2000 YEAR IN REVIEW

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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UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

http://www.geology.uiuc.edu

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 she hopes to apply to other boundaries around the world.

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

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 influencing 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 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.

Photo courtesy of the R/V Gould Crew

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.

"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 examination, 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.

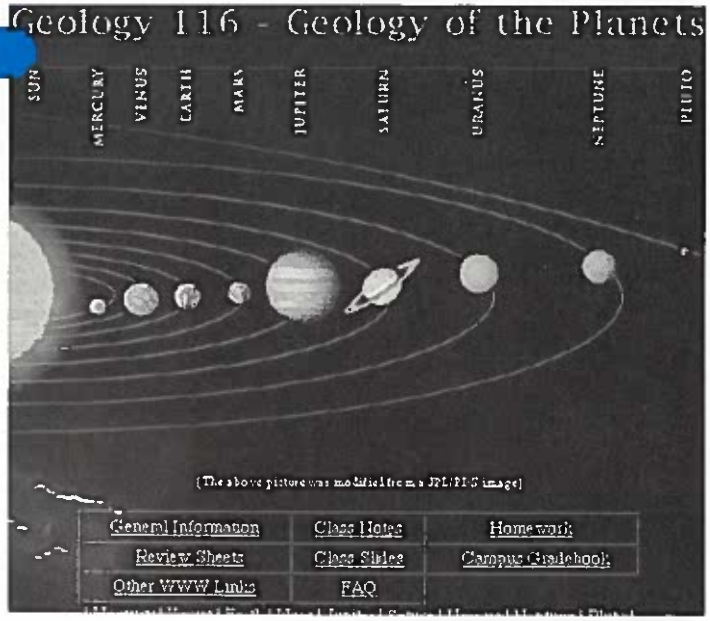
Most recently, Kirkpatrick has been looking at what can be done about the increase of carbon dioxide in the atmosphere, the major cause of global warming. His goal is to see if "sequestering" carbon dioxide by injecting it deep into the ocean or an underground aquifer is a feasible way to remove that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

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 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



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

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.

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."

"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..."

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 ^{16}Sr 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.

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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.

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.

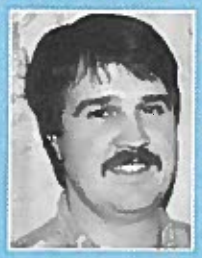
Photomosaic of an inactive, eight-meter-tall carbonate chimney in the eastern portion of the Lost City Field. The calcite, aragonite, and brucite chimneys form delicate yet massive pinnacles that reach up to 60 meters (180 feet) in height.

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 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.

