geol 116 -	Geology of the Planets
Geol 117 -	The Oceans
Geol 118 -	Natural Disasters
Geol 143 -	History of Life
Geol 233 -	Earth Materials and the Environment
Geol 250 -	Geology for Engineers
Geol 280 -	Environmental Geology
Geol 311 -	Structural Geology and Tectonics
Geol 315 -	Field Geology
Geol 317 -	Geologic Field Methods, Western United States (Field Camp)
Geol 332 -	Mineralogy and Mineral Optics
Geol 336 -	Petrology and Petrography
Geol 340 -	Sedimentology and Stratigraphy
Geol 350 -	Introduction to Geophysics
Geol 351 -	Geophysical Methods for Geology, Engineering, and Environmental Sciences
Geol 352 -	Physics of the Earth
Geol 355 -	Introduction to Groundwater
Geol 358 -	Introduction to Seismology
Geol 360 -	Geochemistry
Geol 381 -	Modeling Earth and Environmental Systems
Geol 415 -	Advanced Field Geology
Geol 401 -	Physical Geochemistry
Geol 458 -	Geochemical Reaction Analysis
Geol 489 -	Geotectonics
Geol 491 -	Current Research in Geoscience
Geol 493K1 -	Continental Lithosphere
Geol 493K8 -	Topics in Seismic Imaging
Geol 493K9 -	Modern Experimental Methods in High Pressure Mineral Physics

RESEARCH GRANTS ACTIVE IN 2003



American Chemical Society Petroleum Research Fund

Development of Selenium Isotope Ratios as Indicators of Sedimentary Paleo-Environments.

Principal Investigator: Thomas M. Johnson

Department of Energy

Field-Constrained Quantitative Model of the Origin of Microbial and Geochemical Zoning in a Confined Fresh-Water Aquifer.

Principal Investigator: Craig M. Bethke

Computational & Spectroscopic Investigations of Water-Carbon Dioxide Fluids & Surface Sorption Processes.

Principal Investigator: R. James Kirkpatrick

Department Of Transportation Federal Highway Administration

Illinois Council On Food And Agriculture Research

Estimation of Denitrification Rates in the Shallow Groundwater Flow Systems of Big Ditch Watershed, Illinois – Isotope Assessment.

Principal Investigator: Thomas M. Johnson

NASA

Multicomponent, Multiphase H₂O-CO₂ Thermodynamics and Fluid Dynamics on Mars.

Principal Investigator: Susan W. Kieffer

National Science Foundation

Development of Laser Heating for Sound Velocity Measurements at High P & T.

Principal Investigator: Jay D. Bass

Sound Velocities & Elastic Moduli of Minerals Mantle Pressures and Temperatures with Laser Heating.

Principal Investigator: Jay D. Bass

Workshop on Phase Transitions and Mantle Discontinuities.

Principal Investigator: Jay D. Bass

CSEDI: Collaborative Research: Composition and Seismic Structure of the Mantle Transition Zone.

Principal Investigator: Jay D. Bass

Consortium for Material Property Research in the Earth Sciences.

Principal Investigator: Jay D. Bass

Collaborative Research: Elasticity Grand Challenge of the COMPRES Initiative.

Principal Investigator: Jay D. Bass

Polymorphism and Structural Transitions During Glass Formation.

Principal Investigator: Jay D. Bass

Global Climate Change & The Evolutionary Ecology of Antarctic Mollusks in the Late Eocene.

Principal Investigator: Daniel B. Blake

A Seismic Study of the Taiwan Orogen.

Principal Investigator: Wang-Ping Chen

Collaborative Research: Lithospheric-Scale Dynamics of Active Mountain Building along the Himalayan-Tibetan Collision Zone.

Principal Investigator: Wang-Ping Chen

Geobiological & The Emergence of Terraced Architecture during Carbonate Mineralization.

Principal Investigator: Bruce W. Fouke

Collaborative Research: Field Investigation of SE Oxyanion Reduction & Se Sources in Wetlands: Application of Se Isotopes.

Principal Investigator: Thomas M. Johnson

Quantification of Cr Reduction in Groundwater Using Cr Stable Isotopes.

Principal Investigator: Thomas M. Johnson

Acquisition of Multicollector Inductively Coupled Plasma Mass Spectrometer.

Principal Investigators: Thomas M. Johnson and Craig C. Lundstrom

Experimental Investigations of Solid-Liquid Boundary in the Earth Core.

Principal Investigator: Jie Li

Measuring Trace Element Partition Coefficients Between Minerals & Basaltic Melt.

Principal Investigator: Craig C. Lundstrom

Observational Constraints on Melt-Rock Reactions During Melting of the Upper Mantle.

Principal Investigator: Craig C. Lundstrom

Collaborative Research: Investigating the Processes and Timescales of Andesite Differentiation: A Comprehensive Petrological and Geochemical Study of Arenal Volcano, Costa Rica.

Principal Investigator: Craig C. Lundstrom

Collaborative Research: Emplacement of the Ferrar Mafic Igneous Province: A Pilot Study of Intrusive Architecture and Flow Directions in Southern Victoria Land.

Principal Investigator: Stephen Marshak

Structure and Dynamics of Earth's Core and Lowermost Mantle.

Principal Investigator: Xiaodong Song

Office of Naval Research

The Role of Shipyard Pollutants in Structuring Coral Reef Microbial Communities: Monitoring Environmental Change and the Potential Causes of Coral Disease.

Principal Investigator: Bruce W. Fouke

University Of Illinois Research Board

Anatomy of a Continental Collision Zone: Exploring New Views in Seismic Imaging.

Principal Investigator: Wang-Ping Chen

Poloidal-Toroidal Energy Partition and Rotation of Surface Plates on Earth.

Principal Investigator: Albert Hsui

U.S. Department Of Interior / U.S. Geological Survey

Geologic Mapping of the Rosendale Natural Cement Region, a Portion of the Northern Appalachian Fold-Thrust Belt, Ulster County, New York.

Principal Investigator: Stephen Marshak

Degrees Conferred in 2003

Bachelor of Science Degrees

December 2002

(Due to an editorial oversight, these students were not recognized last issue. We apologize.)

Alec Michael Davis

Andrew George Louchios

Tarak Narendra Patel

May

Nikki Lynn Blight

Denelle Melissa Bourgeois

Amy Elizabeth Eisin

Catherine Colleen Haffner

Daniel Bryan Walker

Bracken Tyler Wimmer

August

Meghan Elizabeth Ward

December

Andrew Christian Anderson

Nicole Kristen Bettinardi

John Robert Kaineg

Scott Patrick Koenig

Amy Lynn Luther

Christopher B. Majerczyk

Richard Joseph Pyter

Master of Science Degrees

August

Will Capper Beaumont – *Denitrification in a Subsurfaced Drained, Agricultural Watershed in Central Illinois* (Thomas Johnson)

December

Chuntao Liang – *Uppermost Mantle Velocity and Moho Depth Beneath China from PN-Tomography* (Xiaodong Song)

Anna Lee Sutton – *Trace Element Partitioning Between Meltilite and Ca Melt: An Experimental Study* (Craig Lundstrom)

Juanzuo Zhou – *Isotope Geochemistry of Speleothem Records from Southern Illinois* (Craig Lundstrom)

Doctor of Philosophy Degrees

October

Qusheng Jin – *Kinetics of Microbial Respiration* (Craig Bethke)

May

Andre Savio Ellis – *Selenium and Chromium Stable Isotopes and the Fate of Redox-Active Contaminants in the Environment* (Thomas Johnson)

LIST OF PUBLICATIONS FOR 2003

- Brudzinski, M. R., and Chen, W.-P., 2003, A petrologic anomaly accompanying outboard earthquakes beneath Fiji-Tonga: Corresponding evidence from broadband P and S waveforms. *J. Geophys. Res.*: 108(B6): 2299-2318, doi:10.1029/2002JB002012.
- Sinogeikin, S.V., Bass, J.D., and Katsura, T., 2003, Single-crystal elasticity of ringwoodite to high pressures and high temperatures: Implications for the 520 km seismic discontinuity. *Phys. Earth Planet. Inter.*: 136 (1-2): 41-66.
- Hu, F.S., Kaufman, D., Yoneji, S., Nelson, D., Shemesh, A., Huang, Y.S., Tian, J., Bond, G., Clegg, B., and Brown, T., 2003, Cyclic variation and solar forcing of Holocene climate in the Alaskan subarctic. *Science*: 301: 1890-1893.
- Lundstrom, C.C., Hoernle, K., and Gill, J., 2003, Major and trace element and U-series disequilibria in Holocene volcanic rocks from the Canary Islands: The role and mechanism of lithospheric melting. *Geochimica et Cosmochimica Acta*: 67: 4153-4177.
- Marshak, S., Nelson, W.J., and McBride, J.H., 2003, Phanerozoic strike-slip faulting in the continental interior platform of the United States: Examples from the Laramide Orogen, midcontinent, and ancestral Rockies: in Storti, F., Holdsworth, R.E., and Salvinie, F., eds., *Intraplate Strike-Slip Deformation Belts*. Geological Society, London, Special Publications 210: 171-196.
- Li, J., and Fei, Y., 2003, Experimental constraints on core composition, in *Treaties on Geochemistry*, Holland, H.D., and Turekian, K.K., eds. Vol. 2 of The Mantle and Core. Carlson, R.W., ed., Elsevier: 521-546.
- Nambi, I. M., Werth, C.J., Sanford, R.A., and Valocchi, A.J., 2003, Pore-scale analysis of anaerobic halorespiring bacterial growth along the transverse mixing zone of an etch silicon pore network. *Environmental Science Technology*: 37: 5617-5624.
- Hou, X., Bish, D. L., Wang, S.-L., Johnston, C. T., and Kirkpatrick, R. J., 2003, Hydration, expansion, structure and dynamics of layered double hydroxides. *American Mineralogist*: 88: 167-179.
- Jin, Q. and Bethke, C.M., 2003, A new rate law describing microbial respiration. *Applied and Environmental Microbiology*: 69: 2340-2348.
- Johnson, T. M., and Bullen, T. D., 2003, Selenium isotope fractionation during reduction of Se oxyanions by Fe(II) + Fe(III) hydroxide-sulfate (green rust). *Geochimica et Cosmochimica Acta*: 67: 413-419.
- Frias-Lopez, J., Bonheyo, G.T., Jin, Q., and Fouke, B.W., 2003, Cyanobacteria associated with coral black band disease in Caribbean and Indo-Pacific reefs. *Applied and Environmental Microbiology*: 69 (4): 2409-2413.
- Hellwig, H., Hemley, R.J., and Cohen, R.E., 2003, Micro-Brillouin investigations of relaxor ferroelectrics: (in) Davies, P.K., and Singh, D.J., (eds.) *Fundamental Physics of Ferroelectrics*: American Institute of Physics: 65 - 74.
- Song, X.D., 2003, Inner core superrotation: Recent observations and future challenges. *Global Tectonics and Metallogeny*: 8: 107-108.
- Hou, X., Kirkpatrick, R.J., Struble, L.J., Shin, J.-H., and Monteiro, P.J.M., 2003, The structure of ASR gel and its relationship to C-S-H. In D. Lange, ed., *Engineering Conference on Advances in Cement and Concrete IX: Volume Changes, Cracking, and Durability*, Copper Mountain, Colorado.
- Chen, W.-P., and Brudzinski, M.R., 2003, Seismic anisotropy in the mantle transition zone beneath Fiji-Tonga. *Geophys. Res. Lett.*: 30: 1682-1686.
- Nicholas, J.D., Youngman, R.E., Sinogeikin, S.V., Bass, J.D., Kieffer, J., 2003, Structural changes in vitreous boron oxide. *Physics & Chemistry of Glasses*: 44(3): 249-251.
- Hu, F.S., and Shemesh, A., 2003, A biogenic-silica d18O record of climatic change during the last glacial-interglacial transition in southwestern Alaska. *Quaternary Research*: 59: 379-385.
- Lundstrom, C.C., 2003, Uranium series disequilibria in mid-ocean ridge basalts: Observations and models of basalt genesis, in Bourdon, B., Turner, S., Henderson, G., and Lundstrom, C., eds., *Reviews in Mineralogy and Geochemistry volume #52: Uranium Series Geochemistry*: 175-214.
- Li, J., Hadidiacos, C., Mao, H.-k., Fei, Y., and Hemley, R.J., 2003, Effect of pressure on thermocouples in a multi-anvil apparatus. *High Pressure Research*: 23 (4): 389-401.
- Lee, S.K., Stebbins, J.F., Weiss, C.A., and Kirkpatrick, R.J., 2003, ¹⁷O and ²⁷Al MAS and 3QMAS NMR study of synthetic and natural layer-silicates. *Chemistry of Materials*: 15: 2605-2613.
- Ellis, A. S., Johnson, T. M., Bullen, T. D., and Herbel, M. J., 2003, Selenium isotope fractionation by natural microbial consortia in unamended sediment slurries. *Chem. Geol.*: 195: 119-129.
- Oswald, W.W., Brubaker, L.B., Hu, F.S., and Kling, G., 2003, Climatic and geomorphic controls on Holocene vegetational changes in the Arctic Foothills, northern Alaska. *Journal of Ecology*: 91: 1034-1048.
- Song, X.D., 2003, Three-dimensional structure and differential rotation of the inner core, in *Earth Core: Dynamics, Structure, Rotation*, Dehant, V.M., Creager, K.C., Zatman, S., Karato, S., eds.: *Geodynamics Series, American Geophysical Union*: 31: 45-63.
- Sung, Y., Ritalahti, K. M., Sanford, R.A., Urbance, J.W., Flynn, S.J., Tiedje, J.M., and Löffler, F.E., 2003, Characterization of two tetrachloroethene-reducing, acetate-oxidizing anaerobic bacteria and their description as *Desulfuromonas michiganensis* sp. nov. *Applied Environmental Microbiology*: 69: 2964-2974.
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- Brudzinski, M.R., and Chen, W.-P., 2003, Visualization of seismicity along subduction zones: Toward a physical basis. *Seismol. Res. Lett.*: 74: 731-738.
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COLLOQUIUM SPEAKERS FOR SPRING AND FALL 2003

Spring 2003

- Jan. 24 Rob Finley, ISGS**
Oil Trade and Prices: Megatrends for the Coming Decades
- Jan. 31 Doug Wiens, Washington University**
Seismological structure and mantle flow patterns in subduction zones
- Feb. 7 Karl Mitchell, Lancaster University**
Recent volcanic activity on Mars?
- Feb. 14 Bruce Fouke, University of Illinois (Joint Geology/Microbiology Seminar)**
Geobiology: Microbial Life in a Geological Context
- Feb. 21 Marc Hirschmann, University of Minnesota**
Pyroxenites in the source regions of oceanic basalts
- Feb. 28 Don Wuebbles, University of Illinois**
Potential Climate Changes for the Midwest during the 21st Century
- Mar. 7 Xiaodong Song, University of Illinois**
Seismology at the Center of the Earth: Evidence for an Inner Core Transition Zone
- Mar. 14 Paul Knauth, Arizona State University**
Environmental Conditions on the Early Earth
- Apr. 2 Jerry Schuster, University of Utah (Special Wednesday Colloquium)**
Imaging Colluvial Wedges and Ancient Earthquakes with Seismic Tomography
- Apr. 4 Barbara Bekins, USGS, JOI/USSAC Distinguished Lecturer**
The Subduction Squeeze
- Apr. 11 Marcelo Garcia, University of Illinois**
Turbidity Currents: architects of submarine canyons and hydrocarbon reservoirs?
- Apr. 25 Rich Aronson, Dauphin Island Sea Lab**
The Destruction of Coral Reef Ecosystems
- May 2 Jane Gilotti, University of Iowa**
Crustal melting, leucogranite formation and extensional exhumation of gneiss complexes in the Greenland Caledonides
- May 9 Wolfgang Schlager, Vrije University**
Orders, fractals and chaos in sequence stratigraphy

Fall 2003

- Sept. 5 David Furbish, Vanderbilt University, Walgreen Lecture**
Theory and observations of flow and bedform dynamics in gravel-bed rivers
- Sept. 12 Dr. Margaret Leinen, National Science Foundation, Alumni Achievement Award Recipient**
Complex Environmental Systems: Science for the 21st Century
- Sept. 19 Andy Freed, Purdue University**
Evidence of Powerlaw Flow in the Mojave Desert Mantle
- Sept. 26 Bruce Buffett, University of Chicago**
The origin and evolution of methane clathrate below the seafloor
- Oct. 3 Carrine Blank, Washington University**
Using the geochemical record to date divergences on the bacterial and archaeal trees—reconstructing microbial communities on the Archean Earth
- Oct. 17 Russell Shapiro, Gustavus Adolphus College**
Fossilized Bacteria From Methane Seeps As An Analogue For An Extraterrestrial Fossil Record
- Oct. 24 Craig Lundstrom, University of Illinois**
Dynamics of Magma Generation and Transport
- Nov. 7 Gabe Filipelli, IUPUI**
The effects of climate on terrestrial nutrient cycling and ecosystem development
- Nov. 14 Lars Stixrude, University of Michigan**
Physics of Iron in the Earth's Interior
- Dec. 5 Craig Bethke, University of Illinois**
M. King Hubbert and the rise of Quantitative Hydrogeology

Awards Presented at the 2003 Banquet

Andrew Anderson, Roger Bannister, Chris Henderson, Scott Koenig, Amy Luther, Meghan Ward: Franklin Field Camp Scholarships. Fund created to help support students attending summer field camp.

Kurtis C. Burmeister, Alexander Glass, Matthew Kirk, James Klaus: Morris M. and Ada B. Leighton Award. Established to support student research.

Alexander Glass: Norman Sohl Memorial Award in Paleontology. Fund established in memory of Norman Sohl.

Outstanding TA Award:
Spring 2002—**Matthew Kirk**
Fall 2002—**Jacquelyn Welch**

Roger Bannister: Estwing Award honoring an outstanding undergraduate student. Student receives an Estwing Pick donated by the Estwing Company.

Meghan Ward: Outstanding Senior Award - Cash Award.

Tai-Lin (Ellen) Tseng: Harriet Wallace Award. A cash award to encourage women students in geology.

Margaret Leinen: Alumni Achievement Award

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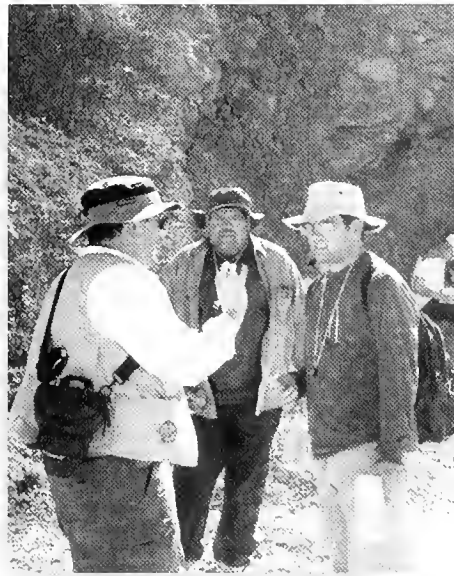
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Sophomore Alene Echevarria goes for broke at the Upper Limits Climbing Gym in Bloomington, Ill. The Geology Club sponsored its second rock-climbing trip there in November, 2003. Ten club members took a two-hour rock-climbing class that covered everything from how to put on a harness, tie knots and belay, to how to communicate between the climber and the ground.



Professor Steve Marshak (farthest left) and Tom Johnson, associate professor (third from left), pose with the 2003 graduating class.



Students studying sedimentary structures near the Salton Sea, California.



Support the Geology Club—Buy A T-Shirt!

This year the geology club printed t-shirts for all its members. Club president, Roger Bannister, also arranged to print a few extras, thinking some alumni might get a kick out of owning one! So, if you are interested, there are some available. Email Roger at geoclub@hercules.geology.uiuc.edu



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U N I V E R S I T Y OF ILLINOIS AT URBANA-CHAMPAIGN

2004

Gary Parker Appointed as W. Hilton Johnson Professor

The Department of Geology is delighted to announce that Gary Parker will assume the title of the W. Hilton Johnson Professor of Geology beginning with the Fall, 2005 term. The Johnson Professorship was made possible through a generous endowment provided by Eric and Kathy Johnson, in memory of Eric's father Hilt Johnson, who was a much admired professor of geomorphology at the University of Illinois for many years. Prof. Parker describes himself as a "hybrid," a scientist with research passions in both geomorphology and civil engineering. In recognition, he will hold appointments both in the Department of Civil and Environmental Engineering (CEE) and the Department of Geology. He comes to the U of I from the University of Minnesota, where he was a professor and the Director of the St. Anthony Falls Laboratory.

This past January, during a break between delivering a Geology/CEE Joint Colloquium ("Effect of Post-Glacial Sea Level Rise on Large Rivers") and visiting Department of Geology faculty and staff, Parker explained how he blends geology and engineering.

"For me, the connection between the two disciplines has always been there. On my geology side I'm a geomorphologist. On my engineering side, I'm a river engineer. Those are just different words for very similar things. In my entire career the applied and the basic sides have always interacted strongly."

For example, Parker cites the dual role of engineering and geology in river restoration, one of his research specialties. "I will say that as time has progressed that, at least with surface process geologists, they used to disdain the idea



of prediction. They were not trained to do it. However, with all the recent interest in river restoration, where people actually have to predict what would make things better if we did this or that to a stream, I find that geomorphologists in general are becoming more predictive. So in a sense the differences between civil engineering and geology are ameliorating with time."

Parker's many research activities include: the computational study of downstream fining and floodplain deposition in large, low-slope sand-bed rivers; density stratification effects due to suspended sediment in rivers; and theoretical and experimental research on cyclic step formation in cohesive and noncohesive sediment. His research articles have appeared in many journals and popular magazines, including GSA Today, Journal of Glaciology, Science, and Nature. Teaching is also one of Parker's passions. "I love to teach," he says. He will be teaching four courses at Illinois.

While contemplating his next career move Parker said the U of I had exactly what he needed. "I do a fair amount of my research in a laboratory and one of the few universities around the country

that has a laboratory that can compete is here at the U of I with the Ven Te Chow Hydrosystems Laboratory. So, I am walking into an environment where certain things that I value and am already comfortable with are on the table."

"Gary's appointment instantly puts the University of Illinois on the map both in fluvial geomorphology and in issues concerning sedimentary transport," says Department of Geology Head Steve Marshak. "He is absolutely one of the top researchers and teachers in these fields, and we are very proud to have him join the faculty as the W. Hilton Johnson Professor."

Civil Engineering Professor and Director of the Ven Te Chow Hydrosystems Laboratory (VTCHL) Marcelo Garcia, said Johnson's appointment is a like a homecoming. "Gary is a worldwide leader in his field but most important he is a continuous source of ideas and help to younger people. We are extremely fortunate for having him in our faculty. There is no question that he will provide an interdisciplinary bridge among our departments and throughout campus.

"On a different note, in the late 1980's, together with Gary Parker we published a paper in Science. As it turns out, Sue Kieffer, Walgreen Chair and Professor of Geology, was the person that handled the review process. At the time she was working on hydraulic jumps in the Grand Canyon of the Colorado River and our paper had to do with hydraulic jumps but in oceanic turbidity currents in submarine canyons many of which rival their sub-aerial relatives in size. Interestingly, we are all here now: Sue Kieffer, Gary Parker, and me. It does not get much better than this."



Letter From The Head

Greetings from the Department of Geology! As always, many things happen during the course of a year, and it's hard to keep track of everything. The faculty continues to evolve. This year we will see the retirement of Prof. Albert Hsui after a quarter century of dedicated service to the Department and its students. Albert has been a kingpin in the geophysics curriculum, teaching a great range of courses ranging from Introductory Geology, the Geology of Planets, to Exploration Geophysics and Geodynamics, and all the time continuing research on flow in planetary interiors and related topics. Albert, you will be missed! We are fortunate to see a new faculty member arrive. Gary Parker, one of the world's leading researchers in fluvial geomorphology and sedimentary transport, will be joining the Department as the first W.H.

Johnson Professor. Gary will hold a joint appointment with the Department of Civil and Environmental Engineering, and thus will provide a key link between our department and the Engineering College. He will be setting up an incredible experimental apparatus for studying turbidity flows, among other problems, at the University's Hydrosystems Lab.

Our faculty and students continue to be recognized. Craig Bethke has been made a Fellow of the American Association for the Advancement of Science, Steve Altaner has won the two highest teaching awards on campus, and Joannah Metz is enjoying her year at Cambridge as a Gates Scholar.

This year also saw additional steps in the development of a School of Earth, Society, and Environment at UIUC. This

School, if it comes into existence, will be an alliance between the Departments of Geology, Geography, and Atmospheric Science on this campus. It will not only make Earth-related studies at UIUC (and thus the Geology Department) more visible, but can be an anchor for new interdisciplinary studies and majors. 2004 also saw us approach the end of the GeoScience 2005 endowment campaign. All signs are pointing to the success of the campaign in achieving its \$3 million goal—many thanks to the GeoThrust Committee, under the chairmanship of Bill Soderman, for their help with this endeavor.

I hope you enjoy this "Year in Review." Read on, to find out more about research, teaching, student activities, and alumni news. Please keep in touch!

Best regards,

—Stephen Marshak

Highlights

Geology Professor Wins University-Wide Teaching Honor

Congratulations to Associate Professor **Stephen P. Altaner** who was awarded this past year with the **College-Level and Campus-Level Awards for Excellence in Undergraduate Teaching**. Steve has been teaching popular courses in introductory geology, natural hazards, and environmental geology.

Rob Finley is New Adjunct Professor

Rob Finley has joined the Department as adjunct professor. Rob has been at the Illinois State Geological Survey (ISGS), Champaign, Illinois, since February, 2000, where he is Director of the Energy and Earth Resources Center. He works with state agency heads as part of the Governor's Energy Cabinet, developing energy market analyses from the perspective of a consuming state, and works on expanding ISGS' energy research programs.

Illinois Geology Students Return to Scotland!

For many years, in the 60's through the early '80s, the late Prof. Dennis Wood took students on legendary field trips to Scotland. (Rumor has it that it wasn't just the geology that was legendary.) In 2004, a group of Illinois geology once again journeyed to the "birthplace of geology," and spent two weeks with a class from the University of Leicester, studying

structure and petrology in Scotland. Highlights included the Moine thrust, the Isle of Skye, and rocky coast of Durness. To prepare for the trip, Prof. Steve Marshak organized a short seminar on the geology of the UK.

Sarah Brown, a graduate student in structure and tectonics, said, "The trip was wonderful. We saw a lot of amazing geology in a relatively short time. And working with a different set of teachers and students was enlightening."

Field Work and International Studies

Recent trips have taken Department of Geology students and faculty around the world and back again. For example, Prof. Bruce Fouke took students to Curaçao where they studied carbonate rocks and the geology of coral reefs. Prof. Wang-Ping Chen continued his seismological research high in Tibet, Prof. Sue Kieffer trekked to New Zealand to examine geothermal systems, Prof. Jay Bass worked at the mineral physics lab in Lyons, France, and Prof. Xiaodong Song collaborated with colleagues in China.

Seismology Briefs

Graduate student **Zhaohui Yang's** work was the topic of a report that appeared in *Science Times*, a weekly publication of the Chinese National Academy of Science in her homeland. The report highlighted her recent work on rheology of the continental lithosphere

that was published in June of 2004 in *Science*.

Undergraduate students Nathan

VanHoudnos and **Trale Bardell** spent the summer working in the Himalayas and Tibet for Project Hi-CLIMB, a large-scale geophysical experiment directed by Dr. Wang-Ping Chen. The Research Experience supports both students for Undergraduates of the National Science Foundation.

The devastating earthquake and associated tsunami on December 26, 2004, impacted the lives of many at U of I. In response, the campus set up a special web site for this event, with a summary of scientific background on earthquakes and tsunami written by **Wang-Ping Chen**.

Year in Review is published once a year by the Department of Geology, University of Illinois at Urbana-Champaign, to summarize the activities and accomplishments within the department and news from alumni and friends.

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Graduate Student on Her Way to the Big Easy

Red beans, rice and a plum Shell Oil Co. Internship await Kelly Zimmerman this summer. The first-year graduate student from Camp Point, Illinois, whose area of study is carbonate sedimentology and stratigraphy, will spend 12 weeks this summer in New Orleans as a paid geology-based intern with the giant energy company. She found ample support throughout the interview process from both Shell and from the U of I.

“Every step of the interview process was laid out ahead of time,” Zimmerman said. “A lot of the interview had very non-traditional interview questions. They wanted to know about my experience here at U of I and they asked about my graduate studies. They also wanted to know personal accomplishments that I’ve achieved either through my geology coursework or outside of academia. I’ve worked at the Illinois State Geological Survey and Dot Foods Inc., so they wanted to know about some projects I managed.

“The only unknown I had was what the scenario question would be.”

The situational scenario question is an attempt by the company to determine how well a student can think on her feet. In Zimmerman’s case Shell asked how she would allocate resources in a college if she was a dean facing budget cuts.

“I think the company wants to see how you think on your feet and if you can think of all the angles of a problem or if you are simply going to proceed down only one path.

“They really emphasize that at Shell you might come in with a geology background but you’re going to be working with people with a chemistry background or an engineering background and they want to see if you can encompass the whole scope of the science industry.”

Zimmerman also had some questions of her own for Shell. “Even though I’m interested in working in the oil industry for a while after I graduate, I’d even-

tually like to move into renewables. Environmental geology really interests me. I wanted to know if I would be able to move through the company and change positions to end up on its renewable side. They have a very strong solar power area in California.

“I wanted to make sure that if I came in as a geologist in the oil field that there has been and would be future opportunities to switch over.”

Shell will expose Zimmerman to many different aspects of a geologist’s role in the exploration and recovery of oil. Her time in the bayou country will also include several days on an oil platform in the Gulf of Mexico. But the best part is still to come. As she noted the majority of Shell interns are offered full-time positions...after they graduate, of course.



Joannah Metz: A Gates Scholar

Joannah Metz (B.S. ‘04) was one of 31 U.S. students to receive the prestigious Gates Cambridge Scholarship, funded by an endowment from the Bill and Melinda Gates Foundation, in 2004. The award covers the full cost of studies at Cambridge University in England, as well as of travel and living expenses.

