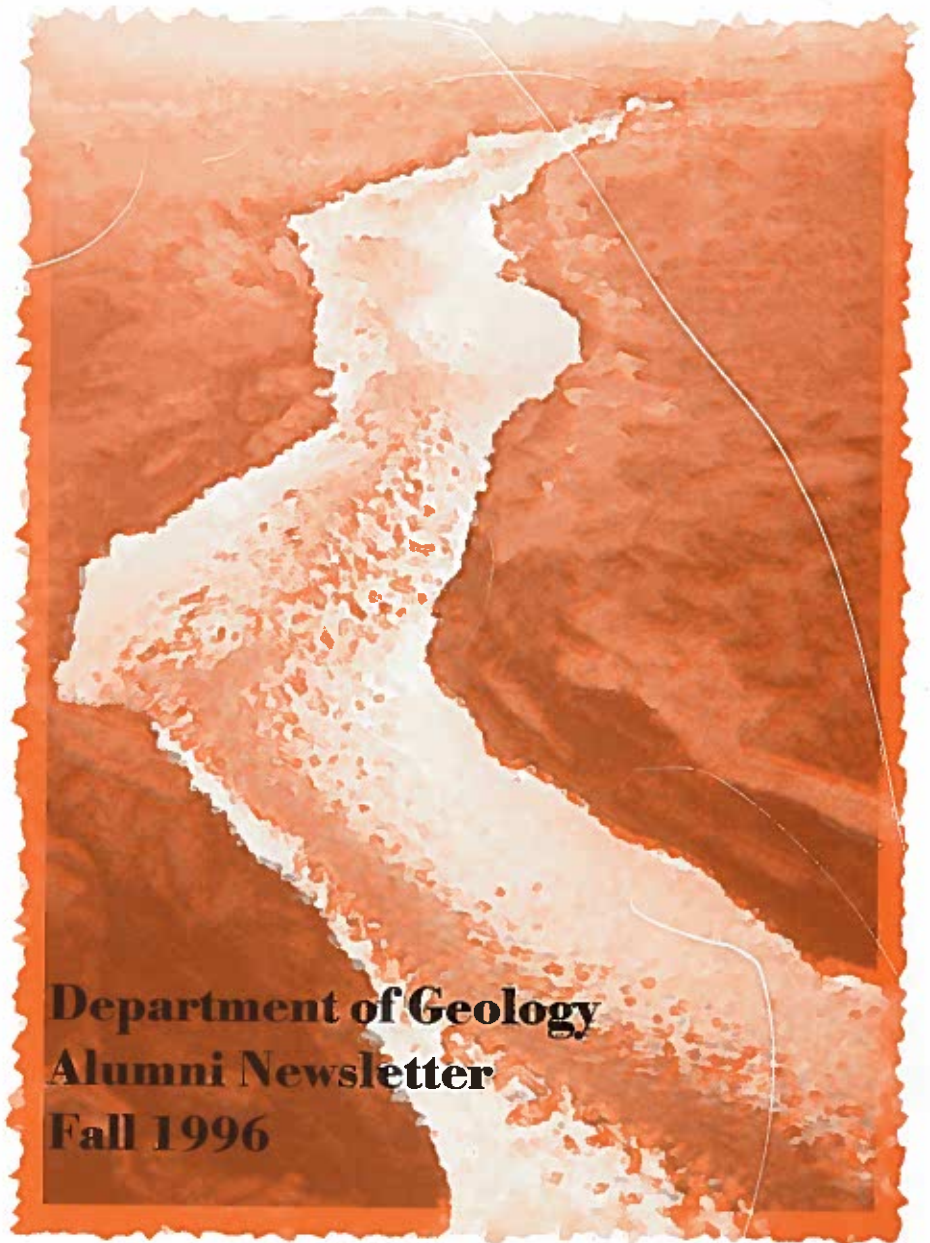


# Geosciences

**University of Illinois  
at Urbana-Champaign**



**Department of Geology  
Alumni Newsletter  
Fall 1996**

# GeoSciences

Department of Geology Alumni Newsletter

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## About Our Cover:

Lava streams, capable of rushing down steep slopes at rates of 60 kph, are formed when lava falls from fountains and flows from vents. This particular lava stream formed during an eruption at Mauna Loa, and the image is one of the many spectacular sites students are able to visit when exploring the virtual field trips created by Stephen Hurst.

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*GeoSciences* is the alumni newsletter for the Department of Geology, University of Illinois at Urbana-Champaign. It is published in the fall and winter of each year.

**Staff** Department Head: R. James Kirkpatrick; Assistant to the Head: Peter A. Michalove; Editor: Susan Sheridan; Production: LAS Office of Publications; Administrative Secretary: Terri George.

# From the Department Head



Dear Fellow Alumni,

As is usual at the start of a new academic year, there are many changes and new faces in the Department. We especially want to welcome Steve Hurst, our new computer systems manager and educational software developer, and Peter Burns and Eric Bestland, who are new visiting assistant professors. Steve has a background in research and education in geoscience as well as computer technology. Technology-based education is rapidly becoming the norm, and Steve is helping us move rapidly in that direction. There is a profile of him in this issue. Peter is a mineralogist and has worked on uranium minerals, among other things. Eric is a sedimentologist and has worked for several years on interior basins. Profiles of them will appear in the winter issue of GeoScience.

As many of you are aware, Bill Shilts became the new chief of the Illinois State Geological Survey last year, and fortunately for us is also an adjunct professor. Bill is a quaternary geologist and this fall semester will be teaching a seminar on "Environmental Applications of Surficial Geology" for graduate students and upper level undergraduates. We look forward to this course in particular and to continued strong interaction between the ISGS and the Department in general.

I also want to take this opportunity to let you know about new programs some of your fellow alumni are undertaking to provide much needed support to the Department, and to thank those involved in the efforts. A group of Midwest alumni with Brud Leighton and Haydn Murray as co-chairs and Park Livingston and Jack Simon as honorary co-chairs is working to develop a \$100,000 endowment for undergraduate research scholarships. The kick-off for this program was on September 21 in Urbana, and it will extend throughout the fall and winter. A group of Oklahoma and Kansas alumni led by Les Clutter are undertaking a similar program to provide a \$50,000 endowment to support student field trips, and the kick-off for this program will be October 24 in Tulsa. Both are modeled after the highly successful effort of the Texas and Louisiana alumni group which is raising \$300,000 for a graduate fellowship. I am very excited about the two new programs because I remember well how important both field trips and research opportunities were to me as a student, and I have seen from the faculty side how much they help students grow.