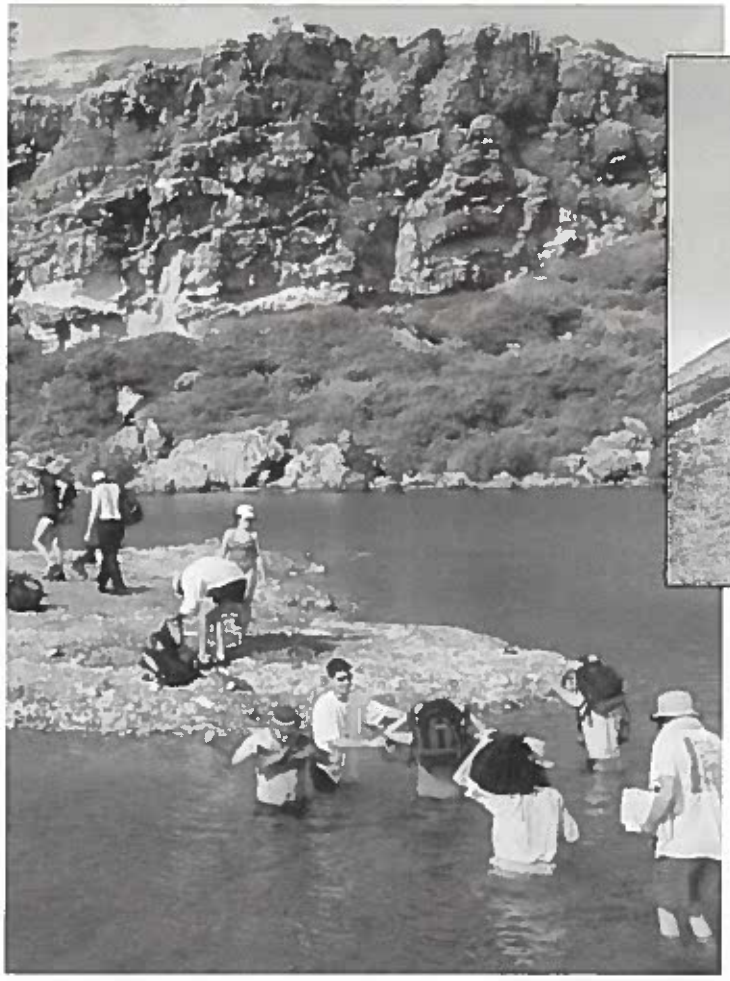
Lundstrom, Hu and Bass Honored

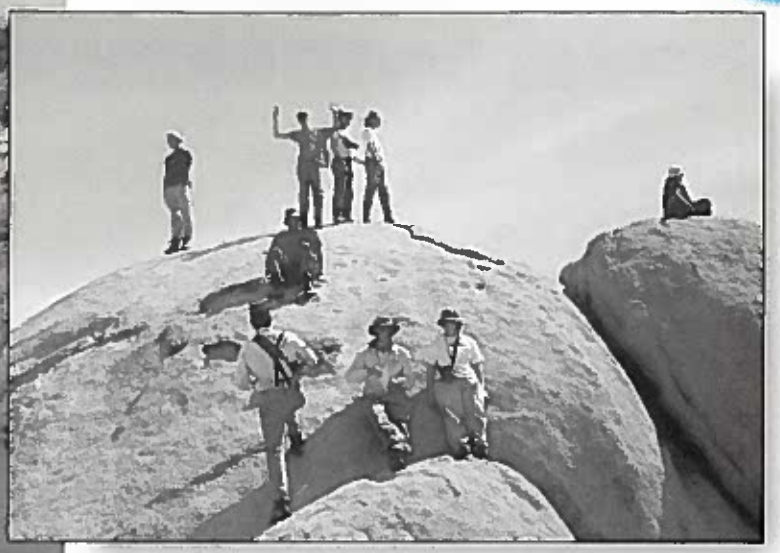


Craig Lundstrom, assistant professor of geology, has won the F.W. Clarke Medal of the Geochemical Society. The Clarke Award is a major award made annually at the V. M. Goldschmidt Conference to an early-career scientist for a single outstanding contribution to geochemistry or cosmochemistry, published 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.

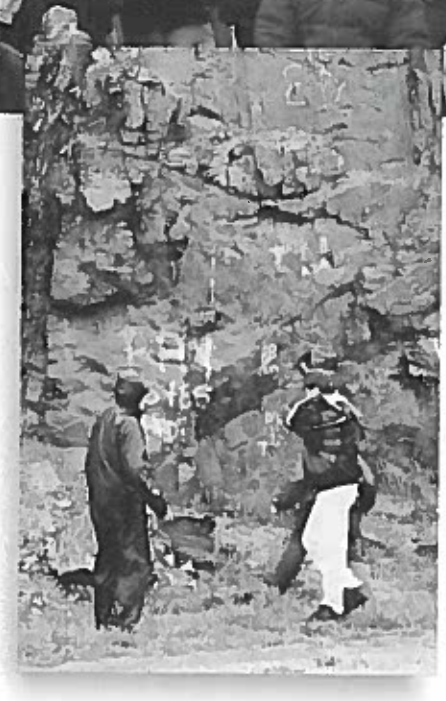
"People are using the software for applications we never even imagined, like designing longer-lasting roadways," says Bethke.

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

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.

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 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."

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

"Professor Nieto is really popular 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 related to this or not, Jillson retired in 1884 ... to become an Army surgeon.

Charles Wesley Rolfe was an energetic administrator and teacher.