As an undergraduate at Illinois, Metz completed three majors (including geology), and gained research experience working with Prof. Bruce Fouke. As the accompanying letter shows, she is taking full advantage of her year in Cambridge.

Metz will return to the United States to pursue a doctorate in planetary science and geology at MIT. From there, she hopes to become an astronaut and eventually undertake fieldwork on Mars.

Letter from Cambridge

By Joannah Metz

Walking the hallowed streets of Cambridge as a graduate student at the University of Cambridge is a bit different from strolling along the streets of Champaign-Urbana; for one thing, the ‘new’ buildings in Cambridge are 500 years old. I love attending a university with so much history, where I can be inspired knowing that I’m attending lectures in rooms Newton and Darwin frequented. Partaking in such Cambridge traditions as rowing, spring balls, and formal halls has helped to give me the flavour of life in Cambridge.

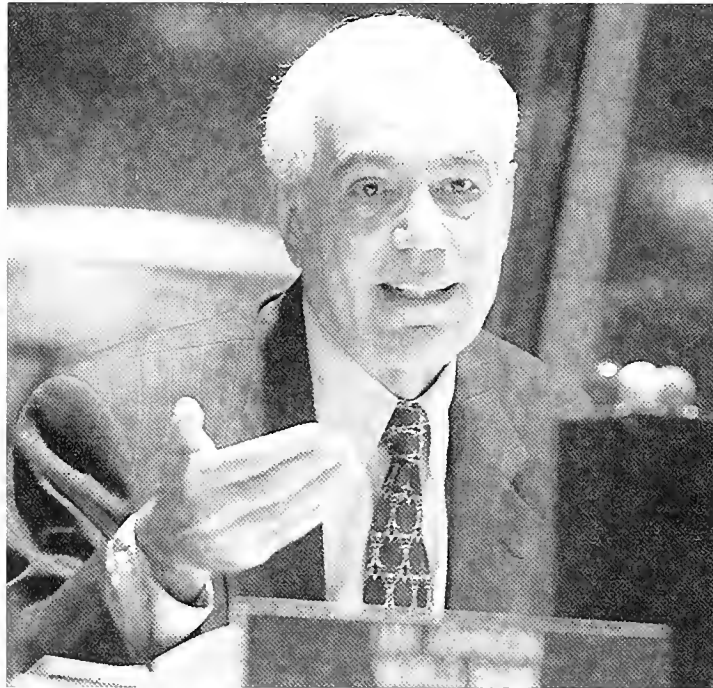
In more academic pursuits, I’m pursuing a one-year M.Phil in Polar Studies. My dissertation research involves looking at the glacier-influenced continental margins of the polar North Atlantic using various marine geophysical methods; and more specifically, I’m looking at iceberg scouring along the continental margins of Greenland, Iceland, and Labrador/Baffin Island. I’ve already learned so much about Earth’s polar regions from all of the knowledgeable researchers in my department, and I look forward to learning much more before I finish my course in June. I was also fortunate enough to be awarded the Gates Cambridge fellowship, which is funding my studies in Cambridge. There is a great community of Gates scholars and we have many interesting lectures by ambassadors, scientists, and foreign policy advisors as well as other opportunities such as trips which all help to broaden our experience at Cambridge.

This has been a fantastic year thus far, and one that has given me not only much knowledge about the coldest regions on Earth, but also has given me many friends and memories.

Mohamed El-Ashry Receives Alumni Achievement Award

We are very proud to announce that Dr. Mohamed El-Ashry, Ph.D. '66, is the 2004 Department of Geology Alumni Achievement Award winner. Dr. El-Ashry came to the University of Illinois from Cairo University, and completed his dissertation under the direction of Harold Wanless on the photointerpretation of coastal changes. Starting from this foundation, he gained vast experience over the years in many aspects of environmental geology. Specifically, he has focused on issues pertaining to water-resources issues and contamination due to mining. Ultimately, he applied his knowledge to addressing the environmental impacts of international development, and has held high-level posts in the diplomatic world. In the course of his career, he published over 200 articles and 3 books.

Currently, Dr. El-Ashry is a Senior Fellow at the United Nations Foundation. Prior to that appointment, he served as Chief Executive Officer of the Global Environment Facility (GEF). Under El-Ashry's leadership, from 1991 to 2003, GEF grew from a pilot program with less than 30 members to the largest single source of funding for the global environment with 173 member countries. The Global Environment Facility has allocated over \$15 billion for more than 1,000 projects in over 140 countries.



"The GEF, as we know it today, is the product of Mohamed El-Ashry's vision, leadership, dedication, and hard work. He has made a significant contribution to the global environment and sustainable development."

James D. Wolfensohn, President of the World Bank, said of El-Ashry's tenure at GEF: "The GEF, as we know it today, is the product of Mohamed El-Ashry's vision, leadership, dedication, and hard work. He has made a significant contribution to the global environment and sustainable development."

El-Ashry came to the GEF from the World Bank, where he was the Chief Environmental Advisor to the President and Director of the Environment Department. Prior to joining the World Bank, he served as Senior Vice President of the World Resources Institute (WRI) and as Director of Environmental Quality with the Tennessee Valley Authority. In recent years, he has also held appointments as the Senior Environmental Adviser to the UNDP, a Special Adviser to the Secretary General of the 1992 U.N.

Conference on Environment and Development (UNCED), and as a member of the World Water Commission. Earlier in his career, he held teaching and research positions at Cairo University, Pan-Americas-U.A.R. Oil Company, the Illinois Geological Survey, Wilkes University, and the Environmental Defense Fund.

El-Ashry is a fellow of the Geological Society of America and the American Association for the Advancement of Science, and a member of the Third World and African Academies of Science. He is listed in "American Men and Women of Science" and "Men of Achievement," and his biography has been featured in *Geotimes*. He is also the recipient of numerous international awards and honors.



Albert Hsui Retires



"I feel good when I run into alumni and they tell me that the things I taught them years ago are very useful and that they finally understand why they had to learn them. Those are the types of encounters that keep me going. You hope that you teach things that help your students be creative and productive."

April 21, 2005, was declared "Albert Hsui Day" and the retiring professor of geology and associate head of the department presented a valedictory talk on "Geodynamics: Mother of All Geological Processes." After his talk, Hsui was the guest at a dinner in his honor, during which his contributions since arriving at UIUC in 1980 were toasted. Hsui moved to the department after completing a Ph.D. at Cornell and a post-doc at MIT—when he arrived, the Department's geophysics program was in transition.

Hsui is modest about his accomplishments. "I feel good when I run into alumni and they tell me that the things I taught them years ago are very useful and that they finally understand why they had to learn them. Those are the types of encounters that keep me going. You hope that you teach things that help your students be creative and productive."

It was the lure of the supercomputers that initially brought Hsui to UIUC, because much of his research relies on computer simulation. Over the years, Hsui has made discoveries concerning mantle convection and its relationship to plate tectonics, the process of plate subduction and its implications to island-arc magma generation and deep seismicity, the evolution of map-view curves in trenches and mountain belts, and the thermal evolution of other planets. Hsui has investigated the constancy of the universal gravitational constant, which has implications to the possible existence of a fifth force of nature.

Teaching is a passion for Hsui, and increasingly, computers have been playing a role in his classes. "Today's students are much more visual, so looking at equations alone is not something that they are accustomed to doing. They understand the meaning of an equation much better if you have them use a computer to simulate what the equation shows. For example, in my 'Geology of the Planets' class, we simulate the Moon orbiting the Earth, and show how the its orbital velocity relates to its distance from the Earth."

Two years ago, Hsui developed a new introductory geology course that fulfills the university's quantitative reasoning course requirement. To make this course possible, Hsui had to write a new lab book that gives students the opportunity to use math in the context of solving geological problems. Enrollment in this class has been growing steadily.

"Retired" just means moving on to the next endeavor, Hsui says. "After 25 years I feel that I've reached a juncture where if I want to do something different I better do it now, while I am still young and energetic."

Deep Secret

Serendipity and good science lead to the discovery of a starfish living at the ocean's depths.

Geology graduate student Chris Mah's discovery of a new species of starfish reads like a good-old fashioned detective story. The mystery began eight years ago off the coast of Palau in the 400-foot depths of the central Pacific, a place only "dive nuts" equipped with mixed gas re-breathing units dare to tread. It was in this murky realm, where, according to diver-scientist Patrick Colin, one finds "a world of white, blue, and black," where "sediment flows off the shallow reefs...like snowfall." Colin was collecting marine animals in the hopes of discovering new anticancer agents from nature. His dive permitted only six hours underwater and, with less than 10 minutes left before his air supply was exhausted, he surfaced with an orange and brown starfish that he later dubbed the "cornbread star."

Enter U of I paleobiologist and starfish researcher Mah, who studies the diversity and evolution of marine invertebrates. The drawers of his lab in the basement of the Natural History Building overflow with every imaginable shape and size of starfish, but none looked quite like the 40-cm example sent from Palau. Months after Mah received the sample, he was visiting the Bishop Museum in Honolulu and, by chance, just happened to notice a second specimen stored almost as an afterthought in a 5-gallon bucket that was holding up a fan. This specimen had been collected at Enewetak Atoll at 420 feet.



Astrosarkus idipi

"It was collected 15 years ago," Mah says. "Ironically, it was Colin who had collected that sample, too, but the opportunity to properly examine the specimen never emerged."

Several years later, Mah discovered a third sample of cornbread star on a dusty shelf in a Belgium marine lab. "It had just been sitting there for probably a decade, after it was collected from the Indian Ocean in 1982. With a critical mass of starfish material in hand I proceeded with a formal description."

Mah, whose research results were published last year in the *Bulletin of Marine Science*, named the starfish *Astrosarkus idipi*. *Astrosarkus* means "star-shaped flesh," and *idipi* is in honor of David K. Idipi, Sr., former director of the Palau Bureau of Natural Resources and Development. The naming was front-page news in the *Tia Belau*, the newspaper of record for Palau.

"The species represents something very distinct, and very new, and very different from previous known animals," Mah says. "It's a bizarre animal to put it mildly. It lives in a region just below conventional scuba dive range and in an area too deep and too jagged for trawler nets. That probably explains why it's never been discovered."

So much remains a mystery about *Astrosarkus idipi*. Mah still doesn't know what it eats or how old any of the specimens are. "Starfish can reabsorb calcite. They don't really show consistent growth patterns."

Presently there is a global effort at the moment to save and conserve biodiversity. Mah says many undescribed species remain to be found and each new species represents hope. "The question that comes out of this is, 'If we can still find an animal that big—pumpkin-sized—in the populated Tropics, then what else is there to be discovered?' You can't understand what's being lost if you don't know what's there in the first place."

Mah is finishing his Ph.D. in 2005, under the supervision of Prof. Emeritus Dan Blake.

Mount St. Helens: 25 years later

Twenty-five years ago, Mount St. Helens erupted in Washington state, prompting U. of I. geology graduate David Johnston, of the U.S. Geological Survey, to report "Vancouver, Vancouver, this is it" from inside his monitoring-station trailer. Johnston's body and trailer were never found; he was among 57 fatalities that day.

"The neighbor asked what we had been doing recently, and when we replied 'working at Mount St. Helens' we were told, 'Oh, it really blew up this morning!'" she recalled. "After recovering from the shock, we packed and headed back to the mountain that afternoon."

Susan W. Kieffer, now the Charles R. Walgreen Jr. Chair in the U. of I. Geology Department, had been on site that March and April as part of a U.S. Geological Survey team studying earlier, smaller eruptions of the long dormant volcano. On the Sunday morning of May 18, 1980, Kieffer was visiting a neighbor in Flagstaff, Arizona.

"The neighbor asked what we had been doing recently, and when we replied 'working at Mount St. Helens' we were told, 'Oh, it really blew up this morning!'" she recalled. "After recovering from the shock, we packed and headed back to the mountain that afternoon."

An official observer, Johnston, who had earned a bachelor's degree in geolo-

gy from Illinois in 1971, had been camped on a high ridge, about 10 kilometers north of the summit of Mount St. Helens. The ridge on which he died, shortly after 8:32 a.m., is now named Johnston Ridge, and is the site of a permanent Webcam that broadcasts images every five minutes of the mountain.

"The mountain today can look so peaceful on a sunny morning, but the knowledge of how violent it turned makes it a very uneasy peace, even though now it is a relatively safe place," she said. "I had met David in the March-April work, and we enjoyed a tremendous comradeship. David was much more experienced with volcanoes than me, and because of his work with the explosive and dangerous Augustine Volcano in Alaska, he knew, and respected, the power of St. Helens probably more wisely than any of the rest of us."

Today, scientists have a lot more understanding of what happened that day, and Kieffer currently is part of a team using supercomputers to further analyze what happened and why.

"At the time of the 1980 eruption, we didn't have supercomputers," Kieffer said.

"Now, we have not only the computational power for the models, but the visualization capabilities of the NCSA (National Center for Supercomputing Applications), and we're hoping to really understand and visualize these events."



Photo courtesy Susan Kieffer

Susan Kieffer at work in her helicopter flight suite on Mount St. Helens in 1980.

The expanding steam and gases in the magma during the 1980 Mount St. Helens eruption propelled fragmented rock and glaciers over 500 square kilometers of land, ripping up and destroying about 4 billion board feet of timber along the way, and causing nearly \$1 billion in economic damage.

"These eruptions have been described as 'ash hurricanes,'" Kieffer said.

Kieffer mapped the directions of blow-down of the trees and reconstructed the dynamics of the blast using rocket-engine theory. She proposed that the flow within the most highly damaged area was moving so fast that gravitational forces couldn't act to divert the flow of the "ash hurricane" down the valleys.

Kieffer is working with Illinois colleagues S. (Bala) Balachandar, professor and associate head of the department of theoretical and applied mechanics, and Andreas Haselbacher, a research scientist at the Center for Simulation of Advanced Rockets, to use supercomputing capabilities and the university's Apple Turing Cluster computer to improve the understanding of the volcano's eruption.

"At the time of the 1980 eruption, we didn't have supercomputers," Kieffer said. "Now, we have not only the computational power for the models, but the visualization capabilities of the NCSA (National Center for Supercomputing Applications), and we're hoping to really understand and visualize these events."

Doom, Boom, and War: Geology at Illinois 1931-1946

by Ralph L. Langenheim

Frank DeWolfe took over as head of the Department of Geology and Geography in 1931, at the height of the Great Depression. DeWolfe served until 1946 and held the Department together through the Depression, the New Deal, and World War II. He was the only department head to reach retirement in office. When he came to the University of Illinois, DeWolfe had a reputation as an outstanding explorationist and administrator. His resume included terms as Director of the ISGS (1911 to 1923), as Chief Geologist for the Humphreys Corporation (1923-1927), and as Vice President of the Louisiana State Lands Corporation. In Louisiana, he introduced seismic profiling, leading to the discovery of many salt domes.

DeWolfe entered a department in which intense feuds, some of a personal nature, divided the faculty. In 1936, an investigative committee chaired by the Dean of LAS reviewed the Department, suggested some staffing changes, and emphasized the need for stronger leadership and scholarship. As problems dissipated, enrollments grew and the department granted 53 masters and 21 doctorates between 1931 and 1946. World War II did take its toll—no degrees were granted in 1943 and 1944.

Staff and students of the mid-20th century concentrated overwhelmingly in sedimentary geology, and Illinois came to be known as a leading “soft-rock” department. For example, the record shows 23 theses in paleontology, 16 in



Frank DeWolfe

stratigraphy, 13 in sedimentology, 8 in marine geology, 5 in petroleum geology, 6 in coal geology, and 3 in subsurface geology. All other disciplines together yielded only 7 theses. The Department reached its highest-ever position (11th) in the American Council of Education’s ranking of graduate programs in geology.

In addition to DeWolfe, Terrence Quirke, Harold Wanless, Harold Scott, Waldorf Howard, Francis Shepard, and Arle Sutton formed the core of the Geology Department staff. Continuing activity on the part of emeritus professor Savage supplemented their efforts, and Carleton Chapman and Robert Sharp joined the staff before leaving for military duty. In addition, G.H. Cady, a distinguished coal geologist from the ISGS for

which GSA’s Cady Award was named, was appointed as an adjunct professor.

Shepard and Wanless developed wide reputations for research and teaching. Shepard helped found the study of submarine geology, and some of the students that he supervised at Illinois went on to achieve fame in their own right. These included Robert Dietz (Ph.D., 1941) and K.O. Emery (Ph.D., 1941). In 1937, though retaining his status as an Illinois faculty member, Shepard relocated to the Scripps Institution of Oceanography; he resigned from Illinois in 1946. Wanless began a lifetime of research on Late Paleozoic cyclothems and pioneered the use of aerial photographs in geologic mapping. He was also an extremely popular teacher—a course that he developed on the geology of Illinois became so popular, considering the state’s burgeoning petroleum industry, that its field trips required use of a bus. Quirke continued research in hard rock geology and began instruction in engineering geology, Howard led a research program in carbonate geology, Scott helped to establish conodont biostratigraphy as a major correlation tool, and Sutton made contributions in sedimentary and petroleum geology.

All in all, as the WW II came to a close, the Illinois geology department was ready to play a leading role in geologic research and education during the post-war period.

Structural Geologist Stephen Hurst Probes the Ocean Depths

Late last January, while most people were battling winter's cold and snow, structural geologist Stephen Hurst joined a team of scientists, engineers and technicians who set sail from Easter Island to explore the Pito Deep, a rift in Earth's crust nearly 6,000 meters deep.

Funded by the National Science Foundation, the expedition had as its goal to probe the ocean crust, and gain a better understanding of how it was created.

"Pito Deep is one of the few locations where such investigations can be made," Hurst said. "The rift is on the boundary between the Easter Island microplate and the Nazca plate, in an area where tectonic movement is pulling the crust apart."

Unlike rifts caused by sea-floor spreading, at Pito Deep there is no fresh magma obscuring the chasm. As a result, the crust is exposed like a split watermelon. The naturally occurring cross-section offers scientists an opportunity to study the structure of the ocean crust and how it formed.

Hurst rendezvoused with the rest of the scientific team on Easter Island. While awaiting final preparations, he had an opportunity to explore the quarry where most of the island's famous stone heads, or Moai, were carved.

"The quarry is spectacular," Hurst said. "There are approximately 300 Moai scattered throughout the quarry area, in various stages of completion. Some are 40 feet long."

When all was made ready, Hurst and the others boarded the Atlantis (host ship for the deep-sea submersible Alvin) and began the 24-hour cruise to Pito Deep, which is about 350 miles north and slightly east of Easter Island.

Having participated in six similar cruises, Hurst was involved with many technical operations of the expedition, from preparing bathymetric maps to analyzing photographs to diving in Alvin.

The floor of Pito Deep lies about 1,500 meters deeper than Alvin can safely dive, but this was not a problem for the researchers. "The bottoms of these canyons are usually filled with sediment and debris from rockslides," Hurst said. "For our studies, we wanted to collect rocks from the steepest, not the deepest, part of the chasm."

The descent takes nearly two hours. The pilot and two "observers" spend the time talking, listening to music or rechecking the equipment. During the dive, the water temperature falls from about 80 degrees Fahrenheit at the surface to close to freezing at depth. Separating the sub's occupants from the cold water is 2 inches of titanium hull, which also offers protection from the crushing pressure.

"Because of the enormous pressures we experience, it's not uncommon to find Alvin's hull festooned with net bags filled with Styrofoam cups and mannequin heads at the beginning of a dive," Hurst said. "The water pressure squeezes them to a tiny fraction of their original size, making neat souvenirs of the dive."

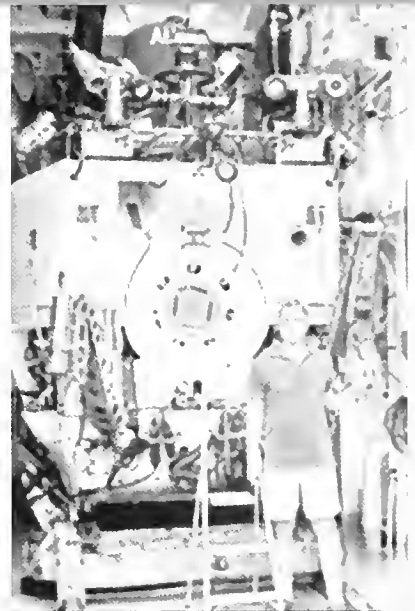


Photo courtesy Stephen Hurst

Geology Department's Stephen Hurst with the deep-sea submersible "Alvin."

The researchers have about five hours to explore the abyss and collect rock samples from the cliff face before Alvin's power runs low and they must float to the surface.

Although data analysis will take many months, Hurst said the expedition's preliminary results are positive.

"We discovered that Pito Deep has a sort of layer cake geology," Hurst said. "Like frosting on a cake, the top layer consists of horizontal lava flows. Beneath that is a layer of vertical dikes – the conduits through which the lava flowed. Beneath that is the now solid magma chamber at the base of the ocean crust. And beneath that lies the mantle."

Obituaries

Jack Pierce, B.S. '49, M.S. '50, retired chairman of the Department of Paleobiology of the Smithsonian Institution's National Museum of Natural History, and professor at George Washington University, died on February 11, 2004. He was 77 years old. Pierce served in the Pacific Theater in WWII. After the war, he attended the U of I, where he received his bachelor's and master's degrees. He received a Ph.D. from the University of Kansas. He then moved to George Washington University as a professor of sedimentology and marine geology. In 1965, Pierce began his tenure at the Smithsonian Institution's Museum of Natural History as a research scientist and curator. He founded the museum's sedimentology department. During the course of his career, Pierce conducted research in Argentina, Belize, Italy, Spain, France, and coastal South America. He was a member of the Sigma Xa, and a fellow of AAPG, SEPM, GSA, IAS, and GSW.

Frank Larry Doyle, Ph.D. '58, passed away on February 26, 2005, in San Antonio, Texas. A professional groundwater hydrologist with an internationally renowned career spanning more than 50 years, Larry served the U.S. Chapter of the International Association of Hydrologists from 1980 to 1988 as Secretary/Treasurer and Chairman. Larry began his career with the USGS in 1960 and worked in Arizona and Colorado. During his career he taught at St. Mary's University in San Antonio, the State University of New York, and the University of Connecticut in Storrs. Larry also had associations with the Geological Survey of Alabama, Dames and Moore, Metcalf and Eddy, the U.S. Nuclear Regulatory Commission, the U.S. Department of the Interior Office of Project Review, and the MITRE Corporation. He carried out geologic and hydrologic investigations in Panama, Nicaragua, Algeria, and Spain.

Bruce Dollahan, B.S. '59, passed away February 1, 2005, in Little Rock, Arkansas. Bruce retired from Sears in 1989 after 30 years of employment. He then worked for three years at Dillard's in Overland Park, Kansas. Among his survivors is his wife, college sweetheart Nora, who he wed in 1959.

1940s

Rob Roy Macgregor, B.S. '40, wrote from his home in Woodstock, Connecticut after reading the late Prof. Harold W. Scott's book, *The Sugar Creek Saga: Chronicles of a Petroleum Geologist*. Reminiscing, Rob writes that he took a job as a "shooter's helper" with the Carter Oil Company in Oklahoma. The company then transferred him to Mattoon, Illinois, to work as a clerk. "It became apparent to me that to get ahead in geology I would need a degree in it. Working in Mattoon provided me an opportunity to continue to work for Carter part time and to attend the U of I part time, taking enough geology courses to acquire a degree." Rob fondly remembers classmate Bernard Curvin (B.S. '39).

Howard L. Patton, B.S. '46, M.S. '48, wrote to the Department in which he remembered his friend and U of I colleague Jim Pearson ('42), who died in 1944 behind enemy lines during WWII. Howard writes, "I had the good fortune to be Jim's field partner, and our Spring course headquartered in the Rose Hotel in Elizabethtown [IL] on the Ohio has provided many pleasant memories. I rode his coattails then...Jim was personable, sensitive, meticulous, and thorough, and he always seemed to be in control of his studies when most of us were laboring mightily...He was a true hero and should be remembered as such by the Department of Geology."

1950s

At the 2005 AAPG Convention in Calgary **Jack Threeth AB'51** was one of several AAPG members who was honored with a Distinguished Service Award recognizing their "singular and beneficial service to AAPG." Jack, whose long career included service as Vice President of Shell Oil, has received the Department's alumni achievement award.

Paul Karrow, Ph.D. '57, was awarded the title Distinguished Professor Emeritus by the University of Waterloo in 2002. He retired from UW in 1999. Presently, Paul is an adjunct professor in the Department of Earth Sciences and continues to teach and supervise graduate students. A day-long symposium was held at the Geological Association of Canada's annual meeting to recognize Paul's work in quaternary geology. Most importantly, Paul is now a grandfather of eight.

1960s

John Hawley, Ph.D. '62, now directs *Hawley Geomatters* in Albuquerque, New Mexico. He is the winner of a 2005 New Mexico Earth Science Achievement Award. The award recognizes individuals who have made outstanding contributions to advancing geoscience in areas of education, research, public service, and public policy in New Mexico.

Bill Soderman, M.S. '60, Ph.D. '62, received the 2004 U of I College of Liberal Arts and Sciences' "Quadrangle Award" in recognition of his many important contributions to the UIUC campus and for his efforts to help establish the GeoThrust Committee and for guiding it over many years. The award was presented at a lavish banquet hosted by the Dean of the College.

At the 2005 American Association of Petroleum Geologists (AAPG) Convention in Calgary **Christopher C. M. Heath, MS'63, Ph.D.'65**, was one of three recipients of the Honorary Membership Award. The award goes to those "who have distinguished themselves by their accomplishments and through their service to the petroleum profession."

For more than 30 years, **Douglas Mose, B.S. '65**, has been a professor of geochemistry at Virginia's George Mason University, where he directs the Center for Basic and Applied Science, a faculty-student research corporation. Douglas is also the president of an environmental (air-water-soil) testing company. He says, "I most fondly remember Harold Wanless for the goals he created in my mind when I listened during and after classes. I was fortunate to be his driver for one year on field trips and, in later years, I realized he became a model for me as a teacher and scientist." Mose earned his Ph.D. at University of Kansas.

1980s

The Geological Society of America elected **Kathleen Marsaglia, M.S. '82**, a GSA Fellow on April 25, 2004. Kathy is a professor at California State University, Northridge, where she teaches and carries out research in sandstone petrography and works on paleogeographic and paleotectonic reconstructions. She has been ship-board scientist on several ODP legs.

Linda Rowan, B.S. '86, is now at the American Geological Institute as Director of Government Affairs. She was a senior editor with the journal *Science*.

1990s

Catherine A. Hier Majumder, B.S. '97, finished her Ph.D. in computational geophysics at the University of Minnesota and then worked as a post-doc at Los Alamos National Lab. She is now beginning a post-doc at Carnegie, in Washington, D.C., where she will be working on projects pertaining to the NASA mission to Mercury.

Doug Tinkham, M.S., '97, will become an assistant professor at Laurentian University (Sudbury, Ontario) in the fall of 2005. Doug did his masters with Steve Marshak before completing a Ph.D. at Alabama and a post-doc at Calgary. Doug, Dee and their daughter Cydney Alicia will be moving at the end of the summer.

HONOR ROLL OF DONORS FOR 2004



Crystal G. Lovett-Tibbs, B.S. '97, was hired last September as an associate attorney in Husch & Eppenberger, LLC, in the firm's Environmental & Regulatory Practice Group.

Joel Johnson, M.S. '98, will become an assistant professor at the University of New Hampshire. Joel did his master's with Steve Marshak before moving to Oregon State for a Ph.D. and a post-doc at the Monterey Bay Aquarium. Joel and his wife will be heading from the beaches of the West Coast to those of the East Coast this summer.

2000s

David Beedy, B.S. '00, M.S. '02, lives in Denver, Colorado, where he is a 9th grade advisor in the Mapleton School District.

Roberto Hernandez, M.S. '00, was promoted to the position of Chief Geologist at Ecopetrol, in Colombia. Roberto completed a thesis in structural geology while at UIUC.

Michael Brudzinski, Ph.D. '01, has accepted a position of assistant professor at Miami University of Ohio. He will begin his appointment in the fall of 2005. Mike worked with Wang-Ping Chen in seismology.

Qusheng Jin, Ph.D. '03, has accepted a position as an assistant professor at the University of Oregon. He and his wife Rose will move to Eugene for the Spring 2006 term. Jin worked with Craig Bethke in hydrogeology and geomicrobiology at UIUC, before becoming a post-doc at Berkeley.

News from Former Faculty

Emeritus professor **George Klein** was appointed Chairman of the Matson Award Committee for the 2006 annual meeting of the American Association of Petroleum Geologists (AAPG). In addition to his continuing work with SED-STRAT Geoscience Consultants, he has published a novel.

We'd love to hear from you



Send us your personal and professional updates by emailing us at geology@uiuc.edu or Department of Geology, University of Illinois at Urbana-Champaign, 245 Natural History Building, 1301 W. Green St., Urbana, IL 61801

Please include degree(s) earned and year, along with your current affiliation.

Buckley Lecture Series Launched

Glen and Susan Buckley have generously endowed a series of lectures in the Department. The Buckley Lecture Series will bring to our weekly colloquial series engaging speakers who will address a broad range of issue with an environmental-geology theme. The inaugural talk in the series will be by Glen Buckley, who will speak on water crises in Texas.

The following is a list of friends and alumni of the Department of Geology who have donated to the department during the calendar year 2004.