Please remember to drop by the Department if you are in the area.

Best Regards,

  
R. James Kirkpatrick  
Department Head

## New Fundraising Effort to Support Undergraduate Scholarships



A Midwest fundraising effort got under way September 21, 1996. Attendees were taken on a tour of the Department of Geology, treated to lunch, and invited to attend the Illinois vs. Akron football game that afternoon. The goal of the development project is to raise \$100,000 for an

endowment which will provide a permanent stream of interest to fund undergraduate research scholarships.

Morris W. Leighton, B.S. '47, and Haydn H. Murray, B.S. '48, M.S. '50, and Ph.D. '51, co-chair the committee overseeing the development project. Leighton is a retired chief of the Illinois State Geological Society and chairman of the Department's GeoThrust committee. Murray is professor emeritus at Indiana University.

Honorary co-chairs for the committee are Park Livingston, B.S. '30, and Jack Simon, A.B. '41, M.S. '46. Livingston served ten years on the University of Illinois Board of Trustees, and is president emeritus of the board. Simon is a retired chief of the Illinois State Geological Society and the first recipient of the Department's alumni achievement award.

## Potential Baraboo Reunion

Members of the 1950 Baraboo field camp experience who are interested in participating in a reunion should contact Richard M. Winar, 2705 Beacon Hill Drive, Apt. 209, Auburn Hills, MI, 48326-3755. Winar may also be reached via email at [mnm47a@prodigy.com](mailto:mnm47a@prodigy.com).

## Students Reap Awards

Faculty, staff, and students all gathered at Yen Ching restaurant in Urbana on May 1, 1996, for the annual Department of Geology awards banquet. The following students received awards:

### Morris M. And Ada B. Leighton Memorial Award:

Amy C. Berger  
Melinda R. Tidrick

### Estwing Pick Award:

Catherine A. Hier

### Outstanding Teaching Assistant Award:

Melinda R. Tidrick, Fall 1995  
Sally E. Greenberg, Spring 1996

### Alumni Outstanding Senior Award:

Theresa L. Croak  
Nathaniel P. Stephens

### Outstanding Woman Graduate Award:

Sally Greenberg

### Department Thesis Support Grant:

Judy Becker  
Christine Gerdon  
Steve Schrimmich

## Degrees Conferred by the Department of Geology

### October 1995

Yeongkyoo Kim, Ph.D.

### January 1996

Daniel Christopher Barnstable, B.S.

Scott Randell Ellis, B.S.

Ayoola O. Folarin, B.S.

David Aaron Grimley, Ph.D.

Christopher Paul Korose, B.S.

James Blake Shodsmith, B.S.

Steven Daniel Sroka, Ph.D.

### May 1996

Edward James Burns, B.S.

Jeanne Marie Burns, B.S.

Theresa Lynn Croak, B.S.

Christie Marie Demosthenous, M.S.

Allison Ann Flowers, B.S.

Theresa Lynn Beckman Fritzel, M.S.

Matthew Patrick Haverty, B.S.

Stanislav Valentinovich

Sinogeikin, M.S.

Nathaniel Patrick Stephens, B.S.

Magna Cum Laude

Meggan Kathleen Weeks, B.S.

### August 1996

John Jeffrey Anglen, B.S.

Anne Marie Estandarte, B.S.

Scott Aaron Stawarz, B.S.

Jianzhong Xu, M.S.



## From the Department's Archives

*Below: Hilt Johnson with Dean Bob Rogers, and Rogers' son at Sheridan field camp, 1965.*

*Right: Don Henderson doing field work in Dubuque, Iowa, 1948.*



## Newsletter Photo Request

Don Henderson has a damaged 8 x 10 photo of the faculty, staff, and graduate students of the Department in 1952. The picture is in such poor condition that it won't reproduce for the newsletter. If any readers have a good copy of the photo, or information to identify some of the people in it, Henderson asks that they write him at the Department address or call him at (217) 367-9975.

**Check It Out!**

<http://www.geology.uiuc.edu/>

## Geology Alumni Serve on GSA Committees

The following alumni of the Department of Geology are currently serving on GSA committees:

### **Committee on Investments:**

F. Michael Wahl

### **Committee on Membership:**

John D. Kiefer

### **Committee on Nominations:**

Sharon Mosher

### **Committee on the Penrose**

**Medal Award:**

Donald R. Lowe

### **Program Committee:**

John A. Cherry

### **Committee on Publications:**

Keros Cartwright

John M. Sharp, Jr.

Bruce F. Molnia

Suzanne Kay

### **Committee on the Young Scientist Award:**

Mark Cloos

### **Ad Hoc Committee to Study**

**GSA Committees:**

Sharon Mosher

### **Ad Hoc Committee on Annual**

**Meeting Programs:**

Sharon Mosher

### **Ad Hoc Committee on**

**Publications:**

Keros Cartwright

John M. Sharp, Jr.

# Profiles

## Outstanding Alumnus: Kenneth O. Emery

"Somebody asked me once, 'What's the basis of my being elected to the National Academy of Science?' To them it seems as if I'd spread myself out to so many different subjects and I'm supposed to be a specialist. I guess I like to work on things I'm interested in."

And his interests range wide.

Kenneth O. Emery (B.S. '35, Ph.D. '41), received the 1996 Geology Alumni Achievement Award. Intended to recognize outstanding achievement in the field of geology, the Alumni Achievement Award was established in 1994 and has been awarded annually as the Department's highest honor. Emery was nominated by the Department's Advisory Committee and the GeoThrust Committee for his pioneering work in oceanography, a field that had its infancy here at the University in the 1930s.

But while technically a specialist in sedimentation, Emery has never been one to limit his research to one narrow aspect of the discipline. Over the course of his lifetime he has traveled the globe and studied atomic radiation, barrier reefs, continental bottom sediments, and atoll formation—to name just a fraction of his research areas.

Born in Canada in 1914 and raised in Texas, as a boy Emery

attended the public schools in the Dallas/Fort Worth area. "I collected fossils from the Cretaceous period, too," he recalls, "so I knew something about the geology around my home."



*Kenneth O. Emery received the 1996 Outstanding Alumni Achievement Award.*

A stint in junior college revealed an aptitude for physics and calculus, and for a while, Emery thought he might pursue electrical engineering. "Just for fun I took a course in geology too, and liked it. One of my professors convinced me to combine my interests in both engineering and geology into mining engineering," says Emery.

