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Indiana University College of Arts & Sciences Alumni Association

# HOOSIER GEOLOGIC RECORD

Alumni Newsletter of the Department of Geological Sciences



Winter 2001

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**Editor's note:** We urge alumni and friends to send us prints, photos, or slides that would interest our readers. Please be sure to provide a complete caption and label the material with your name and address so that it can be returned. We can't promise to include all submissions, but we can promise to return them.

## Chair's greeting

# Challenges build opportunities!

**A**s we draw near the end of our historic endowment campaign, we continue to build on the momentum established by the Advisory Board, our alumni and friends, and former Chair **Lee Suttner**. It is no exaggeration to note to all of you that our department was elevated to historic levels by your collective efforts! "Thank you" seems so completely inadequate to express our collective feelings for your help and support. Being in the unusual position of both alumnus and faculty member, I find myself both proud of our accomplishments and humbled by the magnitude of support from our friends and alumni. We especially will need all of your support in the next few years as we move forward in a challenging financial climate for the university as a whole, and the College of Arts and Sciences in particular. We view these challenges as significant opportunities to advance the Department in particular, and geological sciences in general.

Although we have had a number of highly qualified candidates for faculty positions in the Department, we have nonetheless struggled to land them. We made an excellent offer to an extremely highly qualified candidate for a position in geophysics in the Department. However, because the candidate wanted to stay closer to the Northeast, an offer from another university was chosen over ours. By now, many of you know that we offered the Shrock Professorship to one of the more highly regarded sedimentologists in the world. However, that person's home institution made an even more lucrative counter offer. Consequently, the Shrock Professorship still remains unfilled. We also made excellent offers to two individuals in biogeochemistry and stratigraphy, but their home institution also countered these offers successfully. These successful counter offers (particularly lucrative ones, I might add) from other universities indicate two things to me: The climate for hiring at more senior faculty levels is very severe for departments everywhere; and we have been identifying really good people who are in high demand at some of the best institutions in the country.

All of which brings me to the main challenge that faces us: The College of Arts and Sciences has a tight financial situation at this time, and probably will for the next few years. The reasons for this are varied, but the effect on the Department is singular — we must prioritize our faculty hiring

attempts and spread them out over the coming few years. The new dean of the College, **Kumble Subbaswamy**, has scaled back all previously agreed-upon search authorizations in order to balance the College's budget and to increase the salaries of the long-standing, loyal faculty at our institution. Moreover, despite the presence of professorships and chairs within our department and other departments, the university must cover the salaries and start-up funds of these people. For senior-level hires, this is a significant amount of money, especially for the extremely well-respected and productive senior-level hires we seek for our department.

Our geological sciences faculty had its first retreat in a number of years (I'm told that **Bob Dodd** was chair during the last retreat) on Sept. 15, 2000, at the Seasons Lodge in Nashville, Ind. All faculty and research staff who were in the country attended. Our discussion centered primarily on the issue of department direction and faculty hires, with respect to several issues:

- Our collective views on where geoscience research likely will go in the coming years;
- Opportunities for connectivity and interdisciplinary research between Geological Sciences and other departments on our own campus;
- Employment prospects for our students;
- Enhancement of national recognition; and
- Changes in the financial outlook of the College of Arts and Sciences.

The timing of our faculty retreat was perfect for us to collectively address these issues. The dean has charged us with the responsibility of putting forth a plan for faculty hires in the context of a department plan for the future. This was the main topic of our retreat, which was very successful. The short message is that we are now searching for two positions this year: the Malcolm and Sylvia Boyce Professorship (which will be in hydrogeology) and a junior-level faculty position in geophysics. Both ads have been out for some time, both have been extended, and we have numerous qualified applicants who have expressed an interest in each. We will make an effort to work with the College on a third hire for this year. For next year, we will ask for permission to fill the Murray Chair in Clay Mineralogy and one of our vacant professorships. More hires will follow, but the number per year likely will not exceed two.



Christopher Maples

By spreading out our planned hires over the coming years, we will accomplish three goals. First, we will show a team approach toward working with the new dean of the College and support his mission of balancing the College budget while instituting fundamental changes in the College as a whole. Our department feels that support of our new dean is extremely important at this critical stage in his tenure here. Moreover, we are certain that we will have numerous opportunities to continue to build on the reputation of our department and put forth a strong case for support from the College. We are certain that we will be able to build a case for money that is put into our department being an investment in the College and IU as a whole. Dean Subbaswamy is the third dean of COAS with whom I have worked since I arrived here two years ago! We really look forward to stability in this critical university post and plan to build upon the warm relationship already established. Second, by limiting the number of hires per year, we will increase our chances for successful completion of the searches and addition of new faculty. Because of the costs involved with salaries and start-up funds, such searches can be large financial obligations to the College. By spreading out these obligations, we are more likely to be able to make better offers, which means that we are more likely to be successful in these searches. Finally, by spreading out these searches, we will have an opportunity to allow new faculty to participate in the hiring process and have some influence in the Department's future. We welcome these new ideas and perspectives and will do our utmost for new hires to be a part of the process as quickly as possible.

One of the areas that I hope to pursue with hiring in the future is in the area of geoinformatics (generally, one can consider geoinformatics as the study of how to get

(continued on page 2)

## Owen Award goes to Nevers

In October 2000, the Richard Owen Award, which honors a graduate of the Department who has distinguished himself or herself in industry, government, or academia, was awarded to **George M. Nevers**. George received his master's degree in geophysics from IU in 1957, studying under Jud Mead. He has had a long and exemplary career in the oil and gas industry and recently retired after 40 years with worldwide experience. Before joining Coastal Exploration, where he served five years as president of the Exploration-Production Division, George spent 11 years with Chevron and three years with King Resources as an exploration geophysicist. At the time of his retirement, George was

president of Garnet Resources Exploration Co., a publicly-held company limited to exploration outside the U.S.

George Nevers has played a truly major role in the initiation and successful completion of the Department's \$5 million endowment campaign. He concluded his many years of active service for the Department as president of the Advisory Board and chief fiscal advisor and unofficial accountant for the campaign.

On Oct. 23, 2000, Nevers received the Owen Award and presented the Richard Owen Lecture, which was titled "Is There an Oil Field in Your Future?" Following his address, a reception was held for George and his wife, Peg.



George Nevers, left, is presented the Richard Owen Award by Chair Chris Maples in October 2000. In the background is an oil portrait of Richard Owen.

## From the chair

(continued from page 1)

the most out of geoscience data irrespective of its origins). We live in a data-rich world, one that is obsessed with huge amounts of archival and newly generated data, one that increasingly deals with terabytes of data per day. In my estimation, a major area of future research in geological sciences is in the field of geoinformatics. It really does not matter what area of geological sciences one is in with regard to geoinformatics, as long as large data sets are the norm and not the exception. Examples include remote sensing and hazards monitoring but clearly are not limited to these areas. Why now? First, we have a unique opportunity to capitalize on the emergence of the new IU School of Informatics, which will be one block from our building. Second, biologists, chemists, physicists, engineers, and even business people are making great advances in their areas of study using very large, very diverse data sets that are combined in new ways. Third, IU already has a strong reputation in fields that are relevant to informatics approaches and issues. Geoscientists, as inherently interdisciplinary scientists with diverse sets of data, can assume leadership in database development and assimilation. We have a chance to establish one of the first such areas of study in the United States and build on already established and newly developing connections on our own campus.

Our department has had some personal losses during the past year. As I reported in last year's *Hoosier Geologic Record*, shortly after last year's Advisory Board meeting, long-time friend of Geological Sciences and Advisory Board member **Daniel Tudor** died. We now have an annual colloquium in honor of Dan Tudor. Tom Schull, of

Chevron, delivered the inaugural lecture. We also recently lost our friend and Advisory Board member **Jerome Thornburg**. We will miss both Dan and Jerry greatly in the years to come. **Charles Vitaliano** also died this past year. As many of you know, Dr. Vitaliano was one of the founding fathers of the Judson Mead Geologic Field Station. His influence on the Department and its history has been most significant. He too will be missed greatly in the years to come.

Last year, we decided that increasing faculty salaries was an extremely high priority for our department. We began this calendar year near the bottom of the Big 10 and near the bottom of all the departments in the College in average faculty salaries. It will take several years and large percentages of salary increases to rectify those situations completely. However, we took some steps within the Department to help ourselves. Our moves did not go unnoticed at the dean's level, and although we are a long way from finished, we did make some significant headway. In addition, we were able to immediately fill the research scientist position vacated by **Michael Dorais** with another research scientist, **Chusi Li**. Dr. Li has an extensive publication record, much of which in recent years has been collaborative with our own **Ed Ripley**, among other distinguished scientists. We also have been able to replace support staff as vacancies occur, which is not the case for every department in the College. I also should note that the number of students in our introductory courses continues to increase because we adopted the philosophy some years ago of putting some of our best lecturers in these courses. Other highlights and successes include the continued presence of **Lisa Pratt** in the College as a half-time associate dean for science, a

successful recruiting year for outstanding new graduate students, increased grant success for our department as a whole, continuing excellent relations with the Indiana Geological Survey, and increased support and recruiting visits from potential employers of our graduates.

Many of the challenges that face us might seem insurmountable were it not for the quality and enthusiasm of our faculty, staff, and students. With challenge comes opportunity — we are able to face the one and create the other because of your support. Our endowment campaign has given us the flexibility to support students and research and build for our future. I think it is safe to say that your generosity has been directly responsible for putting us in an unprecedented position of success on our own campus. We owe all of you more thanks than we can adequately express! I continue to feel extremely privileged to be a part of a growing department with such dedicated students, faculty, staff, friends, advisors, and alumni.

I will close by making the same offer to all of you this year that I made last year. As you read through the pages of our yearly update and take a moment to hearken back to your own experiences at IU, please keep one thing foremost in your mind: Our doors are open to you! We would love to see you, and I suspect that you would enjoy visiting with us. So, if your travels bring you in our general direction, or even if you want to make a special visit to Bloomington just to see us, please know that our door is open and we all await your visit. Sara and I express our deepest thanks to our students, staff, faculty, alumni, and friends! We welcome all of you to share in our excitement as we continue to build upon our rich past and embrace our future.

— Christopher Maples

## Around the Department

# Endowment campaign exceeds expectations

In April, 1996, the Department, with the counsel and support of its Alumni Advisory Board, dreamed what then seemed like the impossible dream — creating a \$5 million endowment in five years. The publication of this magazine marks the fifth anniversary of this important date in the history of the Department. It is with great pleasure and even greater gratitude to our alumni and friends to report again on the remarkable success of the campaign. As of July 2000, we could confidently project that the total of pledges, gifts, and matching equivalents from the university administration will exceed \$8,400,000. Already, more than 90 percent of all pledges have been paid. Although the total amount contributed to the Department is truly impressive, just as impressive is the number of individual donors who have been part of this wonderful story of success. In the three-four years prior to the start of the campaign, the Department received on average about 150 individual donations per year, exclusive of those from corporations. In 1999, nearly 400 individual contributions were received, representing nearly 25 percent of our alumni. This is a staggering figure and certainly attests to the loyalty and good feelings so many of our graduates continue to have toward the Department. We take great pride in that recognition. And we extend sincere thanks and appreciation to all of you who have played such an important role in turning our impossible dream into reality.

What impact has this campaign had on



Yes, the Department needs your HELP. Neal Immega and friends arranged this photographic masterpiece of the Geology Building in the early '70s, and it's still true today — we all need a little help from our friends. Contact Lee J. Suttner, Director of Development, Department of Geological Sciences, Geology Building, Bloomington, Indiana 47405, or e-mail [suttner@indiana.edu](mailto:suttner@indiana.edu), for additional information.

the Department, even before its completion? In spite of the fact that the Advisory Board encouraged conservative use of the endowment-generated income until more growth had been achieved, the impact of the campaign has been felt in a number of ways. First and foremost is the administration's authorization for recruitment of new faculty in the Department, during a time of overall cutback in the average number of new positions authorized collegewide. The importance of this cannot be overestimated, given the shrinkage in size of the Department during the 1990s and the well-known correlation between faculty size and national reputation of an academic unit. But, in addition, faculty and staff are already seeing direct benefits from the endowment, exclusive of those directly

tied to the formal endowed positions. These represent a unique attraction for both new students and new faculty to the Department. In 1999, from the endowment income alone, student support in the form of scholarships, research and travel grants, and other forms of aid totaled more than \$22,400. Nearly \$7,000 was used to provide travel expenses for prospective graduate students to visit the campus, the most important activity in which we engage in our efforts to recruit new students. Faculty received travel and research support totaling more than \$11,000, and about \$3,100 was spent to bring in guest scientists for scholarly interaction with our students and faculty. Both faculty and students benefited from the purchase of new analytical and computational equipment valued at close to \$70,000. Being able to provide these levels of support to our students and faculty gives us a significant edge in our competition with other geoscience departments across the country.

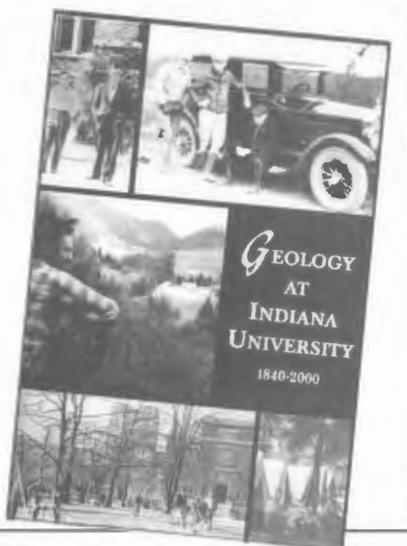
But we must build on this competitive edge by continuing to build our endowment. Although it will be some time before we will initiate another capital campaign of the magnitude that has just been completed, we are challenging you, our alumni, and ourselves to maintain an annual number of individual contributions of at least 400.

If you have been a loyal donor throughout the campaign, a lapsed donor, or a non-donor, please include the Department in your list of institutions to which you contribute an annual gift.

— Lee J. Suttner

## Department history available

Emeritus Professor N. Gary Lane was honored at a champaign and cheese reception on Sept. 4, 2000, on the occasion of the publication of his book *Geology at Indiana University, 1840–2000*. The book can be purchased from the Department of Geological Sciences for \$21.50 (includes postage). Checks should be made payable to the Indiana University Foundation. Everyone in the Department extends their appreciation to Gary for his outstanding effort in compiling this monograph.



# Geoscience seeks to establish research preserve at IU

Geological Sciences Professor Michael Hamburger and research scientist Bruce Douglas have taken a lead role in a campuswide initiative to develop a dedicated research and teaching preserve on or near the IU Bloomington campus. The academic effort grew out of a heated controversy that engulfed the campus and community for several months last year. The issue centered around the fate of the last piece of undeveloped land on the IU campus, a 500-acre parcel of land located adjacent to the existing university golf course and adjoining the city of Bloomington's Griffy Lake Nature Preserve. The debate was sparked by the administration's proposal to develop a golf course with private funding on the IU property. Hamburger and Douglas, among many other faculty members on the IU campus, expressed concerns about the proposed golf development, noting that the land might be suited to other uses more closely tied to the university's primary missions of teaching, research, and public service. Following a heated public debate that reached the national media, the IU trustees announced on Jan. 24 that they were abandoning the plan, and that the land, for the time being, would remain in its present condition. The long-term fate of the IU property, which includes highland meadows, steep ravined slopes, and a wetland area surrounding University Lake and the Sycamore Valley, remains undetermined.

As the controversy over the proposed development abated, Hamburger and Douglas worked to build a coalition of faculty interested in developing a dedicated preserve on or near the IU campus. The preserve, fashioned after such well-known research preserves as Harvard's Arnold Arboretum, Duke Forest, Stanford's Jasper Biological Preserve, and the University of Michigan's Nichols Arboretum, would serve the needs of growing field efforts in the natural sciences at IU. The goals of such a preserve would be "to foster teaching in the natural sciences and humanities, academic research in the geological, biological, and environmental sciences, and community outreach in environmental education." Such facilities provide a resource to enhance nontraditional teaching in the form of outdoor classrooms for field-based science courses at both the undergraduate and graduate levels. They can serve as natural laboratories for long-term research projects in ecology, botany, zoology, geology, meteorology, and environmental sciences. They can be

used as a focal point for arts and humanities courses dealing with environmental policy or artistic depiction of the natural world. They also provide an ideal venue for community outreach, fostering collaborations with elementary and secondary schools, community groups, and the university's continuing education programs.

Hamburger and Douglas have assembled an impressive coalition of 20-25 faculty, representing the College departments of Geography, Physics, Biology, Geological Sciences, and the new Environmental Science Program, together with the schools of Public and Environmental Affairs, Education, Journalism, Law, and Health, Physical Education, and Recreation. The team includes geological sciences faculty Noel Krothe and Greg Olyphant as well as John Steinmetz, director of the Indiana Geological Survey.