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Matthew Kirk	Xiang Xu
Jacquelyn Kitchen	Zhaohui Yang
James Klaus	Kelly Zimmerman
Man Jae Kwon	

COURSES TAUGHT IN 2004

Geol 100	Planet Earth
Geol 101	Introduction to Physical Geology
Geol 103	Planet Earth (QR II)
Geol 104	Geology of the National Parks and Monuments
Geol 107	Physical Geology
Geol 108	Historical Geology
Geol 110	Exploring Planet Earth in the Field
Geol 116	Geology of the Planets
Geol 117	The Oceans
Geol 118	Natural Disasters
Geol 143	History of Life
Geol 233	Earth Materials and the Environment
Geol 250	Geology for Engineers
Geol 280	Environmental Geology
Geol 301	Geomorphology
Geol 411	Structural Geology and Tectonics
Geol 317	Geologic Field Methods, Western United States (Field Camp)
Geol 432	Mineralogy and Mineral Optics
Geol 336	Petrology and Petrography
Geol 340	Sedimentology and Stratigraphy
Geol 452	Introduction to Geophysics
Geol 351	Geophysical Methods for Geology, Engineering, and Environmental Sciences
Geol 470-	Introduction to Groundwater
Geol 360	Geochemistry
Geol 397A1	The Challenge of a Sustainable Earth System
Geol 397C	Paleobotany
Geol 455	Hydrogeology
Geol 481	Modeling Earth and Environmental Systems
Geol 489	Geotectonics
Geol 531	Structural Mineralogy
Geol 591	Current Research in Geoscience
Geol 493F1	Environmental Microbiology
Geol 493K11	Experimental Simulation of Earth's Interior
Geol 493R2	Data Analysis in Geosciences
Geol 593K1	Continental Lithosphere

RESEARCH GRANTS ACTIVE IN 2004



Center for Advanced Cement-Based Materials

R. James Kirkpatrick—Pore Solution-Solid Interactions in Cement Paste: Molecular Modeling of Fluids in Nanospaces

Department of Energy

Jay D. Bass—Consortium for Material Property Research in the Earth Sciences.

Craig M. Bethke—Field-Constrained Quantitative Model of the Origin of Microbial and Geochemical Zoning in a Confined Fresh-Water Aquifer.

R. James Kirkpatrick—Computational & Spectroscopic Investigations of Water-Carbon Dioxide Fluids & Surface Sorption Processes.

Robert A. Sanford—Towards a More Complete Picture: Dissimilatory Metal Reduction by Anaerobacter Species

Michigan State University

Robert A. Sanford—Growth of Chlororespiring Bacteria to High Cell Densities for Use in Bioaugmentation

NASA

Susan W. Kieffer—Multicomponent, Multiphase H₂O-CO₂ Thermodynamics and Fluid Dynamics on Mars

National Science Foundation

Jay D. Bass—Development of Laser Heating for Sound Velocity Measurements at High P & T.

Jay D. Bass—Sound Velocities & Elastic Moduli of Minerals Mantle Pressures and Temperatures with Laser Heating.

Jay D. Bass—Workshop on Phase Transitions and Mantle Discontinuities.

Jay D. Bass—CSEDI: Collaborative Research: Composition and Seismic Structure of the Mantle Transition Zone.

Jay D. Bass—Consortium for Material Property Research in the Earth Sciences.

Jay D. Bass—Collaborative Research: Elasticity Grand Challenge of the COMPRES Initiative.

Jay D. Bass—Polymorphism and Structural Transitions During Glass Formation.

Daniel B. Blake—Global Climate Change & The Evolutionary Ecology of Antarctic Mollusks in the Late Eocene.

Wang-Ping Chen—Collaborative Research: Lithospheric-Scale Dynamics of Active Mountain Building along the Himalayan-Tibetan Collision Zone.

Bruce W. Fouke—Geobiological and the Emergence of Terraced Architecture during Carbonate Mineralization.

Thomas M. Johnson—Collaborative Research: Field Investigation of SE Oxyanion Reduction & Se Sources in Wetlands: Application of Se Isotopes.

Thomas M. Johnson—Quantification of Cr Reduction in Groundwater Using Cr Stable Isotopes.

Thomas M. Johnson and Craig C. Lundstrom—Acquisition of Multicollector Inductively Coupled Plasma Mass Spectrometer.

Thomas M. Johnson and Craig C. Lundstrom—Technical Support for the New MC-ICP-MS Laboratory at University of Illinois at Urbana-Champaign

Jie Li—Experimental Investigations of Solid-Liquid Boundary in the Earth Core.

Craig C. Lundstrom—Observational Constraints on Melt-Rock Reactions during Melting of the Upper Mantle.

Craig C. Lundstrom—Collaborative Research: Investigating the Processes and Timescales of Andesite Differentiation: A Comprehensive Petrological and Geochemical Study of Arenal Volcano, Costa Rica.

Stephen Marshak—Collaborative Research: Emplacement of the Ferrar Mafic Igneous Province: A Pilot Study of Intrusive Architecture and Flow Directions in Southern Victoria Land.

Xiaodong Song—Structure and Dynamics of Earth's Core and Lowermost Mantle.

Xiaodong Song—CSEDI Collaborative Research: Observational and Theoretical Constraints on the Structure and Rotation of the Inner Core.

Xiaodong Song—Probing the Earth's Core and Lowermost Mantle

Office of Naval Research

Bruce W. Fouke—The Role of Shipyard Pollutants in Structuring Coral Reef Microbial Communities: Monitoring Environmental Change and the Potential Causes of Coral Disease.

University of Illinois Research Board

Wang-Ping Chen—Anatomy of a Continental Collision Zone: Exploring New Views in Seismic Imaging.

Albert Hsui—Poloidal-Toroidal Energy Partition and Rotation of Surface Plates on Earth.

R. James Kirkpatrick—A Large Volume NMR Sample Probe for Chemical and Geochemical Research

Xiaodong Song—Acquisition of Portable Broadband Digital Seismometers

U.S. Department of Interior / U.S. Geological Survey

Stephen Marshak—Geologic Mapping of the Rosendale Natural Cement Region, a Portion of the Northern Appalachian Fold-Thrust Belt, Ulster County, New York.

Degrees Conferred in 2004

Bachelor of Science Degrees

May

Roger A. Bannister
Michelle Ann Cox
Kellie Lee Eaker
Joannah Marie Metz
Charles R. Mitsdarfer
Leslie Nicole Savage
Michael S. Schwartz
Michael Patrick Welch
Kelly Marie Zimmerman

August

Charles Schlesinger

December

Benjamin R. Escutia
David J. Kim

Master of Science Degrees

May

Brent V. Olson—(Craig Bethke)

Eric R. Sikora—*Fractionation of Chromium Isotopes by Microbial Cr(VI) Reduction*, (Thomas Johnson)

Jingyun Wang—*Elastic Properties of Hydrous Ringwoodite at Ambient and High-Pressure Conditions*, (Jay Bass)

August

Matthew F. Kirk—*Bacterial Sulfate Reduction Limits Arsenic Concentration in Groundwater from a Glacial Aquifer System*, (Craig Bethke)

Xiang Xu—*NMR Investigation of Cs+ and Cl- Complexation with Suwannee River Natural Organic Matter*, (James Kirkpatrick)

Doctor of Philosophy Degrees

May

George S. Roadcap—*Geochemistry and Microbiology of Extremely Alkaline (PH > 12) Ground Water in the Calumet Slag-Fill Aquifer*, (Craig Bethke)

Jianwei Wang—*Molecular Structure, Diffusion Dynamics and Hydration Energetics of Nano-Confined Water and Water at Mineral Surfaces*, (R. James Kirkpatrick)

LIST OF PUBLICATIONS FOR 2004

- Johnson, T.M., 2004. A review of mass-dependent fractionation of selenium isotopes and implications for other heavy stable isotopes. *Chemical Geology*: 204: 201-214.
- Daniel, I., Bass, J.D., Fiquet, G., Cardon, H., Zhang, J.Z., Hanfland, M., 2004. Effect of aluminum on the compressibility of silicate perovskite. *Geophys. Res. Lett.*: 31: Art. No. L15608.
- Cygan, R.T., Liang, J.-J., and Kalinichev, A.G., 2004. Molecular models of hydroxide, oxyhydroxide, and clay phases and the development of a general force field. *J. Physical Chemistry: B*, 108: 1255-1266.
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- Kirk, M.F., Holm, T.R., Park, J., Jin, Q., Sanford, R.A., Fouke, B.W., and Bethke, C.M., 2004. Bacterial sulfate reduction limits natural arsenic contamination of groundwater. *Geology*: 32: 9539-956.
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- Johnson, T.M. and Bullen, T.D., 2004. Mass-dependent fractionation of selenium and chromium isotopes in low-temperature environments. (in) *Geochemistry of Non-Traditional Stable Isotopes. Rev. Mineral. 55: Mineral. Soc. Amer., Washington, D.C.*, 289-317.
- Foit, F.F., Gavin, D.G., and Hu, F.S., 2004. The tephra stratigraphy of two lakes in south-central British Columbia, Canada and its implications for the mid-late Holocene volcanic activity at Glacier Peak and Mount St. Helens, Washington, USA. *Canadian Journal of Earth Sciences*: 41: 1401-1410.
- Tinkham, D.K., and Marshak, S., 2004. Precambrian dome-and-keel structure in the Penokean orogen near Republic, Upper Peninsula of Michigan: (in) *Gneiss Domes in Orogeny: Geological Society of America Special Paper*: 380: 321-338.
- Kieffer, S.W., 2004. From Yellowstone to Titan, with sidetrips to Mars, Io, Mount St. Helens and Triton. (in) *Volcanic Worlds*, 207-231, Praxis Press, London.
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- Song, X.D., 2004, A review of Pn tomography of China, in Advances (in) *Seismology and Physics of Earth's Interior in China*. Seismological Press, Beijing, 321-345.
- Andre Pugin, IGS**
Architecture of tunnel-channels and buried valleys in previously glaciated areas, hydrogeological implications
- Eric Ferrec, Southern Illinois University**
Magnetic anisotropy of mantle peridotites: example of the Twin Sisters Dunite, Washington State
- Przemek Dera, Carnegie Institution of Washington**
Structural aspects of pressure-induced phase transitions
- Steve Van der Hoven, Illinois State University**
Radiogenic ⁴He as a Tracer for Hydrogeologic Processes in Buried Valley Aquifers
- Jorge Frias-Lopez, University of Illinois**
Microbiology of coral diseases: The ecology of black band disease (BBD)
- Basil Tikoff, University of Wisconsin, Madison**
Fabric and flow in the mantle and mountain building
- Nicole Gasparini, Yale University**
Modeling Erosion in Mountain Rivers
- Linda Bonnell, AAPG Distinguished Lecturer**
Sealed, Bridged, or Open - A New Theory of Quartz Cementation in Fractures
- Linda Ivany, Syracuse University**
The ABCs of Paleobiology: Insights from the Geochemistry of Accretionary Biogenic Carbonates
- Dan Blake, University of Illinois**
Penguins, Sea Stars, and Moss Animals
- Jeff Post, Smithsonian Institution**
Manganese Oxide Minerals: Soils to Synchrotrons
- Jim Kirkpatrick, University of Illinois**
Nuclear Magnetic Resonance and Molecular Modeling Studies of Minerals and Mineral-fluid Interactions
- James W. Kirchner, University of California, Berkeley**
A Spectral View of Watershed Processes
- Thorne Lay, University of California, Santa Cruz**
Earth's Hidden Boundary Layer: Mysteries at the Base of the Mantle
- Marc Reinholdt, University of Illinois**
Clay minerals: synthesis, structural spectroscopic characterizations and clay/polymer nanocomposites elaboration
- Suzan van der Lee, Northwestern University**
Seismic constraints on thickness, rigidity, temperature and composition of the lithosphere and underlying mantle
- Eric Calais, Purdue University**
Continental Deformation in Asia: New Insights from GPS Measurements and Deformation Models
- Jim Best, University of Leeds**
The geomorphology and sedimentology of a big braided river: flow, form and management issues in the Jamuna River, Bangladesh
- Jennifer Roberts, University of Kansas**
Guess who's coming to dinner - The consequences of nutrient-driven silicate weathering by microbial consortia
- Ann Budd, University of Iowa**
Species boundaries in reef corals: Insight from the fossil record
- Jeremy Fein, University of Notre Dame**
Quantifying bacteria-water-rock adsorption reactions using a surface complexation approach
- Feng Sheng Hu, University of Illinois**
Drought History of the Midwest
- Jeff Catalano, Argonne National Laboratory**
Probing Uranium Speciation in Contaminated Sediments and at the Mineral-Water Interface
- Haydn Murray, Indiana University**
Kaolin Occurrences, Genesis and Utilization
- Raymond Arvidson, Washington University, St. Louis**
The Mars Exploration Rover Mission
- Robert W. Howarth, Cornell University**
Human Alteration of the Nitrogen Cycle at Regional Scales: Causes, Consequences, and Steps towards Solutions

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Students Jared Frieberg, Emily Berna, Nicole Bettinardi, Ted Flynn, and Josh Carron on Utah's San Juan River. The trip capped off Professor Craig Lundstrom's Geology 415/515. "Geology of the Southwest" class.



The Department's new state-of-the-art Inductively Coupled Plasma Mass Spectrometer (ICPMS) was installed in December of last year. One of only 50 in the world, the ICPMS was purchased with a grant from the National Science Foundation and will be used for various geochemistry analyses. Pictured behind the spectrometer are, from left to right; Scott Clark, Craig Lundstrom, Justin Glessner, Tom Johnson and Emily Berna.



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School of Earth, Society, and Environment

During the Fall term of 2005, the faculties of three departments, Geology, Geography, and Atmospheric Science, voted in favor of establishing an alliance which will be called the School of Earth, Society, and Environment. This new School will be a component of the College of Liberal Arts & Sciences and will not replace the Departments—each department will continue to exist and each will have a Head, an independent major, and its own graduate program.

The purpose of the School is four-fold. First, it increases the leverage of each department in the competition for campus resources. Significantly, the three Earth-related departments are the only science departments on campus that are not currently part of a school—the School structure is well established at UIUC, and works quite well. Second, by developing an alliance, there will be opportunities for new collaborations,

new research centers, and new interdisciplinary programs to develop. As an example, the Center for Water as a Complex Environmental System, has already been established, and involves faculty from all three departments. Third, the School can serve as a basis for coordinating course offerings, and for anchoring an interdisciplinary major. This major will be in addition to existing majors, and may appeal to a broader group of liberal arts students. Finally, the School will provide students with a larger community of peers with whom to interact while they are at Illinois—this will increase social opportunities.

Many steps still need to happen before the School becomes formally established, but we are optimistic that it will make UIUC an even better institution at which to study the Earth. If things go as planned, the School should be in place by the end of 2007.

New Endowments for Geology:

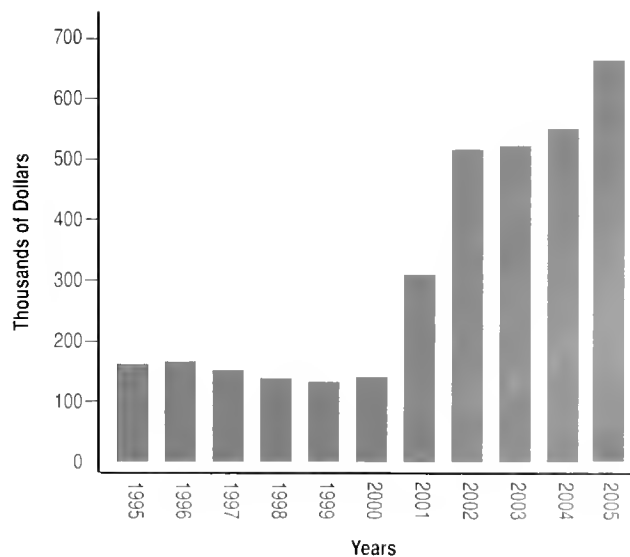
Highlights of the GeoScience 2005 Campaign

Five years ago, the Department embarked on an ambitious campaign, *GeoScience 2005*, to build the Department's endowment. These funds prove essential for the Department to not only maintain existing services and programs, but to flourish. The campaign effort was greatly assisted by the GeoThrust Committee, under the Chairmanship of Bill Soderman (M.S. '60, Ph.D. '62). The other members of the Committee are: Jim Baroffio (Ph.D. '64), David Beach (B.S. '73), Pat Bickford (M.S. '58; Ph.D. '60), Les Clutter (BS. '48), Norb Cygan (B.S. '54; M.S. '56; Ph.D. '62), Ed Franklin (B.S. '56), John Garino (B.S. '57), Jim Granath (B.S. '71; M.S. '73), Brud Leighton (B.S. '47), Tricia Santogrossi (B.S. '74; M.S. '77), and Jack Threet (A.B. '51).

(continued on page 2)

Overhead Dollars Brought to the University by Geology Faculty

Department of Geology faculty, as part of their job, seek research grants from sources outside the University. These grants, which come from agencies such as the National Science Foundation, the Department of Energy, and NASA, support the salaries of graduate students and hourly undergraduates, provide funds for the purchase of laboratory equipment and for field expenses. Significantly, 52 percent of the budget of the University comes from grants to faculty (vs. 17 percent from the State of Illinois). Put another way, faculty research grants provide three times more money to the University than does the State, and more than twice as much as does tuition. About a third of each grant is "overhead" that is paid directly to the University—only two-thirds can be used by faculty for research activities. In the past five years, the amount of overhead that geology faculty have generated has increased by a factor of four, even though the number of faculty has decreased by 25 percent. The graph shows this growth.





Letter From The Head

As this Year-In-Review goes to press (a little on the late side, this year—sorry!), we've come to the close of a very busy season that bodes well for the future. There are a number of significant changes on the horizon, some of which we discuss in this newsletter. Perhaps the biggest change will be the establishment of the School of Earth, Society, and Environment. Right from the start, I wish to emphasize that the School does not replace the Department! The Department of Geology will continue to exist, with its current structure, its traditions, its major, and its graduate program. The School is simply an alliance of three departments to create an entity that has greater visibility and leverage on campus, and will set the stage for interesting new research and teaching col-

laborations. We have already benefited from the School development process by receiving authorization for new faculty searches that probably would not have happened otherwise. The title of the School reflects some of the common interests of the three departments, but does not imply that the Department of Geology is abandoning its traditional strengths. For example, our last two hires have been prominent sedimentary geologists. (Dr. Jim Best, the most recent hire, will become the first Threet Professor of Sedimentary Geology in August, 2006.) With these hires, our Department has reestablished one of the most prominent sedimentary programs in the country. This development is timely, considering the increased interest that oil companies have in hiring our graduates, in the wake of an

upturn in exploration. Other positive developments that you will read about in this issue include the success of the GeoScience 2005 Endowment Campaign. Jay Bass suggested the campaign in 1998, when he was Head. The campaign formally began in 2000, and ran through 2005, ultimately raising over \$3.1 M dollars. I have greatly enjoyed working with all who participated! Also, student numbers have been increasing (with a 75% increase in the past couple of years), grant dollars have been increasing (with a four-fold increase since 2000), and the number of faculty is increasing. There's even some face-lifting in the Natural History Building—the halls are getting new paint and new lighting, even though the floors still creak. Please read on, to learn more.

—Steve Marshak

New Endowments for Geology *(continued from page 1)*

The committee set a goal of raising \$3 million. With the assistance of staff from the University of Illinois Foundation (especially Natalie Handley), and the LAS Advancement Office (especially, Paul Osterhout, Pam Christman, David Bruhns, and Patrick Hayes), we succeeded in raising *more than* \$3.1 million—the campaign was indeed a success! We are very grateful to all who participated—there were hundreds of individual gifts. Thank you!

Here are examples of some of the generous gifts we received:

- Ed and Alison Franklin have set up an endowment to support field camp and other field experiences. A bequest of funds in the future will help with many other needs as well.
- Eric and Kathy Johnson established the W. Hilton Johnson Professorship of Geology, in memory of Eric's father, the late Prof. Johnson. Prof. Gary Parker is the first to hold this honor. Joyce Johnson, Hilt's wife, also established a field fund to support field trips.
- The Jack C. and Richard L. Threet Professorship of Sedimentary Geology, spearheaded by Jack Threet, has been established. The first Threet Professor will be James L. Best, who will join the Department from the University of Leeds (UK) in August, 2006.
- Bill Soderman (M.S. '60, Ph.D. '62) has endowed two graduate fellowships, the Bluestem Fellowship and the Evergreen Fellowship. These will allow us to continue attracting strong students to our graduate program.
- Brud Leighton has continued to build the Leighton endowment to support research activities of graduate students. The bestowing of Leighton awards has become a much appreciated annual event.
- Thanks to a generous lead gift by Jim Baroffio, and gifts from many others, the Department can now offer the Wanless Fellowship, established in honor of the late Prof. Harold Wanless, to outstanding graduate students.
- Roscoe Jackson (M.S. '73, Ph.D. '75) has continued to build a strong endowment for the support of gradu-

ate students and graduate research. Roscoe's generosity helped several students complete research projects.

- Glenn and Susan Buckley established an endowment to bring in outstanding guest speakers to the department in environmental geology. We have now hosted two Buckley Lecturers, so far. Prof. Jim Kirkpatrick has also established an endowment to support visiting colloquium speakers.

These gifts and many others—we wish we had space to list them all—demonstrate the continued loyalty of our alumni and friends. To all who contributed—at all levels—please accept the Department's sincere gratitude.

Year in Review is published once a year by the Department of Geology, University of Illinois at Urbana-Champaign, to summarize the activities and accomplishments within the department and news from alumni and friends.

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Investiture Ceremony Honors R. James Kirkpatrick and Gary Parker

On October 13, 2005, R. James Kirkpatrick was invested as the R.E. Grim Professor, and Gary Parker was invested as the W.H. Johnson Professor in a ceremony that was attended by Dean Sarah Mangelsdorf and by Provost Jesse Delia, as well as by many faculty and students from throughout the campus.

Illinois alumnus R. James Kirkpatrick (Ph.D., '72) became an assistant professor in the Department of Geology in 1977. He moved through the ranks, and served as Head of the Department from 1988 to 1997. Currently, he is the Executive Associate Dean of the College of Liberal Arts and Sciences. Kirkpatrick continues his active research program in many aspects of mineral science, studying a variety of materials ranging from clay, to igneous glasses, to concrete, using NMR spectroscopy and molecular dynamics calculations. Most recently, his research group has investigated the structure and dynamics of water and ionic species on the surface of minerals. He is the author of more than 200 research papers and the editor of three books. Prof. Kirkpatrick has won the Dana Medal of the Mineralogical Society of America, and the Branauer Award from the American Ceramic Society.

The R.E. Grim Professorship in Geology was established in 1977 through the generosity of the late Prof.



From left to right: Department Head Stephen Marshak, R. James Kirkpatrick, Gary Parker, Katherine Johnson, Eric Johnson, Dean Sarah Mangelsdorf, Provost Jesse Delia

Grim and his wife Frances. Prof. Grim was renowned around the world for his work in clay mineralogy and industrial mineralogy. Prof. Richard Hay, who passed away in February, was the first holder of the professorship.

Professor Gary Parker came to UIUC in 2005, after serving many years on the faculty at the University of Minnesota. He holds joint appointments between the Department of Geology and the Department of Civil and Environmental Engineering, recognizing his ties to both areas. Prof. Parker's research interests focus on fluvial geomorphology, and on the process of how flowing water interacts with sediment. This research has many practical applications and has been used to analyze disposal of mine-

derived sediment, to access the risk of pipelines to damage by submarine debris flows, to determine how river channel migration can affect the design of water intakes, and to predict the consequences of dam removal on rivers. Prof. Parker has rapidly put UIUC at the forefront of such work by organizing a major international conference that was held on campus last fall.

The W. Hilton Johnson Professorship in Geology was established in 2000 and supports the research and teaching of faculty in the Department. The professorship was created through a generous gift by Professor Johnson's son and daughter-in-law, Eric M. and Katherine J. Johnson. It recognizes the service of Prof. Johnson (M.S. '61, Ph.D. '62) to the department over many years. Prof. Johnson was a faculty member from 1963 to 1995, specializing in the areas of geomorphology, quaternary geology and glacial geology. He was Director of the University Geology Field Camp for several years and was acting Head of the Department in 1995. Hilt passed away in 1997. The Department was delighted to welcome Eric and Katherine, and Joyce Johnson, Hilt's wife, to the investiture ceremony.

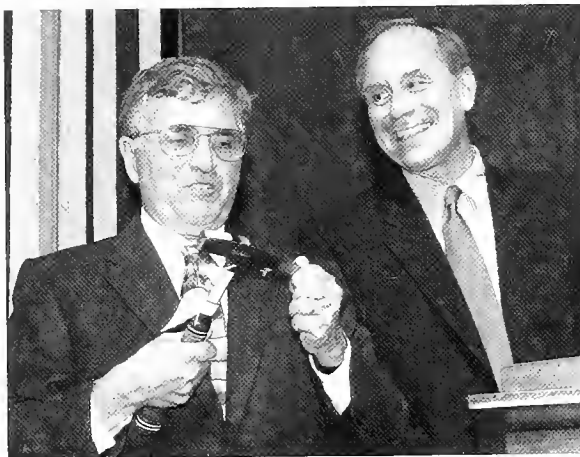
Geology Majors on the Rise At UIUC

In the last three years, the number of majors in the Department of Geology has increased from the mid-30s to over 60. This is fortunate, because according to a recent article by the Associated Press, recruiting on U.S. campuses for geologists has begun to increase. We expect that there will be increasing demand for our graduates. Total U.S. geoscience degrees approached 10,000 annually in the early 1980s, but then crashed to about one-third of that number by 1991. Last year, about 2,400 undergraduate and 1,500 graduate degrees were granted nationwide.

ISGS Centennial Series Brings All-Star Speakers to Campus

As part of the Centennial Celebration of the Illinois State Geological Society, several internationally recognized scientists and science writers came to Urbana-Champaign during the 2005-2006 academic year to make public presentations and interact with the ISGS staff and with Department of Geology students and faculty on the University campus.

The list of distinguished speakers included: Dr. Harrison Schmitt, the only geologist to have walked on the Moon; Kevin Krajick, author of *Barren Lands*, a study of the search for diamonds in Canada; Richard Alley, a paleoclimatolo-



Dr. William Shilts, Chief of the ISGS, and Adjunct Professor, presents Harrison Schmitt with an ISGS Centennial Issue rock hammer.

gist working in Antarctica; Paul Hoffman of Harvard University, a leading proponent of the snowball Earth hypothesis; Scott Tinker, Director of the Texas Bureau of Economic Geology, Patrick Lehey, Acting Director of the USGS; and Simon Winchester, author of *The Crack at the Edge of the World*.

The talks attracted not only ISGS and Department of Geology staff and students, but also the general public. The level of understanding of Earth-related issues in the Champaign-Urbana community increased substantially as a result of this series.

Around the Department

Professor **Sue Kieffer** has been appointed as professor in the Center for Advanced Study, one of the highest forms of recognition the U of I campus bestows on faculty members for outstanding scholarship. The 24 CAS professors, are selected from throughout the campus. They continue to serve as full members of their home departments, while participating in a variety of formal and informal activities organized by the center. Kieffer is a member of the National Academy of Sciences and a fellow of the American Academy of Arts and Sciences. Other honors she has received include a MacArthur "Genius" Fellowship, and the Geological Society of America's Day Medal.

Professor **Craig Bethke** has won the American Association of Petroleum Geologist's "Division of Environmental Geology Research Award." This award recognizes Craig's accomplishments in understanding groundwater environmental issues, such as arsenic contamination. Craig was also installed as a U of I College of Liberal Arts and Sciences Romano Fellow.

Professor **Wang-Ping Chen** will be serving a three-year term (until June 2009) on the Advisory Committee of COMPRES (Consortium for Materials Properties Research in Earth Sciences). This committee plays a major role in guiding research on the Earth's interior. Professor **Jay Bass** served as President of COMPRES two years ago.

Department Head and Professor **Stephen Marshak** hosted Cameroonian geologist Dr. Jean Pierre Tchouankoue to examine similarities in the Precambrian crust in Brazil and Africa. Tchouankoue was delighted to have access to essential technology that are taken for granted at UIUC but don't exist in Africa.

Geochemistry Specialist **Justin Glessner** and his wife announce the arrival of their second son, Leonardo James Glessner, born on November 3, 2005, weighing 8 lbs. 4 oz. and measuring 21" long.

Adjunct Professors **Rob Finley** and **Hannes Leetaru** received a \$19 million grant to work on carbon sequestration at the Illinois State Geological Survey.

Geology senior **Brittany Guzzo** received an NAGT/USGS fellowship, based on her performance at field camp. The fellowship

provides employment at the USGS in Reston.

Professor **Chu-Yung Chen** has taken on the responsibilities of Associate Head of the Geology Department. In this capacity, she oversees the academic programs in the Department.

Jennifer Jackson (Ph.D. 2005) has accepted a tenure-track faculty position in geophysics at Cal Tech. Jennie worked with Professor Jay Bass.

Letter from retired Department Professor Albert Hsui

I am having a great time here in Hong Kong. I have a lot of time to do things that I never had time to do before. I visited my father's home village in the PRC last week. It was nice to be able to trace my roots. At the same time, I learned how devastating the cultural revolution was. After the visit, we had a global reunion of my high school. Hong Kong is such a magnet that everyone seems to come through here. I met a lot of friends whom I have not seen for decades. It was great to reconnect with my past.

In addition, I am doing research to help people here to evaluate earthquake and tsunami potential.



Grad Student Combines Biology and Geology (and a little Chopin)



Emily Wisseman

Geomicrobiologist Emily Wisseman laughs when she describes a typical field trip with her more geology-minded colleagues. “When we’re out in the field the geologists always start by looking

at the rocks. ‘Hey look at this cool rock.’ OK, so there is a plant over there, too. But look at this rock!’

“I come at it saying, ‘Hey, look at this cool plant! Look at what all these microbes are doing to the rock.’ It’s getting at the same idea but from a different perspective.”

The graduate student from Champaign comes to geology by way of a bachelor’s of science in biology from Illinois Wesleyan, a four-month stint as a science teacher at Normal Community West High School and 18 years of classical piano training. (She plays Chopin when she can’t sleep.)

But it was while doing some research for Associate Professor Bruce Fouke that Emily caught the geology bug. While at U of I she has worked on Fouke’s Yellowstone project. “We looked at how the different sediments you see in Yellowstone build up and how microbes interact with them.”

For her master’s thesis she will travel to Curaçao to study coral reefs. (Oh, she’s an experienced diver, too.) Emily is quick to say that coral reefs are basically big rocks: calcium carbonate. “Corals are a really important geologic formation.” Under the guidance of Fouke, Emily will look at the deadly black-band disease that affects this planet’s corals.