That same professor also recommended to Emery that he pursue his interest at the University of Illinois. And in 1936, aboard a freight train, Emery arrived.

"In the thirties there were lots of people riding freight trains," recalls Emery. "We'd get prepared as the freight train was starting, then we'd hop aboard once the train was still going slow enough so we could get aboard yet fast enough to evade the yard cops. That was the method of transport in those days."

Once settled at the University, Emery found two jobs: one fed him, one paid him. "I waited tables for the food, and drafted for Professor Shepard for the money. At thirty-five cents per hour, by the way."

Francis Shepard, considered by many to be the father of marine geology, would have a profound influence on the young Emery. When Emery became disillusioned with the program in mining engineering which concentrated solely on issues related to mining coal, it was Shepard who encouraged him to consider changing his major to geology.

Summer work at the Coast and Geodetic Survey in Washington, D.C. and on cruises at the Scripps Institution of Oceanography influenced him further to concentrate on marine geology. So it was that he completed a master's thesis on the mechanics of sediment coring and, in 1941, a



## Emery Links Oceanography and Coins

True to his desire to study geology from every angle, Kenneth O. Emery is currently working on his sixteenth book, tentatively titled *Oceanography Illustrated by Coins*.

"Many countries and civilizations—the Phoenicians, Greeks, and Romans included—published coins with marine motifs on them.

"For example," says Emery, "Benjamin Franklin is on one of the U.S. half dollars. Well, Franklin had been postmaster for some time and was concerned with why it took two days longer for the mail to come from London to New York than it took for mail to go from New York to London. In studying the problem, he discovered the phenomenon of the Gulf Stream."

Emery continues, "Franklin was also ambassador to France, and on several trips he brought along a thermometer to measure the temperature of the water en route to locate the path of the Gulf Stream."

So far, Emery has amassed and photographed about two thousand coins and is currently sorting the images into categories. Each photo will be accompanied by an explication of the motif.

Coins courtesy of the World Heritage Museum

doctoral dissertation on the lithology of the sea floor off southern California.

The post-Depression era was a difficult time for marine geologists to find work in their field, however, so for a while, Emery worked as a staff member of the Illinois State Geological Survey. He used his background in engineering to search for municipal and industrial supplies of ground water.

An opportunity to work in his chosen field came knocking in 1943 when he rejoined Shepard as a marine geologist. Together they helped the war effort by addressing problems of the ocean associated with pro- and anti-submarine tactics.

Shepard and Emery made bottom sediment maps for the regions in which the United States and Japan were engaged in battle. U.S. submarine captains used the maps to outwit Japanese destroyers; U.S. destroyer captains used the maps to locate Japanese submarines.

"Where there was mud bottom, the sound waves were absorbed; if it was a sandy bottom, the sound would bounce off the bottom and have a pretty long range, say 3000 yards," explains Emery. "The Japanese destroyers could find our subs better that way, so our submarines tried to stay off the sand bottom. On the other hand, if the bottom was rocky, there was a lot of reverberation and the destroyers couldn't pick out the right echo.

"I ran across a destroyer captain recently at a dinner I attended, and he knew about the maps," says Emery, obviously pleased. "In other words, they were used."



After the war, Emery took a post as an assistant professor in the geology department at the University of Southern California at Los Angeles. During the course of his tenure there, in addition to teaching a full course load, Emery spent several summers working with the U.S. Navy and the U.S. Geological Survey.

In 1946 he went to Bikini to study the hole made by the first and second atomic bombs and to determine the spread of the resultant radioactivity. In 1948 he traveled to the Persian Gulf to gather general information about the area, which was not widely available at that time. In 1950 he returned to Bikini, and 1952 found Emery in Guam where he was attempting to confirm Darwin's theory on reef sequence formation (earning him, incidentally, the nickname "Mr. Darwin" among his colleagues). In 1954 Emery's interest in beachrock took him to Hawaii to study the calcium carbonate-rich sand there and the process by which it became cemented into rock.

Emery also spent considerable time during this period aboard the U.S.C. ship R/V *Velero* investigating the southern California and Mexican borderland and aiding students in their graduate work. The latter half of 1958 was spent summarizing the knowledge about the borderland in a book, *The Sea Off Southern California: A Modern Habitat of Petroleum*.

But when it came time to

proofread the manuscript for that book in 1959, Emery was in Israel as a Guggenheim Fellow, studying the manner of deposition of salts in the Dead Sea.

By this time, Emery had reached the rank of professor, "and with no urgent funding

Over the course of his lifetime Emery has traveled the globe and studied atomic radiation, barrier reefs, continental bottom sediments, and atoll formation—to name just a fraction of his research areas.

problems I decided to change from the Pacific to the Atlantic ocean, from teaching to straight research, and from chiefly sedimentation to chiefly geophysics," says Emery. "I decided it was time to learn something different."

In June 1962 Emery joined the Woods Hole Oceanographic Institution where one of his first responsibilities was the study of the entire Atlantic continental margin between Labrador and Mexico. Undertaken in conjunction with the U.S. Geological Survey, this intense effort ended in 1967 with the establishment of a Marine Branch of the USGS.

After a year as the first dean of the WHOI graduate school, Emery returned to shipboard studies with the aid of the U.S.

Navy and as the U.S. representative to the United Nations Economic Commission for Asia and the Far East and its Committee for Coordination of Offshore Prospecting.

When Emery retired as the Henry Bigelow Oceanography Chair at WHOI in 1979, he retired

in name only. From then until now, he has been conducting research and publishing books and articles as steadily as ever.

- The *Geology of the Atlantic Ocean*, written with a colleague and former student, Dr. Elazar Uchupi of WHOI.

- A book to update the usual primitive treatment of the origin of the earth and its relationship to other planets appeared as

*Morphology of the Rocky Members of the Solar System*.

- Studies attempting to explain the apparent rise of sea levels caused by the vertical movements of land were combined and augmented in a book with Dr. D.G. Aubrey, also of WHOI, *Sea Levels, Land Levels, and Tide Gauges*.

When asked what Emery would have done had he not become a marine geologist, he replies, "I probably would have been an electrical engineer, or an archaeologist."

But he is not sorry geology stole his heart. Looking back on his career, he is satisfied with what he has accomplished. "My only regret is that I won't live long enough to explore it all."



# Virtual Field Trips a Reality: Stephen Hurst

In April 1996 the Department of Geology welcomed Stephen Hurst as its newest staff member. Hurst had previously been on the faculty at Duke University since 1990.