Rather than focusing solely on the Griffy watershed land, the group is taking a long-term approach, working to build broad university support for the initiative, identifying possible sites for a research/teaching preserve, developing criteria for choosing prospective sites, and communicating with directors of other university preserves to help guide the development of ours. The initiative has taken on new momentum with a unanimous vote of support from the Bloomington Faculty Council, support from the new dean of the College, and matching \$3,000 grants from the College of Arts and Sciences and SPEA. The group is already working with a group of student interns who have made considerable headway in the process. SPEA



A quiet scene from Griffy Lake — IU faculty and students hope to preserve the area for educational purposes.

environmental policy majors Annie Blackmer and Laura Hartman have extended a survey of other university preserves and are developing an extensive database of university preserves around the country. Geological Sciences senior Carrie Taylor and continuing studies student James Burkhardt began work on GIS (geographic information systems) coverage of four possible preserve sites near the IU campus, with much help from Alex Zlotin of the Indiana Geological Survey. University Division sophomore Lance Thurner compiled a preliminary bibliography of research on the natural lands near the IU campus.

The preserve initiative has big implications for Geological Sciences. It could provide a local research/teaching facility that offers hands-on science opportunities for a broad range and large number of undergraduate students similar to those provided by the IU Geologic Field Station in Montana. A preserve would provide the opportunity for a field research site for environmental geology projects. And it would offer the opportunity to introduce students, even in our large introductory science classes, to the methods of gathering scientific data in the field. In the words of our chair, Chris Maples, "Not only will such a preserve be a high-profile symbol of university/community relations, it will also be a model of interdisciplinary collaboration and incorporation of teaching, research, and public service. In essence, a teaching and research preserve will reflect the best of public higher education in a positive, thought-provoking way."

Looking for more information on the preserve initiative? Check out the preserve Web site at [www.indiana.edu/~preserve](http://www.indiana.edu/~preserve).

# Geophysics under way with collaborations, new projects

The geophysics group welcomed two new members to the family this year: post-doctoral associate **Bingming Shen-Tu** and graduate student **Shakir Shamshi**.

Bingming completed his PhD research at the State University of New York at Stony Brook, where his research focused on mechanisms of deformation in the active plate boundaries in western U.S. He has been working on a number of GPS crustal deformation projects with **Michael Hamburger** in central Asia, the Philippines, and the central U.S. Shakir is an experienced petroleum geophysicist from Xichuan province in northwestern China and will be working with **Gary Pavlis** and graduate student **Christian Poppeliers** on the Tien Shan geodynamics project.

The group also celebrates the completion of a number of graduate degrees: **David Millen** completed his PhD research on "Tectonics of the Northernmost Tonga Subduction Zone and a Comparative Study of Subduction Zone Terminations." He continues his research as a postdoctoral associate with the geophysics group and adjunct professor at Ball State and Indiana State universities. **Naomi Boness** completed her masters thesis, "Determination of Effective Elastic Thickness in the North American Craton and Rheological Implications for the Intraplate Lithosphere," and joined the graduate program at Stanford University in fall 2000. Postdoctoral associate **Tony Lowry** continues his collaborative research with **Michael Hamburger** and **Bruce Douglas** while starting in a new position as research associate in the Department of Physics at the University of Colorado.

Professors **Michael Hamburger** and **Gary Pavlis** continue to collaborate on a major research project on crustal deformation, seismotectonics, and crustal structure in the high Tien Shan mountains of central Asia. Hamburger's principal focus has been the application of Global Positioning System technology to measure minute movements of the earth's crust across this active mountain belt. Together with postdoctoral associate **Bingming Shen-Tu** and colleagues from MIT and the Russian Academy of Sciences, their work has demonstrated the principal cause of mountain building in the Tien Shan: rapid convergence between the Tarim Basin of northwestern China with the Kazakh Platform on the Eurasian plate. Pavlis has been involved in a collaborative project with scientists from UC San Diego and Rensselaer Polytechnic Institute to deploy a network of state-of-the-art broadband seismograph systems across the range.

Pavlis and Hamburger took part in an international conference on geodynamics of the Tien Shan, held in Bishkek, Kyrgyzstan, during early June 2000.

**Gary Pavlis** and students **Scott Neal** and **Christian Poppeliers** have been making some important advances in seismic imaging with P to S conversion of teleseismic body waves. They have developed new deconvolution and migration procedures for application to modern digital seismic arrays that show some promise for major improvements in imaging upper mantle structure. Migrated images of the P to S converted wavefield in a region in northwest Colorado show evidence for lithospheric scale discontinuity that separates the Colorado Plateau from the Wyoming Province. This feature is imaged to a depth of at least 100 km. This technology is likely to prove extremely important as an element of the continental scale array program (USArray) currently being proposed by the National Science Foundation.

**Michael Hamburger** also led a field research project on crustal deformation in the Wabash Valley seismic zone of southern Indiana, Illinois, and western Kentucky. Co-workers included graduate students **Vlad Rybakov**, **Cat Talbot**, and **Naomi Boness**; geophysics technician **Terry Stigall**; post-doctoral associate **Bingming Shen-Tu**; and IGS colleagues **John Rupp** and **Licia Weber**. The group returned with a few hundred megabytes of new GPS data, and a few hundred new chigger, tick, and mosquito bites — and a major poison ivy outbreak! Hamburger continues his work with volcanic data from Taal Volcano in the Philippines, together with grad student **Beth Bartel** and colleagues from the Philippine Institute of Volcanology and Seismology, including our own **Emmanuel Ramos**, MS'92, PhD'95. The project involves an innovative new technical development deployed in collaboration with geophysicists from the University Navstar Consortium. The system involves use of low-cost single-frequency GPS receivers that can be deployed in dense networks around active volcanic systems. **Scott Neal** continues his research with **Gary Pavlis** while working full time as a research geophysicist at Chevron U.S.A. in New Orleans. Graduate student **Shannon Jock** is working with Pavlis and **Noel Krothe** on a geophysical investigation of a toxic waste landfill near Bloomington. We're pleased to report that the Chevron Geophysics Fellowship has returned to IU, following a couple of year's hiatus. This year's fellowship has been awarded to

**Christian Poppeliers**, following (coincidentally!) his successful summer internship with Chevron U.S.A. in Houston last summer.

As reported in last year's magazine, Pavlis and Hamburger continue to collaborate on the geophysics outreach program, the Princeton Earth Physics Project, which brings state-of-the-art seismic instrumentation into the classrooms of America's high-school physics and earth science students. Through the extraordinary efforts of geophysical technician **Terry Stigall**, their work with 20 high schools throughout Indiana continues to be highly successful, and IU remains the national instrumentation center for the PEPP program, supported by major grants from the National Science Foundation and the Incorporated Research Institutions for Seismology.

**Al Rudman** continues to work on collaborative research projects with the geophysics group and was brought in from retirement to teach his famous "geophysical time series" course last spring. He continues his studies applying geophysical methods in mapping fracture patterns in the near surface.

**Bruce Douglas** continues his long-term investigation of the rheological properties of the lithosphere using piezometric studies of mantle xenoliths. One ongoing study involves determination of the stress within the overriding lithosphere during subduction. This work involves using mantle xenoliths collected from Quaternary lava flows from the southernmost Chile Rise and modern seismicity patterns to constrain the rheological properties of the South American lithosphere above a 1,000 km portion of the Chile Trench. The seismicity work is being done in conjunction with **David Millen**. The region includes that portion of the trench where the Chile Rise is being subducted, which provides a natural perturbation to steady state subduction, critical for constraining key parameters. Douglas is also involved with **Tony Lowry** in a related project designed to constrain the rheological properties of the Western United States using piezometric analyses of xenoliths and long-term isostatic response studies. Other ongoing work is focused in the normal fault basins of southwestern Montana. These basins are experiencing present-day extension. This study involves detailed structural mapping and potential field investigations.

Closer to home, Bruce is working with **Cheryl Munson** from the IU Department of Anthropology in a study of the Hovey Lake archaeological site in Posey County,

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# Hydrogeology students stay active in various projects

The hydrogeology group, under the supervision of Noel Krothe, has been active over the last couple of years. Noel was on sabbatical leave during the spring semester 2000. He lectured and conducted isotope research at the Geothermal Institute in Auckland, New Zealand. Steven Loheide, a graduate student in the Department, went to Auckland for two weeks to assist in the sampling of thermal springs. Noel also spent several weeks in Sydney, Australia, at the University of New South Wales.

The hydrogeology group is currently funded by several grants. These projects include a nitrate study of an outwash aquifer in Jackson County (IDEM); a contaminant transport study in the karst aquifer at Spring Mill State Park (IDEM); a contaminant study of waste by-products in the Beach Creek aquifer, Crane Naval Base (USN); and a statewide pesticide study of groundwater in Indiana (IDEM).

Graduate students are also active in other nonfunded research projects.

The origin of mineral spring waters and their dissolved constituents in southern Indiana is being studied by Steve Loheide and Dana Cannon. Oxygen and hydrogen isotopic signatures are consistent with that of local, modern, meteoric waters. Sulfur

isotopic signatures demonstrate that the likely source of the sulfate is a gypsum layer known to exist in the Blue River Group. These results indicate that groundwater flow is caused by topographically driven convection cells. Meteoric water infil-

trates in the Crawford Upland and the Mitchell Plain and percolates through to the Blue River Group carbonates. In the Blue River Group, flow occurs through fractures and conduits to depths of 400 feet (120m), where evaporites are dissolved and the waters attain their mineral characteristics.

Kenneth Arroyo is in the process of writing his thesis, titled "Determining inflow beneath a landfill using a fracture trace, very low frequency (vlf), and geothermal analysis in Bloomington, Ind." During his stay at Indiana University, most of his research has involved groundwater flow in a karst terrain. His research has been conducted at the Lemon Lane Landfill, currently undergoing remediation. During the late 1950s to the late 1970s, polychlorinated biphenyls were disposed of at the landfill by the former Westinghouse Corp. Lemon Lane Landfill is situated on Mississippian carbonates that are easily dissolved and form what is known today as karst. Groundwater flow in karst can be unpredictable, making it difficult to determine contaminant transport pathways and methods of remediation. Arroyo is investigating locations where groundwater could be entering the landfill and flushing out PCB contaminated soil and water.

Bryan Motzel is working on a joint project with the Indiana Geological Survey and the Department. His research site is located near Cortland in Jackson County, Ind., along the East Fork of the White River. Bryan is addressing a nitrate contamination problem in a glaciofluvial aquifer in an area impacted with crops (that utilize nitrogenous fertilizers) and confined feedlots. Bedrock units are both the Devonian New Albany Shale and the Mississippian Borden Group. Sixty monitoring and domestic wells are sampled on a quarterly basis to monitor changes in



Dana Cannon and Steve Loheide sampling water at Trinity Springs.

nitrogen and sulfur isotopic values and nitrate and sulfate concentrations relative to fertilizer applications and seasonal fluxes in precipitation. Distribution of pesticides and trace metals is also being monitored.

Nitrogen isotopes are being used to fingerprint sources of nitrate in the shallow part of the aquifer. Sulfur isotopes are being used to determine sulfur influxes into the deeper part of the aquifer. Multilevel wells will be installed to address redox changes in the aquifer's saturated thickness. Denver Harper, of the Indiana Survey, is creating a GIS to display land use and agricultural chemical application rates and to visualize the results of continuous monitoring of precipitation, groundwater levels, and river stage.

Cat Talbot is using two groundwater flow models (GFLOW and MODFLOW) to characterize ambient flow patterns within the glaciofluvial aquifer underlying the Jackson County site. More than 30 pressure transducers were installed in monitoring wells to record changes in groundwater elevations. Pumping tests were conducted to measure aquifer parameters to be utilized in modeling efforts.

Jennifer Overvoorde is finishing her thesis on contaminant transport within a karst aquifer underlying the ammunition burning ground at the Crane Naval Base. Jen sampled karst spring waters to compare general and contaminant chemistry over the course of a major storm event. She is creating a three-component hydrograph to compare the percentage of discharge originating from the vadose zone, epikarst storage, and precipitation.

Mark Buchler is finishing a thesis on a joint project with the Indiana Geological Survey. His site is located in the Spring Mill

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## Geophysics

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Ind., a site containing four villages of the Caborn-Welborn culture (AD 1400-1700). This work involves the use of ground-penetrating radar to image cultural disturbances in the subsurface related to village life and dwellings. GPR surveys are being done in conjunction with test excavation blocks to develop a noninvasive tool for archaeological investigations.

Bruce continues to split his time between Geological Sciences, the Geologic Field Station, and the growing Environmental Sciences Program. He and Mike Hamburger are collaborating on development of a preserve for research and teaching on the IU campus (see page 4).

The geophysics group is celebrating the successful initiation of its new undergraduate geophysics option. The first three geophysics graduates have moved on in their careers: Mark Panning is in the PhD program at UC Berkeley, while Amy Tieman and Adam Haulter are at the University of Washington in Seattle. Adam is in the geophysics graduate program, while Amy works as a research technician in the seismology group at UW.

## Owen Memorial Room gets facelift, thanks to many

With major efforts from faculty (active, retired, and research scientists), the Owen Memorial Room — donated to the Department by the Owen family of New Harmony, Ind., some 40 years ago — has taken on a beautifully restored appearance. The main room, kitchen, and restroom now have their floors sanded and sealed, walls, ceilings, and doors painted, wood trim added to doors, book cases constructed, and window dividers and treatments added. Especially substantial contributions of time, money, and labor were made by Jim Brophy, Arndt Schimmelmann, and Bob Dodd. Others providing help included Abhijit Basu, Simon Brassell, Bruce Douglas, Erika Elswick, Gary Lane, Chris Maples, Lee Suttner, and Dave Towell. To celebrate the restoration of the Owen Memorial Room, a dedication party was held in the room on Sept. 12, 2000.

Owen Memorial Room  
and detail of molding



## Hydrogeology

(continued from page 6)

Lake drainage basin in south-central Indiana. A two-year project was initiated in July 1998 to determine baseline nonpoint-source contamination levels of the Spring Mill Lake drainage basin. Dye trace investigations were conducted to further delineate the drainage basin into subwatersheds. A GIS database was prepared that incorporates the delineated drainage basin with locations of mapped cave passages, groundwater contours, property boundaries, and land use information. Water sampling was conducted quarterly for two years at six spring discharge locations within the Spring Mill State Park. In addition, storm-event sampling at two major discharge points within the park was conducted. The combined sampling efforts monitored suspended solids, specific conductance, temperature, field pH, dissolved oxygen, coliform bacteria, pesticides, major ion chemistry, trace elements, and sulfur and nitrogen isotopes.

Several students in the group received departmental and national awards in 1999 and 2000.

**Mark Buehler** received the 1999 Patton Award. His research topic was "The Source and Fate of Sulfate from Whistling Spring, Spring Mill State Park." **Steve Loheide** received the Austin Sarten Best Poster



Students attending the G551 field trip to Mammoth Cave National Park were, from left, Judith Thomas, Sue Riegsecker, Jennifer Overvoorde, Bryan Motzel, Dana Cannon, Shannon Jock, and Rebecca Lloyd.

Award for the SGE session at the 1999 GSA meeting in Denver. **Dana Cannon** received the Department of Geological Sciences Indiana University Rawles 2000 Award for Outstanding Associate Instructor. Dana and Steve also received the 2000 John Patton Award, which has helped to fund their research on "The Origin of Mineral Spring Waters in Southern Indiana."

Recently, the Department has designated that the Boyce Professorship will be

used for hiring a new professor in hydrogeology. The hydrogeology group is excited by this opportunity and the search process is well under way. Interviews began prior to the receipt of this magazine. It is desired to hire an experienced hydrogeologist with interests in basin-scale mathematical modeling who will interact with faculty and students in other areas of the Department, such as sedimentology, geophysics, and biogeochemistry.

# Wonderlab Family Fun Fest

2000

In September 2000, the Department and Indiana Geological Survey participated in an unusual science outreach event sponsored by Wonderlab, Bloomington's highly successful and popular museum of science and technology. The event, a science expo called "Family Fun Fest," held at the Monroe County Fairgrounds, also served as a fund-raiser for Wonderlab. It included a large number of hands-on science expositions on a variety of topics from health to technology to earth science. Michael Hamburger of the Department and Todd Thompson of the Survey were the major organizers for the earth science

exhibits and demonstrations. Fourteen graduate students, undergraduate students, and staff participated from the Department with formal exhibits in geophysics, paleontology, and hydrogeology. One observer noted, "I did not see one child who walked past who was not engaged



D Kenneth Arroyo demonstrates the simulation of underground leakage from storage tanks.



H Two participants in the Wonderlab Family Fun Fest discover with a microscope that fossils occur in sand from Lake Monroe.



B Visitors examine a "hand-held seismometer" constructed by the IU geophysics group. The instrument demonstrates the inner workings of a seismometer, and allows kids to "make their own earthquake", registered on the drum recorder at left.

by the students. They went out of their way to attract children to the booths and entertained all questions with sincerity and enthusiasm from 9 a.m. to 4:30 p.m."

