The Pennsylvania State University

Volume 1 Issue 6

September 2004

DEPARTMENT OF GEOSCIENCES

FROM TIM BRALOWER, DEPARTMENT HEAD

Dear Alums:

Greetings from Geosciences! It's been a year of transition in the Department. Professors Shelton Alexander, Peter Deines and Derrill Kerrick retired this June 30 and David Eggler will retire at the end of the fall semester. It is hard to quantify the contributions of these dedicated professors but we will try with tributes later in this newsletter. A few notable statistics: These four faculty combined have logged an amazing 127 years of service, written over 300 papers, supervised 110 graduate students, taught close to 700 courses, and spent 49 years in administrative positions!

Our graduate program has grown gradually over the last few years. Currently we have 110 students, 75% of whom are in the Ph.D. program. Competition for admission is tough and our students are focused and high achieving. We highlight some of these accomplishments in this issue. Our undergraduate program is also thriving with approximately 100 combined Geosciences and Earth majors. We hope to continue improving our degree programs and have hired Professor David Bice to lead an overhaul of our curriculum. Bice, a structural geologist, joins us from Carleton College where he has been Chair of arguably the best undergraduate program in the country.

In our ever-changing field, we strive to keep up with emerging areas. For example, we have recently proposed a new undergraduate major in the field of geobiology. We expect graduates to enter the environmental field, or focus on paleontology or geomicrobiology. The latter discipline is booming and I am happy to announce that we have hired Professor Jenn Macalady also from Carleton. Macalady, who has made a name for herself investigating bacteria in soils and caves, adds valuable field and lab research expertise to our geobiology and astrobiology programs.

Our hydrogeology program is internationally recognized and you cannot find a field where we play a more important role in our surrounding community. A great example—the ongoing acid runoff problem associated with I-99 construction near State College---is showcased in an article by Duff Gold and Art Rose in this newsletter. I am also very pleased to announce that we have hired two new faculty in hydrogeology: Professors Demian Saffer and Kamini Singha. Saffer comes to us from Wyoming where he has built a successful research program on fluids in subduction zones. He is actively involved with the Integrated Ocean Drilling Program. Singha from Stanford specializes in hydrogeophysics, specifically the use of electrical resistivity methods in determining fluid flow. These two new faculty, along with the legendary Dick Parizek, will direct a highly competitive hydrogeoscience program. Finally, we have made an exciting start to rebuilding our petrology program with the hiring of Professor Maureen Feineman from UC Berkeley. Feineman has conducted innovative research combining experimental and field-based geochemistry of arc systems.

Renovation of the Ryan Family Student Center is complete and the results are exceeding everyone's expectations! At the heart of the center is the EMS Museum and we were truly fortunate to hire Museum Director, Russ Graham, a renowned vertebrate paleontologist who joins us from the Denver Museum of Natural History.

On behalf of the faculty, staff and students, please keep in touch with any news. We look forward to seeing many of you at this year's GSA Reception.

With best wishes,

INSIDE THIS ISSUE

FROM THE DEAN'S DESK

Dean, Eric J. Barron

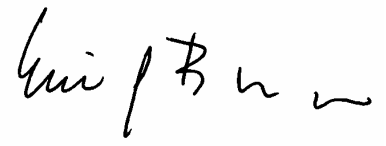
The College of Earth and Mineral Sciences has taken several big steps toward realizing its vision of becoming "the most student-centered college in Penn State history." Our focus over the last year has been to create space for student services and activities designed to enable student success, to build a stronger sense of community, to create opportunities for interaction between students and faculty, and to embed classrooms within departments that will give our majors an increased sense of belonging.

One of the most significant elements of our progress is the opening of the Ryan Family Student Center and classrooms on the ground floor of the Deike Building. Our goal was to integrate teaching facilities, tutoring, advising, student work areas, and museum spaces in order to put EMS students in closer proximity to faculty and staff during their daily comings and goings from the building. By doing so, we make student services that promote success more accessible, and we create a warmer, small-college atmosphere amidst the rich University Park campus environment. To better enhance the College's ability to effectively serve its undergraduate population, the renovated space features updated wireless classrooms and seminar rooms, an expanded student center, EMS Museum, a tutoring center and a state of the art student computer lab. Total cost of the renovations will exceed $1.8 million. The College is in the midst of a fund-raising campaign to finish the project and to establish an endowment for the "EMS Undergraduate Experience" to cover the costs of providing better student services and activities.

A second element designed to create a stronger sense of community from day one is the new orientation program, TOTEMS (Total Orientation Trip for Earth and Mineral Sciences) for incoming freshmen and transfer students. The first TOTEMS held in August 2003 was an outstanding success with faculty, current upper level students, and incoming students enjoying three days of team-building and orientation activities while living in cabins at Lake Raystown. The camaraderie that resulted has endured throughout the year and even initiated a student invitation to the faculty and staff to a formal dinner and dance. A total of 165 faculty, staff and students attended in dresses, coats and ties, and tuxedos, prompting former Dean, John Dutton, to remark that "this is the type of event that separates EMS from every other college." As a remarkable sign of success, nearly 70% of this year's incoming class has already signed up for TOTEMS.

The College is also working diligently to renovate classrooms for our majors within their departments. Modern buildings are designed to control foot traffic. As a consequence, the typical university classroom is being placed on the ground or first floor and faculty offices and labs are being placed on upper floors. The unintentional result is a separation of students from our faculty. EMS is investing to alter this trend for our majors with four newly renovated classrooms being completed adjacent to faculty offices and labs in the last 18 months. The next classroom renovation is being scheduled for 2004/2005. More will follow as resources permit.