“The Department is pretty flexible about letting me incorporate some biology classes and some geology ones. I’m taking biochemistry and sedimentology and, oddly enough, they do have overlaps. They both tie into what I want to do. Geology is really getting in my system.

I like the science that lets you go out and see it.”

Emily says she sees a fascinating connection between biology and geology. “When you mix them together you get the bigger picture. Geologists remind me to look very carefully at the rock systems, which are the basis for the biology you have on top of that. And I’m like, ‘Hey, look at what’s going on that’s affecting the rocks.’ The idea that biology affects geology is really a newer idea, and incorporating microbiology into geologic processes and thinking about that is a new and upcoming field.

“Geology is very interdisciplinary so it almost helps you to come at it with a completely different background. It’s like learning a whole new vocabulary. I really like the big picture science. Geologists look at large rock formations and try to understand how they came to be. Some of the answers may come from studying what takes place in a Petri dish.”

Internship at ISGS Pays Dividends For Undergraduate



Jared Freiburg

When Jared Freiburg arrived at his final semester in the Department of Geology he didn’t know exactly what he was going to do upon graduation. Then he called Hannes Leetaru (Ph.D. ’97), a

Project Scientist at the Illinois State Geological Survey and Adjunct Associate Professor in the Department of Geology. Jared admits his timing was perfect. Hannes said, “Wow! I just got a grant and I need someone,” so Jared went in for an interview and landed the job.

Leetaru is involved in the CO₂ sequestration project underway at the

ISGS. Researchers are looking into ways to pump the CO₂ into old oil wells so it stays out of the atmosphere, and decreases the rate of global warming. The porous rock traps the CO₂ below the ground surface. Jared’s role during his internship was to digitize old well-log data. Once in digital form, the data can be used by sophisticated computer programs to produce sub-surface structure-contour and isopach maps.

Jared’s work at the ISGS led to the production of a senior thesis entitled, “Structural Symmetry of Subsurface Folds in the Southern Illinois Basin.” Leetaru and Department of Geology Head Steve Marshak are co-advisors. This work discusses the relationship between the geometry of sub-surface folds and the geometry of faults whose

motion led to the formation of the folds.

Jared credits the internship at ISGS with his landing of a full-time job as a field assistant with the Connecticut-based mining company, Unimin. The company is involved in similar de-gasification projects, so the interviewers were impressed with Jared’s background.

“I’ll actually be based out of Champaign-Urbana. Unimin has an office in Ottawa, Illinois and they will fly me to all the base sites,” Jared says.

Jared recommends all students in the Department of Geology look carefully at internship opportunities at the ISGS. “There’s a wealth of knowledge of geology over at ISGS and experts who are really willing to work with students.”

Professor Xiaodong Song Confirms Super-rotation of the Earth's Core



Xiaodong Song

In the 2003 science fiction flick *The Core*, a team of scientists drills to the center of the Earth in an attempt to restart the Earth's core, which has mysteriously stopped spinning, altering

the planet's magnetic field and setting off catastrophic—if unrealistic—results. The reality of how the Earth's inner workings rotate is indeed much more fascinating than any cinematic version. No wonder the public's interest in the subject soared recently with the resolution of a nine-year debate regarding the speed of the core.

Prof. Xiaodong Song of the Department of Geology was one of the

investigators that first presented evidence, in 1996, that the Earth's inner core rotates 0.3 to 0.5 degrees per year faster than the rest of the planet. Since then, some seismologists suspected that flaws in the data were responsible for the purported movement, and argued that "super-rotation" of the core did not really happen. The doubt has now disappeared.

"Extraordinary claims require extraordinary proof," says Song. "We believe we now have that proof."

That proof came when Song and his students at UIUC, along with colleagues at Lamont-Doherty Earth Observatory of Columbia University, compared records of seismic waves from recent earthquakes in the South Sandwich

Islands to those of earthquakes that happened 35 years ago.

"Seismic waves that passed through the inner core show systematic changes in travel times and wave shapes when comparing events separated in time by several years," Song says. "The only plausible explanation is a motion of the inner core . . . The interaction of the magnetic field generated by flow in the outer core causes the inner core to spin, like the armature in an electric motor."

Response to this new proof has been impressive. News outlets around the world featured the story. In fact, *The New York Times*, *National Geographic*, *The Washington Post*, CNN, ABC, the BBC, and *The Bangladesh Times* are just a few of the media outlets that have ran stories.

Missouri's Taum Sauk Reservoir Fails

A popular destination for Department of Geology field trips, the 50-acre Taum Sauk Reservoir in southern Missouri emptied out in 12 minutes when a stone retaining wall collapsed just before daybreak on December 14, 2005. A billion-gallon torrent of water washed away at least two homes and several vehicles, and critically injured three children. Water and debris rushed down the mountain, cutting a swath through the forest, and then drained through Johnson Shut-Ins, covering the outcrop with mud. It appears that automated instruments pumped too much water into Taum Sauk, so the water overtopped the reservoir's wall, and caused a section to give way.



Students at the 2005 geology field camp cluster on a peak in the Wasatch Mountains to hear a briefing before heading off to map. Illinois runs the camp in association with four other Big Ten universities. Our students receive generous scholarships from an endowment set up by Ed and Alison Franklin.



Gary Parker Studies Methane Rivers On Titan

Recent evidence from Cassini Mission's Huygens Probe suggests that the largest moon orbiting Saturn, Titan, features methane rivers that sculpt channels into that moon's continents of ice. Surface images from the probe show gravel-sized pieces of river ice similar to stones found in Earth's dry riverbeds.

But with a surface temperature of minus 179°C and an atmospheric pressure one-and-a-half times that of Earth, could river processes on Titan be anything like those on Earth? Gary Parker, the W. H. Johnson Professor of Geology and a professor of civil and environmental engineering at the University of Illinois, has explored this question and his results have been featured in news articles published global-

ly. He has now extended his insight gained from years of studying rivers on Earth to the amazing new imagery of other planets and moons that has recently become available.

"The idea that rivers of methane moving chunks of ice on Titan ought to obey the same rules as rivers on Earth is not what you would assume at first," says Parker. "Only three parameters differ significantly between Earth and Titan: First is the acceleration due to gravity—on Titan, it is about one-seventh the value on Earth. Second is the viscosity of flowing fluid—the viscosity of liquid methane on Titan is about one-fifth that of Earth's water. Third is the submerged specific gravity of sediment—the value on Titan is about two-thirds of that on Earth.

"What this means is that for the same discharge of liquid methane as to water, the channel characteristics on Titan should be remarkably similar to those on Earth," Parker



Gary Parker

says. "However, because of the smaller acceleration due to gravity, channel slopes on Titan should be wider, deeper and less steep than those on Earth." As new satellite images become available, Parker will be testing this idea further.

Rare Volcanic Plumes Create Uncommonly Dangerous Ash Flows

Three unique photographs of a recent volcanic eruption in a remote part of Ecuador show an ash and gas plume unlike any previously documented, and hint at a newly recognized hazard, says Susan Kieffer, who holds the Walgreen Chair in geology.

"The usual volcanic plume consists of a stalk capped with an umbrella, and resembles the mushroom of an atom bomb blast, but the umbrella on this plume was wavy, like the shell of a scallop."

In a recent paper in *Geophysical Research Letters*, Kieffer, theoretical and applied mechanics professor Gustavo Gioia, and graduate student Pinaki Chakraborty explained what might have caused the umbrella to



scallop, a task made more difficult by the scarcity of information.

"We had never seen a scalloped umbrella before," said Kieffer. "Unusual

conditions must have existed in the volcanic plume that formed this umbrella."

Volcán Reventador—Spanish for "one that explodes"—lived up to its name on the morning of November 3, 2002. Following seven hours of seismic activity, the summit cone exploded and sent and erupted hot ash. This ash heated the surrounding air, which became buoyant and rose to form a volcanic plume, carrying ash with it.

Our analysis suggests that the Reventador plume collapsed rapidly, forming new and especially dangerous ash flows," says Kieffer. Originating far from the summit cone, these new ash flows helped spread the damage caused by the eruption.

Illinois Geology on the Launching Pad

by Ralph L. Langenheim

During World War II, the geology program at Illinois almost collapsed, for military demands stripped men from the campus. Full-time faculty decreased to four, geology majors went from 31 to seven, and no graduate degrees were granted in 1943 and 1944. The only two master's degrees granted in 1945 went to our first women graduate students, Dorothy Johnson and Elizabeth Livesay, who studied micropaleontology with Harold Scott and later obtained positions in petroleum geology. At the War's end, students first trickled, then cascaded back to Urbana-Champaign, so that 14 master's degrees and four doctorate degrees were granted in 1949. However, it was not until 1955 that Illinois produced its first woman Ph.D., Barbara Collins, a student of Ralph Grim.

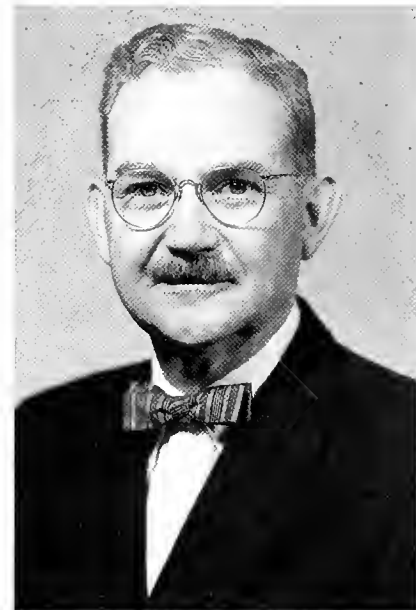
The post-war Department of Geology burgeoned during the last years of Frank DeWolfe's tenure as chairman, and continued with Harold Wanless serving as chairman of an administrative committee until the arrival of George Willard White in 1947. White would lead Illinois' geology for the next 18 years.

A consummate administrator, White was well suited for his leadership role during academia's rapid expansion after World War II. Born the son of a minister in North Lawrence, Ohio in 1903, the highly precocious White was treated almost as an adult from early childhood. He graduated from Otterbein College at 17, and completed his master's (1925) and doctorate (1933) at Ohio State University. Then, he became an instructor at the University of Tennessee, and, later, at the University of New Hampshire. In New Hampshire, White rose to professor and acting Dean of the

Graduate School and led the New Hampshire department to grow into one of the largest among New England state universities. Incidentally, here he also became acquainted with Carleton Chapman as a student. In 1941, White moved to Ohio State University as a professor and as the State Geologist of Ohio.

Once at Illinois, White immediately began to increase the number of staff to generate new graduate programs of distinction, and to polish the department's national and international reputation. He initiated and expanded programs in Pleistocene geology, geomorphology, clay mineralogy, hydrogeology, engineering geology, electron microscopy and field geology. Also, with White's encouragement, the UI Geology Library grew to world-class status, reputedly ranking third after the USGS Library, the New York Public Library, and Harvard University. He was particularly interested in the history of geology, and urged the purchase of rare books.

In addition, White aggressively publicized Illinois geology, recruited students, expanded contacts for graduate-student placement and recruited outstanding staff. Of note, White asked senior staff to visit major graduate and undergraduate programs around the country. Indeed, University planes flew groups of professors to attend national meetings and lecture at larger schools. I well remember such a "barnstorming tour" or flying circus at Berkeley that featured lectures by Harold Scott and George White. We Berkeley alums were at first amused, but became quickly convinced that the geology program at Illinois was substantial. White, and his wife Mildred, regularly traveled overseas, where they sought con-



George White

tacts and recruited graduate students and candidates for visiting professorships.

During the White era, the faculty line in structural geology was kept open for a visitor. Between 1950 and 1964, the annual overseas visitors were: Christoffer Oftedhl (Norway), J. V. Harrison (Oxford), Maxwell Gage (Canterbury), Rhodes Fairbridge (Western Australia), J. M. Carr (Cyprus), Albert Carozzi (Geneva), Kingsly Dunham (Durham), Iles Strachan (Birmingham), Derek Ager (Imperial College), Hendrik Zwart (Leiden), Poul Graf-Petersen (Copenhagen), Heikki Ignatius (Helsinki), Hans Laubscher (Basel), and Hans Holtedahl (Bergen). So far as I know, the foreign visiting professor program was unique and a major factor in Illinois' retention of its ranking amongst the top twenty American graduate programs in geology.

John W. Hawley Receives Alumni Achievement Award

We are very proud to announce that John W. Hawley, Ph.D. '62, is the 2006 Department of Geology Alumni Achievement Award winner. Hawley, who lives in Albuquerque, New Mexico, has authored or co-authored more than 100 publications on environmental geology, hydrogeology, and geomorphology of arid and semi-arid lands in western North America, including the Great Basin, Chihuahuan Desert and Rio Grande rift areas of the Basin and Range province, and the Southern High Plains-Pecos Valley region.

After more than 35 years of public-sector professional activity, Dr. Hawley formed HAWLEY GEOMATTERS in December 1997. This consulting service deals primarily with environmental and groundwater geology of the New Mexico region, with emphasis on assessing and mitigating impacts of water- and mineral-resource development, and waste disposal in fragile arid and semiarid environments.



The company does substantial pro-bono work for Native American residents of New Mexico.

Dr. Hawley has received honors for his published research and scientific-community service including the Kirk Bryan Award for desert soil-geomorphic research, and the Engineering Geology Division Distinguished Practice Award from the Geological Society of America. He has

also received the Certificate of Merit for Arid Zone Research from the American Association for the Advancement of Science, and the New Mexico Eminent Scholar from the State of New Mexico. Hawley is the co-dedicattee of the Society's 50th Annual Field Conference Guidebook and has received the Hanover College Alumni Achievement Award; Honorary Membership in the New Mexico Geological Society, the American Institute of Professional Geologists Presidential Award of Merit, and the New Mexico Earth Science Achievement Award.

In addition, Dr. Hawley has served as President of the New Mexico Geological Society and President of the New Mexico Section American Institute of Professional Geologists.

"John Hawley's career illustrates the wonderful impact that a geologist can have on society," noted Department Head Steve Marshak

Obituaries



Richard L. Hay, R.E. Grim Professor of Geology Emeritus at the University of Illinois, died from pulmonary

fibrosis February 10, 2006, at his home in Tucson, Arizona at the age of 79. Dr. Hay had a long and distinguished career in sedimentary geology, mineralogy, and archaeological geology. He is best known for providing the geological context of two of the most important hominid-bearing sites known in East Africa (Olduvai Gorge and Laetoli). He also made fundamental contributions to the understanding of important minerals such as clays and zeolites.

Born in Goshen, Indiana on April 29, 1929, Dr. Hay obtained both his bachelor's and master's degrees from Northwestern University in 1946 and

1948 respectively, and earned his Ph.D. from Princeton in 1952. In 1957, Dr. Hay became assistant professor of geology and geophysics at the University of California, Berkeley, where he eventually obtained the rank of full professor. In 1983, Dr. Hay moved to the University of Illinois at Urbana-Champaign, as the first R. E. Grim Professor in the Department of Geology. In addition to his academic career, Dr. Hay also served as a geologist for the U.S. Geological Survey.

Dr. Hay was Fellow of the American Association for the Advancement of Science, the Geological Society of America, the Mineralogical Society of America, and the California Academy of Sciences. He received the Kirk Bryan Award in 1978 and the Rip Rapp Archaeological Geology Award in 2000 from the Geological Society of America, and in 2001 was also the recipient of one of the most distinguished awards in the field of human origins, the Leakey Prize. Dr. Hay's 1976 monograph, *Geology of*

the Olduvai Gorge, still stands as a model for archaeological geology research. A dedicated teacher and mentor, he guided many students into distinguished careers. Dr. Hay also had a lasting impact on his peers as well, and was uniformly known by his colleagues as a modest, unassuming man with a ready smile and gentle nature, who was always open to discussion.

Dr. Hay and his wife Lynn moved to Tucson in 1999, after his retirement from the University of Illinois, where he continued geological research as an adjunct professor at the University of Arizona. Dr. Hay is survived by his wife of 32 years, Lynn Hay, who resides in Tucson, Arizona; his son, Randall Hay, of Fort Wayne, Indiana; his two granddaughters; and his two stepsons, George Uricoechea, of Urbana, Illinois, and John Uricoechea, of Springfield, Virginia. Dr. Hay is also survived by his brother, Robert E. Hay of Tucson.

Obituaries

Arthur Hagner died December 13, 2005. He was 94. Art earned his bachelor's degree from New York University and his doctorate from Columbia University. He worked on military development programs for the government during World War II. He was a professor of geology at the University of Illinois at Urbana-Champaign until his retirement after more than 25 years of service. Hagner was known for his work in economic geology, ore mineralogy, clay mineralogy, and petrology. He also contributed articles on geological education and on the philosophy of geology. Prof. Hagner conducted research in Wyoming, New York, Mexico, and Texas. Recognized in *Who's Who in America in Science*, Art moved to Stamford, Connecticut, after retirement and lived there for 30 years. Art was a member of the U.S. Geological Survey and enjoyed classical music, art and collecting minerals.

James L. Eades, Ph.D. '62, passed away January 21, 2006, in Gainesville, Florida. He was 83. James was a student of Ralph Grim. They worked on the chemistry associated with the lime stabilization of soils. He was a National Lime Association Research Associate in the department for several years before he left Illinois to come to the University of Florida as an associate professor in geology. He later became chair and was active in the department until he retired in 2000.

Jack Simon, M.S. '46, died December 17, 2005. He was 86. Jack served in the Army Air Forces during World War II before earning his master's degree in geology from the University of Illinois at Urbana-Champaign in 1946. He worked with the Illinois State Geological Survey. Jack was well known for his work in soil geology. In 1974 he became Chief of the ISGS, a post he held until his retirement in 1982. He was a member of Sinai Temple in Champaign and Exchange Club at the U of I.

Clarence Vernon Crow, B.S. '51, died September 9, 2005 in Decatur, Illinois at the age of 87. After graduation from Lawrenceville, Illinois High School he served in the U.S. Navy during WWII. This included 16 months of sea duty in the Atlantic. He received his bachelor's degree in geology from the U of I and did graduate studies at the University of Michigan and Illinois State University.

After graduation Clarence worked in the exploration and development of underground gas storage fields for a consulting firm in Urbana, Illinois. He was underground gas storage geologist for Illinois Power Company for 23 years, and then spent 12 years as a consultant in underground gas and air storage through the United States. He was involved in the exploration and development of 12 underground gas storage fields and one air storage field. His active career spanned a period of 43 years.

Clarence was a founding member and past president of the Midwest Gas Storage Section of the Society of Petroleum Engineers and a senior member of the American Association of Petroleum Geologists.

Ernest H. Muller, M.S. '49, Ph.D. '52, died October 20, 2005, at the age of 82. Ernie was a Second Lieutenant and Airways Weather Forecaster for the U.S. Army Air Force during World War II. Ernie subsequently completed his B.S. in Geology at Wooster College, Ohio, and received his Master's and Doctorate in Geology from the University of Illinois at Urbana-Champaign. He worked for the US Geological Survey before accepting a faculty position at Cornell University in 1954. Ernie subsequently taught for 30 years at Syracuse University, and worked, studied, and taught in Alaska, Iceland, Chile, New Zealand, and India. He is widely published and a member of numerous professional societies. Ernie was known for his integrity, discernment, and ability to enjoy the subtle and simple aspects of life.

1950s

Jordan. Paul Karrow (Ph.D. '57) was awarded the title Distinguished Professor Emeritus by the University of Waterloo in 2002. He retired from UW in 1999. Presently, Paul is an adjunct professor in the Department of Earth Sciences and continues to teach and supervise graduate students. A day-long symposium was held at the Geological Association of Canada's annual meeting to recognize Paul's work in quaternary geology. Most importantly, Paul is now a grandfather of eight.

1970s

Jim Granath (B.S. '71, M.S. '73) has been promoted to senior explorationist for Forest Oil International in Denver.

James C. Cobb (B.S. '71, Ph.D. '81) is treasurer of the American Geological Institute's Executive Committee. Jim is director and state geologist at the Kentucky Geological Survey at the University of Kentucky.

Christopher Ledvina, (B.S. '74) is currently a professor at Northeastern University. He and his wife Janet announce the birth of a daughter, Julianna Helen, born April 23, 2004. Julianna is their fourth child. The other children are 8-year-old triplets, Carrienne, Rachel and Daniel.

1980s

Brian N. Popp (M.S. '81, Ph.D '86) was elected a Geochemistry Fellow by the Geochemical Society and the European Association for Geochemistry. The title is "bestowed upon outstanding scientists who have, over the years, made a major contribution to the field of geochemistry." Brian is a Professor in the Department of Geology and Geophysics and graduate faculty in the Department of Oceanography at the University of Hawaii. He lives there with his wife Jan Reichelderfer (M.S. 1985) and their daughters Jennifer and Nicole.

Marcia K. Schulmeister (B.S. '85) is an assistant professor in the Earth Science Department of Emporia State University in Emporia, Kansas.



Steve Altaner (Ph.D. '85) and his wife Judy (M.S. '98) adopted a baby girl, Marissa Kate. Marissa was born on Dec. 19, 2005. Steve is an associate professor in the Department.

Istvan Barany, who was a student here from 1987 to 1991, is a Project Geophysical Advisor for Anadarko Petroleum Corporation in Houston, Texas.

Alan Singleton (B.S. '88) is a patent and business law attorney in Champaign, Illinois.

1990s

Ming-Kuo Lee (M.S. '90, Ph.D. '93) was recently promoted to full professor of Hydrogeology in the Department of Geology & Geography at Auburn University.

Robert (Ph.D. '96) and **Melinda** (M.S. '94) **Ylagan** announce the arrival of their second son, Elliot Peter Ylagan, born May 23, 2005, weighing 8 lbs. 8 oz. Elliot was welcomed home by his big brother Renan.

Stephanie Drain (B.S. '95) currently works as a Field Engineer, Midwest Region of SemMaterials, L.P., in Terre Haute, Indiana.

Theresa (Croak) Mueller (B.S. '96) opened her own real estate brokerage (www.TheresaMueller.com). She lives with her husband Keith and two-year-old Stefan in Naperville, Illinois.

Catherine A. Hier-Majumder (B.S. '97) married geophysicist Saswata Hier-Majumder. Catherine received her Ph.D. from the University of Minnesota. She works as a MESSENGER fellow at the Carnegie Institute of Washington. MESSENGER is a NASA mission currently on its way to Mercury. Catherine's husband is a professor at the University of Maryland in College Park,

Geoscientist, scientific data visualization specialist, public domain activist, and blossoming linguist **Maitri Venkat-Ramani** (B.S. '98) has a fascinating blog devoted "to reporting on the aftermath of 2005's Hurricane Katrina and its impact on my area. You can find the blog on Maitri's website, www.vatul.net/bio.html.

2000s

Stacey Kocian (B.S. '01) and **Bryan Luman** (B.S. '01) announce the birth of a son Simon Rhys Luman. Simon was born on October 7, 2005, weighing 6 lbs. 11 oz. The family lives in Kenosha, Wisconsin.

Mike Harrison (Ph.D. '02) and his wife Diane are proud parents of identical twin boys Patrick and Philip (weighing a total of 15 lbs). They were born April 3, 2006. Mike is a professor at Tennessee Tech University.

Chris Majerczyk, (B.S. '03) works in Bloomington, Illinois, for a small environmental consultant called Concord Engineering.

After successfully defending his thesis, **Roger Bannister** (B.S. '04) begins working in Blacksburg, Virginia, in September 2006 as a hydrogeologist for Environmental Systems and Technologies.

From our Mailbox

Letter from U of I Alum **Charles J. Hoke** (A.B. '37)

"I was so pleased to receive the '2004 Year in Review.' The article about Professor Frank DeWolfe was of particular interest since I am a graduate of Illinois, class of 1937. I had the great pleasure and honor to take Geology 101 from professor DeWolfe and to work with him as well as the other professors mentioned in the article. Also, Dr. K.O. Emery and Dr. Robert Deitz were classmates. Two other persons I worked with were Dr. James Schopf and Dr. G.G. Cady, with whom I did microspores of Illinois Coal #6.

"After graduation I took a job in the oil fields of south Arkansas from Phillips Petroleum and after 10 years I took a job as Chief Geologist with Murphy Oil Corporation. [I] retired in 1975 as Vice President [of] Production and Exploration and member of the Board of Directors. Since that time I have been a consultant which I retired from on September 1, 2005. I have now had my 90th birthday.

"I will always cherish the time at University of Illinois and the training and instruction I received there."

Following Hurricane Katrina: Letter from U of I Alum and Tulane Professor **Nancye Dawers** (M.S. '87) Sent from New Orleans on March 27, 2006:

"Tulane has handled this remarkably well, considering big problems still exist in terms of rebuilding the med school. The university sustained between 150-250 million \$\$ in damage (they are still trying to estimate it), and so far nothing received from FEMA or insurance. Once we get a handle on the total undergrad enrollment for fall, and also survive the fast-approaching hurricane season, Tulane should be relatively stabilized. I've been hearing rumors of some possible major lay-offs at the state universities (like LSU and UNO), but no more lay-offs are expect here, at least in terms of faculty. Our dept is actually looking to hire three to four faculty in the next two years.

"Things are actually fine in this part of town, but you go just a couple of miles away and it is total devastation and it looks much the same as it did in the early fall. House repairs are slow, and really just beginning; contractors are basically overwhelmed. Fortunately we could temporarily solve our leaky-roof problem with a big blue tarp."



Alumnus **Hani Khoury** (left) and U of I's **R James Kirkpatrick** at a conference in Switzerland. Hani (Ph.D., '79) is a professor at the University of Jordan and gave an invited talk on the geology of natural cement deposits in

Faculty

Stephen P. Altaner (Associate Professor)
 Jay D. Bass (Professor)
 Craig M. Bethke (Professor)
 Chu-Yung Chen (Associate Professor and Associate Head)
 Wang-Ping Chen (Professor)
 Bruce W. Fouke (Associate Professor)
 Albert T. Hsui (Professor and Associate Head)
 Thomas M. Johnson (Associate Professor)
 Susan W. Kieffer (Walgreen Professor)
 R. James Kirkpatrick (Grim Professor and Executive Associate Dean)
 Jie Li (Assistant Professor)
 Craig C. Lundstrom (Associate Professor)
 Stephen Marshak (Professor and Head)
 Gary Parker (Johnson Professor)
 Xiaodong Song (Associate Professor)

Department Affiliate

Feng-Sheng Hu (Associate Professor)

Academic Staff, Post-Docs, Visiting Staff

Panakkatu Babu (Post-Doctoral Research Associate)
 Alessandro Cantelli (Post-Doctoral Research Associate)
 Justin Glessner (Geochemistry Specialist)
 Richard Hedin (Research Programmer)
 Holger Hellwig (Research Scientist)
 Eileen Herrstrom (Teaching Specialist)
 Stephen Hurst (Research Programmer)
 Ingmar Janse (Post-Doctoral Research Associate)
 Roy Johnson (Research Scientist)
 Andrey Kalinichev (Senior Research Scientist)
 Michael Lerche (Post-Doctoral Research Associate)
 Ann Long (Teaching Specialist)
 Xinli Lu (Post-Doctoral Research Associate)
 Stephen Lyons (Newsletter Editor)
 Michael Martin (Post-Doctoral Research Associate)
 Padma Padmanabhan (Post-Doctoral Research Associate)
 Maik Pertermann (Post-Doctoral Research Associate)
 Jean-Phillipe Perrillat (Post-Doctoral Research Associate)
 Marc Reinholdt (Post-Doctoral Research Associate)
 Bidhan Roy (Post-Doctoral Research Associate)
 Carmen Sanchez-Valle (Post-Doctoral Research Associate)
 Rob Sanford (Senior Research Scientist)
 Stanislav Sinogeikin (Research Scientist)
 Maoshuang Song (Post-Doctoral Research Associate)
 Michael Stewart (Lecturer)
 Rajeswari Vanka (Resource and Policy Analyst)
 Zhaofeng Zhang (Visiting Scholar)
 Jianming Zhu (Visiting Scholar)

Emeritus Faculty

Thomas F. Anderson
 Daniel B. Blake
 Albert V. Carozzi
 Donald L. Graf
 Arthur F. Hagner
 Richard L. Hay
 Donald M. Henderson
 Albert T. Hsui
 George deV. Klein
 Ralph Langenheim
 C. John Mann
 Alberto S. Nieto
 Philip A. Sandberg

Adjunct Faculty

Robert J. Finley
 Leon R. Follmer
 Dennis Kolata
 Morris W. Leighton
 Hannes Leetaru
 William Shilts
 Wolfgang Sturhahn
 M. Scott Wilkerson

Library Staff

Lura Joseph (Librarian)
 Sheila McGowan (Chief Library Clerk)
 Diana Walter (Library Technical Specialist)

Staff

Shelley Campbell (Staff Clerk)
 Barb Elmore (Administrative Secretary)
 Ed Lane (Electronics Engineering Assistant)
 Michael Sczerba (Clerk)

Graduate Students

Min Jeoung Bae	Dmitry Lakshantanov
Peter Berger	Qi Li
Emily Berna	Qiang Li
Nicole Bettinardi	Yingchun Li
Charles Bopp	Christopher Mah
Jon Brenizer	Jorge Marino
Sarah Brown	Lei Meng
Kurtis Burmeister	Jungho Park
Shane Butler	Alan Piggot
Bin Chen	David Robison
Scott Clark	Thomas Schickel
Joshua Defrates	Xinlei Sun
Melissa Farmer	Jian Tian
Theodore Flynn	Lisa Tranel
Lili Gao	Tai-Lin Tseng
Alex Glass	Ivan Ufimtsev
Chris Henderson	Huan Wang
Fang Huang	Jingyun Wang
Adam Ianno	Wei Day
Jennifer Jackson	Emily Wisseman
Meijuan Jiang	Kevin Wolfe
Michael Kandianis	Zhen Xu
Jacquelyn Kitchen	Zhaohui Yang
James Klaus	Kelly Zimmerman

COURSES TAUGHT IN 2005

Geol 100	Planet Earth
Geol 101	Introductory Physical Geology
Geol 103	Planet Earth QRII
Geol 104	Geology of the National Parks
Geol 107	Physical Geology
Geol 108	Historical Geology
Geol 110	Exploring Geology in the Field
Geol 111	The Dynamic Earth - Honors
Geol 116	The Planets
Geol 117	The Oceans
Geol 118	Natural Disasters
Geol 143	History of Life
Geol 333	Earth Materials and the Environment
Geol 380	Environmental Geology
Geol 411	Structural Geology and Tectonics
Geol 415	Field Geology
Geol 432	Mineralogy and Mineral Optics
Geol 436	Petrology and Petrography
Geol 450	Physics of the Earth
Geol 451	Methods in Applied Geophysics
Geol 454	Introduction to Seismology
Geol 460	Geochemistry
Geol 481	Earth Systems Modeling
Geol 497AE1	The Challenge of a Sustainable Earth System
Geol 511	Advanced Structural Geology
Geol 515	Advanced Field Geology
Geol 553	Chemistry of Earth's Interior
Geol 560	Physical Geochemistry
Geol 563	Analytical Geochemistry
Geol 571	Geochemical Reaction Analysis
Geol 591	Current Research in Geoscience
Geol 593F2	Current Topics in Geomicrobiology and Microbial Ecology
Geol 593J2	Molecular Modeling of Water & Interfaces
Geol 593K8	Current Literature in Earth's Deep Interior
Geol 593K12	Active Deformation of the Lithosphere



Air Force/University of Wisconsin

Xiaodong Song—Characterizing High-Resolution Seismic Velocity and Attenuation Structure of Yunnan-Sichuan Region, Southwest China Using Seismic Catalog and Waveform Data.