Geophysics was represented with a "see-through" seismometer (photo A) demonstrated by John and Allison Stigall, husband and daughter, respectively, of Geology electronics technician Terry Stigall. In the background of photo A is a computer movie display of global earthquake distribution. In photo B, two youngsters operate a hand-held seismometer.

The hydrogeology exhibit featured a groundwater flow simulator to demonstrate the movement of water in confined and unconfined aquifers. Kenneth Arroyo and Steven Loheide injected food coloring (to represent a contaminant) into different reservoirs that represented a



E Katrina Nell, right, asks kids to try to identify molds.

leaky lagoon, leaky underground storage tank, and injection wells. They were able to show how contaminants could move in an aquifer depending on where recharge was occurring as represented by the inverted containers in photo C.

In the case shown, recharge was on both sides of the left simulator. This caused the water (and green dye) to flow towards the river channel (the larger reservoir), demonstrating the principle of how rivers and water supplies sometimes are contaminated due to groundwater flow. In photo D, Kenny explains how underground storage tanks (for example, at a gasoline station) can leak and contaminate a drinking water supply.

The paleontology group organized a number of hands-on activities at the Fun Fest. In photo E, **Katrina Nell** asks kids to try to identify the various molds in three flats. Molds included leaves, nuts, berries, twigs, crinoids, and recent gastropods and clams. She also demonstrated how sometimes a mold can be tricky to identify by size and partial imprint. In another exhibit (photo F), youngsters used plaster-of-paris to make their own fossils as molds of real fossils. **Leigh Fall** (photo G) points out the tail trail and footprints of a reptile on a rock slab and how paleontologists use these trace fossils to understand extinct organisms. This led to the “Can You outrun a Dinosaur?” exhibit, where kids compared different



**A** John and Allison Stigall demonstrate the operation of a “see-through” seismometer.



**F** Katrina Nell, right, mixes plaster-of-paris in the “Make Your Own Fossil Exhibit.”

dinosaurs’ strides to their own strides. **Tom Olszewski** (photo F) shows children that fossils are all different sizes, and sometimes paleontologists have to use microscopes to see them. In photo H, two youngsters are looking at sand from Lake Monroe near Bloomington and are surprised to find tiny fossils. These included bryozoans, crinoids, and brachiopods. Other graduate students who assisted with the paleontology exhibits were **Warren Bigelow**, **Matthew Campbell**, **Russell House**, **Laura Slade**, **Natalie Uschner**, and **James Van Alstine**.



**C** Kenneth Arroyo, left, and Steven Loheide demonstrate a groundwater simulator.



**G** Leigh Fall, foreground, right, and Tom Olszewski, background, right, show trace fossils and microfossils to youngsters.

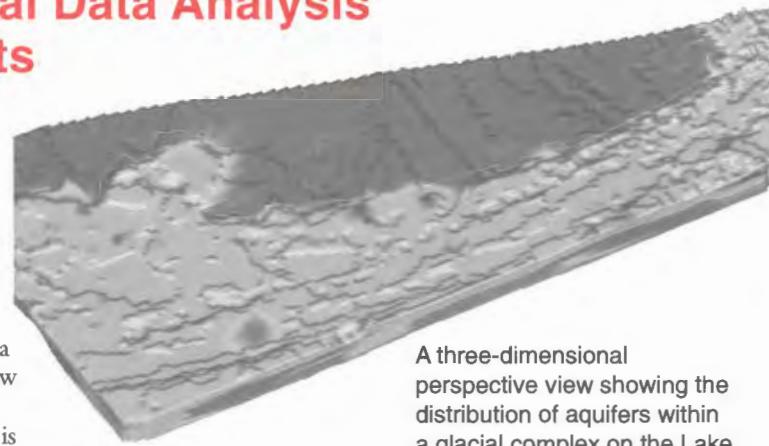
# New IU Center for Geospatial Data Analysis gets under way with projects

A proposal written by **Gordon Fraser** and **Greg Olyphant** to initiate the Center for Geospatial Data Analysis was approved by **George Walker**, vice president for research and dean of the University Graduate School, in 1998. The CGDA is housed in the Indiana Geological Survey, and **Edwin Hartke** serves as the administrative director.

There are two large laboratories. One, a computer and instrumentation lab, is in the Survey wing of the Geology Building and serves as a base for field operations. The other is in the Department wing of the building and serves as a computational laboratory. The computational lab (G522) also contains office space for a full time modeler (**Kevin Spindler**) and several graduate students. The CGDA, which specializes in hydrologic modeling, site monitoring using state-of-the-art electronic instrumentation, and Geographic Information System applications, has an intern program that has provided training and monetary support for six graduate students

and eight undergraduate students since its inception.

**Gordon Fraser** moved to Buffalo State University more than a year ago, so now virtually every CGDA project is supervised by **Greg Olyphant** and/or **Denver Harper** of the Indiana Geological Survey. Numerous grants and contracts have been obtained that amount to more than a half million dollars in external funding. Nearly all Center research is related to ground and surface water quality concerns. Research is under way on the effects of the reclamation of abandoned mine land using coal-combustion byproducts as structural fill and capping material. **Kevin Spindler** and **Greg Olyphant** are developing models to



A three-dimensional perspective view showing the distribution of aquifers within a glacial complex on the Lake Michigan rim.

visualize aquifer systems and groundwater flow in highly heterogeneous glacial materials. In fall 2000, work began with a team of researchers from the USGS to conduct hydrologic assessments aimed at evaluating the vulnerability of 6,000 non-community water supply systems in Indiana. The Center is also compiling multiple GIS coverages that show locations of features that may affect the decision to construct an interstate highway extension across part of the state. In addition, five years of research were recently completed on *E.coli* contamination in streams that discharge into southern Lake Michigan. Results of those studies can be previewed through the Lake Rim Web site at [http://129.79.145.25/indmaps/ims/lakerimmo/lakerim\\_front.html](http://129.79.145.25/indmaps/ims/lakerimmo/lakerim_front.html). Additional findings will be reported by **Judith Thomas**, who is completing her master's thesis research on aspects of the problem.

## Egyptian visiting scientists spend time at IUB

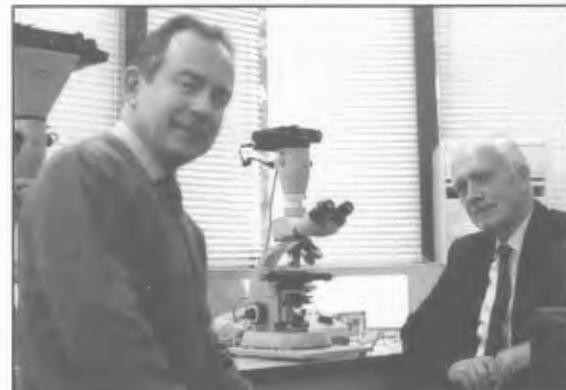
**Samia Mohamed**, **Yasser Safouri**, and **Atef Ibrahim**, professors in different universities in Egypt, spent six months as visiting scientists in the Department, funded by the Egyptian Government. They were advised by professors Ripley, Schimmelmann, and Basu, respectively.

## Masters' fossil, mineral collection donated to the Department

The estate of **Bruce Masters** recently donated his valuable fossil and mineral collections to the Department and Geological Survey, respectively. Masters was a Hoosier native and received his doctoral degree in micropaleontology from the University of Illinois in 1969, following receipt of a BS degree from Valparaiso University in 1959 and an MA degree from the University of California in 1962. His professional career began with Humble Oil and Refining Co. from 1962 to 1969. He served on the faculty of Hartwick College in the position of chair from 1969 to 1974. Subsequently, he was employed as a micropaleontologist with Amoco Production Co., from 1974 to 1992, specializing in international study of Cretaceous and Cenozoic foraminifera.

Upon his retirement from Amoco, Masters moved to his grandparents' farm in Sullivan County, Ind., where he died on March 29, 2000.

The fossil collection consists of a wide variety of invertebrate, vertebrate, and plant fossils. Many specimens are of display quality, and a hallway display of some of the minerals and fossils has been arranged in the main lobby of the Department. When professors **Chris Maples** and **Gary Lane** met with Masters shortly before his death, he said that he had never purchased a specimen. All of his collection he either personally collected, or they were gifts from friends, or he obtained them by



Bruce Masters, left, with micropaleontologist Geoff Adams at the British Museum of Natural History, London, November 1990.

exchange. In addition to the specimens, the bequest included several large display cases. Sincere appreciation is extended to the Masters family for this valuable donation.

# Lectures and Presentations

## Colloquium Series 1999–2000

- Sept. 13, **Lindsey Leighton**, Indiana University: "A New Example of Predatory Drilling in the Paleozoic, and the Implications for Escalation"
- Sept. 20, **Evelyn Krull**, Indiana University: "Applications of Stable Isotopes to Paleosols: Selected Case Studies from Three Continents"
- Sept. 27, **Steve Hasiotis**, Indiana State University: "The New Swiss Army Knife of Paleontology and Sedimentology: Continental Ichnology and Its Many Utilities"
- Oct. 4, **Gerald H. Johnson**, College of William and Mary: "The Chesapeake Bay Impact and Its Lingering Effects" (Richard Owen Award Address)
- Oct. 11, **Bingming Shen-Tu**, Indiana University: "Deformation Kinematics and Seismic Hazards in the Western United States"
- Oct. 18, **Mian Liu**, University of Missouri, Columbia: "Extensional Collapse of Orogenes"
- Nov. 1, **Enriqueta Barrera**, University of Akron: "Deterioration of Greenhouse Conditions and Oceanographic Variability in the Late Cretaceous"
- Nov. 8, **William W. Hay**, Geomar, Christian-Albrechts Universitat, Kiel, Germany: "The Changing Salinity of the Ocean during the Phanerozoic — Effects on Climate and Life" (sponsored by the Institute for Advanced Study)
- Nov. 15, **Colin D. Sumrall**, Geier Collections and Research Center, Cincinnati Museum Center, Cincinnati, Ohio: "Phylogenetic Systematics — Exploring the New Paradigm with Echinoderms"
- Nov. 22, **Peter DeCelles**, University of Arizona: "How the Kinematic History of the Himalayan Fold-Thrust Belt Controls Seawater  $^{87}\text{Sr}/^{86}\text{Sr}$ "
- Jan. 25, **B. Clark Burchfiel**, Massachusetts Institute of Technology: "Evolution of the Tibetan Plateau Viewed from the Perspective of Eastern Tibet" (American Association of Petroleum Geologists Distinguished Lecturer)
- Feb. 4, **Knut Bjørlykke**, University of Oslo, Norway: "Relationships between Sediment Compaction, Fluid Flow, Overpressure and Oil Migration: Examples from the North Sea and Haltenbanken, Offshore Norway" (American Association of Petroleum Geologists Distinguished Lecturer)

- Feb. 14, **Volker Bruchert**, Max Plank Institute for Marine Microbiology, Germany: "Microbial Controls on the Stable Sulfur Isotopic Fractionation during Bacterial Sulfate Reduction"
- Feb. 28, **Robert H. Goldstein**, University of Kansas: "Fluids Trapped near the Earth's Surface"
- Mar. 2, **Toni Simo**, University of Wisconsin, Madison: "The Southern Australian Continental Margin: A New Model and Global Implications"
- April 19, **David Des Marais**, NASA Ames Research Center, Moffett Field, California: "Astrobiology Offers Perspectives on Our Own Biosphere" (Astrobiology/Extreme Life Seminar Series, sponsored by the departments of Chemistry, Biology, and Geological Sciences)
- April 20, **Jeroen Ritsema**, California Institute of Technology: "The Structure Inferred from Earth's Interior Inferred from Seismic Tomography and Waveform Modeling"
- April 24, **Taixu Bai**, Stanford University: "Geomechanics: What, How and Why?"
- April 26, **Jackie Caplan-Auerbach**, University of Hawaii: "Seismicity and Velocity Structure of Loihi Seamount from the 1996 Earthquake Swarm"
- May 1, **Chris Marone**, Massachusetts Institute of Technology: "Laboratory Derived Friction Laws and the Rheology of Brittle Fault Zones"

## Other presentations

- Sept. 7, **Robert Phinney**, Princeton University: "Some Recent Results on the Structure and History of the Sierra Nevada"
- Sept. 20, **Barbara Rassman**, Exxon Exploration Co.: "The Exxon Overview"
- Sept. 21, **Barbara Rassman**, Exxon Exploration Co.: "The Exploration Process at Exxon Exploration"
- Sept. 23, **Graham Oram**, Exmin Corp.: "The Controversy Surrounding the Question of Whether or Not Witwatersrand Gold/Carbon/Uranium Deposits are Truly Detrital in Nature or May Be Hydrothermal in Origin"
- Sept. 27, **Carole Rock**, Chevron Oil Co.: "Subsurface Characterization Technology in the Deep Water Gulf of Mexico"
- Oct. 18, **Thomas Cherian**, Schlumberger Oilfield Service: "Schlumberger Oilfield Service"
- Oct. 19, **Mian Liu**, University of Missouri, Columbia: "All the Goodies You

## Schull presents first Daniel S. Tudor Commemorative Lecture

On Oct. 5, 2000, Thomas J. Schull, MA'66, vice president of planning, evaluation, and business development with Chevron Overseas Petroleum Inc. presented the inaugural lecture of the Daniel S. Tudor Commemorative Lecture Series.

Tom Schull is the first person in this annual series, which will bring a highly distinguished speaker to the Department to present an address on the general application of geophysics to the exploration for natural resources. Schull, a native of Shelby, Ohio, obtained a BS degree at Whittenberg University in 1964 and followed this with an MA degree from IU in 1966. He joined Chevron in 1966 as a geologist and worked through various exploration assignments and management positions within the company.

From 1990 to 1992, he was general manager, exploration, with Chevron USA in San Francisco; 1992-1994, exploration manager, Gulf of Mexico, with Chevron USA in New Orleans; 1994-1996, general manager, exploration and technology, with Chevron Overseas Petroleum Inc. in San Ramon, Calif.; 1996-1999, general manager, asset management with Chevron Nigeria in Lagos, Nigeria; and 1999-2000, managing director, New Ventures SBU.

In October 2000, Schull was appointed vice president, planning, evaluation, and business development with Chevron Overseas Petroleum Inc. in San Ramon, Calif.

The title of Thomas Schull's lecture was "Geophysics in the 21st Century — A Major Oil and Gas Company's Perspective."

Can Get from a Simple Thermal Model of Orogenesis" (computer workshop)

- Nov. 22, **Peter DeCelles**, University of Arizona: "Evolution of the Himalayan Foreland Basin System"
- Feb. 9, **J. Robert Dodd**, Indiana University: "White Island and Lord Howe Island: An Active and an Ancient Volcano

(continued on page 12)

# Geologic Field Station Update

## Judson Mead Geologic Field Station going strong at 51

This past summer was, as usual, an eventful one at the Field Station. Throughout the course of the summer, we celebrated the retirement of two long-standing G429 faculty members, saw record-low enrollments in Option I, "broke in" two new faculty members in Option II, saw the return of a former long-time Option II faculty member as a "volunteer," suffered through one of the worst droughts and fire seasons in almost a century, and still managed to offer what are still unarguably the best field-based courses in geology and environmental sciences in the country.

Most important, this was the last year of teaching for both **Dave Towell** (Indiana University) and **Jim Meyers** (Winona State University). Between the two of them they represent 59 years of service to the Field Station. Their knowledge and expertise is irreplaceable, and they will be sorely missed. Because of their stature in the Field Station community they actually received two (!) retirement parties — one at the Field Station towards the end of Option I and the second here in Bloomington in early October.

Several factors have led to various changes in our Option II faculty. Last fall, **Paul Doss** (University of Southern Indiana), our specialist in hydrogeology, accepted the position of chief geologist of Yellowstone National Park. As a result, Paul

was not able to teach in G429/G429e this past summer. After a national search, we hired **Katie Kilroy** (Susquehanna University), who joined us as the new hydrogeologist. Unfortunately, **Dave Fastovsky** (University of Rhode Island), our specialist in sedimentology, was not able to return last summer. To fill this void we hired **Kathy Summa** (Winona State University) to be our new sedimentologist. With two new faculty members in Option II, one can imagine that a lot of scrambling was going on. To our great delight, **Tom Straw**, a former Option II faculty member and director, volunteered to help out for several weeks during this critical transition year. Anyone who knows Tom will appreciate the fact that not only did Tom bring desperately needed experience to the program, but he also brought one of the best repertoires of jokes, stories, and general



knowledge of Montana lore and history. Tom is eager to volunteer his services again next summer. We are eager to accept!

Both Options I and II had to struggle with one of the driest summers on record in Montana. For the first time, the Option I faculty and students had to contend with "Option II weather" (i.e., hot and dry) while the Option II faculty and students had to contend with furnace-like temperatures and eye-stinging smoke from several nearby forest fires. The Field Station was never in any danger of burning up, but some days the smoke was so thick that you could not see the top of Brownback Mountain from the Field Station.