While at Duke, Hurst was instrumental in developing a series of computerized field trips, giving users the chance to "visit" geologically significant sites electronically. He brings this technology to the University with hopes that such so-called "virtual field trips" will become an

integral part of the geology curriculum.

But let's start at the beginning. "I was born in Nuremberg, Germany," says Hurst, "but I don't remember a thing about it because shortly thereafter my family moved to Peoria. My dad worked at Caterpillar, just like everyone else's dad in Peoria."

Did he have any inkling that geology was in his future? Hurst says no. "I did like to collect rocks as a kid, but I didn't know anything about them. I was

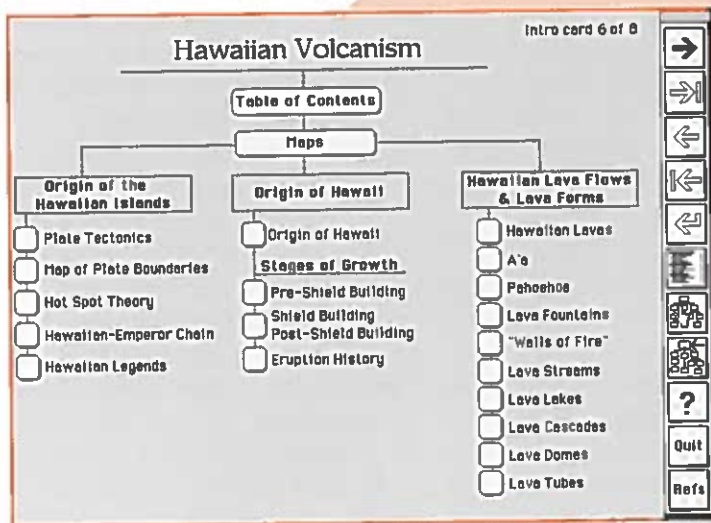
always scientifically minded, though, and knew that the natural world was what I was interested in."

A temporary relocation to Oak Park meant that Hurst attended Oak Park-River Forest High School.

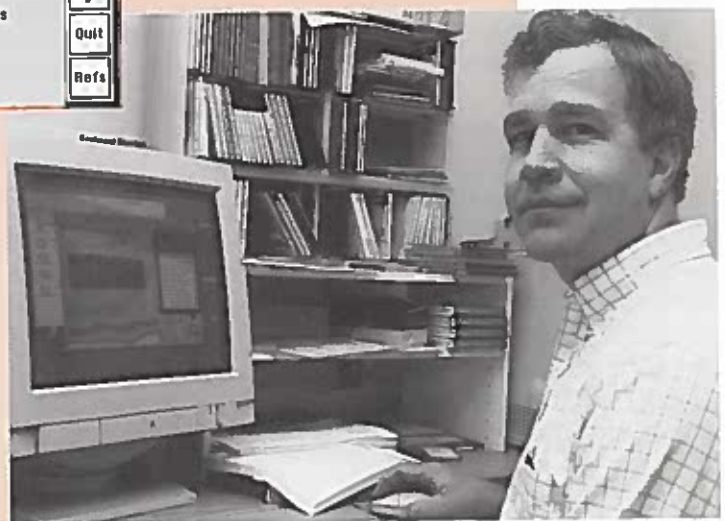
"Oak Park-River Forest was an excellent high school. It changed my horizons a lot," Hurst recalls. "That school had nice facilities, nice capabilities, very good teachers."

A chemistry scholarship brought Hurst to the California Institute of Technology in 1973. He credits Cal Tech for providing him with a solid background for future work in scientific fields.

"When I was a student at Cal Tech, there were really no such



*Stephen Hurst (below) creates virtual field trips that enable students to visit geologically significant sites electronically. For instance, students wanting to explore volcanism may begin at this point (left), where topics of interest are outlined and accessed by the click of a button.*





*Some of the field trips contain short movies (top) that show geological phenomena in action. This series of images is taken from a movie which shows the dramatic eruption of Mount Saint Helens in 1980. Students are able to visit sites on many different scales as illustrated above. On the left is an aerial view of the Andros tidal flats. On the right is a thin section of the offshore marine sediment.*

### A sampling of field trip sites include:

- the Mid-Atlantic Ridge to explore the types of extension common to the region, along with an examination of volcanism and rock types;
- the Richmond Basin to search for vertebrate fossils of previously unknown Tetrapods;
- South Florida, Florida Bay and the reef tract to gather information on the organisms and associated sediment types;
- Oman and Cyprus to investigate the ophiolites present on a number of different scales;
- Yellowstone National Park;
- the Barrier Islands of Cape Lookout, NC, to explore the barrier island environment;
- Long Valley Calder, CA, to determine the geothermal potential of the area.

thing as majors. You received a general bachelor's of science degree," explains Hurst. "As a result I learned a lot about a lot of different subjects, and that background has served me very well over the years."

When, later, he was to work for Conoco, Inc., as a geologist, one of his first assignments there was to build a laser probe.

"For that I had to learn about ultra high vacuum systems, lasers,

optics, isotope fractionation, mass spectrometers," says Hurst. "All stuff that requires freshman and sophomore level physics and calculus. It all comes back to what I learned during those years at Cal Tech."

From Cal Tech, Hurst went on to earn a master's degree in inorganic chemistry from University of North Carolina. But about half way through that experience he had a change of

heart. "I realized that I didn't want to be cooped up in a lab smelling fumes for the rest of my life, and that what I liked to do was to go backpacking and camping and things like that, so I thought maybe I'd switch to geology."

Upon completing his master's degree in inorganic chemistry in 1979, he applied and was accepted to UNC's graduate program in geology. In 1981 Hurst earned a

master's degree in isotope geochemistry.

"For the next three years, I worked for Conoco, Inc., in Ponca City, Oklahoma," says Hurst. "At the time, that was their research and development location. I was there doing mainly isotope geochemistry and geochemistry."

The decision to pursue his Ph.D. in structural geology at the University of California at Davis ended his tenure at Conoco. Post doctoral studies took him to Duke in 1990, where he also accepted a position as research assistant professor.

A faculty member at Duke first had proposed the idea of the virtual field trips before Hurst was even on the scene. But the initial proposal was for millions of dollars, to be spent on development of the idea and new equipment, and was rejected.

"I came to Duke a few months or maybe a year after it got shot down and realized that I could do 95% of the job a lot cheaper with existing materials and offered to work up a prototype. It took me about a week. I showed it to them, and they were very enthusiastic," Hurst recalls.