Center for Advanced Cement-Based Materials

R. James Kirkpatrick—Pore Solution-Solid Interactions in Cement Paste: Molecular Modeling of Fluids in Nanospaces.

Critical Research Initiative

Richard L. Weaver and Xiaodong Song—Correlation of Stochastic Seismic Waves: Theory and Application.

Department of Energy

Craig M. Bethke—Field-Constrained Quantitative Model of the Origin of Microbial and Geochemical Zoning in a Confined Fresh-Water Aquifer.

R. James Kirkpatrick—Computational & Spectroscopic Investigations of Water-Carbon Dioxide Fluids & Surface Sorption Processes.

Department of Energy

Robert A. Sanford—Towards a More Complete Picture: Dissimilatory Metal Reduction by Anaeromyxobacter Species.

Robert A. Sanford—Biomolecular Mechanisms Controlling & Radionuclide Transformations in Anaeromyxobacter Species.

Michigan State University

Robert A. Sanford—Growth of Chlororespiring Bacteria to High Cell Densities for Use in Bioaugmentation.

NASA

Susan W. Kieffer—Multicomponent, Multiphase H₂O-CO₂ Thermodynamics and Fluid Dynamics on Mars.

National Science Foundation

Jay D. Bass—Development of Laser Heating for Sound Velocity Measurements at High P & T.

Jay D. Bass—Sound Velocities & Elastic Moduli of Minerals Mantle Pressures and Temperatures with Laser Heating.

Jay D. Bass—Workshop on Phase Transitions and Mantle Discontinuities.

Jay D. Bass—CSEDI: Collaborative Research: Composition and Seismic Structure of the Mantle Transition Zone.

Jay D. Bass—Consortium for Material Property Research in the Earth Sciences.

Jay D. Bass—Collaborative Research: Elasticity Grand Challenge of the COMPRES Initiative.

Jay D. Bass—Polymorphism and Structural Transitions During Glass Formation.

Daniel B. Blake—Global Climate Change & The Evolutionary Ecology of Antarctic Mollusks in the Late Eocene.

Wang-Ping Chen—Collaborative Research:

Lithospheric-Scale Dynamics of Active Mountain Building along the Himalayan-Tibetan Collision Zone.

Bruce W. Fouke—Geobiological & The Emergence of Terraced Architecture during Carbonate Mineralization.

Thomas M. Johnson—Collaborative Research: Field Investigation of SE Oxyanion Reduction & Se Sources in Wetlands: Application of Se Isotopes.

Thomas M. Johnson—Quantification of Cr Reduction in Groundwater Using Cr Stable Isotopes.

Thomas M. Johnson and Craig C. Lundstrom—Acquisition of Multicollector Inductively Coupled Plasma Mass Spectrometer.

Thomas M. Johnson and Craig C. Lundstrom—Technical Support for the New MC-ICP-MS Laboratory at University of Illinois at Urbana-Champaign.

Jie Li—Experimental Investigations of Solid-Liquid Boundary in the Earth Core.

Craig C. Lundstrom—Collaborative Research: Investigating the Processes and Timescales of Andesite Differentiation: A Comprehensive Petrological and Geochemical Study of Arenal Volcano, Costa Rica.

Stephen Marshak—Collaborative Research: Emplacement of the Ferrar Mafic Igneous Province: A Pilot Study of Intrusive Architecture and Flow Directions in Southern Victoria Land.

Xiaodong Song—Structure and Dynamics of Earth's Core and Lowermost Mantle.

Office of Naval Research

Bruce W. Fouke—The Role of Shipyard Pollutants in Structuring Coral Reef Microbial Communities: Monitoring Environmental Change and the Potential Causes of Coral Disease.

Bruce W. Fouke—Microbiological, Physiological, and Toxicological Effect of Explosive Compounds on Coral Health.

University of Illinois Research Board

R. James Kirkpatrick—A Large Volume NMR Sample Probe for Chemical and Geochemical Research.

Xiaodong Song—Acquisition of Portable Broadband Digital Seismometers.

U.S. Geological Survey

Stephen Marshak—Geologic Mapping of the Rosendale Natural Cement Region, a Portion of the Northern Appalachian Fold-Thrust Belt, Ulster County, New York.

Degrees Conferred in 2005

Bachelor of Science Degrees

May

Matthew Borkowski
Alene Echevarria
Adam Ianno
Adam Nolen
Amanda Raddatz
John Ralston
Ashley M. Ravestein

August

Michelle Kondich

December

James Depa
Christopher Heren
Christopher Mead

Master of Science Degrees

May

Lei Meng—(Craig Bethke)
Yingchun Li—*Constraining Inner Core Rotation From a Worldwide Search of Waveform Doublets*, (Xiaodong Song).

August

Sarah Brown—*Ozark Plateau, Midcontinental North America; Insights into Thermochronology Using Apatite Fission Track Analysis*, (Stephen Marshak)

December

Lisa Tranel—*Subsurface Structure and Tectonic Subsidence Across the Illinois Basin and Ozark Dome Boundary*, (Stephen Marshak).

Doctor of Philosophy Degrees

May

Kurtis C. Burmeister—*Aspects of Deformation and Strain in the Appalachian Fold-Thrust Belt (New York) and the Shear Zones of the Sveconorwegian Orogen (Norway)*, (Stephen Marshak)

Jennifer M. Jackson—*The Effect of Minor Elements on the Physical and Chemical Properties of Lower Mantle Minerals at High-Pressure*, (Jay Bass)

Christopher Leat Mah—*Cladistic Analysis of the Goniasteridae (Asteroidea; Valvatoidea): Phylogeny, Evolution, and Biodiversity*, (Daniel Blake)

Jian Tian—*Varve Chronology, Proxy Calibration, and Holocene Climate of Minnesota*, (Thomas Anderson and Feng Sheng Hu)

December

James Klaus—*"The Microbial Ecology of Reef Corals: Diversity, Disease and the Environment,"* (Bruce Fouke)

LIST OF PUBLICATIONS FOR 2005

- Brudzinski, M.R., and Chen, W.-P., 2005, Earthquakes and strain in sub-horizontal slabs, *J. Geophys. Res.*: 110, (11 pp.), B08303, doi:10.1029/2004JB003470.
- Zhang, H.J, Thurber, C. H. and Song, X.D., 2005, High-resolution seismic velocity and attenuation structure of the Sichuan-Yunnan region, Southwest China, using seismic catalog and waveform data, (in) Proceedings of the 27th Seismic Research Review: Ground-Based Nuclear Explosion Monitoring Technologies, LA-UR-05-6407, 266-275.
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- Clegg, B.F., Tinner, W., Gavin, D.G., and Hu, F.S. 2005, Morphological analysis of *Betula* (birch) pollen and paleoecological application. *The Holocene*: 15: 229-237.
- Gavin, D. G., and Hu, F.S. 2005, Bioclimatic modelling using Gaussian mixture distributions and multiscale segmentation. *Global Ecology and Biogeography*: 14: 491-501.
- Korotky, A.M, et al, including Hu, F.S. 2005. Characteristics of the Holocene environmental history of the Sikhote-Alin Range (Primorski Krai) from lake sediments, (in) Pages from Quaternary History of Northeast Asia (V.Ye. Glotov, ed.), 70-86.
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- Parker, G. and Perg, L., 2005, Probabilistic formulation of conservation of cosmogenic nuclides: effect of surface elevation fluctuations on approach to steady state. *Earth Surface Processes and Landforms*: 30(9), 1127-1144.
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- Taki, K. and Parker, G., 2005, Transportational cyclic steps created by flow over an erodible bed. Part 1. Experiments. *Journal of Hydraulic Research*: 43(5), 488-501.
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- Cui, Y. and Parker, G., 2005, Numerical model of sediment pulses and sediment-supply disturbances in mountain rivers. *Journal of Hydraulics Engineering*: 131(8), 646-656.
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Seismic Tomography, Adjoint Methods, Time Reversal, and Banana-Donut Kernels

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Effect of Post-Glacial Sea Level Rise on Large Rivers

Gordon Grant, U.S. Forest Service/Oregon State Univ.
A River Runs Underneath It: Geological Control of Hydrogeomorphic Regimes in the Oregon Cascades and Implications for Climate Change

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Fine-scale Heterogeneity Within Earth's Inner Core

S. Balachandrar, UIUC Department of Theoretical and Applied Mechanics
Scalar and particulate Gravity Currents—Modeling and Large Scale Simulations

Jeff Dorale, University of Iowa
Strong Contrasts in Mid-Continental Flooding Regimes Among Holocene, Last Glacial, and Last Interglacial Climates

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Better than Ever: Sedimentary Geology and Surface Processes

The Department of Geology has a long, rich tradition as a national leader in sedimentary geology and surface processes. The program's roots extend back at least to what many alumni fondly call "the Wanless Era," named for Prof. Harold Wanless, who made fundamental contributions to sedimentary geology. Over the years, major figures in sedimentary geology and geomorphology have populated the halls of NHB. Graduates of our programs have gone on to distinguished careers in industry, academia, and service.

During the 1980s and '90s, however, a generation of distinguished senior faculty in these fields retired. The retirements coincided with a period during which the College slowed the rate of hiring, and thus we were not able to rebuild the programs instantly. During the past several years, however, the tide has turned and the Department has once again become established as a leading research and teaching center in sedimentary geology and surface processes. Now, our sedimentary geology program includes: Bruce



Fouke who specializes in the geology and geomicrobiology of carbonate rocks; Sue Kieffer (the first Walgreen Chair) who specializes in geophysical fluid dynamics; Gary Parker (the first W.H. Johnson Professor) who specializes in fluvial geomorphology and abyssal fans; Jim Best (the first Threet Professor) who specializes in clastic sedimentology; Alison Anders who specializes in geomorphology and surface processes; Jonathan Tomkin (Associate Director of SESE) who specializes in geomorphology

and geodynamics; Bruce Rhoads (an affiliate professor) who specializes in fluvial geomorphology; Marcelo Garcia (an affiliate professor) who directs the Hydrosystems Laboratory for modeling sedimentary environments; and Feng Sheng Hu (an affiliate professor) who specializes in Quaternary paleobiology and paleoclimate. It is highly likely that next year a new paleobiologist will be joining the University.

(continued on page 3)

Meet the Newest Members of the Geology Department

The Department has grown significantly in the past year, with the appointments of Jim Best, Alison Anders, and Jonathan Tomkin.

Jim Best

Jim Best came to Illinois in the fall of 2006 through the Faculty Excellence Hiring Program, which creates an opportunity for depart-

ments to bring in senior faculty. Prior to his arrival at UIUC, he was the Professor of Sedimentary Processes at the University of Leeds, where he ran a huge program for studying sedimentary phenomena. At Illinois, he holds appointments both as the "Threet Professor of Sedimentary Geology," a position made possible through the generosity of Jack and Richard Threet, and as a professor of geophagy.

Professor Best, as one of the premier process sedimentologists in the world, brings instant attention to the University. Along with others now on our staff, the University is rapidly becoming a major player in the field of water-sediment interactions. He is making a strong commitment to the synergy that has developed at UIUC in the interdisciplinary field of water-related research. Jim conducts research

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GREETINGS



Letter From The Head

The Department is back in growth mode! We've seen a number of positive signs in the last year that give the sense that the Department clearly has a promising

future. In no particular order, consider some of the changes:

- We have succeeded in bringing in new faculty with world-class reputations, so the total number of faculty has grown for the first time in years. Our most recent hires — Sue Kieffer, Gary Parker, Jim Best, Alison Anders, and Jonathan Tomkin—have put the Department back on the map in the general area of sedimentary systems and surface processes. Both Gary and Jim now hold endowed professorships and have won major international career-achievement awards, and Sue is a member of the National Academy of Sciences.
- The Department is now well connected to a number of strong programs across campus—we are no longer an isolated, small unit. Our faculty have joint or affiliate appointments in Civil and Environmental Engineering, the Institute for Genomic Biology, the Materials Research Center, the National Center for Supercomputing Applications, the School of Integrative Biology, the Center for Water as a

Complex Environmental System, the Department of Geography, the Department of Atmospheric Sciences, and the Department of Physics.

- The number of students has grown—we have passed 70 majors, double what we had 3 years ago, and with the largest incoming class of graduate students in many years, our grad student program has enlarged. Classes that just a few years ago almost couldn't run because of too few students now are having to open up new sections, and we are sending almost twice as many students to field camp. And with over 3,000 students taking our introductory general education classes, we are teaching a sizable proportion of the University's entire student body.
- Faculty are offering new courses—geological fluid dynamics, geomorphology, geodynamics, sedimentary processes, continental lithosphere, sustainability, and others are now available, and with the help of a generous gift from Shell Oil Company, our famous (infamous) 415/515 field trip is able to expand its offering. In addition to trips to the southwestern USA and Curaçao, we will be offering a trip to study the sedimentary basins of Ireland.
- Our endowment has doubled in the last 5 years. With the generosity of our distinguished alumni, we will soon have 6 graduate fellowships to offer, as well as support for graduate research, field camp scholarships, visiting lecturers, and other important causes.
- We are seeing a surge in corporate recruitment of our students, with some companies hiring several a year. And for the first time in anyone's memory, recruiters have shown up at field camp to recruit students right out of the camp.
- The Geology Club has been very visible and has sponsored many activities, including open-house exhibits, the

first "Earth Fear Film Festival" (where students enjoyed learning the science and non-science behind Hollywood productions), and sponsorship of the Science Olympiad. The Graduate Student Council has been busy running the 6th Annual "Earth Research Review" which has evolved into a major event where students present posters describing their research accomplishments, in a fun atmosphere of a wine and cheese party.

Of course the biggest change is the development of the School of Earth, Society, and Environment. The School becomes official this summer, and we have already enjoyed such benefits as better business operations, better computer support, and new collaborative research and teaching opportunities. The next step will be the renovation of our old friend, the Natural History Building, to become a better facility for 21st century teaching and research.

I'll be on sabbatical all of next year, so you won't hear from me for a while. But enjoy this issue and read more about how your Department is changing and, hopefully, growing.

Best regards,
Steve Marshak

Shell Oil Company is now generously supporting the Department's Geology 415/515 field trips. The 2005 trip (led by Craig Lundstrom) rafted the San Juan River; the 2006 trip (led by Steve Marshak) went to southern Arizona and California; the 2007 trip (led by Bruce Fouke) went to Curaçao; and the 2008 trip (to be led by Jim Best) will go to western Ireland.

Year in Review is published once a year by the Department of Geology, University of Illinois at Urbana-Champaign, to summarize the activities and accomplishments within the department and news from alumni and friends.

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Meet the Newest Members

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both in the lab, using flume tanks, on the computer, and in the field. He has recently undertaken studies of large rivers in Canada and Bangladesh, using ground-penetrating radar and precise surveying techniques.

Jim, his wife Mary, and their children, will soon be moving into a vintage house on Elm Boulevard.

Alison Anders



Alison Anders comes to the Department as Assistant Professor of surficial processes, after completing a post-doc at Yale

and a Ph.D. at the University of Washington. She combines studies of geomorphology with studies of climate to understand the interaction between weather systems and landscape evolu-

tion, and has been developing innovative techniques for characterizing rainfall distribution in mountain ranges.

Alison will teach geomorphology and other aspects of surface processes at both the undergraduate and graduate levels, courses which have not been fully staffed since the retirement of Hilt Johnson. Alison will be involved in the Center for Water as a Complex Environmental System, and hopes to build linkages between geology and atmospheric sciences.

Alison is not new to the Midwest, as she grew up in Minneapolis and attended Carlton College as an undergraduate. She has moved to C-U with her husband, Jonathan Tomkin.

Jonathan Tomkin



Jonathan Tomkin received his Ph.D. from the Australian National University, and then completed a post-doc at Yale

University before taking a faculty position at Louisiana State University. His undergraduate background was in physics, but he saw the light and went into geosciences as a graduate student. Jonathan works in surficial processes from a geodynamic perspective—he's interested in understanding the tectonic processes that lead to uplift and evolution of mountain landscapes, as well as in the erosional processes that tear them down.

Jonathan holds two appointments at UIUC. He is the new Associate Director for Academic Affairs of the School of Earth, Society, and Environment. He will also be a Research Assistant Professor in the Geology Department, where he will be teaching graduate courses in geodynamics and tectonic geomorphology.

Unlike his wife, Alison Anders—a Minnesota native—Jonathan, who grew up in Melbourne, Australia, found the winter weather of C-U to be a bit on the chilly side.

Better than Ever

(continued from page 1)

The faculty are award-winning researchers. Sue Kieffer has received a MacArthur "genius award" and is a member of the National Academy of Sciences; Marcelo Garcia received the Hans Albert Einstein Award from the American Society of Civil Engineers; Gary Parker has won the Lifetime Achievement Award of the International Association of Hydraulic Engineering; and Jim Best has won the Warwick Award of the British Geomorphological Society.

Our researchers are able to conduct state-of-the-art simulations of depositional and erosional environments at the 11,000 square-foot Ven Te Chow Hydrosystems Laboratory, one of the world's best facilities for flume tank and wave tank studies. Recent work in the

lab has focused on examining bed forms, submarine fans, and river evolution. The new Institute for Genomic Biology, which just opened on campus, allows research on the microbial communities of the sedimentary realm. And the National Center for Supercomputing Applications provides opportunities for developing numerical simulations of processes. Collaborative proposals under development with the Department of Geography, the Illinois State Geological Survey, the Department of Atmospheric Sciences, and the Department of Civil and Environmental Engineering are seeking funding for major new field equipment, including LIDAR and ground-penetrating radar.

Our renewed commitment to sedimentary geology also includes an association with the Center for Water as a Complex Environmental System

(CWACES). The Center, under the leadership of Bruce Rhoads, is devoted to improving understanding of water-related issues. Our hydrogeology faculty, Craig Bethke and Tom Johnson, add an important groundwater component to the Center.

We have been increasing opportunities for our students to participate in field trips to examine sedimentary processes and produces. Under the auspices of Geology 415/515, students have trekked across the deserts of southern Arizona, have rafted down rivers in Utah, and have snorkeled over reefs in Curaçao. Recent generous gifts from Shell Oil Company allow us to expand our program. We hope to offer a trip to the sedimentary basins of western Ireland in the coming year.

Scott Morris Establishes a new Office of Business Affairs

As part of the development of the School of Earth, Society, and Environment the Departments of Geology, Atmospheric Sciences, and Geography have consolidated business and financial operations, including grants and contracts administration, purchasing, travel, and accounting into a single facility called the Office of Business Affairs. In June, 2006, Scott Morris was appointed as the Operations Manager of the School—in this capacity, he supervises the Business Affairs Office. He also oversees computer and technical support, facilities, and construction projects for the School. Morris, who grew up in Altamont, Illinois, attended Lake Land College, Eastern Illinois University, and holds a bachelor's degree in Business Administration from Kennedy-Western University. He has been with the University since 1986,

with the exception of a few years during which time he worked as Operations Manager for a faculty start-up company in the Research Park.

According to Morris, “centralizing business operations for three departments, currently housed in three different buildings, has proven to be quite a challenge, considering that each has developed its own procedures over the years. However, we have now established a combined office on the 4th floor of the Natural History Building allowing us to bring all financial staff together in the same location. We have also hired a new Grants & Contracts Specialist. The combined office can provide improved and more consistent services, where the staff will be able to focus on specific tasks but cross-trained to provide back up as needed. The new approach is a big step in the right direction.”

Renovation Plans in NHB

Exciting plans are under development to renovate NHB in order to be able to incorporate all three departments of the new School. There's quite a bit of unutilized or underutilized space in the building at present. Most of the space is left over from the closing of the museum, but there are also classroom spaces that have not been updated for decades and are underutilized. The goal is to try to figure out how we can renovate this space for a reasonable cost to make it possible for three academic units to operate in the building. When the academic units are there we'll have three times as many faculty members and three times as many graduate students residing in the same building. So NHB will become a much livelier space.

NSF Teaching Fellowship Leaves lasting Impression

How do you explain isotopic fractionation to 5th graders? This was one of the many questions that graduate student and National Science Foundation GK-12 Teaching Fellow Scott Clark faced during the 2005-06 academic year. NSF Teaching Fellows collaborate with K-12 teachers to bring energy and fresh perspectives into the teacher's classrooms.

Clark's fellowship took him to the Unity Point School in southern Illinois, where he designed and led geological field trips for 5th-grade and high-school students. The products of this effort included “a multi-day project that fosters student learning on subjects ranging from the theory of plate tectonics to earthquake-hazard preparedness.” He focused on developing inquiry-based teaching methods and on the use of technology in earth science classrooms.

“The students were fun because they were interested, were willing to tackle challenging topics, and were not afraid or embarrassed to ask questions.”

Clark was also delighted to learn that after his teaching stint, the school applied for and received a school seismograph from the IRIS *Seismographs-In-Schools* program. The students have seen the instrument record an earthquake halfway around the world.

“Now, an earthquake isn't just something that gets reported in the news,” Clark says. “Such experiences make science alive for kids.”



Mapping A Future in Geology



Jessica Parker

The road to from geography to geology is paved with maps. Just ask graduate student Jessica Parker, who will be mapping carbonate sediment in the Gulf of Mexico as an intern for Shell Oil

this summer in Houston. Parker's U of I undergraduate degree in geography gave her only a taste of geology via environmental science classes, but gave her valuable experience with geographic information science (GIS). Her brief experience led her to look into the option of pursuing a double major in geology and geography. After discussing options with folks at the Illinois State Geological Survey (ISGS), where she held an internship, and in the

Department, she realized she had enough credit to graduate

"Instead of staying another year an undergraduate, I went ahead and began a master's in geology."

Support from a research assistantship in the Veterinary Medicine School, applying her background in GIS made the switch in disciplines possible.

For Parker the two disciplines of geography and geology are *simpatico*, and the connections, via the study of maps, has led to an opportunity for a summer internship at Shell Oil Company.

"In my mind the two disciplines aren't very different. At the ISGS I was working with maps of state geology. At Shell, I'll be focusing on making maps that spatially display carbonate data. The internship will bridge my geography and geology training."

The mapping of the carbonate deposits is a key component of oil exploration, Parker notes.

"Porosity and permeability, two factors that determine whether or not a rock is a good oil reservoir, vary with location. Maps can display the distribution of permeability, and can help determine if it economical to extract oil from a particular formation." GIS techniques provide an efficient way to manipulate large volumes of data.

Parker has found that the Geology Department is a supportive environment for combining disciplines.

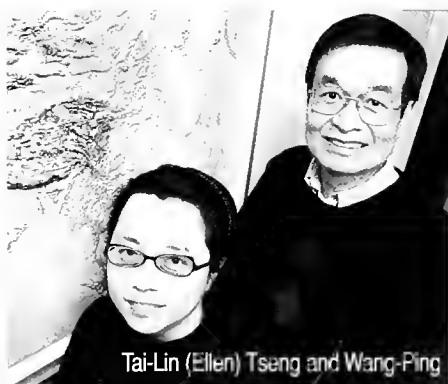
"I was a little intimidated at first because I lacked a solid geologic background. But the Department is definitely open to new ideas and has been very encouraging. They were very supportive in having me join the program."

Seismologists locate missing lithosphere slab under Tibet

Geologists in the Department have located a huge chunk of Earth's lithosphere that went missing 15 million years ago. By finding the massive block of errant rock beneath Tibet, the researchers are helping solve a long-standing mystery and clarifying how continents behave when they collide.

About 55 million years ago, the Indian plate crashed into the Eurasian plate, forcing the land to slowly buckle and rise to produce the Tibetan Plateau, the world's largest and highest plateau. Tectonic models of the plateau vary greatly. According to one model, the thickened lithosphere beneath Tibet became unstable, and a piece broke off and sank into the deep mantle.

"While attached, this immense piece of mantle lithosphere under Tibet acted as an anchor, holding the land above in place," said Wang-Ping Chen, professor of geophysics. "Then, about 15 million years



Tai-Lin (Ellen) Tseng and Wang-Ping

ago, the chain broke and the land rose, further raising the high plateau."

Until recently, this tantalizing idea lacked any clear observation to support it. Then doctoral student Tai-Lin (Ellen) Tseng and Chen found the missing anchor.

"This remnant of detached lithosphere provides key evidence for a direct connection between continental collision near the surface and deep-seated dynamics in the mantle," Tseng said.

Through a project called Hi-CLIMB, an integrated study of the Himalayan-Tibetan Continental Lithosphere during Mountain Building, Tseng analyzed seismic signals collected at a number of permanent stations and at many temporary stations to search for the missing mass. She precisely measured the velocities of seismic waves traveling beneath the region at depths of 300 to 700 kilometers. Because seismic waves travel faster through colder rock, Tseng was able to discern the positions of detached, cold lithosphere from her data.

"We not only found the missing piece of cold lithosphere, but also were able to reconstruct the positions of tectonic plates back to 15 million years ago," Tseng said. "It therefore seems much more likely that instability in the thickening lithosphere was partially responsible for forming the Tibetan Plateau, rather than the wholesale subduction of one of the tectonic plates."

Scientists propose alternate model for plume on Enceladus



What's causing all the commotion on Enceladus?

Last year, when the Cassini spacecraft discovered an enormous plume erupting on Enceladus, one of Saturn's moons, scientists speculated that liquid water lay at shallow depths beneath the icy surface.

Now, as reported in a recent issue of the journal *Science*, researchers have proposed an alternate model to account for this spectacular plume.

"With a diameter of only 500 kilometers, Enceladus is a tiny moon; it would fit easily between Los Angeles and San Francisco," says Professor of Geology Susan Kieffer, lead author of the *Science* paper. "This tiny satellite should be cold and inactive, like our own moon. But it isn't."

Kieffer, who holds a Charles R. Walgreen Jr. Chair in the Department of Geology, has studied geysers and volcanoes on Earth, Io (a satellite of Jupiter), and Triton (a satellite of Neptune).

The surface of Enceladus is composed of water ice with traces of car-

bon dioxide. Part of this surface does appear old and cratered like Earth's moon, Kieffer said. "The south polar region, however, is geologically active, with many surface features, indicating current activity."

Initial reports speculated that chambers of liquid water lay close to the moon's surface and erupted in a giant geyser. The water would be near freezing, so scientists dubbed the model "Cold Faithful," after the familiar, but hotter, Old Faithful geyser in Yellowstone National Park.

"A problem with this model," Kieffer said, "is that 10% of the plume consists of the gases carbon dioxide, nitrogen and methane. You might get a carbon dioxide-driven liquid geyser there, but you can't put this much nitrogen and methane into liquid water at the low pressures found inside Enceladus."

Kieffer and colleagues have proposed an alternate model to explain the plume on Enceladus. The gases in the plume, they propose, are dissolved in a

reservoir of clathrate under the water ice cap in the south polar region. The clathrate model allows an environment that would be 80° to 100° Celsius colder than liquid water, with a "Frigid Faithful" plume emanating from clathrates, rather than from liquid water reservoirs.

"Exposed to near-vacuum conditions by fractures at the south pole, the clathrates decompose violently, spewing out nitrogen, methane and carbon dioxide gases, and ice particles; as well as leaving fracture walls coated with water ice," said Kieffer, who has recently been appointed as a professor in the U of I's Center for Advanced Study, one of the highest forms of campus recognition.

The other authors of the paper besides Kieffer are postdoctoral researcher Xinli Lu and Department geologists Craig Bethke and Steve Marshak, planetary scientist John Spencer at the Southwest Research Institute, and chemist Alexandra Navrotsky at the University of California at Davis.

Researchers study role of natural organic matter in environment

The decomposition of plant, animal, and microbial material in soil and water produces a variety of complex organic molecules, collectively called natural organic matter. These compounds play many important roles in the environment.

By studying the molecular mechanisms responsible for the complex behavior of natural organic matter, Research Associate Professor Andrey Kalinichev and Professor Jim Kirkpatrick in the Department of

Geology are finding new ways to prevent the compounds from fouling water purification and desalination facilities.

"Bio-fouling creates great complications for the water purification and desalination industries," Kalinichev said.

Because of its acidic nature, natural organic matter can form complexes with dissolved metal ions. The way in which such ions bond to natural organic matter, and the potential effects of the ions on bio-fouling, were studied using molecular dynamic computer simulations

performed by Kalinichev, and nuclear magnetic resonance measurements performed by Kirkpatrick and former student Xiang Xu.

Kalinichev and Kirkpatrick found that sodium and magnesium ions have very weak interactions with natural organic matter. Cesium interacts more strongly, but calcium has the strongest interaction with natural organic matter.