On the academic front, we are once again struggling with low enrollments. After posting significant enrollment gains in both Options I and II during the past three years, we witnessed precipitous drops in both options this past summer. The rather bleak enrollment picture, coupled with the pending retirement of two of the remaining three faculty members in Option I, has put in motion a fundamental change in the academic program. Starting next year, there will be a single offering of G429/G429e. It will be offered during the current Option II time slot. **Sue McDonald**, the remaining Option I faculty member, will join the existing Option II faculty members. G329, Environmental Field Sciences, will move into the time slot formerly held by Option I of G429.

This past summer, as has been the case since the mid-1990s, **Melody Holm**, MA'77, has led a course at the Field Station called Geology and Ecosystems, a field

## Presentations

(continued from page 11)

in the Southwest Pacific: A Geologic Travelogue"

- Feb. 14, **Derek Fullerton**, Exmin Corporation: "Diamonds"
- Feb. 15, **Ron Seavoy**, Indiana University: "I. A Visit to the Grasberg Porphyry Copper Deposit, the World's Largest Gold Mine! II. Lombok — East of Bali: Active Mining and Reconnaissance"
- Feb. 29, **Robert H. Goldstein**, University of Kansas: "Importance of Reflux in Carbonate Diagenesis"
- Mar. 3, **Toni Simo**, University of Wisconsin, Madison: "Environmental Sedimentology"
- Mar. 10, **Steve Jaume**, University of Queensland, Australia: "Going Critical: The Dynamical Evolution of Earthquake Fault Systems"

- April 21, **Jeroen Ritsema**, California Institute of Technology: "How Different Are P and S Velocity Anomalies in the Deep Mantle?"
- April 25, **Taixu Bai**, Stanford University: "Fracture Spacing in Layered Rocks: A New Explanation"
- April 27, **Jackie Caplan-Auerbach**, University of Hawaii: "Song of the Volcano: Seismic and Acoustic Signals Detected by the Hawaii Undersea Geo-Observatory"
- May 2, **Chris Marone**, Massachusetts Institute of Technology: "Frictional Mechanics of Granular Material: Implications for Faulting"
- May 30, **Eliza Richardson**, Massachusetts Institute of Technology: "Characteristics of Human-Induced Seismicity in South African Gold Mines: Implications for Tectonic Earthquakes"

workshop offered by the National Minerals Training Office and the National Forest Service. This workshop has been so popular, not only among the participants, but also Forest Service administrators, that a second session was planned for August 2000. Unfortunately, the severe forest fires in Montana canceled those plans. The impact of the program has extended well beyond the Forest Service participants and into science education.

Following are excerpts from a letter that appeared in the October 2000 issue of *GSA Today*. It was written by Al Fleming, a high school teacher, who participated in the workshop after receiving the 1999 Outstanding Earth Science Teacher Award for the state of Illinois presented by the National Association of Geoscience Teachers. The GSA, through the John F. Mann Institute for Applied Geoscience, generously sponsored Fleming's participation.

"As the only teacher among this group of geologists, biologists, and soil scientists, it was exciting for me to see scientists modeling collaborative scientific investigative techniques consistent with many of the reform efforts taking place in science education. The purpose of Geology and Ecosystems was to examine the components of the area's ecosystems, with particular attention to the interaction of these components with respect to their geologic framework. During our group's week in the field, we modeled many of the collaborative approaches to science that I try to teach my students. We looked closely at the interplay between geology, soils, and vegetation. For me — someone who considered soils and plants a nuisance in examining the geology of an area — it was enlightening to have a botanist accurately predict soil and bedrock types based on plant distribution, or to hear a soil scientist explain why certain plants grew in an area based on the bedrock geology. By pooling our shared expertise and experience, we were able to develop a broader, fuller understanding of that particular region of the Rocky Mountains."

Fleming also stated that "the opportunity provided me with not only content knowledge in the natural sciences, but, more important, personal experience working with professional scientists. As a result of this experience, my own observations of how science is done in the field will have a lasting impact on my classroom instruction and,



Jim Meyers (with infamous "Dork" hat), left, Jim Brophy, and Dave Towell (prior to removing his moustache) at the end of their final summer of G429, July 2000.

consequently, make a real difference in my students' appreciation of science as a valuable human endeavor."

Finally, the Field Station is sorry to be losing the services of Candace Franz who has been the administrative assistant for the past three years. Candace is a PhD candidate in fine arts and was recently awarded two prestigious fellowships that will permit

her to study abroad. We are thrilled for Candace, but we will miss her. At the same time, we wish to announce that Cindy Hale is the replacement for Candace, and we welcome her into the Field Station family.

All-in-all, year No. 51 has been a good year, and we are already gearing up for No. 52.

— James G. Brophy

## Department of Geological Sciences faculty & staff

**Professors:** Abhijit Basu, Simon Brassell, James Brophy, Jeremy Dunning, Michael Hamburger, Claudia Johnson, Erle Kauffman, Noel Krothe, Christopher Maples (chair), Enrique Merino, Greg Olyphant, Gary Pavlis, Lisa Pratt, Edward Ripley, Lee Suttner, David Towell, and Robert Wintsch

**Part-Time Professors:** Henk Haitjema (SPEA), Brian Keith (Survey), Peter Ortoleva (Chemistry), Carl Rexroad (Survey), Jeff White (SPEA)

**Professors Emeriti:** Robert Blakely, J. Robert Dodd, John Droste, Donald Hattin, Norman Hester, N. Gary Lane, Judson Mead, Haydn Murray, Albert Rudman

**Visiting Assistant Professor:**

Michael J. Zaleha

**Research Scientists:** Bruce Douglas, Erika Elswick, Chusi Li, Arndt Schimmelmann

**Postdoctoral Fellows:** David Finkelstein, Tom Olszewski, Bingming Shen-Tu

**Librarian:** Lois Heiser

**Library Staff:** Dennis Scoville (technical services), Linda Stewart (circulation/reserves)

**Staff:** Kim Schulte, administrative assistant, chair's office; Patty Byrum, administrative secretary, chair's office; Amy Beatty, grant monitor/administrative support, fourth floor; Charlene Butler, grant monitor/administrative support, fifth floor; Ruth Droppo, senior office services assistant, third floor; Richard Gibson, resident manager, Geologic Field Station, Montana; DeAnn Reinhart, office services assistant, business office; Mary Iverson, student records; Cindy Hale, senior administrative secretary, Geologic Field Station; Clint Mahoney, computer systems manager; Terry Stigall, geophysics electronics technician; Steve Studley, manager, mass spectrometry lab

# Indiana Geological Survey Update

## Energy resources research

John Rupp, collaborating with the Business Research Center at IU and the Midwestern Regional Center for Global Environmental Change, conducted an investigation to summarize Indiana's energy consumption and energy reserves for the Indiana Department of Commerce. Topics covered in the study included energy consumption by fuel type (coal, gas, oil, biofuels, etc.), consumption by economic sector, prices of fuels, energy reserves, renewable energy, and energy efficiency.

Maria Mastalerz is continuing her research on the chemistry of Indiana coals and their petrographic and chemical characteristics, especially as they relate to

database, and converted to GIS coverages. These digital map databases are useful in assessing unused mineral resources, in determining areas at risk for subsidence, and in protecting ground water.

In cooperation with the Oil and Gas Division of DNR, Charles Zuppann and Neal Schroeder are developing a petroleum well records database management system. The system is being designed to facilitate oil and gas data exchange between the two organizations and will provide certain well data to the public via CDs and the Internet.

A new investigation is under way by Maria Mastalerz to assess the significance of isotopically labile organic hydrogen in

strategy based on the unique finite element basin simulator developed at IU by the Laboratory for Computational Geodynamics. The project will integrate basin simulation with seismic and other data and is expected to predict the location and yield of fracture sweet spots. It will also contribute to the future development of these unconventional, naturally fractured natural gas resources.

An IGS-sponsored investigation is under way to evaluate the architecture and petrology of the Mississippian-age Salem Limestone as a building stone and as a petroleum reservoir. The detailed study of the Salem exposed in the active walls of quarries will lead to the building of a 3-D actualistic model of the Salem. The study is being conducted by Brian Keith and Todd Thompson, with the aid of Department of Geological Sciences MA candidate Kirsten Bannister, with financial support from the IGS Director's Research Assistantship Program.

The Department of Interior's Global Climate Change Program for Great Lakes Research is sponsoring Todd Thompson's and John Johnston's study of Late Holocene lake-level variation of the Great Lakes. They are assessing the historic and prehistoric changes in the water levels of the Great Lakes to ascertain the meaning of fluctuations in light of global climate change.

The Indiana Historical Society is supporting Richard Powell's and Erik Kvale's investigation into the carving styles and distribution of Hindostan whetstone gravestones. Whetstone was used for tombstones beginning about 1820. Because of the unique character of the whetstone, it should be possible for the investigators to identify corridors of commerce for these stones through several decades of the 1800s.

## Geochemical research

Tracy Branam, John Comer, Margaret Ennis, Jack Haddan, Denver Harper, Greg Olyphant, and Ron Smith completed the analyses and quality assurance/quality control work for a four-



Maria Mastalerz measures desorption of gas from freshly cut coal samples.

low-sulfur coal deposits. Another important area of research that she is working on is the resource potential of coalbed methane in Indiana coal deposits.

Carol Conolly and Alex Zlotin's research on Illinois Basin coal availability and demonstrated reserves has recently focused on the Springfield and the Danville Coals. These studies contribute information to the National Coal Resources Data System, a nationwide effort being undertaken and supported by the USGS since 1986, and to the USGS-sponsored National Coal Assessment Program.

The Geological Survey's Coal Mine Information System, piloted by Nathan Eaton and Licia Weber, has been working in a collaborative effort with the DNR's Division of Reclamation since 1981. In this project, historic maps of mined areas in Indiana are scanned, edited, entered into a

the thermal maturation of source rocks. Sponsored by the DOE and in collaboration with Arndt Schimmelmann in the Department of Geological Sciences, the multidisciplinary investigation will study, among other similar topics, hydrogen exchange in kerogen. Results of the research will provide a better understanding of thermal maturation of organic matter and may help explain chemical reactivity of organic hydrogen in kerogens and fossil fuels.

## Basin and sedimentologic research

The DOE is sponsoring a study to refine a three-dimensional basin simulator for predicting the location and characteristics of naturally fractured petroleum reservoirs. John Comer is developing and testing a simulation-enhanced fracture detection

year project to monitor water quality at the Midwestern abandoned mine land reclamation site located in Pike County. This location is the first in Indiana where coal combustion byproducts (ash and fixated scrubber sludge) have been used to reclaim an abandoned coal mine. Results indicate that the reclamation effort has improved the quality of water leaving the site.

Ron Smith is heading a project on method development and analyses of toxic metals in fish from the Calumet River collected by the U.S. Fish and Wildlife Service. This project is a cooperative effort designed to verify the analytical methods and collect preliminary data for a formal proposal to the U.S. Environmental Protection Agency to study the effects of toxic metals on fish species in selected Indiana rivers. Smith is also investigating the removal of toxic metals from acid mine drainage in wetlands constructed for the purpose of reclamation. His project was one of two selected for funding through the Surface Mine and Reclamation Technology grant program sponsored by the Indiana DNR Division of Reclamation.

### Geophysical research

IGS geophysicist Ray René has developed and applied methods for gravity and magnetic fields interpretation in a program called SOAPFI (shape-of-anomaly potential fields inversion). The methods are used to map abandoned underground limestone mines. He is also utilizing reflection seismic

and well-log interpretation of Silurian reefs in Indiana related to hydrocarbon exploration.

### Environmental geological research

Ned Bleuer, Steven Brown, Jennifer Olejnik, Mike O'Neal, and Robin Rupp are working on an IDEM-supported project titled "Accelerated Glacial Terrain Characterization and Mapping." This is a cooperative effort to develop a statewide water-well record database for use in graphics and GIS software applications. Project scientists have developed new software, in collaboration with ESRI, that depicts complex datasets in three dimensions.

A project at the Spring Mill State Park is designed to determine potential non-point source contaminants in the Spring Mill Lake drainage basin and to document the amount and variability of pesticides, bacteria, and toxic metals that have an impact on the lake and its subterranean tributaries with their unique ecosystem. Various diverse groups are cooperating on this project, including IGS scientists John Comer, Nancy Hasenmueller, Ed Hartke, Tracy Branam, Carl Rexroad, Margaret Ennis, Sam Frushour, Dick Powell, Carl Rexroad, Mark Buehler, and Ron Smith; Noel Krothe of IU's Department of Geological Sciences; Ball State University's chemistry department; the Indiana State Department of Health; and the Office of the Indiana State Chemist.

### Geologic mapping

Ned Bleuer, Steven Brown, Walter Hasenmueller, Jennifer Olejnik, Mike O'Neal, and Robin Rupp are involved in a USGS-sponsored Statemap Project, compiling and producing a number of geologic maps. Areas of emphasis include glacial-terrain mapping in the northern part of the state along the Michigan border, the Michiana corridor, which includes parts of Elkhart, LaGrange, and Steuben Counties, and bedrock and glacial-terrain mapping in the area around Indianapolis, which includes the Lafayette and Muncie quadrangles.

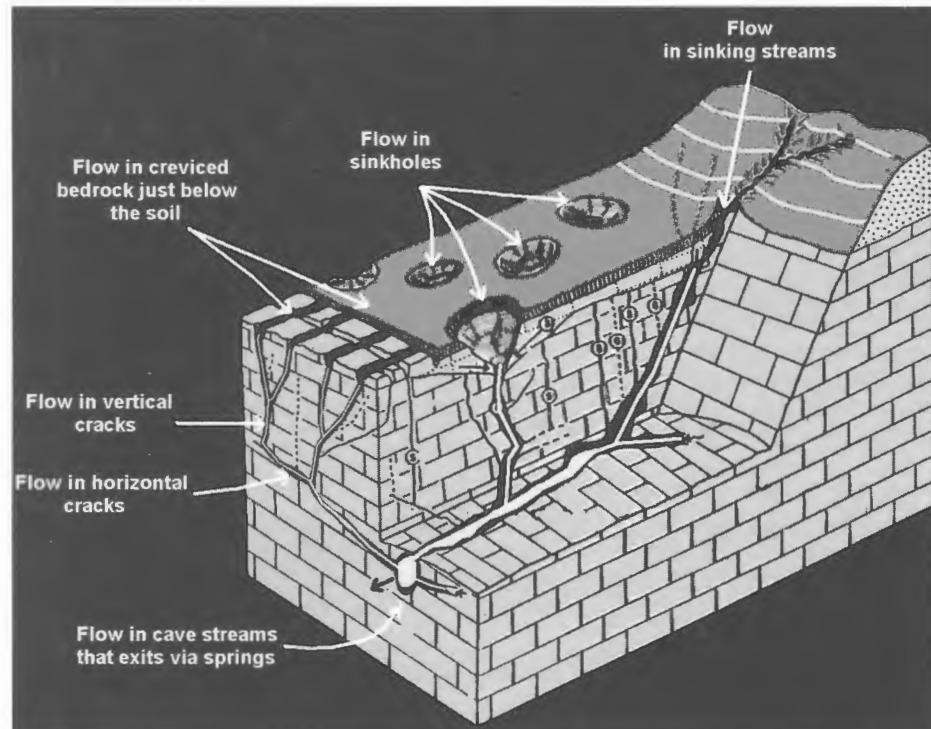
The Central Great Lakes Geologic Mapping Coalition, comprising the state geological surveys of Indiana, Illinois, Michigan, and Ohio together with the USGS, has secured sponsorship from the U.S. Congress. One of the goals of the coalition is to refine geologic maps to address societal issues related to resource development and conservation, as well as waste disposal issues. The Indiana portion of the coalition's pilot program focuses on the development of a number of digital products that utilize glacial-terrain maps produced recently in Allen County. These maps, together with subsurface data, digital elevation models, and digital imagery, will be integrated to provide analysis and illustration products for map users.

### Center for geospatial data analysis

The mission of the Center for Geospatial Data Analysis, a unit within the IGS, is to provide scientifically-based decision-support systems to a wide variety of technical and nontechnical users in order to promote the environmentally sound use of land, water, and mineral resources. This mission is accomplished by employing state-of-the-art technology in geographic information systems, statistical and numerical analysis, and field instrumentation to environmental issues. Staff members include Denver Harper, Ed Hartke, Kevin Spindler, and Alex Zlotin of the IGS, and Greg Olyphant of the Department of Geological Sciences.