A more modest grant proposal was subsequently funded by the Department of Education, and what emerged was a CD ROM with eighteen virtual field trips.

The field trips are easily navigated. Users click on photos,

buttons, or text to access information that comes in all forms, from video sequences to animated graphics to text. Students are often given the capability of viewing complexes on several different scales ranging from satellite views to thin section. At the end of some field trips students are able to test what they've learned with a short quiz. If they feel the need to review something, the appropriate

We're working on a simulation where the student would control the amount of water in a system, the amount of heat coming from hot rock below, and the permeability of the rock. They would then try to simulate either a geyser, a hot spring, or a fumarole.

section of the trip is only the click of a button away.

"I don't see these as substituting for lectures, or real field trips, or even lab exercises where you handle real rocks, do real experiments," assures Hurst. "The idea of the virtual field trip is that you put everything in context. So if students are learning about hydrology, they're going to do what they would anyway in the lab, then they'll go to the field trip and see it in the context of, say, Yellowstone.

"We're working on a simulation where the student

would control the amount of water in a system, the amount of heat coming from hot rock below, and the permeability of the rock. They would then try to simulate either a geyser, a hot spring, or a fumarole."

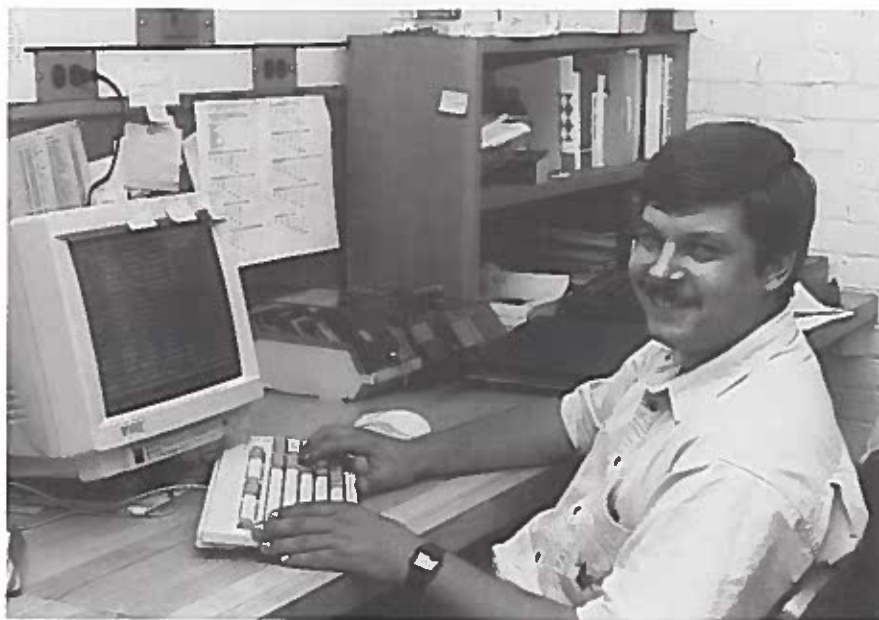
Students derive some distinct benefits from having this information at their fingertips. First, it allows them to see sites that would be extremely difficult or expensive to access. Second, by doing a virtual analysis of the site, students can get results much more quickly. "On a real field trip where samples are taken and then analyzed, it takes weeks to get results," explains Hurst. "On the computer, the analysis takes minutes."

Initially, Hurst hoped that the virtual trips could be modified or added to by other people. While he still thinks this is a good idea, it's not practical, he says, "because to make them useful for professors, the trips need to be accompanied by workbooks, exercises, a set of instructions. These trips don't come with that."

Ultimately, Hurst hopes to develop the project to the point where it becomes truly interactive for the student. "I'd like the student to be able to ask questions, refine data, manipulate it, form a hypothesis, test it, simulate something real or close to something real and decide whether it works or not."



# Uncovering the Earth's Mantle: Stanislav Sinogeikin



*Stanislav Sinogeikin*

Like many geologists, Stanislav Sinogeikin's interest in the subject began when he was a young boy. While collecting minerals and rocks around his native Moscow and all over Russia, Sinogeikin taught himself to identify and classify them.

It was while a student at a high school that Sinogeikin started to seriously study geology at the Geology School for high school students affiliated with Moscow State University. He went on to pursue his degree in petrology and geochemistry at Moscow State University.

Sinogeikin considers the education he received in Russia to

be very good and comprehensive. "When I was studying geology, I had to learn a lot from different geological sciences," he says. "Over here students have a choice about which classes to take. In Russia the educational system is (was) a little bit different. I had five years to earn a degree and I didn't choose what I was going to learn, what courses I had to take, except that all these courses were prepared for geochemistry and petrology majors. There was a schedule to follow for each semester. It was beneficial for me to take all of these courses because I have a broader scope of knowledge that surrounds my narrow field."

While working as a research assistant in the Institute of Experimental Mineralogy in Russia, Sinogeikin was given an opportunity to pursue his doctorate here under the guidance of Professor Jay Bass. For various personal and professional reasons, he decided to accept the challenge.

"I wanted to stay in science, but it was pretty difficult in terms of money. Things seem to be getting better in Russia now, but at that time my salary just was not enough to feed my wife and 2-year-old daughter, despite the fact that I had my own apartment and did not have to pay rent. I did not die from hunger, but I had to spend a lot of nights translating commercial papers to and from English, or programming just for some extra money. Over here I am not a millionaire either, but at least I can spend all my time doing my job," says Sinogeikin.

In June 1994 Sinogeikin arrived on campus. He is currently working on the problem of the mineralogy of the Earth's mantle. "This is not exactly mineralogy because we are working mostly with synthetic high-pressure mineral phases. We start with physical properties of minerals—sound velocities, and compressibilities, for example—and are trying to apply them to geophysics to construct Earth's models," says Sinogeikin. "What we are doing is called mineral physics."

The challenge lies in trying to construct a model of something that cannot be observed directly. The thickness of the Earth's crust in regions where people can drill deep wells varies from 30 to 50

km. The deepest hole into the crust is less than 16 km. Obviously, the mantle cannot be studied by peering down a deep well.