This work was funded by the U.S. Department of Energy and the National Science Foundation.



Finding New Worlds in the Subsurface

Ted Flynn is almost poetic when he describes what he has been exploring in the huge Mahomet Aquifer that underlies much of central Illinois and supplies the region with its clean drinking water.

"In the very fine, water-filled glacial sands filled of the aquifer, there's no oxygen but things are still living! The water contains anaerobic bacteria, organisms that don't breathe in oxygen and breath out carbon dioxide like we do, but rather breathe in sulfate and breath out sulfide.

"This permits an entire ecosystem of micro-organisms to exist underground, and these have the capacity to affect groundwater geochemistry. We're studying how microbes and microbial respiration affect groundwater geochemistry."

The third-year Ph.D. student, who came to Illinois from Notre Dame to work with Prof. Craig Bethke, has developed a new water-testing system that more accurately samples groundwater. Flynn wanted to test the assumption that the bacteria collected by simply filtering a water sam-

ple taken from a well actually represents of the bacterial community in the aquifer as a whole. What he found was that traditional testing only examines a fraction of that community.

To see what else is in the groundwater, Flynn filled bags with sterilized sand from the Mahomet Aquifer, then placed the water down wells. He allowed the sand to be colonized by the bacteria in the water samples and then removed the bags and extracted bacteria using filters.

"Once we have a filter with the water bacteria and the sand with the attached bacteria, we extract the DNA from the bacteria and then use molecular biology techniques to compare the entire microbial community from one sample to the other.

"We found was that there are actually two distinct groups of microbes: the attached bugs and the unattached ones. Amazingly, the attached community in a well is more similar to the attached community in a different well tens of miles away than it is to the unattached commu-

nity in its own well."

Because of his results, Flynn notes the traditional filter tests do not give the complete picture. "Perhaps 99% of the microbes in an aquifer are attached to solids at any given time."

Flynn wants to continue exploring the differences between bacteria in various watery communities. He enjoys the multidisciplinary nature of his research and says the U of I, with programs in both hydrogeology and geomicrobiology, was the perfect choice for graduate school. He has had the opportunity to work not only with Prof. Bethke, but also with Prof. Bruce Fouke and Research Scientist Rob Sanford. Through the geomicrobiology program, he now can interact with researchers at the new Institute for Genomic Biology.

"I really like the collegial atmosphere here. I've also been able to interact with people from different groups and different departments—from animal sciences to civil engineering."

Around the Department

Affiliate Professor **Marcelo Garcia** won the 2006 Hans Albert Einstein Award from the American Society of Civil Engineers for "outstanding research contributions to sediment transport engineering, and outstanding service through visionary editorship of the ASCE book on Sediment Engineering." This award, named for Albert Einstein's son, is the highest recognition internationally in the field of sedimentation engineering. Professor **Gary Parker** received the award in 1994.

Professor **Jay Bass** has received an Honorary Doctorate from the University of Lyon in France. This prestigious award recognizes his contributions in mineral science. He has also been elected to the governing board of a newly formed Synchrotron Project, HPSynC, which is an Earth science synchrotron effort.

Geology Librarian **Lura Joseph** has been promoted and granted tenure in the University of Illinois Library. Joseph was a geologist in the oil industry for 18 years before taking a degree in library sciences. Her responsibilities have recently increased because the Geology Library has taken over responsibility for the Atmospheric Sciences collection. With this acquisition, the library now provides service to twice as many students and faculty.

Associate Professor **Craig Lundstrom** has been appointed an Associate of the UIUC Center for Advanced Studies. This is an honor bestowed upon faculty to provide them with time to pursue high-profile research.

Professor **Wang-Ping Chen** is serving on the Advisory Board of COMPRES (Consortium for Materials Properties Research in Earth Sciences, USA) until June of 2009. Professor **Jay Bass** continues his service on the Executive Board of COMPRES.

Professor Emeritus **Alberto Nieto** will be teaching for several months in the geotechnical program at Tsinghua University in Peking.

The Geology Department is now a member of UNAVCO, the national consortium for space-based geodesy. With this new membership, our Department is now represented in all three major research consortia in geosciences (the other two being IRIS, Incorporated Research Institutions for Seismology, and COMPRES). Professor **Wang-Ping Chen** is serving as the institutional representative in UNAVCO.

Professor **Ralph Langenheim** continues his service as an elected member of the Champaign County Board. His former student, **C. Pius Weibel** (Ph.D. '88), was recently elected to the Board and has been made the Board's chair. Weibel is a geologist at the Illinois State Geological Survey.

George Maxey and the Birth of Hydrogeology at Illinois

by Ralph L. Langenheim

In 1955, Department Head George White joined with the Illinois State Geological Survey to hire George Burke Maxey with a joint appointment as Associate Professor of Geology and Head of the Illinois State Geological Survey Division of Ground Water Geology, thus launching a dynasty in geohydrology at the University of Illinois. Maxey remained at Illinois for only seven years. He left in 1962 to join the Desert Research Institute in Nevada, and was succeeded, successively, by his doctoral students, first Robert N. Farvolden (1960-1967), then John Bredehoeft (1968-1969), and finally by Patrick Domenico (1969-1982).

The time was ripe for bringing hydrogeology to Illinois, for increasingly many graduates were ending up practicing geohydrology in their jobs with government agencies. Maxey was the right person to get the program off the ground, for he distinguished himself as an innovative, charismatic and convivial leader of students. Along with his wife, Jane, Maxey hosted many memorable parties at his home, and encouraged a sense of camaraderie and enthusiasm among his students that has rarely been matched. Encouraged by White in 1960, Maxey joined Ven Te Chow's group in the Department of Civil Engineering and together with them organized Illinois' first groundwater course. While Maxey supported students studying Illinois aquifers for the ISGS, he also sent a group to Nevada to work in the Humboldt River watershed, a project instigated by a group



of ranchers interested in increasing irrigation. This "band of brothers"—including Bob Farvolden, Phil Cohen, John Hawley, Keros Cartwright, Lyle McGinnis, Bill Wilson, and John Bredehoeft—along with some of their families, lived together in Winnemucca where they completed one of the first comprehensive regional evaluations of both surface water and groundwater in a desert climate.

When Bob Farvolden, a founding head of the Alberta Research Foundation Ground Water Division, succeeded Maxey he began a pioneering program on the hydrogeology of landfills. Farvolden went on to establish the first Canadian degree program in hydrogeology at Western Ontario, and later organized a center for hydrologic research at the University of Waterloo, where he hired Illini Ph.D.s, John Cherry and George Pindar.

John Bredehoeft served as an interim visiting professor directing the geohydrology program for the 1978-69 academic year. He went on to a distinguished career at the U.S. Geological Survey where he led initiatives in the quantitative analyses of fluid flow and advocated application of computer modeling in hydrogeology. These achievements earned Bredehoeft the Distinguished Service Award and the Meinzer Award of the GSA Hydrogeology Division, the Penrose Medal, the Horton Medal of the American Geophysical Union, and membership in of the National Academy of Engineering. Pat Domenico, the last of Maxey's direct intellectual offspring, succeeded Bredehoeft and remained at Illinois until 1982, when he moved to Texas A&M.

In all, almost 50 hydrogeologic theses have been written at Illinois. The Illinois hydrogeology program that Maxey founded graduated many remarkable individuals who went on to preeminent programs in the country, as hydrogeology defined itself and became a major discipline within geoscience. The numerous Illini on the roll of recipients of the Distinguished Service Awards of the Hydrogeology Division of the Geological Survey testify to the quality of that influence: George Maxey, 1984; Robert Farvolden, 1992; John Sharp and Paul Witherspoon, 1996; John Cherry, 1998; Keros Cartwright, 1991; Paul Seaber, 1993; Stanley Davis, 1997; Richard Parizek, 1992; and John Bredehoeft, 2003.

Dr. Frank Schwartz Receives Alumni Achievement Award



We are very pleased to announce that Dr. Frank Schwartz (FPI) ('72, Ph.D) is the 2007 Department of

Geology Alumni Achievement Award winner. Dr. Schwartz is an internationally respected research scholar and teacher in hydrogeology and hydrology. He joined The Ohio State University (OSU) in 1988 as The Ohio Eminent Scholar in Hydrogeology. This endowed chair is among the most prestigious at The Ohio State University. Professor Schwartz is the author of more than 150 publications and is known internationally for his work on field and theoretical aspects of contaminant hydrogeology and remediation, mass transport, ground-water geochemistry, and watershed hydrology. He has co-authored three textbooks, which are widely used for teaching hydrogeology around the world. Since arriving at OSU, Dr. Schwartz has been successful in attracting close to \$5M in funded external research from a variety of Federal agencies. In 2005, he was named as the Director of the School of Earth Sciences, which now has 37 faculty members and about 130 students.

Professor Schwartz has received major awards recognizing his status as a scientific leader. He is a co-recipient of the prestigious O.E. Meinzer Award (1984), the Excellence in Science and Engineering Award (1991), and the GSA Distinguished Service Award (2005). He received the King Hubbert Science Award (1997). He was elected as a Fellow of the American Geophysical Union in 1992.

In addition to teaching and research, Professor Schwartz has acted as a consultant to government and industry, and in various advisory capacities. He serves regularly on panels of the Water Science and Technology Board, an arm of the National Research Council designed to guide government policies.

We asked Dr. Schwartz to share a few remembrances of his years at Illinois.

"What I remember so vividly about my time at U of I are the people, faculty members and fellow graduate students. The professors and students of my time were exceptionally talented individuals—really in a league of their own. Clearly, when students come to a world-class institution like U of I, it is to discover tal-

ented professors, the Pat Domenicos, Vic Palciauskases and Don Graffs of the world. These individuals are all long gone from Illinois, and probably not well known to more recent alumni. You should think of them as links in the long chain of accomplishment and scientific excellence, which has been a hallmark of our department."

Obituaries



Donald Munro "Hendy" Henderson of Urbana passed away on October 21, 2006. He was 85, and leaves behind his wife Peggy, five children, and five grandchildren.

Don received his bachelor's degree from Brown University and his master's and doctoral degrees from Harvard University. He joined the faculty of the University of Illinois in 1948 as an instructor, moved through the ranks to become full professor in 1969, and became professor emeritus in 1989. A large retirement party was held in his honor at the Krannert Art Museum, complete with a string quartet playing music composed for the occasion.

Don was a member of the Mineralogy Society of America, the Geological Society of America, the American Geophysical Union, the American Association for the Advancement of Science, and the American Crystallographic Association. From 1958 to 1959, he held a Guggenheim Fellowship.

Over his long career, Hendy conducted research on a variety of topics, ranging from crystal chemistry, to nuclear magnetic resonance studies, to the process of dolomitization. He also published on aspects of geological education.

In the Department, Hendy's rigorous courses in mineralogy were legendary. They yielded generations of very well trained students. From 1978 to 1983, he assumed the position of Assistant Head and Educational Coordinator for the Department, and in this capacity ensured that teaching assignments were made and fulfilled, and that students received the advice they needed to succeed in their graduate programs.

Sadly, Hendy suffered adult polio soon after he arrived at the University of Illinois, and needed to walk with canes for the remainder of his life. Nevertheless, he continued to accompany students on field trips, and to commute daily from his home in Urbana by bicycle. In the winter he attached crampons to his canes, to conquer the ice.

Hendy will be remembered as a very kind person and a friend who served as a rational anchor in the department over many decades. He will also be remembered as an incredible punster who could always bring a note of levity to any situation. In his memory, his family and friends have established the Donald M. Henderson Memorial Fund within the Department of Geology's endowment. When the fund has grown, its income will be used to help purchase books for the Geology Library. One could often find Hendy in the stacks, reading both modern and historic geologic literature.

Obituaries

Robert W. "Moose" Leonard (B.S. '55) of St. Charles, Illinois, passed away on December 29, 2006 in Oak Lawn, Illinois, surrounded by his loving family. He was 74. Bob will be remembered for his genuine kindness and his devotion to family, church, friends, and community.

Following college, Bob served as an officer in the United States Army Air Corps until 1958 and in the Army National Guard until 1965. For 33 years, he served as a pilot with United Airlines and retired as a 747 captain. He also served as Mayor of North Aurora, Illinois, from 1965 to 1969, and spearheaded the development of the River Corridor Master Plan.



James F. Luhr (B.S. '75) of University Park, Maryland, died peacefully at home on January 1, 2007 of complications from influenza. He was 53.

A renowned geologist, he was director of the Global Volcanism Program at the Museum of Natural History, Smithsonian Institution. Jim was the devoted father of two

daughters, and was married to Karen Prestegaard, whom he met at UC Berkeley when both were pursuing doctoral degrees.

Jim was a passionate scientist, committed to deepening public awareness of scientific discovery. He helped to curate the Museum's enormously popular Hall of Geology, Gems and Minerals; collaborated extensively with Mexican scientists during years of research in that country; and chaired the Museum's mineralogy department for five years. He popularized science in every available medium: as editor of the books "Earth" (2004) and "Paricutin: The Volcano Born in a Mexican Cornfield" (1993); in exhibitions; through online and CD-Rom products; and even with a "build your own volcano" kit for children. Among his achievements, Jim contributed to the development of early-warning systems to protect trans-Pacific flights from the effects of volcanic eruptions. Jim was also an accomplished fiddler, specializing in Irish music.

Catherine A. Hier-Majumder (B.S. '97) passed away October 27, 2006 after being struck by a train in the Washington D.C. area. Cathy was beginning a career in planetary geophysics at the Carnegie Department of Terrestrial Magnetism. After graduating from Illinois, Cathy completed a Ph.D. in geophysics at the University of Minnesota in 2003. She spent the next year on a postdoctoral appointment at the Lawrence Livermore National Laboratory. Cathy joined DTM in April of 2005, and was known as a brilliant and creative scientist. Her mother and her husband, Suswata, who is a professor at the University of Maryland, survive her.

1950s

Alumnus and former faculty member **William Hay** (M.S. '58) received the Twenhofel Medal for a career of outstanding contributions in sedimentary geology from the Society of Sedimentary Geology. In his acceptance reply Bill credited U of I's George White for his support.

1960s

Margaret Leinen (B.S., '69) is the chief science officer and vice president of Climos, a climate change research firm, as of January 2007.

1970s

Owen White (Ph.D. '70) received the R.F. Legget Medal, the highest honor given by the Canadian Geotechnical Society. The medal is "presented to an individual who has made significant personal contributions to the Canadian understanding of the inter-relationship of civil engineering and engineering geology through publications, research or professional society activities; and who has stimulated geotechnical activities in Canada through the encouragement of co-workers."

Jim Granath (B.S. '71, M.S. '73) has been promoted to Principal Structural Geologist for Midland Valley, a Scottish structural geology-consulting firm that specializes in cross-section construction for the oil industry. Jim will be based in Denver.

Rod Balazs (M.S. '71) is with Mor-Staffing, Inc., a human resources firm based in Fort Washington, PA. He stopped by the GSA alumni reception in Philadelphia.

1980s

Richard Leary (Ph.D. '80) retired from the Illinois State Museum at the end of 1997 after more than 35 years as Curator of Geology. He returned as a volunteer to provide information for the exhibit. In January of 2006, Richard and his wife traveled to Antarctica, their seventh continent, and in March they visited Guatemala and Costa Rica, bringing the total of countries visited to 50. They also have camped in all 50 states (49 in a tent).

Snehal Bhagat (B.S. '84, M.S. '88) is now a project manager for TRC, an environmental consulting firm. He has recently transferred from Chicago to their Kansas City Office, and will soon be getting married.

Joanne Kluessendorf (B.S. '83, M. S. '86, Ph.D. '90) Director of the Weis Earth Science Museum, has received the AGI Award for Outstanding Contribution to Public Understanding of the Geosciences. This award recognizes her continuing work to establish the Weis Museum, which is the official mineralogical museum of Wisconsin. She has also nominated numerous geologic sites for National Historic Landmark status. Previous winners include Stephen J. Gould and Robert Ballard.

Jim Cremeens (B.S. '89, M.S. '90) is the Principal Engineer of SRK Consulting, in Lakewood Colorado. He passed through C-U during August 2006 and visited the Department.

1990s

Richard D. Poskin (B.S. '91) teaches in the Science Department at Wabash Valley College in Mt. Carmel, Illinois.



Tim Paulsen (Ph.D. '97) recently received the EAA/C.R. Meyer Endowment for Excellence Professorship, a four-year appointment that supports scholarly activities at the University of Wisconsin Oshkosh.

Tim is working on the McMurdo Ice Shelf drilling project as part of ANDRILL, an international geologic drilling program focused on understanding the climate and tectonic history of Antarctica.

Tara Curtin (M.S. '97) is an assistant professor of geoscience at Hobart and William Smith Colleges. Tara joined the HWS faculty in 2001 and teaches courses in environmental geoscience, sediments and sedimentary rocks, and hydrogeology and geochemistry.

Amy Berger, (Ph.D. '98) is associate professor of geology at Heidelberg University. She was named the Ream-Paradiso Distinguished Teaching Award winner. The award recognizes excellence in classroom teaching, academic accomplishments, professional activities and service to the Heidelberg community.

Maitri Venkat-Ramani (B.S. '98) married Derick Erwin on January 2, 2007 in Pennsylvania. Maitri is a geophysicist with Shell Exploration & Production Co. in New Orleans. Derick is a native of

Wisconsin and is a computer systems administrator in New Orleans.

2000s

Mike Harrison (Ph.D., '02), has been promoted to associate professor with tenure at Tennessee Tech University. He is now Chair of the Department of Geology, and continues his research on the structural geology of the Appalachians. Mike and Diane have their hands full, with new twins in the house.

Ashley Ravenstein (B.S. '05) has been hiking the Pacific Crest Trail. You can check her progress, view her photos and read her journal here: www.allinthejourney.com.

Marynia Kolak (B.S. '06) holds an internship with the USGS in St. Petersburg, Florida as a "Gulf of Mexico Analyst Intern." She hopes to save up enough money for a trip to South America.

Births

George T. Bonheyo, who worked as a Research Scientist in geomicrobiology at UIUC is the proud dad of Clara Stase Bonheyo, who was born on June 20, 2006.

New Generation of Geology Alumni Join Faculty Ranks Nationwide

Illinois has long had a tradition of training geoscientists who become faculty at colleges and universities. This tradition is certainly continuing, for a number of students who have completed graduate degrees since 1990 have joined faculty ranks at institutions around the country. Examples include Brian Phillips (Ph.D. '90) at SUNY-Stonybrook, Steve Hagemen (Ph.D. '92) at Appalachian State University, Ming-Kuo Lee (M.S. '90, Ph.D. '93) at Auburn University, Honn Kao, (Ph.D. '93), at the Department of Geosciences, National Taiwan University, and Institute of Earth Science, Academia Sinica, Taiwan. (Currently at Pacific Geoscience Center, Sydney, BC, Canada.), Fred Siewers (Ph.D. '95) at Western Kentucky University, George Grathoff (Ph.D. '96) at Portland State University, David Finkelstein (Ph.D. '97) at University of Tennessee, Tim Paulsen (Ph.D. '97) at the University of Wisconsin Oshkosh, Tara Curtin (M.S. '97) at Hobart and William Smith College, Doug Tinkham (M.S., '97) at Laurentian University, Christine Clark (M.S. '97) at Eastern Michigan University, Eric Holdener (Ph.D. '97) at Kenyon College, Joel Johnson (M.S., '98) at the University of New Hampshire, John Werner (Ph.D.'98) at Seminole Community College, Oswaldo Araujo (Ph.D.'99) at the University of Brasilia, Amy Berger, (Ph.D.'98) at Heidelberg College, Mike Brudzinski (Ph.D.'02) at Miami University, Qusheng Jin (Ph.D.'03) at the University of Oregon, Andre Ellis, (Ph.D.'03) at the University of Texas at El Paso, Jennie Jackson (Ph.D.'05) at Cal-Tech, Kurt Burmeister (Ph.D.'05) at the University of the Pacific, Jim Klaus (Ph.D.'05) at San Jose State University, and Alex Glass (Ph.D.'06) at Central Washington University. At least two are already department chairs—Scott Wilkerson (Ph.D.'91) at DePauw University and Mike Harrison (Ph.D.'02) at Tennessee Tech. We hope we haven't left anyone out! If so, please let us know.

Degrees Conferred in 2006

Bachelor of Science Degrees

May

Tyler Beemer
Jeremy Bellucci
Ellen Benefield
Jacob Bennett
Christopher Crowell
Sara Doubek
Jared Freiburg
Brittany Guzzo
Lewis Hutcheons
James Jacobsen
Melanie Mudarth
Kristina Sipowicz
Boback Kendy

August

Joshua Carron
Marynia Kolak
David Li

December

Andrew Schaff
Martin Stroka

Master of Science Degrees

May

Jon S. Brenizer, *High-temperature Elastic Properties of Iron-bearing Enstatite*, (Jay D. Bass)

Kelly Marie Hutchings, *Crystalline Architecture of Travertine Terraces at Mammoth Hot Springs, Yellowstone National Park, U.S.A.*, (Bruce W. Fouke)

Thomas J. Schickel, *Dynamics of Calcium Carbonate Precipitation at Mammoth Hot Springs, Yellowstone National Park, USA*, (Bruce W. Fouke)

August

Nicole Bettinardi, (Susan W. Kieffer)

December

Emily Berna, *The First Field Study Demonstrating Stable Chromium Isotopes as a Quantifier of Cr(VI) Reduction*, (Thomas M. Johnson)

Doctor of Philosophy Degrees

October

Alexander Glass, *The Brittle Star Fauna of the Hunsruck Slate and A Phylogeny of the Paleozoic Ophiuroidea*, (Daniel Blake)

Faculty

Stephen P. Altaner (Associate Professor)
 Jay D. Bass (Professor)
 James L. Best (Threet Professor)
 Craig M. Bethke (Professor)
 Chu-Yung Chen (Associate Professor and Associate Head)
 Wang-Ping Chen (Professor)
 Bruce W. Fouke (Associate Professor)
 Thomas M. Johnson (Associate Professor)
 Susan W. Kieffer (Walgreen Chair)
 R. James Kirkpatrick (Grim Professor and Executive Associate Dean)
 Jie Li (Assistant Professor)
 Craig C. Lundstrom (Associate Professor)
 Stephen Marshak (Professor and Head)
 Gary Parker (Johnson Professor)
 Xiaodong Song (Associate Professor)

Department Affiliate

Marcelo Garcia (Seiss Professor, Civil and Environmental Engineering)
 Feng-Sheng Hu (Associate Professor, Plant Biology)

Academic Staff, Post-Docs, Visiting Staff

Panakkatu Babu (Research Scientist)
 Geoffrey Bowers (Post-Doctoral Research Associate)
 Alessandro Cantelli (Post-Doctoral Research Associate)
 Pinaki Chakraborty (Post-Doctoral Research Associate)
 Justin Glessner (Geochemistry Specialist)
 Richard Hedin (Research Programmer)
 Holger Hellwig (Research Scientist)
 Eileen Herrstrom (Teaching Specialist)
 Stephen Hurst (Research Programmer)
 Roy Johnson (Research Scientist)
 Andrey Kalinichev (Research Associate Professor)
 Michael Lerche (Post-Doctoral Research Associate)
 Ann Long (Teaching Specialist)
 Xinli Lu (Post-Doctoral Research Associate)
 Stephen J. Lyons (Newsletter Editor)
 Michael Martin (Post-Doctoral Research Associate)
 Padma Padmanabhan (Post-Doctoral Research Associate)
 Philip Parker (Visiting Research Programmer)
 Jean-Phillipe Perrillat (Post-Doctoral Research Associate)
 Marc Reinholdt (Post-Doctoral Research Associate)
 Daniel Saalfeld (Visiting Research Programmer)
 Carmen Sanchez-Valle (Post-Doctoral Research Associate)
 Rob Sanford (Senior Research Scientist)
 Michael Stewart (Lecturer)
 Rajeswari Vanka (Resource and Policy Analyst)

Sharon Yeakel (Research Programmer)
 Zhaofeng Zhang (Visiting Scholar)
 Jianming Zhu (Visiting Scholar)

Emeritus Faculty

Thomas F. Anderson
 Daniel B. Blake
 Albert V. Carozzi
 Donald L. Graf
 Richard L. Hay
 Donald M. Henderson
 Albert T. Hsui
 George deV. Klein
 Ralph Langenheim
 C. John Mann
 Alberto S. Nieto
 Philip A. Sandberg

Adjunct Faculty

Robert J. Finley
 Leon R. Follmer
 Dennis Kolata
 Morris W. Leighton
 Hannes Leetaru
 William Shilts
 Wolfgang Sturhahn
 M. Scott Wilkerson

Library Staff

Lura Joseph (Librarian)
 Sheila McGowan (Chief Library Clerk)
 Diana Walter (Library Technical Specialist)

Staff

Shelley Campbell (Staff Clerk)
 Barb Elmore (Administrative Secretary)
 Ed Lane (Electronics Engineering Assistant)
 Michael Sczerba (Clerk)

Graduate Students

Min Jeoung Bae	Dmitry Lakshtanov
Peter Berger	Qi Li
Emily Berna	Qiang Li
Charles Bopp	Jorge Marino
Jon Brenizer	Christopher Mead
Shane Butler	Mara Morgenstern
Bin Chen	Jessica Palmer
Melissa Chipman	Alan Piggot
Scott Clark	David Robison
Dai, Wei	Thomas Schickel
Joshua Defrates	Pragnyadipta Sen
Dong Ding	Xinlei Sun
Theodore Flynn	Tai-Lin Tseng
Lili Gao	Ivan Ufimtsev
Chris Henderson	Huan Wang
Fang Huang	Jingyun Wang
Kelly Hutchings	Emily Wisseman
Adam Ianno	Kevin Wolfe
Meijuan Jiang	Zhen Xu
Michael Kandianis	Zhaohui Yang

COURSES TAUGHT IN 2006

Geol 300	Planet Earth
Geol 101	Introductory Physical Geology
Geol 103	Planet Earth QRIL
Geol 104	Geology of the National Parks
Geol 107	Physical Geology
Geol 108	Historical Geology
Geol 110	Exploring Geology in the Field
Geol 117	The Oceans
Geol 118	Natural Disasters
Geol 143	History of Life
Geol 333	Earth Materials and the Environment
Geol 380	Environmental Geology
Geol 411	Structural Geology and Tectonics
Geol 415	Field Geology
Geol 417	Field Camp (in Utah)
Geol 432	Mineralogy and Mineral Optics
Geol 436	Petrology and Petrography
Geol 440	Sedimentology and Stratigraphy
Geol 452	Introduction to Geophysics
Geol 460	Geochemistry
Geol 470	Introduction to Hydrogeology
Geol 481	Earth Systems Modeling
Geol 497SK	Geological Fluid Dynamics
Geol 511	Advanced Structural Geology
Geol 515	Advanced Field Geology
Geol 540	Petroleum Geology
Geol 591	Current Research in Geoscience
Geol 593110	Geochemical Kinetics
Geol 593F2	Current Topics in Geomicrobiology and Microbial Ecology
Geol 593 GP	River Morphodynamics
Geol 593J2	Molecular Modeling of Water & Interfaces
Geol 593 K1	Continental Lithosphere
Geol 593K8	Current Literature in Earth's Deep Interior
Geol 593K11	Experimental Simulation of the Earth's Interior
Geol GeolL2	Advanced Petrology Seminar



Research Grants Active InI 2006

Air Force

Xiaodong Song—Characterizing High-Resolution Seismic Velocity and Attenuation Structure of Yunnan-Sichuan Region, Southwest China using Seismic Catalog and Waveform Data.

Xiaodong Song—Surface Wave Dispersion Measurements and Tomography from Ambient Seismic Noise in China

Department of Energy

Craig M. Bethke and **Robert Sanford**—Field-Constrained Quantitative Model of the Origin of Microbial and Geochemical Zoning in a Confined Fresh-Water Aquifer.

R. James Kirkpatrick and **Andrey G. Kalinichev**—Computational and Spectroscopic Investigations of the Molecular Scale Structure and Dynamics of Geologically Important Fluids and Mineral-Fluid Interfaces.

Robert Sanford—Biomolecular Mechanisms Controlling Metal and Radionuclide Transformations in Anaeromyxobacter Dehalogenans.

Robert Sanford—Towards a More Complete Picture: Dissimilatory Metal Reduction by Anaeromyxobacter Species.

Michigan State University

Robert A Sanford—Growth of Chlororespiring Bacteria to High Cell Densities for Use in Bioaugmentation.

NASA

Susan Kieffer—Multicomponent, Multiphase H₂O-CO₂ Thermodynamics and Fluid Dynamics on Mars.

National Science Foundation

Jay Bass—Sound Velocities and Elastic Moduli of Minerals at Mantle Pressures and Temperatures with Laser Heating.

Jay Bass—Collaborative Research: Composition and Seismic Structure of the Mantle Transition Zone.

Jay Bass—Collaborative Research: Elasticity Grand Challenge of the COMPRES.

Jay Bass—Development of Laser Heating for Sound Velocity Measurements at High P & T.

Jay Bass—Consortium for Material Property Research in the Earth Science.

Wang-Ping Chen—Collaborative Research: Lithospheric-Scale Dynamics of Active Mountain Building Along the Himalayan-Tibetan Collision Zone.

Wang-Ping Chen—Collaborative Research: A Study of Deep Subduction Integrating Broadband Seismology and Mineral Physics.

Bruce Fouke—Geobiological and the Emergence of Terraced Architecture During Carbonate Mineralization.

Thomas M. Johnson—Quantification of Hexavalent Cr Reduction in Groundwater Using Cr Stable Isotopes.

Thomas M. Johnson and **Craig C. Lundstrom**—Technical Support for the New Mc-ICP-MS Laboratory at University of Illinois.

Susan Kieffer—Multiphysics Modeling and Terascale Simulations of Volcanic Blasts Over Complex Terrains.

Jie Li—Experimental Investigations of Solid-Liquid Boundary in the Earth's Core.

Jie Li—Constraints on Core Composition from Nuclear Resonant Scattering and X-Ray Diffraction Studies on Fe-Light-Element Compounds.