The Center has received a grant from IDEM to conduct a pilot project for the Source Water Assessment Project. During the pilot phase of the project, the investigators will study and test a variety of methods for acquiring, analyzing, and presenting the information that is needed by the public to take actions to protect their own water supplies. Additionally, the pilot project should provide for more efficient and timely execution of the full-scale SWAP

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Three-dimensional conceptual model of karst drainage. (Modified from Quinlan, 1988)

# Geologic Survey

(continued from page 15)

program, which will last nearly four years. Center staff are also involved in a study in IDEM's Section 319 Non-Point Source Pollution Program to conduct a statistical analysis of data collected as part of the Indiana Pesticides in Ground Water Monitoring Network. The project investigators will work with IDEM to ensure that statistically valid data are being procured in IDEM's network for monitoring pesticides in ground water.

In cooperation with the Biological Research Division of the USGS and IU's Department of Geological Sciences, the Center initiated a project to develop a basis for forecasting outfalls of *E. coli* into Lake Michigan from the Little Calumet River watershed, which is the largest watershed that contributes bacterially contaminated streamflow to Indiana's southern Lake Michigan shoreline. The project is sponsored by the EPA. The investigators have documented the relationship between *E. coli* and water quality, rainfall history, ambient chemical conditions, and streamflow. This information will contribute to understanding seasonal and storm-period variations of bacterial outfalls into the lake.

**Chris Dintaman** continues his work with IDEM on the GIS mapping of solid and hazardous waste sites in Indiana.

## Mineral resources research

The IGS continues to bolster its strong relationships with the mineral resource industries of the state. Working closely with the Indiana Limestone Institute, an institution promoting the architectural use of Indiana (Mississippian Salem) dimension stone, **Margaret Ennis** and **John Hill** initiated a project to evaluate various materials used to separate limestone pieces (padding) and its tendency to produce pad marks.

**John Hill** is also working with the Indiana Mineral Aggregates Association to establish plans for environmental stewardship related to their present and post-quarrying impacts on the communities that surround their operations.



Alex Zlotin, left, and Denver Harper, of the Center for Geospatial Data Analysis, view GIS coverages associated with watershed modeling of the Trail Creek Watershed in northwestern Indiana.



Chris Dintaman uses current map-grade technology (Trimble GeoExplorer II) to obtain coordinates of a landfill benchmark.

Staff members **Sam Frushour**, **Walter Hasenmueller**, **John Hill**, and **Kathryn Shaffer** are also developing databases that provide information on mineral production, active and abandoned quarries, and stone testing.

## Surveywide investigation

The IGS has contracted with an environmental and engineering firm to provide about 50 GIS coverages for 26 southwestern Indiana counties as part of an environmental impact statement for a proposed interstate highway through the area. Because of the diversity of coverages required in this study, nearly half of the staff at IGS are in some way playing a part in this project.

## Educational outreach

The IGS continues to refine the capabilities of its Web site. Recent enhancements include integrated databases and interactive GIS-based maps of Indiana. Indiana Geology Today, the IGS's popular educational Web site, features a vast collection of articles, images, interactive animations, teaching resources, and reference materials about Indiana geology. Visit us at [www.indiana.edu/~igs](http://www.indiana.edu/~igs).

— Deborah DeChurch

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# Faculty News

## Faculty activities

**Abhijit Basu** continues to be the same “arch conservative” and is doing what he has been doing for some years. He does not leave the Moon, teaches in the Honors College (four Wells Scholars enrolled in his seminar in spring 2000), discusses stones from the sky with freshmen, visits NASA (his source of research funding), visits Italy (for wine and soccer, we suspect), and continues to edit *GSA Memoirs and Special Papers*. Somehow, he also has found time to be elected to the Bloomington Faculty Council and also serve as chair of the BFC Nomination Committee.

**Bob Dodd** (emeritus) reports that he and Joann are continuing to enjoy retirement with lots of traveling (New Zealand, Lord Howe Island, Bolivia, and London during the past year). He also helped with the running of the faculty coffees and the Owen Room renovation. Bob taught a course titled Geology for Travelers in the noncredit course series of the IU School of Continuing Studies. He also continues to volunteer for the Red Cross, grow roses, run, bike, hike, and bird watch.

**Jeremy Dunning** was appointed dean of the Indiana University School of Continuing Studies on Oct. 1, 1999. He had been serving as interim dean of the school since January 1997, holds an appointment as professor in the Department of Geological Sciences, and is adjunct professor in the School of Public and Environmental Affairs.

**Michael Hamburger** has been elected both to the Bloomington Faculty Council and to one of the three positions as a BFC representative to the University Faculty Council.

**Claudia Johnson** continues to focus her research on reef ecosystems of the geologic past. She and her students work on the evolution and extinction history of Cretaceous “greenhouse world” reefs as well as those of Pleistocene “icehouse” times. New research directions are leading to investigations of the comparative role of scleractinian corals and rudist bivalves in Cretaceous reefs and implications for changes in reef composition in a future greenhouse world. Claudia is also studying hierarchy theory and using it as the theoretical framework for determining evolutionary processes with Phanerozoic reef ecosystems. A preliminary set of data was presented at the sixth International Cretaceous Conference in Vienna in August

2000. The book Claudia co-edited with **Enriqueta Barrera**, *The Evolution of the Cretaceous Ocean/Climate System*, was published by GSA in 1999. Claudia was invited to give a keynote address to members of the International Geological Correlation Program 464 in Tokyo earlier in the year.

A large component of Claudia’s research is gained from field investigations, most recently in Texas. An excursion to the central Texas Cretaceous outcrops gave students plenty of exposure to the stratigraphy, sedimentology, and paleontology of carbonate platform facies, and provided excellent exercises in separating rock units from geologic time units. A field trip to investigate the Cretaceous reefs of Puerto Rico is planned for mid-2001. Positive teaching experiences occur in both the field and the classroom, and this past year was particularly rewarding, as students in her graduate course Evolution of Ecosystems and her 100-level, non-majors course Prehistoric Life were engaging both inside and outside of class time. She looks forward to another good year of integrating her current research with teaching in classroom and field settings.

**Erle Kauffman** has had a busy year. This included being lead author on a publication on “The Ecology of Cenomanian Lithistid Sponge Frameworks, Regensburg Area, Germany,” third author on “Decapod and Stomatopod Crustaceans from Mass Mortality Lagerstatten: Turonian (Cretaceous) of Colombia,” and second author on a publication on “Cretaceous Evolution of Rudist Ecosystems; A Regional Synthesis of the Caribbean Tropics.” He also co-taught a full class on cycles and sequences in stratigraphy, and sat in on a second class. Erle served on three departmental committees and as chair of one MS research committee supervising a project on Campanian-Lower Maastrichtian ammonites. This year, he plans to get back into teaching (as he continues to recover from a serious stroke) and will be even more active in research. Quo Vadis.

**Gary Lane** (emeritus), as noted above in “Around the Department,” recently completed his history of the Department, *Geology at Indiana University, 1840–2000*. He had worked on this book on and off for several years and is pleased that it is now available. In May, Gary made a pilgrimage to the Holly Island (Lindisfarne) in northeasternmost England with **Bill Ausich**, MA76, PhD’78, professor at Ohio

State University. Gary and Bill were interested in visiting sites related to St. Cuthbert, after whom fossil crinoid stems in England are named — St. Cuthbert’s beads. They spent three days on the island studying the geology and determining where the fossil crinoid stems may have been procured. The “beads” are first mentioned in print in the 1600s. They also visited the Farne Islands, where Cuthbert had his hermitage, the cathedral in Durham where he is buried, and South Shields, east of Newcastle, the site of the abbey where the Venerable Bede lived, who wrote the first life of Cuthbert in 700 A.D.

Gary spent most of August 2000 touring the Tarim Basin in northwestern China, along with **Chris Maples**, **Johnny Waters**, MA’76, PhD’78, and **Gary Webster**. They didn’t find many echinoderms, but they saw some impressive geology and landscapes.

**Enrique Merino** has had an exciting past year, and the year ahead looks equally good. He was invited by **B. Jamtveit**, a prominent Norwegian metamorphic petrologist, to be one of an interdisciplinary group of 12 researchers from Europe and the U.S. (structural geologists, geochemists, petrologists, and physicists) to carry out a broad project titled “Fluids in the Crust” in Oslo for a full year, financed by a large grant from the Norwegian Academy of Sciences. Enrique gave a talk to the other members of the group in September 2000. A field trip to Kenya is planned for early 2001 and another one to Sardinia later. He will join the group in Oslo in March for three months this academic year. Enrique considers this a “fabulous invitation, perfectly suited to my interdisciplinary interests and to the research I’m doing with **Ray Fletcher** (Boulder, Colo.) on the awesome potential consequences of the force of crystallization — including triggering earthquakes, accounting for replacement (a problem for a century), and localizing ore bodies of scarce metals.”

**Haydn Murray** has been honored as a 50-year fellow of the Geological Society of America. At IU, he has successfully completed the funding for the endowed chair in applied clay mineralogy, which will soon be advertised. Haydn continues to be very

active and gave the annual address at the industrial minerals luncheon in Salt Lake City at the SME annual meeting in February 2000. He also gave the introductory lecture in the workshop at the annual meeting of the Clay Minerals Society at Loyola University in Chicago. The topic of the workshop was "Industrial Clay Mineralogy." Four of Haydn's former students presented papers at the workshop — **Jessical Elzen Kogel**, MS'87, PhD'90, **Robert Pruett**, MS'88, PhD'93, **Colin Harvey**, PhD'80, and **William F Moll**, MA'58. Colin Harvey will be a visiting professor at IU during this spring semester, teaching clay mineralogy, industrial minerals, and X-ray methods. In August 2000, Haydn gave a plenary lecture on the topic of clay mineral developments in North and South America at the 26th meeting on Clay Mineralogy and Petrology of the Czech National Clay Group. At this meeting in Karlovy Vary, Czech Republic, Haydn was awarded an honorary membership in the Czech National Clay Group.

A student studying under Haydn, **Jean Hemzacek Laukant**, is finishing her PhD thesis research this academic year while teaching at Northern Illinois University. Her thesis is on the crystalline and amorphous silicas present in calcium montmorillonite and palygorskite clays. **Christina Shriner** is a postdoctoral research associate in the clay minerals lab, working on identifying clays that were used in the various types of pottery made in Lerna during the early Bronze Age environment of the Argive plain.

Haydn and Juanita's granddaughter, Samantha Murray, is living with them while attending her second year of graduate school in the IU School of Public and Environmental Affairs. Her brother, Mark Murray, graduated with a degree in geology from Colorado State University in May 2000, a third-generation geologist. Steve Murray, Samantha and Mark's father, is chief geologist, offshore operations, for El Paso Natural Gas Co. in Houston, Texas.

**Greg Olyphant** is no longer an active participant in the summer programs of the Geologic Field Station in Montana, but considers it to have been a fulfilling experience to be a key player in the four years of concerted effort that resulted in the development of the new environmental field courses, G429e and G329, now being successfully taught by others. Once completed, **Sally Letzinger's** dissertation, which focuses on predicting snowmelt runoff from alpine watersheds in the Tobacco Root Mountains, will constitute a fitting conclusion to his involvement in what Greg describes as "that awesome arena

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## Basu joins Intensive Freshman Seminar Program

IU Bloomington established its Intensive Freshman Seminar Program in 1990 to prepare freshmen to embark on their college careers and to provide a growth experience for faculty members and student interns who surround the IFS participants. In an article in the July/August 2000 issue of INDIANA ALUMNI MAGAZINE, **Lisa Schubert** describes the participation of Professor Abhijit Basu of the Department of Geological Sciences in this program. The IFS program is a three-week August program that offers incoming Bloomington freshmen a jump-start on their college careers.

Basu's student was **Amish Patel** who came to IU from California and completed three hours of course work while forming a close relationship with his faculty mentor (Basu) and becoming acclimated to the campus. A goal of the program is to create a "smooth and seamless transition" to help incoming students to "connect with the community socially and academically," says **Travis Paulin**, director of summer freshman programs. The IFS classes are nontraditional and meet each morning in three-hour blocks where faculty have devised different ways to engage the students for the entire course time, using a variety of activities. In addition to daily course work, IFS seminar students are involved in a variety of social activities, but must choose these on their own and learn how to balance the activities with their academic work. IFS alumni become student interns affiliated with the program and form a liaison between the students and faculty members, as well as living with the students in the residence halls and helping them with homework, projects, and study skills.

In order to teach IFS, faculty members such as Basu must apply for positions and propose specific course goals and activities. If selected, IFS faculty attend workshops in the spring semester before the summer IFS to discuss and learn how to meet the needs of incoming freshmen. Basu created a course experience for Amish Patel on the topic of exploring the planet Mars. Both of them experienced the satisfaction of personal growth from the program. Patel, a straight-A student in high school who did well previously with minimal effort, admitted that the sudden freedom left him a bit overwhelmed at first. The same level of effort in the IFS course resulted in a grade of B-.

"It was a real wake-up call for me," he said. "I saw I would have to manage my time much better if I was going to take 17 hours per semester." Patel hopes to one day become an astronaut and says that the short time he spent in IFS gave him the boost he needed. "Every day it gets better. IFS was three weeks of fun I will remember the rest of my life."

Amish Patel, left, reviews planetary science with Professor Abhijit Basu during their participation in the Intensive Freshman Seminar Program. Photo by Tiagan Miller, with permission of the INDIANA ALUMNI MAGAZINE.



# Faculty activities

(continued from page 19)

for teaching and research."

**Lisa Pratt** recently agreed to serve an additional year as associate dean for science and research at the request of the new dean of the College, **Kumble Subbaswamy**.

**Ed Ripley** has been appointed a member of the Bloomington Faculty Board of Review for 2000-02.

**Lee Suttner** enjoyed his first complete year with no major administrative responsibilities, giving him more flexibility in summer and holiday travel. His second-last MS student, **Carrie Nolan**, completed her degree requirements in late summer and joined Exxon-Mobil in Houston. His last MS student, **Shayne Wiesmann**, will complete his work this spring, and **Bill Elliott**, the last of his PhD students will finish within a year. All have worked on some phase of the Western Interior Foreland Basin study of tectonic and climatic controls on nonmarine facies architecture, which has benefited from NSF funding for nearly the last decade. In July, Lee joined Shayne, Bill, and **Mike Zaleha** on their final visit to field sites in Wyoming. They were joined in the famous Como

Bluffs area by **Kelly Trujillo**, a University of Wyoming PhD student, on whose research committee Lee serves. Prior to the Wyoming field work, he spent a week at the IU Geologic Field Station teaching the geology module of G329, the relatively new introductory environmental science course.

Lee continues to enjoy regular contact with our alumni in his role of director of development for the Department. Coupled with the fund-raising and development that he does on behalf of the GSA Foundation as its president, he travels extensively to make personal visits and pleas for support. If he comes knocking, he asks that you do not hide your checkbooks and wallets.

On the personal front, Lee's daughter Lisa married Shannon Roberts on a wet, but happy weekend in June. Friends from across the country returned to Bloomington for the wedding. The entire Suttner family is grateful to all alumni and Department friends who made the trip. Lee's other two daughters, Lori and Jennifer, now live in Grand Rapids, Mich., and Evansville, Ind., respectively, and Jim is now a CPA in Bloomington. Ginny continues as principal of St. Charles School in Bloomington.

**Dave Towell** completed his 33rd and final summer of teaching at the Geologic Field Station in July 2000. His first summer at the Station was in 1965, and he missed only three summers thereafter. To say the least, the program got into his blood. This being Dave's last academic year before retiring at IU and because of his love of the Station and Montana (and liking an additional reason to head west next summer), he is planning on a retirement party at the Station on Aug. 14, 2001. Those wishing to attend should contact Dave Towell, and he will send a formal invitation when plans are finalized. After retirement in May (though he will remain on the University Athletics Committee for one additional year), Dave and Lindsay will remain in Bloomington, but plan lots of trips and outdoor activities. They are excited about purchasing a big truck and fifth-wheel trailer, the latter to be referred to as "the rolling condo" as opposed to "the rig," which is the typical RV terminology. Dave also wishes all of our alumni the very best in this, his last year as editor of the *Hoosier Geologic Record*.

unfailing assistance from Mike in their research. His personal research and research with colleagues, including the support of students with his research grants, have contributed substantially to the Department. We wish the very best to Mike in his new position.

**Chusi Li** joined the Department in August 2000 as the director of the microprobe and X-ray laboratories. Chusi received his PhD in geology from the University of Toronto in 1993. Previously, he had received his bachelor's and master's degrees from Chengdu Institute of Sciences and Technology in China in 1982 and 1986, respectively. In addition to numerous industrial consulting positions, he has held postdoctoral positions at the University of Toronto and l'Université du Québec à Chicoutimi, a research associate position at the University of Toronto, and most recently, the position of senior lecturer at the University of Pretoria, South Africa, where he taught exploration geochemistry and advanced metamorphic petrology. Li is the author or co-author of numerous abstracts and technical reports. In addition, he has authored or co-authored 25 refereed journal articles (not including publications in Chinese), including eight co-authored papers in the June-July 2000 issue of *Economic Geology*. The Department welcomes Chusi Li to the IU family and wishes him great success and happiness in his new position.