However, the approximate composition of the mantle is

known to be mostly magnesium-iron silicates with some amount of calcium and aluminum. And it is also known from experiments which mineral phases are stable at temperatures and pressures of the Earth's interior and which

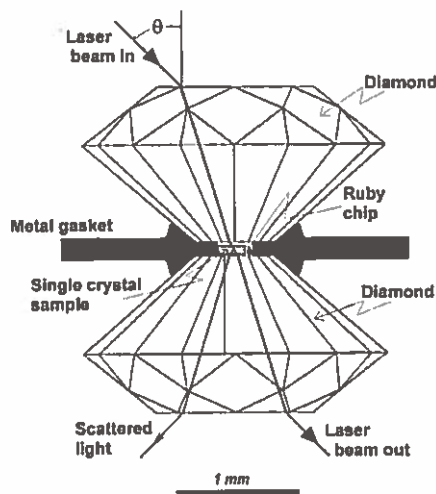
minerals simply cannot exist there.

"For example," Sinogeikin explains, "we cannot find quartz in the mantle because if you heat and squeeze it to temperatures and pressures found in the mantle

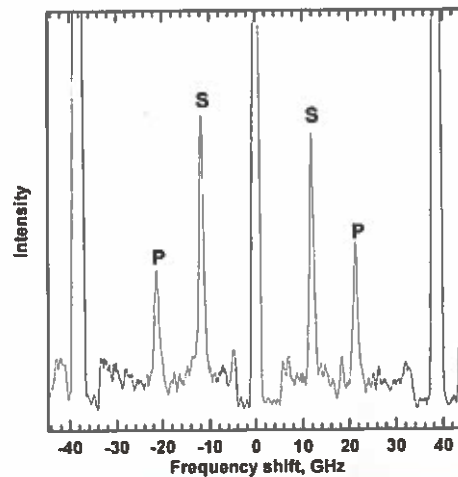


*To measure various properties of mantle minerals, Sinogeikin positions samples on the Brillouin system.*

#### Principle of diamond anvil cell



#### Typical brillouin spectrum of polycrystalline majorite



Two diamond anvils (left) have a metal gasket between them. The gasket has a hole (diameter 200 microns) filled with an alcohol mixture as a pressure transmitting medium. Small diameters of diamond tips allow the application of relatively small forces to obtain very high pressures, corresponding to 600-700 km depths inside the Earth. The ruby chip fluorescence is used to measure pressure inside the chamber. Focusing the laser beam on polished samples, Brillouin spectra are collected, which give direct information about sound velocities in minerals. The Brillouin spectrum (right) shows four peaks (denoted with P and S) which are symmetric with respect to the central Rayleigh peak. Frequency shifts from the peaks are proportional to sound velocities in the mineral and can be easily calculated for any experimental geometry.

it will go through phase transitions or dissolve in other silicate mineral phases. We can estimate pressures and temperatures in the mantle, but the problem is to figure out it's chemical and mineralogical composition."

As it turns out, Sinogeikin and others who are working on this problem start with a set of assumptions and constraints. First, it is assumed that the composition of the Earth should be similar to that of other planets of the Earth group, so one part of Sinogeikin's work is to study chunks of meteorites that have fallen to the Earth.

"After all, what are meteorites? At some time there was a big planet like Earth and it collapsed and these pieces of rock are traveling through space and sometimes they fall to the Earth.

Their composition is not absolutely the same as that of the Earth, but it must be pretty close. Plus it's possible that we can find mantle mineral phases which cannot be synthesized in a lab," says Sinogeikin.

Another assumption is made regarding xenolites, pieces of rock that were taken by rising magma to the surface of the Earth.

"For example," Sinogeikin explains, "we know that kimberlitic magma is generated at

a pretty high depth, say 100 kilometers, or even deeper. When magma travels up it can catch and carry pieces of rocks that are in its path and bring them to the surface or close to the surface. We can find these rocks, define their mineral and chemical composition and estimate pressure and temperature at which they were formed."

**At it's thinnest point,  
the crust of the earth is seventy  
kilometers deep. The deepest hole  
into the crust is only sixteen  
kilometers. Obviously, the mantle  
cannot be studied by peering down  
a deep well.**

Geologists also know the density and pressure of the Earth as a function of depth and have a good idea of the temperature distribution in the Earth.

"If we know that the chemical composition of most of the mantle is olivine and pyroxene, we can squeeze them to some pressures and heat them to some temperatures and see what phases they go through. We can observe these phases and say that a particular phase is stable at the depth, say from 410 to 530 kilometers," Sinogeikin says.

"The mineralogy of the Earth is

a very complicated puzzle, all components of which must fit together, otherwise you will not see the whole picture. A lot of research groups in the geological sciences are working on different parts of this puzzle. Our part in this collective work is to measure acoustic velocities, compressibilities, and other physical properties of possible mantle

mineral phases. Then we refer to all other available information to try to fit our results into the whole picture or to change this picture in a way that it fits better."

Sinogeikin acknowledges that, for now, there is no direct application for this knowledge.

"We are just trying to understand how the Earth works," he says. "Once we know how it works, we can manage it better. So far it is just pure science, for curiosity's sake. In the

future, however, there are likely to be many benefits, not the least of which may be the ability to predict earthquakes."

Once he has his doctorate in hand, Sinogeikin hopes to find a faculty position where he will be able to continue his research. But whether that position will be in the U.S. or in Russia is hard to say. Only one thing is certain, according to Sinogeikin: "I'm going to stay in science."



# Time Enough for Another Career: Patricia Lane

Sixteen years, three department heads, alumni by the hundreds. As administrative secretary for the Department of Geology, Patricia "Pat" Lane was the grease that made the wheel run until her retirement on June 30, 1996.

Previously a secretary in the Department of Civil Engineering, Pat replaced Ellen Abel as transcribing secretary for the geology department while John Hower was the head.

"There were many changes going on in the Department at that time," recalls Pat. "But even though it was in a transitional stage, I was glad I had made the move to geology because John was a supportive person to work for."

It wasn't long after Pat began working in the department that Hower told her she was to be responsible for writing the departmental newsletter. Pat had never edited a newsletter before, but she's also never been one to turn down a challenge. "I wondered how I was going to do it," she says, "but I was very gung-ho. If John said I should do it, then I was going to do it."

As editor of the newsletter, Pat corresponded with some of the alumni and talked with others on the phone, trying to keep up with their lives since they left the

University. She also attended social functions sponsored by GSA and AAPG.