Craig C. Lundstrom and **Stephen Marshak**—Assessing Diffusive Differentiation During Igneous Intrusion Using Integrated Theoretical Experimental and Field Studies.

Xiaodong Song—CSEDI Collaborative Research: Observational and Theoretical Constraints on the Structure and Rotation of the Inner Core.

Xiaodong Song—Structure and Dynamics of Earth's Core and Lowermost Mantle.

Office of Naval Research

Bruce Fouke and **Milton McAllister**—Microbiological, Physiological, and Toxicological Effects of Explosive Compounds on Coral Health.

Bruce Fouke—The Role of Shipyard Pollutants in Structuring Coral Reef Microbial Communities: Monitoring Environmental Change and the Potential Causes of Coral Disease.

Colloquium Speakers for Spring and Fall 2006

Ed Evenson, Lehigh University

Glaciohydraulic Supercooling, Basal Freeze-on, Debris Entrainment and Deposition at Modern Glacier Margins in Alaska and Iceland ... Is the Present the Key to the Past?

Paul Knauth, Arizona State University

Impact Origin of Sediments at the Opportunity Landing Site on Mars with Implications for Astrobiology

Scott Tinker, Director, Texas Bureau of

Economic Geology

The "I" in Business Ethics

Franz Geiger, Northwestern University

Environmental Interfaces in Geochemistry: From Cr(VI) to Antibiotics

Paul Hoffman, Harvard University

Snowball Earth: Science or Snowjob

Lucy Flesch, Purdue University

Constraining the Extent of Crust-Mantle

Coupling in Central Asia Using GPS, Geologic, and Shear Wave Splitting Data

Rosaly Lopes, The Jet Propulsion Laboratory (NASA)

The Surface of Titan: Results from the Cassini-Huygens Mission

Miaki Ishii, Scripps Institute of Oceanography

December 26, 2004 and March 28, 2005

Sumatran Earthquakes Imaged by the Japanese Hi-Net Array

Barbara Sherwood Lollar, University of Toronto

Use of Stable Carbon Isotope Analysis to Identify Source and Degradation of Chlorinated Solvents in Groundwater

Dr. Thomas Prickett, T. A. Prickett and Associates

The History of Groundwater Modeling

Carmen Sanchez-Valle, UIUC Department of Geology

Fluid-Mineral Interactions in Subduction Zones: Constraints from Experiments in the Diamond-Anvil Cell

Paul Fenter, Argonne National Laboratory

Observing Mineral-Water Interfaces with 'X-Ray Vision'

Scott Olson, UIUC Earthquake Engineering

Using Liquefaction Features to Evaluate the Strength of Paleoequakes

Brian Phillips, Stony Brook University

Incorporation of Large Adsorbed Ions in Calcite: Structural Information from NMR Spectroscopy

Daniel Holm, Kent State University

Proterozoic Tectonic Evolution of the Upper Great Lakes Region

Wendy Mao, Los Alamos National Laboratory

Viewing The Core-Mantle Boundary through A Diamond Window

Gabe Bowen, Purdue University

Prospects for a High-Carbon Future Inferred from Earth's Past: The Paleocene-Eocene Thermal Maximum

Eric Sandvol, University of Missouri, Columbia

The Eastern Turkey Seismic Experiment: The Study of a Young Continent-Continent Collision

Grant Heiken, Los Alamos National Laboratory

Geology and Urban Sustainability—The View from Rome

Mark Reagan, University of Iowa

Evolution of Volcanism in the Mariana Islands

John Hawley, Hawley Geomatters

Neogene Basin-fill Aquifer Systems of the Binational Paso Del Norte Region - Advances in Characterization of their Depositional History and Hydrogeologic Framework

Fangzhen Teng, University of Chicago

Diffusion-Induced Lithium Isotopic Fractionation in Crust

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HONOR ROLL OF DONORS



The following is a list of friends and alumni of the Department of Geology who have donated to the Department during the 2006 calendar year. We are very grateful for their generous support.

Brennan, R. A., R. A. Sanford, and C. J. Werth, 2006, Chitin and comcobs as electron donor sources for the reductive dechlorination of tetrachloroethene. *Water Research.*: 40, 2125-2134.

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Roscoe Jackson's Generous Gift

Roscoe Jackson's (M.S. '73, Ph.D. '75) generous endowment provides support for both graduate research projects and for equipment purchases. The initial purchase we made was a modern, digital video microscope system for students to see thin sections in the context of classes. It's a beautiful instrument that Jim Best was responsible for selecting and purchasing.

Count me in!

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Geology students and faculty on a recent field trip to the Marquette region of northern Michigan examine an outcrop of glacially polished quartzite.



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TY OF ILLINOIS AT URBANA-CHAMPAIGN

Students Explore Coral Reefs, Shear Cliffs During Overseas Field Trips

In the middle of a stark Illinois winter, Professor Bruce Fouke and 35 students hopped a plane and headed for the southernmost part of the Caribbean. Another example of “timing is everything.” The trip was the culmination of a semester’s worth of lectures and laboratory preparations in Geology 415/515, Field Geology, co-taught in 2007 by Fouke and Ed Morford, assistant director of campus recreation for aquatics. Students were also required to attend class sessions at Freer Pool where they demonstrated their swimming capabilities, learned first aid, and practiced snorkel-based research techniques that they then applied on the coral reefs.

From January 4 to January 11, 2007, students studied modern and ancient coral reefs surrounding the island of Curaçao, located in the Caribbean Sea near the northern coast of Venezuela. Approximately half of the course was taught in the shallow, near shore environments using snorkel techniques, while the other half was based on land.

The students experienced a highly integrative educational experience, which included dynamic sedimentary processes, geomicrobiology, large-scale tectonics and groundwater hydrology. “Curaçao is a unique natural laboratory in which to teach students the complex interactions between life and earth, and allow them to tangibly track these physical, chemical, and biological feedback interactions through geological time,” said Fouke.

Tom Schickel (MS '06), a recent graduate of the Fouke research group at Illinois who now works full-time as an exploration geologist at Shell, joined the



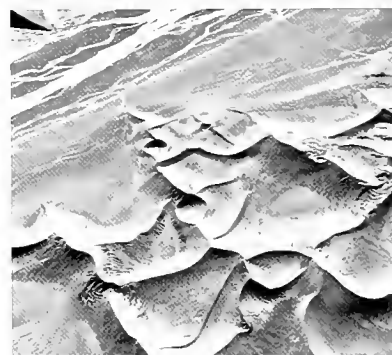
Just after snorkeling at the Water Plant dive site on Curaçao, Fouke shows the students how a spiny sea urchin moves its spines using internal water pressure, called a hydrostatic skeleton.

trip to help Fouke teach techniques fundamental to hydrocarbon exploration, as well as meet students and further strengthen long-standing recruiting ties with the Department.

In May 2008, Professor Jim Best will be teaching Field Geology on the west coast of Ireland. Best will be accompanied by a mixture of undergraduate and graduate students—39 in all—and five faculty and staff who will visit the magnificent cliffs of County Clare. They will stay in the small country village of Kilfenora. Best explains that the cliffs are a spectacular example of a range of ancient sedimentary environments, some

(continued on page 3)

New Textbook Uses Google Earth



Sand dunes in Namibia as seen from Google Earth.

In the course of an introductory geology class, students can fly to the Amazon rainforest, the deserts of Namibia, or the tundra of Siberia courtesy of the latest edition of *Earth: Portrait of a Planet*, a textbook written by Geology Department Head and Professor Steve Marshak.

The third edition of *Earth: Portrait of a Planet*, published in late 2007, includes over 200 virtual field trips called “Geotours.” Each Geotour utilizes Google Earth to fly students to spectacular examples of geologic features. Google Earth, a free computer tool that provides a navigable mosaic of satellite imagery, allows students to examine structures and landscapes in amazing detail.

“Instead of just seeing a static image of Mount St. Helens, students can fly around the volcano, can zoom in and zoom out of the crater, and can tour the damage that

(continued on page 3)



Letter From The Head

If the only constant in life is change, then 2007 is truly a year of constant change.

While we congratulate Jay Bass and Craig Bethke as new Ralph E. Grim Professors of Geology (with formal investitures held on February 28, 2008), R. James Kirkpatrick, a Ralph E. Grim Professor of Geology and former head of the department, has resigned his post of senior executive associate dean of the College of Liberal Arts and Sciences to become the dean of the College of Natural Science at the Michigan State University. We wish you all the best, Jim and Carol.

Meanwhile, we welcome Marilyn Whalen, the new administrative secretary to the Department as Barb Elmore, who served in this position for decades, has retired. I have no doubt she will keep busy in her retirement! Throughout this issue of the newsletter, you will find related reports on these important milestones in the Department and more. Speaking of which, you'll notice that we have a new editor, Kim Schmidt, who has instigated some new features in this issue.

The fact that I am writing this letter means Steve Marshak, who has served the Department as head for almost a decade, is taking a well-deserved sabbatical for the entire 2007-08 academic year.

In addition to research time at the Woods Hole Institution of Oceanography in Massachusetts, Steve is traveling to Brazil and France to collaborate with colleagues and conduct fieldwork. So far Steve has managed to stay away from administrative matters that may distract him from the privileges of being on sabbatical.

Over the past summer, the Department officially became a member of the School of Earth, Society, and Environment. Don Wuebbles, a professor of Atmospheric Sciences, is serving as executive coordinator of the School while an international search for a permanent director is underway. In the short time since I served as acting head, it is quite apparent that the long tradition of strong support from our alumni distinguishes us from Atmospheric Sciences and Geography, the other two Departments in the School.

To this end, the newly formed GeoThrust Graduate Fellowship exemplifies the spirit and the tradition of giving back, bringing our total number of graduate fellowships to six (others include the Bluestem, the Evergreen, the Texas/Louisiana Geology Alumni, the Harold R. Wanless, and the Harold W. Scott Fellowships). Over the years, the GeoThrust Committee, comprised of all alumni volunteers, has worked diligently and creatively with all of you to support the Department in many ways. The story (p. 7) behind the new Fellowship is intriguing and we are so proud of the dedication and the entrepreneurship of our alumni and friends! Indeed, the insight to recognize opportunities, the ability to assemble resources and the perseverance to achieve goals are what makes our students, alumni, friends, and faculty shine in so many different endeavors.

On this note, you have probably noticed that the job market for geoscientists has been booming. The growth is not just in the energy sector. Mining, land management, environmental, and geotechnical consulting all have large, unmet demands for qualified geoscientists. This trend is expected to continue in the near future. This background plays into the long-term planning of the Department and will be the subject of careful consideration in 2008 and beyond. Meanwhile, some of our majors are working with graduate students to organize the very first student chapter of the American Association of Petroleum Geologists on this campus.

With research and teaching going strong across the board in the Department, I have focused my energy as acting head in seeking direct support from industry. In recent years, with the exception of support for individual programs or field trips, support of the Department from industry is largely in the form of matching funds. We are in the process of developing a close working relationship with some major petroleum companies, seeking their support in the form of graduate fellowships and undergraduate scholarships in Geology. So stay tuned.

Indeed, we love to hear from all of you—about your activities, your ideas, your vision and above all, your passion; your passion for the future of the Department, the University, the geosciences, and the society at large. Please enjoy reading this issue and stay in touch.

Best wishes,
Wang-Ping Chen

Year in Review is published once a year by the Department of Geology, University of Illinois Urbana-Champaign, to highlight the activities and accomplishments within our department and feature news from our alumni and friends.

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Students Explore Coral Reefs, Shear Cliffs

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of the best in the world. "These sediments are 325 million years old and show past surface environments, from shallow water corals and reefs, deltas with vegetation and swamps, through shallow seas with a whole range of different beasts swimming around in them, to the dark, deep seas. So what we can do is go and look at essentially a slice through all these environments and work out how this area formed geologically," Best said.

Many of the sediments the students will be studying are similar to those found subsurface in Illinois and Pennsylvania. In fact, much of the early pioneering work on how these types of sediments accumulated was done by Harold Wanless during his long tenure at Illinois.

While on the trip, students will spend a majority of their time working in groups to collect, analyze, and present data, using what they've learned in the past semester to create a picture of the geological history of this paleo-environment. In the last three days of the trip, they will travel to a site that they have not yet seen and will be asked to create a geological map of the area, complete with an interpretation of the area's geological history.

Best has invited several guest speakers to join them in the field in Ireland. The first, Dr. Mike Simms from the National Museums of Northern Ireland, will help the group look at recent glacial geology, including the landforms as they have evolved over the last 20,000 to 30,000 years. The second is Dr. Carleton Jones,

an archeologist from the National University of Ireland at Galway, who will take the group to some of Ireland's most spectacular and beautifully preserved Neolithic remains, including burial chambers. "This is an area that was populated from about 7,000 years B.C. onwards and there are many remains of early habitation as these cultures farmed the hills, changed the landscape, and left their burial grounds and different marks on the geography of the area. The trip is meant to be principally geological in focus, but I also want to discuss recent geomorphology, including how the landscape has been formed and shaped, and recent human occupation," said Best.

Hydrocarbon geologists from oil companies around the world visit the cliffs of County Clare to learn more about ancient sediments and apply their findings to current drilling projects. Best sees this trip as an opportunity for students to learn not only about the academic side of geology, but also about the applied and economic side. Schickel, who traveled with Fouke to Curaçao, will also partici-

participate in Best's course enabling students to make "links between industry and what the students are learning in their undergraduate or graduate courses," said Best.

Shell Oil Company has provided different forms of support to the Department and is making a major subsidy so that these major field trips are accessible for stu-

dents. Acting Head Wang-Ping Chen notes that "Industrial sponsorship of University activities is in a state of flux as state funding continues to decline. In this case, direct support from Shell enables us



The cliffs at Fohagh Point, County Clare show syn-sedimentary soft sediment deformation in deltaic sediments. These carboniferous deltaic sediments were deformed while they were still soft and results of this process is vividly seen on this cliff face.

New Textbook

(continued from page 1)

resulted from the cataclysmic 1980 explosion. Students can also measure distances and elevations right on screen. I think that such active imagery achieves a much better job of conveying the context of geology, than can any static image," said Marshak.

To help instructors use Geotours for classes, M. Scott Wilkerson (PhD '91), now chair of the geology department at DePauw University, and Marshak produced a new workbook, as an ancillary to *Earth: Portrait of a Planet*. The workbook provides questions about the Geotour sites that students can answer only if they visit the site themselves, on the computer. Wilkerson, who introduced Marshak to Google Earth, has also prepared a computer file that allows students to reach Geotour sites at the click of a button.

The use of Google Earth as a teaching tool is a relatively new idea—in fact *Earth* is the first geology textbook to integrate the tool. The book's publisher, W.W. Norton & Co., reports that the Geotours, and the new workbook, are being incorporated in courses around the country.

Disclaimer: The Department of Geology holds no business interest with either Google or W.W. Norton & Co.

to take students to key field areas overseas—an important function in the context of the "global village."

In previous years, students in Field Geology have traveled to the American Southwest to study geology in the Death Valley and along the San Andreas Fault with Professor Steve Marshak and in the Grand Canyon and along the San Juan River region with Associate Professor Craig Lundstrom.

Kirkpatrick Retires from College

Jim Kirkpatrick retired from the Department in July 2007. Kirkpatrick first came to Illinois when he was a graduate student in the early 1970s. He went on to become an alumnus, a professor, a department head, a dean, and a donor. By the time of his retirement, he had dedicated almost 40 years of service to Illinois.

Shortly after earning his Ph.D. from Illinois in 1972, Kirkpatrick left the state, traveling first to Houston to take a position as a senior research geologist at Exxon Production Research Company. He then spent two years as a research fellow at Harvard before moving to California to work on the Deep-Sea Drilling Project with the Scripps Institution of Oceanography. The Midwest called him back, however, and in 1978 he returned to Illinois to join the faculty.

A short ten years later, Kirkpatrick was named head of the department, a position he held from 1988 to 1997 when he was named a senior executive associate dean in the College of Liberal Arts and Sciences.

Throughout his tenure as an administrator, Kirkpatrick maintained an active and distinguished research program. "Jim is one of those unique kinds of faculty who reinvents himself progressively during his career so what he's doing at a late stage in his career is totally different than what he was doing at the initial stage of his career. The result of that is that he was always on the cutting edge of his discipline," said Steve Marshak, head of the department.

Kirkpatrick was Professor Craig Bethke's advisor while Bethke earned his doctorate at Illinois. "Throughout his career at Illinois, Jim's research program remained at the very pinnacle of his field, in terms of productivity



and scientific impact. And the time and energy he put into leadership and service, first as department head and then as associate dean for the sciences, was the impetus for revitalizing the geology department. Jim is not someone who can be replaced," said Bethke.

In 2004, Kirkpatrick was honored with the Dana Medal from the Mineralogical Society of America. In his acceptance speech, Kirkpatrick said, "We live in an extraordinary historical period for science, and it has been my great fortune to be able to build my career during that time. When I started, equilibrium thermodynamics was the nearly universal way of thinking about geochemical systems, the electron microprobe was a novel tool, and automated diffractometers were just coming on line. What change there has been! The two parts of my career, the earlier days of crystallization kinetics and igneous petrology and the later days of materials structure and dynamics with NMR spectroscopy and molecular modeling, are reflections of these changes."

Kirkpatrick's career has been just as extraordinary as the time in which he's worked and, accordingly, his peers have recognized his contributions to the field. In addition to the Dana Medal, Kirkpatrick was awarded the Brunauer Award and was named a fellow of the Mineralogical Society of America, the Geological Society of America, and the American Ceramic Society. In 2005 he was named the R.E. Grim Professor of Geology.

In July 2007, Kirkpatrick was feted at a retirement celebration celebrating his years of service to the University. Held at the Union, more than 100 guests attended and Dean Sarah Mangelsdorf, former Interim Provost and Dean Jesse Delia, and Department Head Steve Marshak gave remarks.

Upon his retirement, Kirkpatrick left an endowment to the Department that will fund the Kirkpatrick lectureship. Kirkpatrick delivered the inaugural speech in August, entitled "Spectroscopic and Computational Studies of Mineral-Fluid Interactions." "The Kirkpatrick lectureship—a fitting reminder of Jim's legacy—is the latest addition to the Department's named lecture series, bringing the total to nine," said Wang-Ping Chen, acting head of the department.

Kirkpatrick is now the dean of the College of Natural Science at Michigan State University. His wife, Carol, retired from the office of the Provost and Vice Chancellor for Academic Affairs at UIUC to join Jim at Michigan State. In the 1980's, she was a support staff who mainly worked on matters related to graduate and undergraduate studies in the Department.



A Trip Back to Camp

Over the past year and a half, Norb Cygan (BS '54, MS '56, PhD '62) visited Fort Lewis, Colorado and Sheridan, Wyoming—field camp sites that Illinois students attended from the 1950s through the 1980s. Cygan was an assistant at the Sheridan camp from 1955-1956 and was visiting lecturer from 1956-1961.

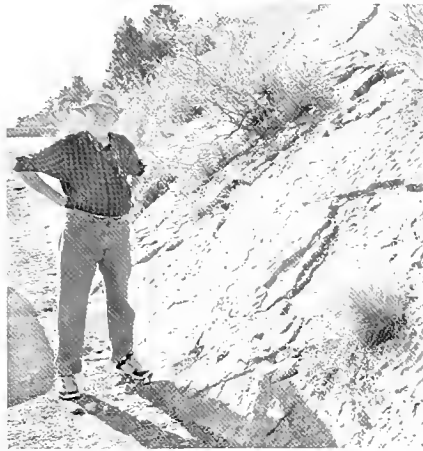
What did you find when you went back to Fort Lewis, Colorado?

In the fall of 2006, Bob "Moose" Leonard (BS '55) and I visited the Fort Lewis, Colorado area where field camp was held in the early and mid-50s. Fort Lewis, at that time, was a two-year college for the University of Colorado system and was primarily a high altitude agriculture school. A lot of people went there from overseas, from places like Chile, Austria, places like that, that had a high altitude farming and so on.

At field camp, we stayed in what was the old army barracks of Fort Lewis itself which was a frontier post. We used the facilities of the university for lectures and making maps after we went out in the field every day to do field work. When I visited in 2006, many of the buildings had been torn down. The old barracks where we students stayed was a bull artificial insemination station. I thought everyone would get a kick out of that. That building is still there.

When did Illinois move to the Sheridan, Wyoming camp?

In 1955 field camp moved to Sheridan, Wyoming. Initially we used old



army barracks. Then we stayed in the abandoned Sheridan hospital.

Eventually we moved the campus up to Sheridan Junior College. The college has expanded quite a bit, but when we were there, at one time, everybody had sleeping bags and slept on the gym floor. That was our barracks. We also used the facilities at that site for drafting and lectures.

What did you do for fun?

The ranchers used to hold parties for us. They really treated us well. They took us out waterskiing on the lakes there and they had barbeques on their ranches. We were allowed to walk through their ranches and look at the rocks. Many famous people owned ranches there—like actor Robert Taylor. He was quite famous back in the 40s. Some of the guys had lunch at his ranch. We also made side trips to Yellowstone and the Grand Tetons and camped out on those trips.

Can you tell us about the memory brick?

There is a plaza in town called Sheridan Plaza. They have statues of cowboys and Indians and pioneers. I bought a brick that commemorated Illinois's field camp and they planted that brick along with many others in the plaza. A lot of the people there have long since passed away, but there are a lot of people, especially the women who are now in their 40s and 50s who remember our students.

Why is field camp important?

Many people decided after field camp they didn't like that kind of life and dropped out. Other people realized that this was going to be part of their life—doing fieldwork all over the world.

What are you doing now?

I've done a bit of consulting this last year, especially on water, and some on uranium. But my big push has been working with kids and teachers at Dinosaur Ridge, an area on the outside of Denver that has dinosaur footprints and bones in the rocks which are uplifted from the Rocky Mountain event. It is an outdoor educational lab and tens of thousands of kids a year come to visit. I teach classes on the geology of Colorado at Denver University. I also teach special science programs to Colorado teachers through Colorado School of Mines and University of Northern Colorado.



Photo courtesy Wasatch-Uinta Field Camp website.

Field Camp remains an important part of the geology program today. Illinois has partnered with the University of Iowa, University of Minnesota-Duluth, University of Wisconsin-Madison, Michigan State University, and the University of the Pacific to teach this six-week course in Park City, Utah. In 2008, 21 students from Illinois will be attending Wasatch-Uinta Field Camp—the largest number of students attending in 25 years. Lecturer Michael Stewart will be an instructor at the camp and the new director is our alum Kurt Burmeister (PhD '05). Students will map in the Wasatch and Uinta Mountain Ranges and take day trips to Grand Teton National Park, southeastern Utah, and the gold fields of Nevada.

Alumna at Caltech

Editor's Note: We are adding "Profile of Recent Alumni" as a new feature in the Year in Review.

Jennifer Jackson (PhD '05) was one of many first-year undergraduates sitting in the lecture hall for Geology 104, Geology of the Natural Parks. The class filled a requirement, and though she liked science in high school, she never expected that little more than a decade later she would land a faculty position at the California Institute of Technology.

But that class inspired her to sign up for more courses in geology and she began to realize that she wanted to turn her interest into an academic career. Soon after taking Physical Geology, she began working in Professor Jay Bass's lab doing what she calls "real research" for the first time. The combination of her work in the lab and an inspirational trip to northwest Arizona with Professor Steve Marshak's Field Geology class solidified her interest in geosciences and set her on her path. In 1999, Jennifer graduated from Illinois with a

degree in mathematics and a minor in geology.

After earning her master's degree in mineralogy and crystallography from Notre Dame in 2000, Jennifer returned to Illinois to pursue her Ph.D. Again, she found herself working alongside Professor Bass who served as her advisor for her dissertation, "The Effect of Minor Elements on the Physical and Chemical Properties of Lower Mantle Minerals at High-Pressure."

Jennifer is now an assistant professor of mineral physics in the Seismological Laboratory of the Division of Geological and Planetary Sciences at Caltech where her current research focuses on the material properties of deep Earth minerals under extreme conditions in an effort to understand terrestrial-type planetary evolution. In the past two years she has been invited all over the world, and has visited Japan, Australia, England, and Italy to give talks about her research.

Though her research is integral to her position at Caltech, Jennifer enjoys the balance between research and teaching. Now, with a lab of her own, Jennifer is a mentor to three graduate students and one



Jennifer Jackson

undergraduate student. Working alongside these students in the lab offers her the opportunity to do for them what Illinois faculty did for her nearly ten years ago: to provide support and encouragement. "I want to make sure they have all the tools they need and every opportunity to learn and do exciting research," she said.

In addition to the one-on-one instruction in the lab, Jennifer also spends time in the classroom teaching courses such as "Topics in Deep Earth Mineral Physics" and "Mineral Physics of Earth's Interior," a course she recently developed for her department. "Teaching keeps everything in perspective," she said. "These very sharp students are here to learn, and when you are explaining high-level science to them, you're also learning."

Students and Faculty Named 'Excellent' Instructors

Twenty-three Department of Geology instructors were named to the UIUC List of Teachers Ranked as Excellent by Their Students for the spring, summer, and fall 2007 semesters.

Graduate students Charles Bopp, Shane Butler, Bin Chen, Melissa Chipman, Adam Ianno, Daniela Lindner, Chris Majerczyk, Chris Mead, Mara Morgenstern, Jessica Palmer, Alan Piggot, and Pragnyadipta (Deep) Sen were named to

the list for their work as teaching assistants in the Department.

Faculty and academic professionals appearing on this list include Stephen Altaner, Jay Bass, Craig Bethke, Bruce Fouke, Eileen Herrstrom, Tom Johnson, Jei Li, Ann Long, Craig Lundstrom, Steve Marshak, and Michael Stewart.

Four instructors received the highest ranking of "outstanding." During the spring semester, this ranking was earned by

Shane Butler (Geology 108). Associate Professor Stephen Altaner (Geology 100) and Pragnyadipta (Deep) Sen (Geology 417) were named outstanding for the summer semester. In the fall, Daniela Lindner (Geology 101) and Pragnyadipta (Deep) Sen (Geology 411) earned top honors.

Rankings are released every semester and are based on student evaluations maintained by the Center for Teaching Excellence on the Illinois campus.

GeoThrust Committee Rallies Together to Fund New Graduate Fellowship

In 2005, a fundraising effort to build the Department's endowment not only met, but exceeded its goal of \$3 million. Led by the GeoThrust Committee, this campaign resulted in generous gifts from hundreds of donors and established a wide base of departmental support including fellowships, named professorships, and two funded lecture series among other needs.

Members of the GeoThrust Committee, chaired by Bill Soderman (MS '60, PhD '62), recently embarked on a new fundraising effort coinciding with the larger University of Illinois campaign, Brilliant Futures. "At the end of the previous fundraising process I realized the Committee didn't give a group gift. It occurred to me that this would be an excellent way to commemorate the group's good work." Thus, the GeoThrust Graduate Fellowship was born.

Soderman contributed half the funds needed to establish the fellowship in September 2007 and encouraged his fellow Committee members to do the same. "I'm strongly motivated to develop fellowships

at Illinois—I know what it meant to receive a fellowship myself," said Soderman, who received the Petroleum Research Foundation Fellowship as a doctoral student. "It makes me feel good that I can give back to the University."

Members embraced Soderman's challenge and quickly raised the remaining funds needed. The official agreement for the GeoThrust Graduate Fellowship was created in November 2007 and the Office of the Provost will provide matching funds to enhance its impact.

"I was so pleased to have such a good and timely response," said Soderman.

Acting Head Wang-Ping Chen said, "The Department is truly fortunate to

have the GeoThrust Committee as a driving force for our fundraising efforts. Over the years, the Committee has worked diligently and creatively with all

of our alumni and friends to support the Department in many ways. The new fellowship is another example of inspiration, leadership, and entrepreneurship—characteristic of our alumni."

Alumni and friends who are interested in contributing to the GeoThrust Graduate Fellowship, or to the Department in gen-

eral, are encouraged to contact the LAS Office of Advancement at (877) 265-4910, (see back cover for details) and indicate that you wish to make a gift to the Department of Geology.

Beloved Secretary Retires After Twenty Years

In August 2007, Geology administrative secretary Barb Elmore retired from the University with 26 years of service. Barb was with the geology department for 20 of those years and was well loved by faculty and students alike.

"Barb became the institutional memory of the department—over the years, she really kept track of what all of our graduates have done. In fact, she would often be the first person alumni would go see when they came back to visit the department," said Professor and Head of the Department, Steve Marshak.

Elmore was honored twice for her work—once in 1998 when she was awarded the Chancellor's Distinguished Staff Award and again in 2007 when she was named one of the recipients of the 2007-2008 LAS Staff Award.

Marshak explained that these awards recognized Elmore's success in expertly managing a heavy workload. "When Barb took the job, she effectively took on three full jobs and she did them all incredibly well."

Upon her retirement, the Department and friends celebrated Elmore at a party held at the Illini Union. "Not only was the party well attended, but a lot of people got up to give testimonials about Barb. The expressions of gratitude came from everyone, ranging from current undergrads to senior emeriti," said Marshak.

When asked what she is doing with her new found free time, Elmore said, "I don't know how I found the time to work!" Since her retirement, Elmore has kept busy with projects around the house and with helping her mother, who is almost 90 and still lives alone.



On August 29, 2007, friends and colleagues celebrated Barb's service to the Department during a retirement party held at the Illini Union

She is also spending more time on the hobbies that she loves, including reading and crochet.

Elmore notes that she greatly enjoyed working with students, but she acknowledges that it was bittersweet to see them graduate. "It was always fulfilling to see the students attend Commencement after all their hard work," Elmore said. "But then, sadly, I had to say goodbye!" Luckily, as Marshak pointed out, many graduates came back to see her. "I really enjoyed seeing the alumni when they came back," she said. "It was always fun to have them come in."

Oceanography on the Prairie

by Ralph L. Langenheim

Editor's Note: "Windows on the Past" is a regular feature of the Year in Review contributed by Professor Emeritus Ralph L. Langenheim. Ralph's writing represents a long-serving faculty member's recollections and his perspectives of the Department's past.