Other personnel changes in the Department include the addition of **Clint Mahoney** as computer systems manager to replace **Brian Snow**, who has taken a position in instructional support for a California software company; **Lorie Canada**, fourth-floor secretary, to a secretarial position in the IU Athletics Department; **Candace Franz**, Field Station secretary, to full-time doctoral study at IU with a fellowship in art history; and **Tricia Miles**, fifth-floor secretary, to a position in the IU School of Music. **Cindy Hale** is the new Field Station secretary, and her previous position as office services assistant, business office, has been filled by **DeAnn Rinehart**. The new fourth-floor grant monitor/administrative support position is held by **Amy Beatty**, and **Charlene Butler** holds the same position on the fifth floor. Our best wishes go to everyone in their new positions, both inside and outside of the Department!

## Hoosier Geologic Record

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THE  
**COLLEGE**

## Staff changes

**Michael J. Dorais**, research scientist at the Department for the past 12 years and director of the electron microprobe and X-ray laboratories has accepted appointment to a tenure-track position at Brigham Young University. Students and faculty alike are most appreciative of the generous and

# Faculty Research Grants

## Faculty research grants

1999–2000

• A. BASU (NASA) — “Petrologic Evolution of Lunar and Meteorite Parent Body Regolith”

• S. BRASSELL (NSF) — “Evolution of Temperature Controls on Alkenone Biosynthesis”

• M. DORAIS (NSF) — “History of Terrane Assembly, Eastern New England”

• M. HAMBURGER (USGS) — “GPS Measurement of Crustal Deformation in the Wabash Valley Seismic Zone”

• M. HAMBURGER (NSF) — “Collaborative Research: GPS Measurement of Crustal Deformation at Pinatubo and Taal Volcanoes, Philippines”

• M. HAMBURGER (NSF) — “Acquisition of GPS Instruments for Measurement of Crustal Deformation at Pinatubo and Taal Volcanoes, Philippines”

• M. HAMBURGER (NASA) — “GPS Measurement of Crustal Deformation at Taal Volcano, Philippines”

• M. HAMBURGER (NASA) — “GPS Measurements of Localized Deformation in the Tien Shan”

• M. HAMBURGER (Ind. Comm. Higher Educ.) — “Teacher Training and Curriculum Development in Earthquake Studies”

• M. HAMBURGER (NASA) — “Lithospheric Rheology and Geodynamic Processes from Integration of Geodetic, Gravity and Topography Data”

• N. HESTER (CUSEC) — “Earthquake Hazard Program”

• C. JOHNSON (NSF) — “Comparative Role of Scleractinian Corals and Ancient Rudist Bivalves in Cretaceous Reefs: Implications for Changes in Reef Composition in a Future Greenhouse World”

• E. KAUFFMAN (NSF) — “Testing the hypothesis of a Cretaceous Super-tropical Climate Zone in the Caribbean Province: Do Climate Simulations and Observational Data Support the Concept of Tropical Stability?”

• N. KROTHE (CBS Corp.) — “Determining the Amount of Groundwater Storage in the Phreatic and Epikarst Zones in the Karst Aquifer at the Lemon Lane Landfill: A Stable Isotopic Study”

• N. KROTHE (U.S. Army) — “A Hydrogeologic Study to Determine the Groundwater Flow, Aquifer Characteristic and Chemical Transport in the Big Clifty/Beach Creek Aquifer Beneath the Ammunition Burning Grounds”

• N. KROTHE (PU) — “Collection of water samples of state chemist office”

• N. KROTHE (COMARCO) — “Groundwater Investigation at the Ammunition Burning Ground, Crane Division, Naval Warfare Center”

• N. LANE (NSF) — “Echinoderm Rebound and Diversification after the Late Devonian Extinction: Evidence from Asian Carboniferous and Eurasian Famennian Echinoderm Faunas”

• C. MAPLES (Shell Oil) — “Shell Department Grant”

• C. MAPLES (NSF) — “SGER: Devonian-Carboniferous Echinoderm from Iran: Implications for Extinction Rebound and Global Repopulation”

• G. OLYPHANT (PU) — Illinois-Indiana Sea Grant College Program Graduate Fellowship”

• G. PAVLIS (NSF) — “Direct Imaging of Crust and Upper Mantle Structure with Broadband Seismic Arrays”

• G. PAVLIS (IRIS) — “Princeton Earth Physics Program Instrument Center: IRIS Educational Outreach Cost-share”

• G. PAVLIS (NSF) — “Princeton Earth Physics Program Instrument Center”

• G. PAVLIS (IRIS) — “Event location and array processing software developments for the IRIS broadband array system”

• G. PAVLIS (NSF) — “Collaborative Research: Geodynamics of Intracontinental Mountain Building in the Tien Shan, Central Asia”

• L. PRATT (Texas A&M) — “Distribution of Sulfur Compounds and Stable Isotopic Composition of Organic and Inorganic Sulfur in Sediments from Leg 175 Benguela Current: Paleoceanographic Implications”

• L. PRATT (Texas A&M) — “U.S. Science Support for German Mora”

• L. PRATT (Princeton U.) — “Subcontract Proposal to Princeton Univ.: South African Ultra Deep Mines — Long Term Sites for Interdisciplinary Studies (LSLIS) into Extreme Environments of the Deep Surface”

• L. PRATT (Texas A&M) — “JOI/USSSP Post-Cruise Support Proposal: Oxygen, Hydrogen, and Carbon Isotopic Composition of Interstitial Waters at ODP Site 1150, Leg 186; Support for German Mora.”

• E. RIPLEY (NSF) — “Isotopic Studies of Hydrothermal Flow Systems above and below the Duluth Complex, Midcontinent Rift System, Minnesota”

• E. RIPLEY (NSF) — “Acquisition of a Sulfur Isotope-Ratio Mass Spectrometer”

• E. RIPLEY (NSF) — “Re-Os Isotopic Systematics accompanying the Conversion of Organic-Rich, Pelitic Country Rocks to

Hornfels, Magma Contamination, and Sulfide Ore-Genesis, Duluth Complex, Midcontinent Rift, Minn.”

• E. RIPLEY (U. Missouri) — “Acquisition of a Sulfur Isotope-Ratio Mass Spectrometer — Agreement with Univ. of Missouri”

• A. RUDMAN (USGS) — “A Comprehensive Geophysical Investigation to Assess Seismic Hazards in the Wabash Valley Seismic Zone: A Case Study of the New Harmony Fault”

• A. SCHIMMELMANN (WHOI) — “High-precision Hydrogen Isotopic GCMS, a Subcontract Proposal to Woods Hole Oceanographic Institution”

• A. SCHIMMELMANN (NSF) — “Reconstructing Extreme Southern California Flood Events from Gray Flood Deposits in Santa Barbara Basin, since 5000 B.P.”

• A. SCHIMMELMANN (NASA) — “Isotopic Biogeochemistry, Subcontract Proposal to Woods Hole Oceanographic Institution”

• A. SCHIMMELMANN (USDE) — “Significance of Isotopically Labile Organic Hydrogen in the Thermal Maturation of Source Rocks”

• A. SCHIMMELMANN (NSF) — “Collaborative Research: Reconstructing Southern California Flood Events from Gray Flood Deposits in Santa Barbara Basin, since 5000 B.P.”

• A. SCHIMMELMANN (WHOI) — “Isotopic Biogeochemistry, IU/WHOI/NASA Subcontract”

• A. SCHIMMELMANN (Shell Intl.) — “IU/SHELL International Exploration and Production Inc. Cooperative Project”

• L. SUTTNER (NSF) — “Effects of Intra-Basinal Structures on Early Cretaceous Fluvial Systems (Lakota/Cloverly Formations), Central Cordilleran Foreland Basin”

• L. SUTTNER (Shell Oil) — “Shell Departmental Grant”

• L. SUTTNER (PU) — “Collection of Water Samples for State Chemist”

• R. WINTSCH (NSF) — “Identifying Multiple Thermal Events in Polymetamorphic Rocks: Electron and Ion Microprobe Analysis of Complexly Zoned Titanite”

• R. WINTSCH (NSF) — “Supplement to Identifying Thermal Events in Polymetamorphic Rocks: Electron and Ion Microprobe Analysis of Complexity Zoned Titanite”

• R. WINTSCH (NSF) — “History of Terrane Assembly, Eastern New England”

# Student Notes

These companies sent representatives to the Department to recruit both full-time employees and interns during the 1999-2000 academic year:

- Exxon Exploration Co., Houston, Texas (Barbara Rassmann);
- Chevron Petroleum Technology Co., Houston, Texas (Carole Rock); and
- Schlumberger Oilfield Services, Houston, Texas (Thomas Cherian and Michiru Tomida).

## Awards and grants

### Undergraduate

- N. Gary Lane Beginning Geologist Award: Courtney Brown (Indianapolis, Ind.)
- Junior Award: Paul Lester (Indianapolis, Ind.)
- Professional Development Award: Ralph Millikin (South Bend, Ind.) and Carrie Taylor (Columbus, Ind.)
- Faculty Scholarship (Senior) Award: Brian Howard (Carmel, Ind.)
- Field Station Scholarships (IU): Deiss Award — Paul Lester (Indianapolis, Ind.); Mead Scholarships — Natalie Uschner

(Richmond, Va.), Brian Howard (Carmel, Ind.), Daniel Miksch (Schererville, Ind.)

### Graduate

- Estwing Award and Outstanding Academic Achievement: Shayne Wiesemann (Rolling Prairie, Ind.)
- Department of Geological Sciences Award for Academic Achievement: Christian Poppeliers (Orlando, Fla.)
- Outstanding Associate Instructor: Dana Cannon (Cincinnati, Ohio)
- TERA: Christopher Willan (Stuccasunna, N.J.)
- Chancellor's Fellowship: Steven Loheide (Lodi, Wis.)
- McNair Fellowship: Miriam Attenoukon (Baltimore, Md.)
- Women-in-Science Fellowships: Karen Cyr (Fort Wayne, Ind.), Sarah Pietraszek-Mattner (Glenwood, N.Y.)
- Shell Oil Fellowships: Kirsten Bannister (Tacoma, Wa.), Russell House (Oxford, Ala.)
- AAPG Grant-in-Aid 1999: William Elliott (Latrobe, Pa.)
- Bernice Eastwood Covalt Memorial Scholarships: Matthew Campbell (Spartanburg, S.C.), William Elliott (Latrobe, Pa.)
- 1999-2000 Illinois-Indiana Sea Grant College Program Graduate Fellowship: Judith Coffman Thomas (Hiram, Ohio)
- AGU Outstanding Student Paper Award in Seismology for the 1999 fall meeting: Christian Poppeliers (Orlando, Fla.)
- John B. Patton Awards: Dana Cannon (Cincinnati, Ohio), Steven Loheide (Lodi, Wis.), Sarah Pietraszek-Mattner (Glenwood, N.Y.), Rachel Walker (Brisbane, Q.I.B., Australia)
- SEPM 1999 Mobil Student Participation Grant, Gulf Coast Section, for the presentation "Geological Heterogeneities and Reservoir Model Based on Facies Architecture of Middle Mississippian Salem Grainstone, Shoals, Illinois Basin": Nadeem Ahmad (Faisalabad, Pakistan)
- GSA National Meeting, Denver, SGE Session, Best Student Paper: Steven Loheide (Lodi, Wis.)

## Use of Landmark taught in seminar

In late January and early February 2000, a one-credit seminar for graduate students and faculty on the use of Landmark Graphics Corp.'s Stratworks software package, recently donated to the Department, was taught by graduate student **Carrie Nolan**. Carrie had used this software extensively during an internship at Exxon and had also participated in a week-long seminar on its use, taught at Landmark headquarters in Houston. Stratworks is perhaps the most widely used software for manipulation of log and outcrop data. It was developed by geoscientists for geoscientists, so it is relatively user-friendly. Stratworks utilizes UNIX work stations and can be used for log correlation, cross-section construction, and production of various kinds of maps, such as structure contour, isopach, and lithofacies. It is an effective tool in analyzing how faults affect contour patterns.

## Degrees awarded

### Bachelor of Arts

- Suzanne Gerteisen (Monroe, Ind.)  
Jason Melady (Carmel, Ind.)  
Michael Sowder (Oolitic, Ind.)  
Monica Tatera (Madison, Ind.)

## Fellowship honors memory of Daniel S. Tudor

A major contribution to the Department's endowment campaign has made possible the creation of the Daniel S. Tudor Graduate Fellowship in geophysics or a closely allied field. The fellowship will honor Daniel Tudor's friendship with the donor, leadership in the geosciences, and lifelong support of the Department. It is expected that the endowment-equivalent income of the contribution will be matched by the university administration, and that, with additional contributions from friends and former colleagues of Tudor, a 10-month stipend plus full tuition and related expenses will be covered by the fellowship.

The Department seeks to make this newly endowed fellowship a stipend that will be competitive with geophysics fellowships awarded on a nationwide basis. If you would like to contribute to the endowment, please send a check, payable to the Indiana University Foundation (noting on the check or in a cover letter that your gift is for this endowment), to Lee J. Suttner, director of development, Department of Geological Sciences. Mrs. Tudor will be informed of all gifts made to the endowment in memory of her late husband.

### Bachelor of Science

- Sarah Bryant (Bloomington, Ind.)  
Thomas Chorniy (Grand Haven, Mich.)  
Jeffrey Dick (Hammond, Ind.)  
Jason Krothe (Bloomington, Ind.)  
Nathan Luzny (Franklin, Ind.)  
Christopher Parks (Corydon, Ind.)

### Master of Science

- Naomi L. Boness, Guildford, England (2000): "Determination of Effective Elastic Thickness in the North American Craton and Rheological Implications for the Intraplate Lithosphere"
  - Heather Clark, Tigard, Oregon (2000) (Research Project): "Chemical Alterations of Fixated Scrubber Sludge"
- (continued on page 23)

# Advisory Board Update

The Advisory Board for the Department of Geological Sciences met Thursday and Friday, Oct. 5-6, in Bloomington. The full Board meeting was preceded by a meeting of the Executive Committee on Thursday, Oct. 4. This was Dick Gibson's last year of a two-year term as president of the Advisory Board. He was replaced by Derek Fullerton, former vice president of the Board. John Bubb was elected as the new vice president. Gibson did an excellent job as president and has our most sincere thanks for his efforts and accomplishments. John Bubb also deserves special recognition for his excellent job in handling the numerous and complicated spreadsheets this year, taking over from George Nevers, who performed admirably in previous years.

The meeting was attended by Board members Robert Blakely, Malcolm Boyce, Michael Cowen, Derek Fullerton, Dick Gibson, Glenn Hieshima, Robert Jones, Judson Mead, Michael Mound, Frank Pruett, John Steinmetz, Thomas Straw, Kenneth Vance, Johnny Waters, and Stephen Wells. Lee Suttner, director of development for Geological Sciences, and Susan Green, executive director of development for the College of Arts and Sciences, also attended the meeting. The Board welcomed new member Steve Wells, president of the Desert Research Institute.

Highlights of the Advisory Board meeting included a question and answer session with the new dean of the IU College of Arts and Sciences, Kumble Subbaswamy. Dean Swamy, as he prefers to be called, began his duties in July. The



Department's relationship with Swamy has been excellent so far and his interaction with the Board was both welcome and well received. Following the chair's state of the department address (most of which is highlighted on page 1), the Board had its annual meeting with student members of SAC. Faculty chairs or members of the various faculty search committees reported to the Board about the progress and future of searches for the Shrock Professorship (Simon Brassell and Lee Suttner), the Malcolm and Sylvia Boyce Professorship  
(continued on page 24)

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1 2 3 4 5 6

Advisory Board members attending the October 2000 meeting were 1. Glenn Hieshima 2. Tom Straw 3. Bob Blakely 4. Chris Maples 5. Steve Wells 6. Dick Gibson 7. Johnny Waters 8. Mal Boyce 9. Ken Vance 10. Robert Jones 11. Frank Pruett 12. Susan Green 13. John Steinmetz 14. Michael Mound 15. Derek Fullerton 16. Jud Mead 17. Michael Cowen 18. Kim Schulte

## Student notes

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Exposed to Simulated Acid Mine Drainage

- Carrie E. Nolan, Elgin, Ill. (2000): "Fluvial Hydraulics, Geometries, Migration, and Associated Alluvial Stratigraphy of the Lower Cretaceous Cloverly Formation, Bighorn Basin, Wyoming"
- Catherine A. Thibault, Indianapolis, Ind. (1999): "GPS Measurements of Crustal Deformation in the Northern Philippine Island Arc"
- G. Todd Ventura, Boulder, Col. (1999): "Investigation of Coral Diversity and Coral Number on Disturbance-Induced Patches: A Study of the Intermediate Disturbance Hypothesis in the Key Largo Formation, Late Pleistocene, Florida"
- Christopher G. Willan, Dover, N.J.