Going to those events enabled Pat to meet alumni she would not have met otherwise. She recalls, "When I first started going to GSA

*"I've made a point, all my life, of doing the things I wanted to do when I wanted to do them."*

and AAPG meetings, invariably someone would make the comment, 'Oh, you are the new Rosa Nickell.'" (Rosa Nickell had been a long-time department secretary.) That link with the past was all that was needed for Pat to build a relationship with alumni she met. "I encouraged them all to keep in touch with the department."

John Hower's unexpected and tragic death in 1983 created new stresses for Pat. "That was an extremely disastrous event which of course threw the department into crisis, but it was also a very difficult time for me personally. John and I had become friends and his death affected me deeply."

Pat recalls, "Fortunately David Anderson, who had replaced John as department head prior to his death, was a very gentle man; perfect for that time when we needed a friend in the department

and a calming influence."

While working for Anderson, Pat upgraded to staff secretary and later to administrative secretary, her responsibilities steadily increasing. When Anderson stepped down in 1988, James Kirkpatrick became the new department head.

"With Jim came a new wave of transitions," recalls Pat. "He made some major changes in the way we were operating."

One of those changes, creating a position for an assistant head, meant that much of Pat's responsibilities changed as well. "Over the last seven years or so, I gradually evolved into a whole different kind of job. I guess I kind of redefined my role."

Retirement offers Pat yet another chance to redefine herself.

"I've spent the summer doing some remodeling at home," she says. "We've put new carpeting in the house, and," she smiles at this, "I'm trying to talk my husband into building a deck. He thinks perhaps he should get me another job so I stop thinking of things for him to do. We also have a new Shelty puppy named Murphy."

Pat hopes to continue doing some kind of part time or temporary work. "I am not and never have been a housewife," she notes. "I would be very afraid, if I did not get out and get involved in something, that I would become a hermit."

One of Pat's consuming passions is machine knitting. She owns three knitting machines and



*Pat says goodbye to friends and faculty members in the Department of Geology at Ned Kelly's Restaurant in Urbana. Among those who helped her celebrate were (from left to right): Jerry Magloughlin, Tom Anderson, Pat Lane, Eddie Lane (Pat's husband), Nancy Anderson, and Jim Kirkpatrick.*



is a founding member of the local machine knitter's guild. Still, don't expect to find her knitting away in solitude. "Knitting machine groups have a tendency to be fond of traveling to knitting conferences around the country. I've often joked about the fact that

I don't knit much, but I travel a lot."

Pat looks upon retirement as a chance to take advantage of new opportunities.

"I think one of the advantages of retiring as early as I am is that I have the time to start another career if I want to. My parents waited to retire until they were 65,

putting things off that they wanted to do, thinking they'd have time later. Well, my mother's health got bad, so there were some things they were never able to do.

"I've made a point, all my life, of doing the things I wanted to do when I wanted to do them."

# Alumni News

## Obituaries

**Robert M. Kosanke** died April 17, 1996, at the age of 78. He worked at the Illinois Geological Survey and taught at the University of Illinois from 1943 until 1963. He was a research geologist at the U.S. Geological Survey in Lakewood and continued there as Scientist Emeritus. A Fellow of the American Association for the Advancement of Science and the Geological Society of America, Kosanke received the GSA's Cady Award in 1989 for his outstanding scientific contributions and pioneering work in coal geology.

He is survived by his wife, two sons, and one granddaughter.

**James Baxter**, Ph.D. '58, emeritus chief of the Illinois State Geological Survey died April 14, 1996. He was 68. He is survived by a sister and three half sisters. Memorial contributions may be made to Temple Baptist Church, Champaign.

## Thirties

**Dalias A. Price**, A.B. '37, M.A. '38, writes, "I enjoyed the Spring 1996 newsletter and was amused at the items about me. I have not had a sex change in Denmark and still am a male. My first name has been a puzzle all my life but since it is a family name I have kept it now for almost 83 years! Also, please note the spelling of my last name."

Price continues writing and recently saw the publication of *Geography of Illinois*. He was one of other authors. Our apologies to Mr. Price, whom we formerly thought was Ms. Peice.

When we goof, we goof.

## Forties

**Robert J. Cordell**, B.S. '39, M.S. '40, retired as president of Cordell Reports, Inc. about ten years ago. The reports, which were marketed to oil and gas companies, dealt with the geology and hydrocarbon potential of numerous regional areas. Since his retirement, Cordell has written his autobiography, about 125 essays, and narratives of the 18 foreign tours he has taken. He and his wife, Fran, continue to enjoy playing bridge and attending symphony concerts. They have three children and five grandchildren.

**Paul K. Sims**, A.B. '40, M.S. '42, will step down in November as president of the Economic

Geology Publishing Company, publisher of *Economic Geology*.

**Morris W. Leighton**, B.S. '47, named chief emeritus of the Illinois State Geological Survey when he retired, received a Gaylord Donnelley-Nature of Illinois Foundation Award in 1994. The award recognized Leighton for his significant scientific and conservation efforts in the state.

## Fifties

**Paul E. Schnurr**, B.S. '51, is recently retired after a long career in oil exploration. Upon receiving his masters degree from the University of Texas, Schnurr worked for Chevron Oil Corporation from 1955-1981 where he did offshore oil exploration off the coast of California. From 1981-1990 he worked as an exploration manager; first for Hrubetz Oil Company, and then for P.G. and E. Exploration Company. After that, he writes, "I did property evaluation for four years, and finally hung it up."

**Edwin A. Welge**, B.S. '51, former supervising oil and gas engineer for the Kern Co. is now retired and doing part-time consulting work.

**W. F. "Willy" Weeks**, B.S. '51, M.S. '53, currently professor of geophysics (glaciology) at the University of Alaska in Fairbanks, Alaska, has received the 1996 Emil Usibelli Award for Excellence in



Research. He was cited for his work in advancing understanding of the behavior of the world's sea ice covers. The \$10,000 award honors the memory of Emil Usibelli, founder of the Usibelli Coal Company. Weeks retired in June 1996 and has since moved to Portland, Oregon where he is working on a book about sea ice.

**Robert L. Brownfield**, M.S. '55, is currently a graduate student at the University of Iowa.

In the spring issue of *GeoSciences* we mistakenly reported that **Richard M. Winar**, B.S. '53, M.S. '55, lived in Waterford, Michigan. He and his wife Lois live in Auburn Hills, Michigan.

**Allen S. Braumiller**, M.S. '57, retired in March as vice president of exploration at Helmerich and Payne, Inc. Since then he and his wife, Patsy, have founded Braumiller and Braumiller, Inc., a gas and oil exploration company which also does archaeological exploration.