Improbable as it may seem, oceanography was an important part of our departmental program, beginning in the 1930's. A newly-minted Ph.D. from the University of Chicago, Francis Shepard came to Illinois in 1922, joining our faculty as a structural geologist. He remained responsible for instruction in structural geology until 1942 when he joined the University of California Division of War Research. His doctoral research in structural geology was based on field work begun on his honeymoon when he traveled by train, horseback, and on foot, camping out in the Canadian Rockies. One summer on Cape Cod, however, would alter his research significantly and lead to a very distinguished career as a founding father of a sub-discipline in marine geology.

After the birth of their first child, Shepard and his wife Elizabeth did not return to the Rockies and to his previous research, but instead spent the summer cruising off Cape Cod on the family yacht at the suggestion of his father. While on the yacht, Shepard collected sediment samples from the shoreline to the edge of the shelf. Here he discovered that, instead of sediments becoming progressively finer grained offshore, coarse and fine grained sediments occurred patchily between the shore and the shelf margin. This pattern was contrary to accepted doctrine, a point that he made in his 1927 "Influence of Oscillating Sea Level on the Development of the Continental Shelves," a report that

attracted wide notice and marked the beginning of a permanent redirection in Shepard's research career. Thenceforth he concentrated on the submarine geology of the continental shelf and slope, most notably describing the submarine canyons on the Atlantic coast of the United States and, most extensively, off the coast of Southern California, while maintaining his academic home base at Illinois until 1942.

As his interests changed, Shepard introduced geomorphology to our curriculum in 1930, a course that he continued as Physiographic Geology from 1931 through 1941. Finally, Geology of the Ocean was introduced in 1941. His 1948 book, *Submarine Geology*, perhaps the capstone of his career, is a summary of the results of the pioneering, gentleman yachtsmen who established modern American academic oceanography at the Woods Hole and Scripps oceanographic institutions.

While at Illinois, and as a life long friend, Shepard collaborated with Harold Wanless, who came to Illinois after graduating from Princeton as a new Ph.D. in 1923. Together, they published *Sea Level and Climatic Changes Related to Late Paleozoic Cycles* (1936), which explained Pennsylvanian cyclic sedimentary patterns as brought about by the melting and the reestablishment of continental glaciers in the Southern Hemisphere. Decades after its publication, this work that countered the time's consensus that Late Paleozoic cyclic sediments resulted from repeated crustal uplift and depression, has become the generally accepted explanation for Late Paleozoic cyclic sedimentation.

Wanless was also an early protagonist for using aerial photographs in geological mapping and research, a technique that was just beginning to come to the fore in the late 1930's. Although primarily famous for his cyclothem studies,



Francis Shepard testing a sample grabber and a stereo camera on the E.W. Scripps, September 22, 1942

ies, Wanless continued his collaboration with Shepard, compiling sequential charts and aerial photographic records of Gulf and Atlantic shoreline configurations while Shepard compiled records of the Pacific Coast. Their final report, "Our Changing Coastlines," was published after Wanless' death in 1971. While Wanless supervised doctoral candidate Mohammed al-Ashry, now famous for his work on marine environments for the United Nations, Shepard supervised three Illinois doctoral students in marine geology: George Cohee, who left oceanography for a distinguished career in government surveys; K. O. Emery, whose outstanding career culminated in his directorship of the Woods Hole Oceanographic Institution; and Robert Dietz who became famous for pioneering research on deep sea mapping, deep sea drilling, sea floor spreading, and meteoritic impact sites. Departmental legend has it that Dietz proposed a study of lunar geology for his Ph.D. project only to be turned aside. Dietz also was associated with the Department in the 1980's as an adjunct professor supervising thesis research on impact sites.

The saga of oceanography on the Boneyard continued with Jack Hough, who always contended that his work on the Great Lakes was oceanography, and with Bill Hay; a suitable topic for our next installment.

Around the Department

Professor **Wang-Ping Chen** was named acting head of the Department for the academic year 2007-2008 while Professor Steve Marshak was on sabbatical. This event cut short Chen's sabbatical as a chaired visiting professor of the National Science Council of Taiwan at the Institute of Earth Sciences, Academia Sinica.

Geophysical Journal International ranked a paper co-authored by Professor **Jay Bass** and three French colleagues as number ten on a list of "most cited papers over the last three years." The paper is titled, "Lower Mantle Composition and Temperature from Mineral Physics and Thermodynamic Modeling" and was published in the March 2005 issue.

Professor **Steve Marshak** spent the 2007-2008 academic year on sabbatical. During the fall, he worked with geologists at the U.S. Geological Survey in Woods Hole, MA on thrust-belt deformation. He went to Brazil in the winter to work with a colleague there on ongoing projects concerning Precambrian geology. In the spring, he worked at the University of Lausanne (Switzerland), continuing work on Precambrian geology, and was a visiting

professor at the University of Naples (Italy), continuing work on thrust belts.

Dr. George Devries Klein, professor emeritus, remains active as a geological consultant in the greater Houston area and is president of SED-STRAT Geoscience Consultants, Inc. Since October 2005 it has been nearly non-stop consulting for him, proving there is life after 74! Project areas where Klein has completed work include South Texas, East Texas, Permian basin, Russia, the Louisiana Shelf, Alberta basin (Canada), San Joaquin basin (California), and Galveston Bay, Texas.

Geology librarian **Lura E. Joseph** received the Best Paper Award given by the Geoscience Information Society for her paper "Image and Figure Quality: A Study of Elsevier's Earth and Planetary Sciences Electronic Journal Back File Package." The paper was published in *Library Collections, Acquisitions, & Technical Services*.

John Kolinski, an undergraduate researcher in geological fluid mechanics who has worked closely with Professor

Susan Kieffer for the past two summers, was selected as one of the top four presenters from Illinois's Undergraduate Research Opportunities Program sponsored by the Illinois Space Grant Consortium. The ISGC subsequently sponsored his participation in the Great Midwestern Regional Space Grant Conference held at Purdue University in September 2007.

Professor **Jim Best** gave three keynote addresses in 2007. Two covered his work on Argentinean rivers: one was given at the USGS National Surface Water Conference & Hydroacoustics Workshop held in St. Louis and the other was given at the Workshop on Morphodynamic Processes in Large Lowland Rivers held in Sante Fe, Argentina. He also delivered a keynote address to the 2007 Hydraulic Measurements & Experimental Methods Conference (HMEM), held in Lake Placid, New York and sponsored by the American Society of Civil Engineers' (ASCE) Environmental and Water Resources Institute (EWRI) and The International Association of Hydraulic Research (IAHR).

Degrees Conferred in 2007

Bachelor of Science Degrees

May

Mark Danielson
Lauren Feiter
Steven Keown

August

Elizabeth Armstrong
Rivkah Cooke
Eric Kiser
Brandon Weinberg
Joshua Welch

December

Phillip Swartz
Erica Toledo

Master of Science Degrees

May

Wei Dai, *Telesismic Earthquake Waveform Doublets from South Sandwich Islands Subduction Zone: Spatial and Temporal Distributions and Implications for Inner Core Rotation* (Xiaodong Song)

Joshua Defrates, *Crenulation Cleavage and Down-Dip-Verging Mesofolds in the Precambrian Baraboo Syncline, South-Central Wisconsin* (Stephen Marshak)

August

Shane Butler, *A Facies-Constrained Model of Pleistocene Travertine Deposition and Glaciation in the Northern Yellowstone Region* (Bruce Fouke)

Adam Ianno, *Differentiation Mechanisms in Zoned Plutons: Insight from Non-Traditional Stable Isotopes* (Craig Lundstrom)

Emily Wisseman, *Bacteria as Sensitive Indicators of Coral Reef Health: Bacterial Community Shifts across Coral Reef Environmental Gradients* (Bruce Fouke)

December

Melissa Chipman, *A Paleolimnological Record of Climate Change Over the Past 2000 Years at Ongoke Lake, Southwest Alaska* (Feng Sheng Hu)

Doctor of Philosophy Degrees

May

Michael Kandianis, *Modeling Departures from Abiotic Expectations During the Calcium Carbonate Precipitation Process* (Bruce Fouke)

Dmitry Lakshtanov, *Elasticity and Phase*

Transitions of Stishovite and NaCl at High Pressure (Jay Bass)

Xinlei Sun, *Three Dimensional Inner Core Anisotropy, Lowermost Mantle Structure, and Inner Core Rotation* (Xiaodong Song)

Tai-Lin Tseng, *Seismic Studies of the Mantle Transition Zone* (Wang-Ping Chen)

October

Jorge Marino, *Paleogeothermal Conditions in the Illinois Basin during Late Paleozoic Coalification* (Steve Marshak)

December

Scott Clark, *Selenium Stable Isotope Ratios in Wetlands: Insights into Biogeochemical Cycling and How a Diffusive Barrier Affects the Measured Fractionation Factor* (Tom Johnson)

Fang Huang, *Studies of Magmatism by Trace Element Partitioning between Clinopyroxene and Silicate Melt, U-Series Disequilibria in Lavas from Subduction Zones, and Non-traditional Stable Isotopes* (Craig Lundstrom)

Obituaries

Reverend Robert L. Brownfield (MS '55) died January 16, 2007 at the age of 88. He retired from the Illinois Department of Highways in 1985 where he worked as a geologist and civil engineer. In 1992 he was ordained as a Catholic priest.

Paul Clawson (BS '55) died May 11, 2007 at the age of 81. After serving in World War II and Korea, Clawson earned his degree from Illinois and eventually founded Geothermics, Inc., a company that drilled shallow wells for irrigation and provided geological consulting services.

Willis M. Decker (BS '39) died January 10, 2007 at the age of 91. He worked for Cities Service Oil Company in Tulsa for 39 years and went on to become vice-president of Jett Oil Company until 1983.

Robert L. Glossop (BS '52) died July 12, 2007 at the age of 77. He owned Glossop Oil and Gas Company.

Richard Thomas Hercher (BS '50) died January 7, 2007 at the age of 77. Hercher was an independent consulting geologist who spent 25 years participating in the exploration and development of oil and gas production in Colorado and Nebraska.

James Francis Luhr (BS '75) died January 1, 2007 at the age of 53. Luhr was director of the Global Volcanism Program at the Museum of Natural History, Smithsonian Institution.

Joseph Morgan (BS '50) died September 24, 2007 at the age of 80. After receiving his master's degree from the University of Wyoming, Morgan worked as a geologist in the oil and gas industry.

John Matkin Richart (BS '57) died March 16, 2007 at the age of 77. Richart served with the Navy during the Korean War, and after graduation was hired by Pure Oil Company where he worked for 29 years.

Mary Barnes Rolley (MS '48) died on August 5, 2007 at the age of 86. Rolley worked at the Illinois State Geological Survey before relocating to California and working as a draftswoman for North American Aviation and raising her family.

Edward Shover (PhD '61) died October 28, 2007 at the age of 71. He worked as a geologist in the aerospace and petroleum industries in and around Houston, Texas.

Adler Spotte (BS '40, MS '41) died January 11, 2007 at the age of 92. The son of a coal miner, Spotte grew up in Staunton, Illinois. After volunteering to serve in the Navy during World War II, Spotte built a career leading a number of coal companies in Virginia, West Virginia, and Kentucky.

Allen W. Waldo (AB '27, MS '28) died March 14, 2007 at the age of 102. He taught geology at the College of the Pacific and Stockton College and spent summers as a ranger naturalist in Yosemite and Crater Lake National Parks.

Meggan Kathleen Weeks (BS '96) died June 25, 2007 at the age of 33. At the time of her death she was working toward her master's degree in materials science and engineering from the University of North Texas.

Roy Edward Williams (PhD '66) died April 6, 2007 at the age of 69. While earning his Ph.D. at Illinois, Williams worked as a research assistant at the Illinois State Geological Survey.

Roger Glen Wolff (MS '60, PhD '61) died on January 1, 2007 at the age of 74. He worked his entire career at the United States Geological Survey. Before he retired he served as the chief of the Office of Hydrologic Research.

1960s

David L. Gross (MS '67, PhD '69) was appointed by the Governor of Illinois and confirmed by the Illinois State Senate to the geologist position on the Board of Natural Resources and Conservation, the governing board for the Illinois State Geological Survey, the Illinois Natural History Survey, the Illinois State Water Survey, and the Waste Management and Research Center. David is a senior geologist emeritus at the Illinois State Geological Survey where he still maintains an office. He currently serves as an outside director and chairman of First State Bank in Beardstown, Illinois.

1970s

John Morrone (BS, '79) hails from the Colorado office of the Bureau of Land Management. As baby-boomers retire, he anticipates numerous vacancies throughout BLM offices which are now offering many student internships. John also would like to see more of his contemporaries participate in Departmental receptions at national meetings so he can catch up with old friends and colleagues.

Carl Steffensen (BS '79) and **Patricia Santogrossi** (BS '74, MS '76) have both been elected members of the AAPG House of Delegates (AAPG's legislative body) for three year terms (2007-2010) representing the Houston Geological Society.

1980s

Lawrence L. Fieber (BS, '83) has worked for the Chicago branch of Burns and McDonnell, a major engineering consulting firm, for eight years now. He recently visited the Department for the first time in ages and brought with him the news that there is a great deal of demand for geotechnical and environmental geologists in the Chicagoland area. Burns and McDonnell is doing some serious recruiting at UIUC at the moment and Lawrence would love to see more alumni from the Department join him in the Chicago office.

Colloquium Speakers for Spring and Fall 2007

Spring 2007

Jan. 19

Mark H. Anders, Columbia University
The Normal Fault Paradox: Getting to the Root of the Problem

Jan. 26

Wendy Panero, Ohio State University
Water Transport and Storage of Water in the Earth's Lower Mantle

Feb. 2

Alan Boudreau, Duke University
The Evolution of Texture and Layering in Layered Intrusions

Feb. 9

Steve Jacobsen, Northwestern University
Earth's Deep Water Cycle: The Emerging Picture from Mineral Physics

Feb. 16

Eric Roden, University of Wisconsin
Geochemical Controls on Microbial Fe(III) Oxide Reduction Kinetics

Feb. 23

Chuck Langston, University of Memphis
The Scientific Mystery of the New Madrid Seismic Zone

Mar. 2

Timm Strathmann, UIUC Environmental Engineering
Rapid Reduction of Aquatic Contaminants by Organically Complexed Iron (II) Species

Mar. 9

Alan Howard, University of Virginia
Sedimentary Landforms on Mars: Fluvial, Lacustrine, Eolian, and Possibly Oceanic

Mar. 30

Dave Bish, University of Indiana
Water on Mars: Can Hydrous Minerals Explain Observed Martian Surface Water?

Apr. 5

Laura Crossey, University of New Mexico
CO₂ Mound Springs and Travertines of the Western U.S.: Towards a Model for Continental "Smokers"?

Apr. 13

Davis Blowes, University of Waterloo
Permeable Reactive Barriers for Treating Groundwater Contaminated by Dissolved Metals

Apr. 20

Mike Ritzwoller, University of Colorado
Revealing the Earth's Crust and Upper Mantle in HiDef: An Overview of the State of Ambient Noise Tomography

Fall 2007

Aug. 24

R. James Kirkpatrick, College of Natural Sciences, Michigan State University
Spectroscopic and Computational Studies of Mineral-Fluid Interactions

Aug. 31

Don Wubbles, Executive Coordinator, School of Earth, Society, and Environment (SESE)
The Status of SESE

Sept. 7

Bridget Scanlon, Bureau of Economic Geology, UT Austin
Impacts of Changing Land Use on Subsurface Water Resources in Semiarid Regions

Sept. 14

Pinaki Chakraborty, UIUC Department of Geology
The Rayleigh-Taylor Instability: From Water Falling Out of a Glass to Fire Falling Out of the Sky

Sept. 21

Mark Skidmore, Montana State University
Microbially Mediated Weathering in Subglacial Systems

Sept. 26

Jim Butler, Kansas Geological Survey
Getting the Information Ground Water Modelers Need: A Report From the Field

Oct. 5

Greg Retallack, University of Oregon
Global Greenhouse Crises of the Past

Oct. 12

Henry Scott, Indiana University at South Bend
High-Pressure and Temperature Investigations in the Fe-C and Fe-P systems: Implications for Planetary Interiors

Oct. 19

Ken Wohletz, Los Alamos National Laboratory
Were the Dark Ages Triggered by Volcano-Related Climate Change?

Oct. 26

Gary Pavlis, Indiana University
The Southeast Caribbean Plate Boundary: New Insights from the Bolivar Project

Nov. 2

Craig C. Lundstrom, UIUC Department of Geology
Magma Differentiation in a Temperature Gradient: A Potentially Important Process with an Isotopic Fingerprint

Nov. 9

Frederik Simons, Princeton University
Measuring Geophysical Processes in Space from the Shifting Weight of the Earth: Old Problems, New Methods, New Results

Nov. 30

Darryl Granger, Purdue University
Landscape Response to Tectonics and Climate: A Cosmogenic Nuclide Perspective

From Our Scrapbook



A group of undergraduates gather on the lawn north of the Natural History Building at the annual Department picnic held on September 14, 2007.



Associate Head of the Department, Professor Chu-Yung Chen joins undergraduate senior Meghan Ori at the Majors and Minors Fair held at the Illini Union in October, 2007

Faculty

Stephen Altaner (Associate Professor)
 Alison Anders (Assistant Professor)
 Jay Bass (Grim Professor)
 Jim Best (Threet Professor)
 Craig Bethke (Grim Professor)
 Chu-Yung Chen (Associate Professor)
 Wang-Ping Chen (Professor and Acting Head)
 Bruce Fouke (Associate Professor)
 Thomas Johnson (Associate Professor)
 Susan Kieffer (Walgreen Professor)
 R. James Kirkpatrick (Grim Professor & Senior Executive Associate Dean)
 Jie Li (Assistant Professor)
 Craig Lundstrom (Associate Professor)
 Steve Marshak (Professor and Head—on sabbatical leave until Fall 2008)
 Gary Parker (Johnson Professor)
 Xiaodong Song (Associate Professor)

Department Affiliate

Marcelo Garcia (Seiss Professor, Civil and Environmental Engineering)
 Feng Sheng Hu (Associate Professor; Plant Biology)
 Bruce Rhoads (Professor, Department of Geography)

Academic Staff, Post-Docs, Visiting Staff

Geoffrey Bowers (Post-Doctoral Research Associate)
 Mariano Cantero (Post-Doctoral Research Associate)
 Pinaki Chakraborty (Post-Doctoral Research Associate)
 Rocio Fernandez (Post-Doctoral Research Associate)
 Justin Glessner (Geochemist)
 Holger Hellwig (Research Scientist)
 Eileen Herrstrom (Teaching Specialist)
 Stephen Hurst (Research Programmer/Geologist)
 Andrey Kalinichev (Research Associate Professor)
 Michael Kandianis (Post-Doctoral Research Associate)
 Michael Lerche (Post-Doctoral Research Associate)
 Ann Long (Teaching Specialist)
 Xinli Lu (Post-Doctoral Research Associate)
 Padma Padmanabhan (Post-Doctoral Research Associate)
 Philip Parker (Visiting Research Programmer)
 Daniel Saalfeld (Visiting Research Programmer)
 Rob Sanford (Senior Research Scientist)
 Xinlei Sun (Post-Doctoral Research Associate)
 Michael Stewart (Lecturer)
 Jonathan Tomkin (Research Assistant Professor)
 Tai-Lin Tseng (Post-Doctoral Research Associate)
 Sharon Yeakel (Research Programmer)
 Paulo Zandonade (Post-Doctoral Research Associate)
 Zhaofeng Zhang (Visiting Scholar)
 Jianming Zhu (Visiting Scholar)

Adjunct Faculty

Robert Finley
 Leon R. Follmer
 Morris W. Leighton
 Hannes Leetaru
 William Shilts
 Wolfgang Sturhahn
 M. Scott Wilkerson

Emeritus Faculty

Thomas F. Anderson
 Daniel B. Blake
 Albert V. Carozzi
 Donald L. Graf
 Arthur F. Hagner
 Albert T. Hsui
 George D. Klein
 Ralph Langenheim
 C. John Mann
 Alberto Nieto
 Philip Sandberg

Library Staff

Lura Joseph (Librarian)
 Sheila McGowan (Library Assistant)
 Diana L. Walter (Senior Library Specialist)

Department Staff

Michael Sczerba (Clerk)
 Marilyn Whalen (Administrative Secretary)

Graduate Students

Anirban Basu
 Peter Berger
 Charles Bopp
 Jon Brenizer
 Shane Butler
 Bin Chen
 Melissa Chipman
 Mirona Chirienco
 Scott Clark
 Rivkah Cooke
 Wei Dai
 Joshua Defrates
 Dong Ding
 Xing Ding
 Theodore Flynn
 Lili Gao
 Jessica Hellwig
 Carly Hill
 Ana Houseal
 Fang Huang
 Kevin Hughes
 Adam Ianno
 Meijuan Jiang
 Michael Kandianis
 Dmitri Lakshtanov
 Qi Li
 Qiang Li
 Daniela Lindner
 Vineeth Madhavan
 Chris Majerczyk
 Jorge Marino
 Chris Mead
 Charlie Mitsdarfer
 Mara Morgenstern
 Jessica Palmer
 Mauricio Perillo
 Alan Piggot
 Geoffrey Poore
 Amanda Raddatz
 David Robison
 Pragnyadipta Sen
 Ivan Ufimtsev
 Holly Vescogni
 Jingyun Wang
 Nathan Webb
 Emily Wisseman
 Kevin Wolfe
 Zhen Xu
 Zhaohui Yang

COURSES TAUGHT IN 2007

GEOL 100	Planet Earth
GEOL 101	Introductory Physical Geology
GEOL 103	Planet Earth QRII
GEOL 104	Geology of the National Parks
GEOL 107	Physical Geology
GEOL 108	Historical Geology
GEOL 110	Exploring Geology in the Field
GEOL 116	The Planets
GEOL 117	The Oceans
GEOL 118	Natural Disasters
GEOL 143	History of Life
GEOL 333	Earth Materials and the Environment
GEOL 380	Environmental Geology
GEOL 411	Structural Geol and Tectonics
GEOL 415	Field Geology
GEOL 417	Geology Field Methods, Western US
GEOL 432	Mineralogy and Mineral Optics
GEOL 436	Petrology and Petrography
GEOL 440	Sedimentology and Stratigraphy
GEOL 454	Introduction to Seismology
GEOL 460	Geochemistry
GEOL 470	Introduction to Hydrogeology
GEOL 481	Earth Systems Modeling
GEOL 497A	The Sciences and Ethics of Sustainability
GEOL 497AB	Geomicrobiology and Geochemistry
GEOL 497SK	Geological Fluid Dynamics
GEOL 512	Geotectonics
GEOL 515	Advanced Field Geology
GEOL 552	Geodynamics
GEOL 553	Chemistry of Earth's Interior
GEOL 560	Physical Geochemistry
GEOL 562	Isotope Geology
GEOL 571	Geochemical Reaction Analysis
GEOL 591	Current Research in Geoscience
GEOL 593	Advanced Studies in Geology
GEOL 593GP	River Morphodynamics
GEOL 593J2	Molecular Modeling of Water
GEOL 593K14	Seismic Interferometry, Diffuse Wave Correlations, & Imaging

Research Grants Active in 2007

- AIR FORCE**
- Xiaodong Song**—Characterizing High-Resolution Seismic Velocity and Attenuation Structure of Yunnan-Sichuan Region, Southwest China using Seismic Catalog and Waveform Data.
- Xiaodong Song**—Surface Wave Dispersion Measurements and Tomography from Ambient Seismic Noise in China.
- AMERICAN CHEMICAL SOCIETY**
- Jonathan Tomkin**—The Effect of Late Cenozoic Glaciation on the Evolution of the Olympic Mountain.
- Craig M. Bethke and Robert Sanford**—Field-Constrained Quantitative Model of the Origin of Microbial and Geochemical Zoning in a Confined Fresh-Water Aquifer.
- Thomas M. Johnson**—Chromium Isotopes as Indicators of Hexavalent Chromium Reduction.
- R. James Kirkpatrick and Andrey G. Kalinichev**—Computational and Spectroscopic Investigations of the Molecular Scale Structure and Dynamics of Geologically Important Fluids and Mineral-Fluid Interfaces.
- Robert Sanford**—Biomolecular Mechanisms Controlling Metal and Radionuclide Transformations in Anaeromyxobacter Dehalogenans.
- Robert Sanford**—Towards a More Complete Picture: Dissimilatory Metal Reduction by Anaeromyxobacter Species.
- EXXONMOBIL UPSTREAM RESEARCH COMPANY**
- Craig Bethke**—Membership in the Hydro-Geology Program Industrial Consortium for Research and Education.
- MICHIGAN STATE UNIVERSITY**
- Robert A Sanford**—Growth of Chlororespiring Bacteria to High Cell Densities for Use in Bioaugmentation.
- NASA**
- Susan Kieffer**—Multicomponent, Multiphase H₂O-CO₂ Thermodynamics and Fluid Dynamics on Mars.
- NATIONAL SCIENCE COUNCIL OF TAIWAN**
- Wang-Ping Chen**—Caucasus Scientific Experiments (CAUSE): An Integrated Study of Active Continental Collision.
- NATIONAL SCIENCE FOUNDATION**
- Jay Bass**—Sound Velocities and Elasticity of Deep-Earth Materials at High Pressures and Temperatures.
- Jay Bass**—Sound Velocities and Elastic Moduli of Minerals at Mantle Pressures and Temperatures with Laser Heating.
- Jay Bass**—Collaborative Research: Elasticity Grand Challenge of the COMPRES.
- Jay Bass**—Consortium for Material Property Research in the Earth Science.
- Wang-Ping Chen**—Collaborative Research: Lithospheric-Scale Dynamics of Active Mountain Building along the Himalayan-Tibetan Collision Zone.
- Wang-Ping Chen**—CSEDI Collaborative Research: A Study of Deep Subduction Integrating Broadband Seismology and Mineral Physics.
- Wang-Ping Chen**—Collaborative Research: Imaging the Continental Lithosphere with Earthquake Sources.
- Bruce Fouke**—Geobiological and the Emergence of Terraced Architecture during Carbonate Mineralization.
- Bruce Fouke**—NSF Research Experience for Middle School Teachers at Mammoth Hot Springs, Yellowstone National Park.
- Thomas M. Johnson and Craig C. Lundstrom**—Technical Support for the New Mc-ICP-MS Laboratory at University of Illinois.
- Susan Kieffer**—Multiphysics Modeling and Terascale Simulations of Volcanic Blasts Over Complex Terrains.
- Jie Li**—Constraints on Core Composition from Nuclear Resonant Scattering and X-Ray Diffraction Studies on Fe-Light-Element Compounds.
- Craig C. Lundstrom and Stephen Marshak**—Assessing Diffusive Differentiation during Igneous Intrusion Using Integrated Theoretical Experimental and Field Studies.
- Xiaodong Song**—CSEDI Collaborative Research: Observational and Theoretical Constraints on the Structure and Rotation of the Inner Core.
- Xiaodong Song**—Structure and Dynamics of Earth's Core and Lowermost Mantle.
- Jonathan Tomkin**—Collaborative Research: Glacial Erosion in the Patagonian Andes; Testing the Buzzsaw.
- OFFICE OF NAVAL RESEARCH**
- Bruce Fouke and Milton McAllister**—Microbiological, Physiological, and Toxicological Effects of Explosive Compounds on Coral Health.
- Bruce Fouke**—The Role of Shipyard Pollutants in Structuring Coral Reef Microbial Communities: Monitoring Environmental Change and the Potential Causes of Coral Disease.
- THE RESEARCH FOUNDATION OF THE STATE UNIVERSITY OF NEW YORK**
- Jay Bass**—High-Resolution Inelastic X-ray Scattering at High P & T: A New Capability for the COMPRES Community.
- SANDIA NATIONAL LABORATORY**
- Craig Bethke**—Software Licenses for Geochemist Workbench.
- SCK.CEN**
- Craig Bethke**—Membership in the Hydro-Geology Program Industrial Consortium.
- SHELL INTERNATIONAL EXPLORATION AND PRODUCTION**
- Gary Parker and Garcia Marcelo**—Channelization by Turbidity Currents in Submarine Fairways and on Fans.
- UNIVERSITY OF ILLINOIS**
- Wang-Ping Chen**—Building Infrastructure for Space-Based Geodesy.
- Bruce Fouke**—Calcium Carbonate (CaCO₃) Biomineralization: The Geologic Record of Biological Responses to Rapid Environmental Change.

From Our Scrapbook



More than 100 guests attended the joint UI-U alumni reception at the Annual Meeting of the Geological Society of America in Denver. In the foreground, Chuck Norris (BS '69) and his wife greet Keros Cartwright (PhD '73).

LIST OF PUBLICATIONS FOR 2007

- Andrews A.H., Lundstrom C.C., Cailliet G.M., and DeVogelaere A.P. Investigations of bamboo coral age and growth from Davidson Seamount. *Technical Report Monterey Bay*. National Marine Sanctuary.
- Andrews A.H., Kerr L.A., Cailliet G.M., Brown T.A., Lundstrom C.C., and Stanley R.D. Age validation of canary rockfish (*Sebastes pinniger*) using two independent otolith techniques: lead-radium and bomb radiocarbon dating. *Marine and Freshwater Research*, 58: 531-541.
- Anders A.M., Roe G.H., Durran D.R., and Minder J.R. Small-scale spatial gradients in climatological precipitation on the Olympic Peninsula. *Journal of Hydrometeorology*, 8: 1068-1081.
- Ashworth P.J., Best J.L., and Jones M. The relationship between channel avulsion, flow occupancy and aggradation in braided rivers: insights from an experimental alluvial basin. *Sedimentology*, 54: 497-513.
- Bass J.D. Mineral Physics: Techniques for measuring high P/T elasticity. In G.D. Price and J. Schubert (Eds.), *Treatise of Geophysics* (pp. 269-292). Amsterdam: Elsevier B.V.
- Best J., Ashworth P., Sarker M.H. and Roden R. The Brahmaputra-Jamuna River, Bangladesh, In A. Gupta (Ed.), *Large Rivers: Geomorphology & Management* (pp. 395-430). Wiley.
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