(2000): "Glacial Stage Reef Tract Development of the Pleistocene Coral Cap on Barbados, West Indies: Implications for Tectonic Uplift History"

### Doctor of Philosophy

- Nadeem Ahmad, Faisalabad, Pakistan (2000): "Deposition, Sequence Stratigraphy, and Hydrocarbon Potential of a Gravity Flow Deposit (Carper Sandstone) within the Osagean (Middle Mississippian) Sequence Stratigraphic Framework, Eastern Illinois Basin"
- Eung-Seok Lee, Seoul, Korea (1999): "Hydrogeological Investigation in a Karst Terrain in South Central Indiana, U. S. A.: Delineating the Flow Systems and Mixing Problems Using Major Ions and Stable Isotopes in Water as Tracers"
- Karl W. Leonard, Pullman, Wash.

(1999): "Sequence Stratigraphy of the Muscatatuck Group (Middle Devonian) in Southern Indiana: A New Framework for Paleoecological Analysis"

- David W. Millen, Bloomington, Ind. (2000): "Tectonics of the Northernmost Tonga Subduction Zone and a Comparative Study of the Tectonics of Subduction Zone Terminations"
- German Mora, Bogota, Colombia, South America (2000): "Stable-Isotopic and Geochemical Assessment of Andean Terrestrial Ecosystems during Pleistocene Climate Changes"
- Haichao (George) Yu, Beijing, Peoples Republic of China (1999): "Hydrogeology and Geochemistry of the Groundwater in a Karst Terrain of Southern Indiana"

## Advisory Board

(continued from page 23)

(Noel Krothe), an assistant professor search in geophysics (Michael Hamburger), and an assistant professor search in biogeochemistry (Lisa Pratt). In addition, Simon Brassell and Jim Brophy provided reports about ongoing changes in the graduate curriculum and enrollments. Jim Brophy, in his role as director of the Judson Mead Geologic Field Station, informed the Board about changes in the curriculum and increasing cost pressures for the Field Station this coming year. Board member and state geologist John Steinmetz outlined ongoing research and outreach accomplishments at the Indiana Geological Survey.

Another highlight was the presentation by Mike Dunn, dean of the new IU School of Informatics. In a very general sense, informatics is the study of data, data assimilation, data transfer, and so-called metadata (data about data). Consequently, the new School of Informatics will promote highly quantitative, computer-oriented classes and extra-university experiences for its students. Dunn had a stimulating presentation that elicited numerous questions and extended discussions well after his talk. He noted that the first named computer science department in the country was established at Purdue in 1967. He also noted that geoscience data as a whole is the second-largest collection of data in the world, behind governmental and military intelligence data.

The traditional Friday night reception and dinner was held this year at the newly renovated Virgil T. DeVault Alumni Center on campus. Board members, faculty, spouses, friends, and special guests (including Dean Swamy) were in attendance for the evening.

The annual meeting of the Advisory Board continues to be one of the highlights of our year in the Department. Next year's meeting will be held Oct. 4-6. As has been the case in past years, special thanks are owed to Patty Byrum and Kim Schulte for their hard work and preparation before and during this year's Board meeting. The Geological Sciences Advisory Board is held up as model for advisory boards of other departments within COAS. We are indeed fortunate to have such active, interested, and accomplished alumni and friends of the Department of Geological Sciences. The Advisory Board continues to be extremely helpful and supportive, with numerous excellent suggestions and sage advice, all of which are extremely appreciated by an inexperienced department chair!

— Christopher Maples

## In Memoriam

### Charles J. Vitaliano

1910-2000

Professor Emeritus Charles J. Vitaliano, fellow of the Geological Society of America, died on April 6, 2000, just a few days after his 90th birthday. He died peacefully in Bloomington, Ind., after a long, productive, and happy career that extended for many years after his retirement in 1980.

Charles was born in New York City on April 2, 1910, the eldest of the three children of Joseph and Catherine de Barberi Vitaliano. During the Depression, Charles had to drop out of high school in order to help support the struggling family. Happily, he was able to attend night school and complete work for his diploma, even while one job after another ended because of failing businesses. With spirits low, he returned home one day to find that, having passed the New York State Regents Examination, he had been admitted to the City College of New York, in which he was encouraged to enroll at once. His decisions to pursue collegiate studies and to major in

geology were fortunate ones for the profession, not only for the scientific contributions that he would later make, but also because of the legendary teacher and mentor he would become at Indiana University.

While working towards his undergraduate degree, Charles held a number of night jobs, including unloading railroad freight cars and working as an assistant baggage master for the Italian Line of steamships. Undaunted by the demands of studying by day and being on the job at night, Charles completed work for the BS degree in 1936 and enrolled in the graduate program at Columbia University. There, he earned a master's degree in 1938 and a PhD degree in 1944. Under the tutelage of Paul F. Kerr, and holding a James Furman Kemp fellowship, Charles specialized in igneous petrology, a subject that remained a consuming passion throughout his lengthy career. While at Columbia, he met Dorothy A. Brauneck, a geology graduate student, and the couple were married in October

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### New member profile

### Wells adds his experience to Board

Stephen G. Wells, BS'71, is the newest member of the Advisory Board. He is president of the university and community college system of Nevada's Desert Research Institute. In addition, he is a graduate faculty member in both the Department of Geological Sciences and the Hydrologic Sciences Program at the University of Nevada at Reno. Steve earned the BS degree in geology at IU in 1971, followed by a master's degree and PhD from the University of Cincinnati in 1973 and 1976, respectively. He joined the faculty at the University of New Mexico in 1976 and rose through the ranks to become professor and chair of the Department of Geology in 1989. He moved to the University of California-Riverside in 1991 and then to the Desert Research Institute in 1995. At the Institute, he rose from executive director and research professor to his current position of president beginning in 1999.

A councilor of the Geological Society of America for 1999-2001, Steve has served from 1998-2000 on the Committee on Continuing Education and will serve 2000-2002 on the Committee on Publications of GSA.

Steve has published more than 50 peer-reviewed papers and 12 book chapters focusing upon the geomorphology and Quaternary geology of arid and semiarid regions and the geomorphic and hydrologic responses to Quaternary climate change, as well as tectonic and volcanic activity. In addition, his research career has a blend of applied studies and basic research.

Steve serves on a number of public and private boards and committees concerned with water quality, technology development, and historic preservation. He enjoys hiking, backpacking, canoeing, swimming and reading. Steve and his wife, Bethany, live in Reno with their son, Chris, 17, and daughter, Katie, 13.

# In memoriam

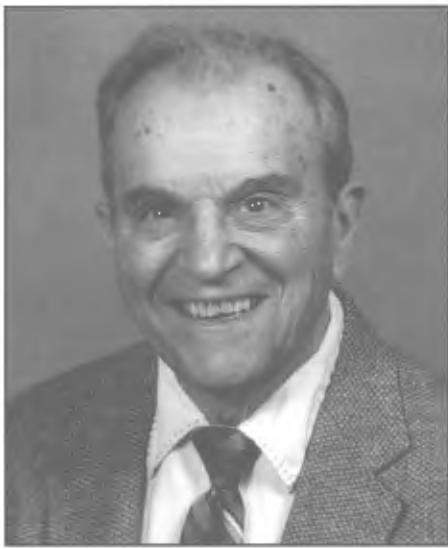
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1940. Their marriage produced two children, Judith and Peter, and endured for just a few months shy of 60 years!

Upon graduating from Columbia, Charles accepted a position as instructor in ceramic petrology at Rutgers University, and then, from 1942 to 1947, served as field geologist with the U.S. Geological Survey, in which capacity he was engaged primarily in exploring for magnesite in the strategic minerals program.

In 1947, Charles was offered and accepted an associate professorship at Indiana University, where he was responsible for teaching elementary geology and field geology. Within a few semesters his teaching role expanded so as to include igneous and metamorphic petrology. The need for a summer field training program was recognized as a primary goal for the Department. Accordingly, in the summer of 1948, Charles took a group of IU students to the Princeton University field station at Red Lodge, Mont., and in 1949 became director of the new IU Field Station, which was constructed near Cardwell, Mont. Always an ardent field geologist, Charles was in his element as Field Station director, a position he held through the summer of 1950.

During the summers of 1950 to 1958, Charles held a position as field geologist with the U.S. Geological Survey, working in Nevada and New Mexico, and in 1958 returned to the IU Geologic Field Station to assist for the next 16 years in operation of the now greatly expanded program. He retired from Indiana University in 1980, but maintained an office and research involvement for many years thereafter.



Charles J. Vitaliano

Charles was one of the few IU geology faculty members to receive Fulbright awards, serving as a senior research fellow in New Zealand during the 1954-55 academic year and as a Fulbright lecturer in Australia in July 1955.

His expertise in and zeal for igneous petrology was by this time widely known, and his efforts in this field were supported by National Science Foundation grants from 1957 to 1961 and from 1966 to 1972. His enthusiasm for research attracted numerous students who completed master's and doctoral degrees under Charles's demanding tutelage and led eventually to publication of a superb multiple-authored, detailed geologic map of the Tobacco Root Mountains of Montana. Charles's research had tremendous geographic reach, including the Great Basin, Northern Rocky Mountains, Snake River Plain, Midwest, New Zealand, and Greece.

He dealt with geologic problems as

dissimilar as the origin of western mineral deposits and the archaeological geology of volcanic ash, and with rocks ranging in age from billions-of-years-old (Archean) "basement" rocks to surficial deposits formed within the past few thousand years.

First and foremost, Charles was a mineralogist and petrographer, whose expertise with the petrographic microscope is legendary. Second, Charles will be remembered as a field geologist, whose legacy includes not only the numerous published reports and maps he authored, but also the exceptional skill with which he instilled in his students a love of field work and proficiency in the methodology of field investigations. In 1982, the IU College of Arts and Sciences recognized this quality by honoring him with its Distinguished Teaching Award. By that date, Charles had officially retired from Indiana University, but with his wife, Dorothy, continued active involvement with the problem of ash distribution from the Minoan eruption on Santorini, Greece. During these investigations, Charles analyzed tephra (volcanic ejecta) deposits, which are key to deciphering the chronology of ancient civilizations. His work in this field led, in 1985, to chairmanship of the Archaeological Geology Division of the Geological Society of America, and his final work in the new discipline was published in 1997.

Ever dynamic, Charles pursued with characteristic enthusiasm many interests outside his research, teaching, and mentoring responsibilities. From 1966 to 1985, he was on the board of directors of the IU Credit Union, serving as chair during the 1967-68 fiscal year. In 1973, Charles served as a consultant for the Earth Resources Technical Satellite project at the University of Montana. And from 1979 to 1981, he was a member of the Scientific Advancement Committee at IU. For several decades, Charles was a major figure in programs and events of the Unitarian Universalist Church in Bloomington. Always a keen advocate of healthy exercise, Charles was for many years an avid handball player and became a jogger almost before the word had been coined. In later years, he swam regularly to maintain the fitness that carried him up mountain slopes at the head of the field party well into his 70s. He and Dorothy were inveterate travelers, having visited the Galapagos Islands, enjoyed a historical tour of Turkey, participated in an African safari, and traveled by helicopter to see volcanic phenomena in the remotest parts of Kamchatka in eastern Siberia. They were in Prague when the Russian tanks rolled in in 1958, rode camels in Egypt, sailed to

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## Vitaliano Research Grants-in-Aid Endowment established

A major donation to the Department is being used to establish a new Charles J. Vitaliano Research Grants-in-Aid program in honor of one of the Department's most beloved and long-term professors. The grants will be awarded as part of a nationwide competition among students intending to do research in Montana, which in part will be based at the Judson Mead Geologic Field Station of Indiana University. Professor Vitaliano had a career-long passion and enthusiasm for Montana geology, as well as strong ties to the Field Station developed during the many years he used the Field Station as a base for his teaching and research. It is fitting that this program maintain his wonderful legacy linking research in Montana geology and the Field Station, and at the same time provide national recognition for the Field Station and the Department.

All former students and friends of Professor Vitaliano are encouraged to contribute to the new endowment. The larger it becomes the greater the number of students it will support. Checks should be made out to the *Indiana University Foundation*, with a cover letter or note on the check directing the contribution to the *Charles J. Vitaliano Endowment* and sent to Dr. Lee J. Suttner, Director of Development, Department of Geological Sciences at Indiana University. Mrs. Vitaliano will be informed of all contributions made in memory of her late husband.

# Alumni Notebook

**William I. Ausich**, MA'76, PhD'78, served a term on the *Treatise on Invertebrate Paleontology* Advisory Committee for 1997-2000.

**Kennard B. Bork**, MA'64, PhD'67, was awarded the Neil Miner Award by the National Association of Geoscience Teachers at the Geological Society of America annual meeting in Reno, Nev., in November 2000. This award is given annually by NAGT for "exceptional contributions to the stimulation of interest in the earth sciences." Ken, who is the

Alumni Professor of Geology at Denison University, served as president of the History of Earth Sciences Society in 1999-2000.

**Volker Bruchert**, PhD'97, is now at the Max Plank Institute for Marine Microbiology, Germany. On Feb. 14, 2000, he presented the departmental colloquium with a talk titled "Microbial Controls on the Stable Sulfur Isotopic Fractionation during Bacterial Sulfate Reduction."

Last September, **James A. Carpenter**, BA'75, presented a \$30,000 grant to the

Corkscrew Swamp (Fla.) Sanctuary. The money was a gift from Pathways to Nature, a joint program between the National Fish and Wildlife Foundation and Wild Birds Unlimited Inc., a chain of nature stores of which Carpenter is the president and chief executive officer. The grant will help fund the sanctuary's "Clues to Discovery" exhibit.

**Thomas W. Chorny**, BS'99, along with several other IU graduates, competed in the Olympic Track and Field Trials in Sacramento, Calif., this past July. His specialty was the men's 3,000 meter steeplechase.

**Brooke P. Clements**, BS'82, is the vice president of exploration for Ashton Mining of Canada, a company that hopes to find a diamond mine in the Americas. He lives with his wife, Juanita, and son, Jeffrey, in Vancouver.

**Lyndon L. Dean**, BS'60, retired at the end of 1999 after more than 30 years with Material Service Corp. He has formed a geological consulting service called Mine IT and is the owner and principal geologist. He writes that he plans to relocate to western North Carolina and will continue consulting in the Midwest, as well as the Carolinas.

**Peter DeCelles**, MA'84, PhD'84, currently at the University of Arizona, presented the departmental colloquium on Nov. 22, 1999, with a talk titled "How the Kinematic History of the Himalayan Fold-Thrust Belt Controls Seawater  $^{87}\text{Sr}/^{86}\text{Sr}$ ." On the following day, he hosted a brown bag seminar on "Evolution of the Himalayan Foreland Basin System."

**David Des Marais**, MA'72, PhD'74, of the NASA Ames Research Center, Moffett Field, Calif., presented a talk at IU on April 19, 2000. His was the first lecture in the Astrobiology/Extreme Life Seminar Series sponsored by departments of Chemistry, Biology, and Geological Sciences. Dave's address was titled "Astrobiology Offers Perspectives on Our Own Biosphere."

**Robert C. Earle**, BS'87, MS'91, is a consulting geologist with URS Corp., Willow Grove, Pa. He and his wife, Kris (Heinrichs), BS'85, MA'88, were married at Beck Chapel in August 1989. She teaches Spanish and French at a small private college. They have three children: Bethany, 10, Colin, 7, and James, 3.

**Patricia Arkin Gerdzen**, BS'50, writes that "after many years away from the field of geology I have returned to paleontology as a volunteer." Gerdzen, a retired school

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## In memoriam

(continued from page 25)

Antarctica on a World Explorer cruise, and traveled to China and South America as participants in the People-to-People program. Further, there are few parts of Europe that have not seen the smiling faces of the affable Charles and Dorothy Vitaliano.

Charles was blessed with a happy home life, loving family, a legion of friends, a profession he loved passionately, accomplishments enough to satisfy any person, and a long and healthy life. His unfailingly good nature, happy countenance, and constant congeniality were among the endearing trademarks of this humble and remarkably able man. He is sorely missed by all who had the privilege of knowing him professionally and personally.

— *This memorial resolution was written by Donald E. Hattin and read into the minutes of the Bloomington Faculty Council.*

## Jerome Thornburg

1949-2000

Jerome Thornburg, of Houston, Texas, petroleum geophysicist with Conoco Inc. and member of the Advisory Board, died on Sept. 2, 2000. Survivors include his wife of 21 years, Janet Bauder Thornburg, daughter Laurel Thornburg, mother Frances Lamey Thornburg, of Evansville, Ind., Robert Lawrence Thornburg, of Wadesville, Ind., and sister Jacqueline Robertson and niece Jennifer Bayer, both of Mount Vernon, Ind.

Jerry was born on Aug. 31, 1949, in Evansville, Ind., the son of Robert and Frances (Lamey) Thornburg. He was a 1967 graduate of North Posey High School, earned his BS in geology from Indiana State University in 1971 and MA

in geophysics in 1975 at Indiana University, where he studied under Al Rudman.