**Paul F. Karrow**, Ph.D. '57, is a professor in the Department of Earth Sciences at the University of Waterloo. He is a member of the Quaternary Sciences Institute and

an associate of the Waterloo Centre for Groundwater Research. He teaches undergraduate and graduate quaternary geology; his current research interest is in unraveling quaternary history from many approaches.

In June 1995, Karrow was awarded the W.A. Johnston Medal by the Canadian Quaternary Association for professional excellence in Quaternary research.

**Henry S. Brown**, M.S. '54, Ph.D. '58, writes that after graduate school he taught for three years at Berea College in Kentucky. Then he moved to North Carolina State University where he was professor of geology and head of the Department of Marine, Earth and Atmospheric Sciences. Since his retirement in 1989, Brown has been a consultant for Geological Resources, Inc. Brown's wife, Wilda, teaches piano at Meredith College in Raleigh. Together they have five children and seven grandchildren.

**Philip E. Vierling**, B.S. '58, is retired after 29 years teaching general science, physical science, and earth science at Foreman High School in Chicago. Currently he pursues his avocation full

time—writing hiking and canoeing trail guides and historical publications on northeastern Illinois.

**Thomas W. Lynch**, B.S. '55, M.S. '58, J.D. Law '59, worked as an attorney in Tulsa, Oklahoma for 16 years. He and his family then moved to Dallas where he continued to work as an attorney in the oil business until his retirement last year as vice president and general counsel for Oryx Energy Company (formerly Sun Exploration and Production Company).

## Sixties

**Robert Luce**, M.S. '62, currently works for The Hydrodynamics Group, a consulting company he co-founded in 1995 with fellow alumnus **John Bredehoeft**, M.S. '57, Ph.D. '62, and five other scientists and engineers. The Group specializes in ground and surface water studies, environmental investigations, and remediation.

**Douglas Mose**, B.S. '65, teaches environmental science and chemistry courses at George Mason University. He is also CEO of the Association of Environmental Professionals, Inc., which directs activities of investigative staff, primarily during investigations of air, water, and soil. Mose offers this insight: "The 1990s appear to be an interval of more intense student activity, in terms of academic effort. Geology majors who succeed have obtained chemistry and/or biology degrees before, during or after receiving their geology degree. As an educator and an employer of science students, single-major graduates

*GeoSciences* is for alumni and largely about alumni. Please take the time to complete and return the information form at the end of this issue. Just as you like to read about classmates and other alumni, they'd like to know the latest about you. Your news is important to them and to us in the Department. Send along a recent photo, too, but let us know if you want it returned.

The class notes are divided by decade. Those who were affiliated with the Department during part of one decade through to the next are listed according to the last degree received. Within each decade, items are listed in yearly sequence, not alphabetically.

(undergraduate and graduate) cannot match the qualifications and experience of the increasingly common dual-major students."

**Joseph E. Nadeau, B.S. '65**, has been named vice chair of the Northeastern Section of the Geological Society of America. His scientific specialization has been sedimentary and water mass chemistry, with field studies focused on Bermuda and the Caribbean. He also serves as vice chair of the board of the New Jersey Marine Science Consortium.

**Charles H. Norris, B.S. '69**, started his own business in March 1996. Geo-Hydro, Inc. performs consulting tasks in geology and hydrogeology to mining, energy, and environmental industries. In May his son Aaron graduated from the University of Colorado, and his daughter Stephanie from Denver South High School. "This leaves me sharing the house with only three other carbon-based life forms," he writes. "All four-legged."

## Seventies

**Chang L. Lin, Ph.D. '70**, is president of Canlin Trading and Consulting, Ltd., an organization dedicated to the promotion of bilateral cooperation in Asia Pacific regions. In March 1996, Lin retired as assistant deputy minister of the Department of the Environment in Nova Scotia after 26 years of service.

**John Nelson, M.S. '73**, currently works for the Illinois State Geological Survey. Nelson also serves as crew chief for a Champaign-Urbana group that sets off community displays for fireworks companies.

**Andrew M. Gombos, Jr., M.S. '74**, currently works at Exxon Exploration Company in Houston, Texas. He was transferred there in October 1995 after nearly 18 years at Exxon Production Research Company. "I am classified as an exploration geophysicist, which should surprise those who know me as a paleontologist," he writes. "I am interpreting 3D seismic data from our field in Chad, Africa. Quite exciting and interesting work."

**Mike Kirby, B.S. '79**, is pursuing his doctorate in hydrogeology at Western Michigan University. His research focuses on the transport of nitrates in the vadose zone and improved agricultural management practices to reduce nitrate contamination of ground water. Kirby is teaching courses in physical geology and environmental earth science. He is a certified professional geologist with AIPG and a registered professional geologist in Tennessee. He is also a registered monitoring well and pump installer in Missouri.

## Eighties

**John L. Shepard, M.S. '80**, is now area manager for the Eastern Gulf Coast Region of Shell Oil Company and is based in New Orleans. Most of his work deals with offshore plays and includes some major discoveries.

**Becky Birch, B.S. '81**, writes that she has left Melbourne, Australia to accompany her husband Wayne Mudge on his three-year "foreign" assignment with Exxon in Houston, Texas.

**Larry Smith, B.S. '89**, has accepted a tenure-track position with the Department of Geography at UCLA. His research demands there will include synthetic aperture radar (SAR) remote sensing of melt processes in arctic Russia. He earned an M.S. from Indiana University in 1991 and a Ph.D. from Cornell University. While at Cornell he was voted most outstanding graduate student, he was a NASA GSRP Fellow, he presented an AGU outstanding student paper on the subject of hydrology, and he received the GSA Fahnestock Award. Smith has published papers on SAR remote sensing of rivers and glaciers and wavelet analysis of streamflow records.

## Nineties

**Christopher A. Hedlund, B.S. '90**, is a graduate student at Colorado State University. He received a 1996 Grant-in-Aid from the American Association of Petroleum Geologists Foundation.

## RE M I N D E R

You can send your update for the  
Alumni News section  
via e-mail: [geology@uiuc.edu](mailto:geology@uiuc.edu)

# Let's Keep In Touch

Please take a few minutes to let us and your classmates know what you've been doing: promotions, publications, election to office, marriage, parenthood, moving, awards. We'd all like to hear from you. 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](mailto:geology@uiuc.edu).

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Other news you would like to share \_\_\_\_\_

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Your comments on the alumni newsletter \_\_\_\_\_

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