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

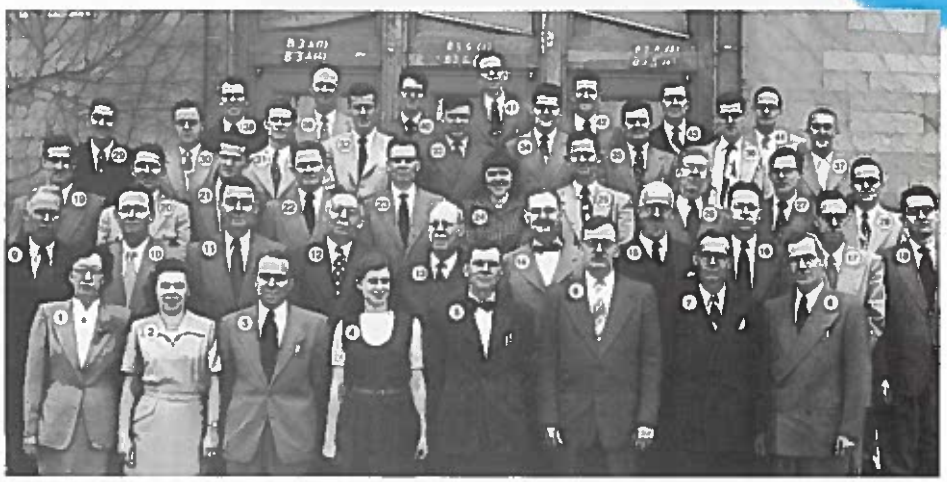
comment on the characters of distribution of brachiopods. This was followed by two papers on hydrogeology and an additional two on the geology of clays and the distribution of paving brick material in Illinois. Rolfe's final paper was an historical account of geologic studies in Illinois prior to establishment 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.

1952 Group Photo Revisited



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

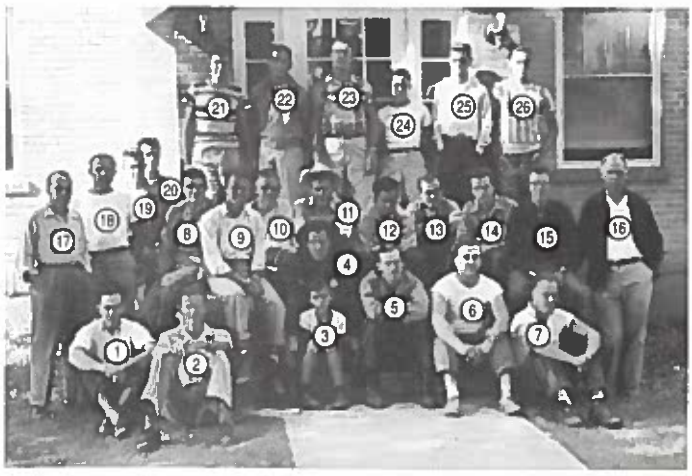
Jack Burgess, B.S. '49, writes that no. 29 is Frank Staplin and no. 31 is Byrd Berman.

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 camptosaurus 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 family 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.

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.

Photo courtesy of George Klein

Leinen in the field circa 1967

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.

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

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 brittle-stars 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.

Undergraduate Awards

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 Shinbori

August
Philip Michael Johanek
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 Reconaissance 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.

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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
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

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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)
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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
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Stephanie Gillain
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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 abd 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 493I1 -	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 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

Illinois Council on Food and Agriculture Research

Estimation of Dentrification 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 Paleoecologic Significance.
Principal Investigator: Daniel B. Blake

A Seismic Study of the Mantle Transition Zone and Subducted Lithophere.
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, $^{87}Sr/^{86}Sr$ 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. Glutter
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 Pozzuoli, 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 volcaniclastic 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 Sciéntifique 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 ^{14}C 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 Jurasic/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, 6970: 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-Mg_2SiO_4 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 wasteform 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.

Lundstrom, C.C., 2000, Models of U-series disequilibria 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, ^{15}N 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 ^{77}Se 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.

Colloquium Speakers

Spring 2000

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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