Jerry began his career in industry with Cities Service Oil Co., where he was a petroleum geophysicist from 1975 to 1979. He moved to Conoco in 1979 and served as geophysicist there until his death. Jerry was a most valued alumnus of the Department and had been a member of the Advisory Board since 1995. He served the Board and the Department with distinction and will always be warmly remembered for his thoughtful, conscientious, generous, and unpretentious qualities.

## Remembering alumni

We have learned of the recent deaths of several other alumni and extend our condolences to their families and friends.

• **Dallas "Jake" Fiandt Jr.**, BA'49, MA'50, of Baton Rouge, La., formerly employed by the Indiana Geological Survey for 27 years as a geologist for Texaco, and seven years prior to his retirement as a geologist for Campbell Energy Corporation, died in August 2000.

• **Karl W. "Bill" Frielinghausen**, BA'48, MA'50, of Cody, Wyo., a well-site and consulting geologist specializing in the Big Horn Basin, died in October 1999.

• **Gregory J. Giordano**, BS'82, of Fort Wayne, Ind., died in June 1994.

• **Margaret C. Kuzmitz**, BA'38, of Bluffton, Ind., died in December 1998.

• **Paul D. Proctor**, PhD'49, for many years a faculty member at the University of Missouri, Rolla, and after retirement at Brigham Young University, died in June 1999 at Provo, Utah.

• **Joseph "Nick" Stellavato**, MA'74, geologist at the Yucca Mountain depository site, died in July 2000 at Las Vegas, Nev.

• **Paul David Yundt**, BS'50, of Greenville, Ky., died in May 1999.

## Alumni notebook

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psychologist, lives in Orinda, Calif., with her husband, Robert.

**Scott A. Glassman**, BS'81, writes that he has moved from New Orleans to Houston with Texaco and is now the manager of the seismic imaging, lithology, and hydrocarbon prediction team.

**Robert D. Hall**, PhD'73, is past chair of the North-Central Section of the Geological Society of America.

**Anthony R. Hoch**, BS'88, writes that he is now an assistant professor at Lawrence University in Appleton, Wis., where he teaches mineralogy, geochemistry, and introductory courses in geology and environmental science.

**Douglas M. Kayes**, BS'78, MA'79, writes that he has retired from Mobil Oil after 20 years and is currently a division manager at Stone Energy's Houston office.

**Frank E. Kottlowski**, BA'47, has been honored as a 50-year fellow of the Geological Society of America. He continues to serve as chair and American Association of State Geologists representative to the GSA and AASG Selection Committee for the John C. Frye Memorial Award in Environmental Geology.

**David A. Kring**, BS'84, of the Department of Planetary Sciences at the University of Arizona, Tucson, is chair of the Planetary Geology Division of the Geological Society of America for 1999-2001. He wrote the lead article in *GSA Today*, August 2000, titled "Impact Events and Their Effect on

the Origin, Evolution, and Distribution of Life."

**Dave Lazor**, MA'68, PhD'71, conducted an eight-day rafting trip down the Colorado Grand Canyon for the Houston Geological Society in June 2000. Some 31 brave souls, mostly geologists, rafted from Lees Ferry down river some 160 miles, where they were then helicoptered up to the Bar-10 Ranch and then flown to Las Vegas. Six participants had IU connections and included Al and Phil Rudman, Joan Lauer, Wulf and Christine Massell, and the group leader, Dave Lazor.

**Lindsey R. Leighton**, MS'95, returned to the department as a postdoctoral research fellow and made a colloquium presentation on Sept. 13, 1999, titled "A New Example of Predatory Drilling in the Paleozoic, and the Implications for Escalation."

**Maxwell A. Meise Jr.**, BS'57, MS'61, MA'73, has retired after 40 years of teaching at Warren Central High School in Indianapolis. He was elected to the McCordsville, Ind., town council in 1999. He writes that he participates in the youth and music programs at Fall Creek Wesleyan Church, and that he and his wife, Judith, are both active in the U.S. Coast Guard Auxiliary, teaching boating classes and patrolling a local lake.

**Thomas G. Playmate**, BS'76, MA'78, is an associate professor of geology at Southwest Missouri State University in Springfield, Mo. He was recently elected to serve as chair of the faculty senate for the 2001-02 academic year.

**Robert J. Pruett**, MS'88, PhD'93, is



Six hardy souls — with IU connections — enjoying their Grand Canyon float trip in July 2000 and having just sung the IU fight song are, from left, Phil Rudman, recent student in Geology G221 and G222; Wulf Massell, MA'69, PhD'74; Al Rudman, emeritus faculty IUB; Dave Lazor, MA'68, PhD'71; Joan Lauer, faculty IUPUI; Christine Massell, Geology G429.

### Alumni receptions held in Louisiana, Texas, Nevada

**A**s in previous years, alumni socials were held in 2000 to promote fellowship and maintain contact among alumni.

- On April 17, a group of alumni and friends attended a reception held in New Orleans, La., during the annual national meeting of the American Association of Petroleum Geologists.

- On Sept. 22, an alumni social, hosted by John Bubb and Glenn Hieshima, was held for Houston-area alumni in that city.

- The final alumni reception was on Nov. 13 at the national meeting of the Geological Society of America, held this past year in Reno, Nev.

Do come to an alumni reception during the coming year!

the leader of minerals technology at EEC International. He lives with his wife, Diane, and children in Milledgeville, Ga.

**Scott W. Rogers**, BS'71, is the geo-physical manager for the onshore division of Samedan Oil Corp. He lives with his wife, Carol, in Houston, Texas.

**Otto Sardi**, PhD'69, retired from Connecticut State University in 1997. He writes: "My wife Henriette and I are fully enjoying our retirement years. We travel, mainly to Europe, go to gem and mineral shows, and give talks to clubs and schools." Last fall, they visited the famous amethyst mine of Idar Oberstein, Germany, and the basaltic volcanic mountains on the shore of Lake Balaton in Hungary. Their twin daughters, Monica and Nancy, not yet 3 years old in 1968 when Otto completed his PhD dissertation, are now both engineers, in structural civil and computer software, respectively. Their youngest daughter, Sylvia, is a postdoctoral fellow at Yale University Medical School. Interestingly, Otto was also a postdoctoral Mellon Fellow at Yale's Geology Department in 1982-1983. He and his wife live in Columbia, Conn.

**Thomas J. Schull**, MA'66, gave the inaugural lecture of the Daniel S. Tudor Commemorative Lecture Series at the Department on Oct. 5, 2000 (see page 11). Tom was recently named vice president of planning, evaluation, and business development with Chevron Overseas Petroleum Inc. in San Ramon, Calif.

**Phyllis Scudder Snow**, BS'56, MA'58, retired in 1995 from the fields of hydrology

(continued on page 28)

## Alumni notebook

(continued from page 27)

and geology. She is now an active participant in her community orchestra and band. She and her husband, Donald, live in Kalispell, Mont.

**Cecilia A. Sponable**, BS'88, writes that she has left Diamond Shamrock and the environmental industry to stay home with her child. She and her husband, Dennis, live in Lakewood, Colo.

**John R. Taylor Sr.**, BA'49, is semi-retired in the transportation industry with his Cincinnati company, Taylor Warehouse, now operated by his two sons, both IU graduates. He notes that his company includes Bloomington in its delivery of many food products. He was in the first Montana field course and writes, "I remember the great times our class had at the Red Lodge, Mont., Field Station in the summer of 1948!"

**Steven D. Theodosis**, PhD'56, is retired. His long and active career included teaching in the summer program at the Field Station in 1950. He and his wife, Georgia, live in Broomfield, Colo.

**Howard L. Tipsword**, MA'38, retired from Mobil Oil Corp. in 1976 and now lives in Springfield, Mo. In a class note to the *INDIANA ALUMNI MAGAZINE*, Howard reported that he received his master's degree just two and a half months after the late **Herman B. Wells** was named president of IU. At that time (1938), out-of-state tuition was just \$25 per semester! The non-Indiana resident today is charged a tuition of \$468 per credit hour! (Indiana resident graduate students currently pay \$161 per credit hour.) Times indeed have changed. Howard recalled that he earned his

graduate degree in paleontology and studied under professors **J.J. Galloway** and **E.R. Cumings**, "both fine persons and with national reputations in their field." Owen Hall, of course, was then home to the Department of Geology. Following up on Howard's note this editor received a marvelous letter from him, which is reproduced below at the end of "Alumni Notebook."

**Kenneth Waters Jr.**, BA'49, MA'50, writes of his memories of Professor Deiss and the Field Station. After that experience, he tells how he "landed a job at the AARG in 1950 at Chicago, with the California Company, ordered to report to Harvey, La., (New Orleans) and have been a Gulf Coast geologist ever since."

**William J. Wayne**, MA'50, PhD'52, remains busy in retirement from the University of Nebraska. In 1999, he revisited Yellowknife, Canada, where he and his wife, Naomi, had visited in June 1998 to attend the eighth International Permafrost Conference. In spring 1999, a paper of his on a rockfall south of Salta, Argentina, triggered by a major earthquake about 5,000 years ago appeared in the journal *Geomorphology*. Bill also presented a paper co-authored with **Bob Diffendal** at the Denver GSA meeting in spite of a case of laryngitis. On the personal side, Bill now plays the flute with the Lincoln Downtown Seniors Band. He also played the same piccolo (restored) at a veterans parade on Memorial Day that his great grandfather played in a military band during the Civil War. Naomi recently gave him a bass flute, and he's now "working on it." Older daughter Nancy still lives in Bellevue, Neb., and is employed at a nearby garden center; younger daughter Annette, is physical

planner for the Southwest Minnesota Regional Development Commission and lives in Currie, Minn.; son John and his wife own and operate the Wayne Cyclery in Grand Island, Neb.

**Charles E. Wier**, BA'43, MA'50, PhD'55, was the 1999 Veterans Day speaker at the Monroe County Courthouse in Bloomington. Charles served as a first lieutenant in the 11th Airborne Division parachute unit, making jumps in the Philippines and Japan for more than three years during World War II.

**Joe I. Willman**, BA'60, MAT'62, writes that he is now "winding down a long career in pathology in Muncie, Ind." He and his wife, Teresa, live in Gaston, Ind.

**Milt Wiltse**, MA'66, PhD'68, visited the Geological Survey and the Department in September 2000 upon returning from a week-long trip to Washington, D.C., where he represented the state of Alaska in federal government meetings. Milt is director of the Geological and Geophysical surveys, as well as state geologist of Alaska.

**Larry D. Woodfork**, BS'64, MA'65, is president-elect of the American Geological Institute and a member of the Executive Committee of the organization. Larry is also chair of the Southeastern Section of the Geological Society of America for 2000-2001.

**George Hai Chao Yu**, PhD'99, is a senior scientist and project manager for Harding ESE, a leading environmental consulting company in Knoxville, Tenn. He and his wife, Jing Li, and their daughter, Miao, live in West Knoxville. He can be reached at [gyu\\_5@yahoo.com](mailto:gyu_5@yahoo.com).

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## Graduate alumnus of 1938 fondly remembers IU

Dear Dr. Towell,

Thank you for your kind letter. Your information that IU tuition is now \$468 per credit hour is very interesting. The 32 credit hours I received in 1937-38 for \$50 would cost \$14,976 today. I believe I wrote earlier that room rent in a private home on Tenth Street was \$10/month. Meals averaged about \$40/month and this included breakfast at the Book Nook, a former hangout of Herman B Wells and Hoagy Carmichael. Since you were kind enough to ask, I'll include some highlights of my stay at IU, which are some of my most pleasant memories. These would only be of interest to anyone else because of their antiquity.

My close friend, W.O. "Bill" Allen and I were both geology graduates of Tulsa University, and we enrolled at IU in September 1937 to work toward master's degrees in paleontology/geology. Registration consisted of filling out forms with faculty members of the Geology Department. They were lined up side by side at a long table. The fact that we had come from Oklahoma especially to study under professors Galloway and Cumings seemed to be unusual, so much so that when we informed Dr. Galloway of this, he managed to have us repeat it loudly enough so that his fellow faculty members were sure to hear it.

My friend, Bill, owned a 1937 Oldsmobile coupe as shown in the enclosed photo. Today this ancient machine resembles an experiment in claustrophobic confinement. However, in its day, this auto with its sporty rumble seat was the latest thing in style and was considered class-in-action. Even a bashed fender, which was becoming a permanent fixture, only added to the *razz-a-ma-tazz*. The new price of the 1937 Olds was about \$800.

Although we worked hard and diligently, daily life at IU with our academic studies in Owen Hall and acquired friendships with faculty and fellow students was interesting and gratifying. In addition to professors Galloway and Cumings, we valued the friendship with Professor Ralph Esarey and association with Dr. Malott. We had valued friendships with student colleagues, including Jim Reeves, Fred Latimer, Ray Robbins, Charles Spence, George Heap, Tom Dawson, Hollis Fender, Rodifer Harris, Lester Logue, Fred Shrock, and John Patton (later chair and state geologist).

Aside from academics, one of our most

pleasant experiences at IU was sitting in the Commons after lunch, nursing a soda, and listening to the great swing band of Jimmy Cathcart giving us big band classics in the Benny Goodman style. An unforgettable night at IU was my attending the senior prom and dancing to the music of the Henry Busse band. Henry was so sentimental that he asked us not to dance during his closing theme of "Hot Lips!"

Another remarkable occasion in January 1938 was when Bill and I passed our French language requirement for the MA degree. We celebrated with a dinner-dance on the enclosed roof of the Severn Hotel in Indianapolis. Two sorority sisters from IU went with us. For transport, we relied on our "merry Oldsmobile." One of the coeds shared the driver's seat inside with Bill. The other one braved the rumble seat (outside) with me. Cruising the 80 miles round trip outside in mid-winter wasn't exactly a "walk in the park." However, youth knows no obstacles — riding the rumble

was literally a breeze with no sweat and the excitement of the moment made it enjoyable. We had a sparkling evening to the extent that we delayed our departure and arrived back at the sorority house in Bloomington at 2 a.m., two hours past midnight curfew. The door of the entrance was flung open the moment we arrived. The house mother was waiting for us and it's surprising that she didn't have the police out. While the sorority sisters cringed inside and fled up the stairs, the house mother stood by in stony silence. Evidently outrage and indignation had rendered her speechless. Bill and I escaped in jig time, fortunately, before she recovered her faculties; when it came to confronting irate house mothers, we were quite guilty of cravenly cowardice. We gave the house mother a wide berth in all future activities.

We made several geology field trips, but the best one of all was in April 1938 and it was truly unforgettable. All of the students and most of the faculty in the Geology Department participated. Students in classes from freshman geology through advanced courses and graduate school attended. We had all the requisites for a memorable and exciting field trip: youth,



Howard Tipsword, above and standing beside Bill Allen's Oldsmobile in a photo taken in 1938 near the corner of Tenth St. and Fess St. in Bloomington

perfect spring weather, and lovely, rolling hilly outdoor scenery of southern Indiana. The trip was overnight from Bloomington to New Albany and ending up in Clifty Falls State Park on the north bank and overlooking the Ohio River. This field trip had the added attraction of the presence of the girl students (mostly freshmen). Their presence in these early days was a rare occurrence as most field trips were an all-male province. Proper conduct typical of this "age of innocence" prevailed. Still, the feminine presence gave a vivacious quality to the formation studies and fossil collecting. It was a lovely trip and so enjoyable. It affords one of those bittersweet memories of your youth that you recall for a lifetime.

Our memorable stay at IU was quickly coming to a close. Bill and I were awarded our MA degrees in early June 1938. Indiana University gave us a lot more than our degrees. We had acquired a great respect for

(continued on page 30)

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## Letters from alumnus

the university and I take pride in our association with it. We had made many fine friendships with both students and faculty. Professors Cumings, Galloway, and Esarey had instilled in us a sense of values that would serve us for life. Two of the greatest of these: *simplicity* in outlook and all activity and *perseverance* in all endeavor. These values and living by them have added much to our lives over the years. My IU interlude was an exciting lifetime adventure. It ended abruptly and was over much too soon —long before I was ready to say goodbye.

Bill and I returned to Tulsa. I was employed by Amerada Petroleum Corp. the next several months. Bill worked for his father who was an

(continued from page 29)

independent oil operator. In 1939, I was hired as a paleontologist-geologist by Socony Vacuum Oil Co. in Venezuela. This began my 38-year career with Mobil Oil Corp. and affiliates that took me from Venezuela and Colombia to Louisiana and Texas. My marriage to Maxine Cassady, of Tulsa, in 1941 was my good fortune. She has been my lifelong companion and best friend for all these years.

As you can see, Dr. Towell, my chronicle got completely out of hand in length. It would be my pleasure if you wish to enter any of it in the *Hoosier Geologic Record*.

Thank you and kind wishes,

— Howard Tipsword

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