The renewed emphasis on our undergraduates is already having an impact. Whereas many units in the University experienced decreased enrollments this past year, EMS recorded its largest incoming class in the last ten years, and our current students are very proud of the changes that are taking place. This is just the beginning. If you would like to help us foster the sense of community of a small liberal arts college embedded in one of the nation's great research universities, please let us know. And, if you are in the area, by all means stop by to see the newly renovated ground floor and our wonderful new student center.



RYAN FAMILY STUDENT CENTER OPENS

When freshmen arrive in the College of Earth and Mineral Sciences, Dean Eric J. Barron wants them to be imbued with a sense of community. The new Ryan Family Student Center on the University Park campus will have them well on their way. The center's goal is to integrate teaching, tutoring, advising, student work areas and museum space into a communal area that brings the students closer to one another and to the faculty.

"I want them to be have the sense of community of a small liberal arts college embedded in a powerful research university," he said.

The Ryan Family Student Center opened at the close of the spring semester. It is part of a bigger renovation project on the first floor of Deike Building, bringing updated, wireless classrooms, and the EMS museum to the area. New galleries are being constructed for the museum, affording better display space and interactive exhibits. The museum will open in early September.

The center was named to honor the legacy of the John T. Ryan family. The Ryan Family Foundation pledged $250,000 for its construction. John T. Ryan Sr. was a founder of the Mine Safety Appliance Co. His son John Jr., a Distinguished Alumnus, served as president of the Penn State Alumni Association and as the first editor of the Mineral Industries Bulletin.

With about 350 faculty and staff members and about 1,000 undergraduate students, Earth and Mineral Sciences is not the University's biggest college. "The college is a discovery college," Barron said. "We want to capture the good students."

Within the Ryan Student Center, EMS students can find tutors in writing, chemistry and math, as well as quiet study rooms where they can do their homework and get some coaching. "We have a writer in residence," Barron said, "because we believe every student has to communicate well."

The college's message to the students, Barron said, is: "We want you to take the challenging classes. But we also are willing to make the investment in tutors to make sure that you do well in them."

The college has invested in a computer lab where students can work and research, a private conference room and a small coffee bar area complete with microwave and refrigerator. Every Thursday, there's free pizza available for the students. "We already have some alums who have promised to man the coffee bar during finals week," Barron said.

Along the wall are a bank of offices for professional advisers, tutors and for the college's student council. The center has a number of tables where "students can debate their homework in a collegial fashion." Not too far from them are a comfy sofa and stuffed chairs arranged in a living room environment where students can just hang out.

Erin Manion, a senior majoring in geosciences, has been working out of the center for about a month.

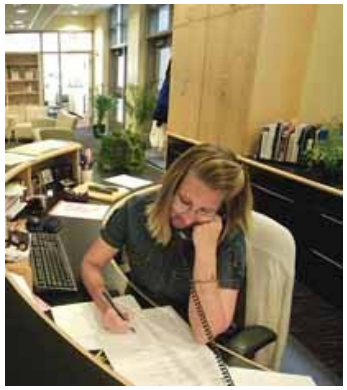
“I think it's amazing," she said. "I think the students are really lucky to have this. I wish I were a freshman so I could enjoy it for about four years."

"We enjoy our students, that's for sure," said Linda Spangler, student center office manager. She oversees all the operations of the student center, assisting students and advisers, arranging tours for prospective students and families and is a mentor to the student council.

The philosophy of community extends to the wall outside the center where a message has been carved into a black wall above the names of faculty, staff and alumni: "More than a century: Earth and Minerals Sciences graduates welcome the next generation."

This story originally appeared in “Penn State Live. “

A View of the Ryan Family Student Center



Linda Spangler, Office Manager, oversees the daily operations of the Center

GEOBIOLOGY CLASS TAKES JOURNEY TO ANCIENT AND MODERN DENVER

Handful of baculites from the Pierre Shale.

From April 16-20, 2004, Professor Peter Wilf took his 19 Geosci 204 students to Denver, Colorado and its environs so that they could experience in real life almost everything they had learned in class about the evolution and extinction of life on the dynamic Earth. The Denver Basin is an ideal setting because of its rich fossil record and well-understood stratigraphy and structure, and perhaps most importantly because of the rich educational framework provided by the Denver Museum of Nature & Science (DMNS). The DMNS provided outstanding guide services for the trip, led by their Chief Curator, Dr. Kirk Johnson. The DMNS is conducting the NSF-funded Denver Basin Project and is actively studying most of the sites visited, so that the students were directly exposed to the exciting process of scientific discovery within a major research program.

Denver Mayor John W. Hickenlooper and the class

Students enjoyed many stunning hands-on experiences. Highlights included putting their fingers on the Great Unconformity at two sites (Red Rocks Park and Manitou Springs) and on the K-T boundary impact layer at West Bijou Creek. They got to see, find, and touch a dazzling variety of unusual fossils, such as dinosaur bones and trackways in place on Dinosaur Ridge and dinosaur, mammal, and plant fossils in the research collections of the DMNS (not on view to the public) as well as major, world-class public exhibits. Students collected Cretaceous ammonites and clams from the Pierre Shale, dinosaur and crocodile fossils just below the K-T boundary, and Paleocene plant fossils just above. Students visited the oldest known (Paleocene) rainforest, along I-25 in Castle Rock, and dug up huge fossil leaves. They climbed Castle Rock and saw evidence for a massive Eocene volcanic eruption and catastrophic floods. The trip concluded with a train ride on the Cog Railway to the topographic top of the local world, the summit of Pikes Peak (14,100 feet), followed by a very unusual, personal, one-hour audience at the administrative top of the world with Denver Mayor John W. Hickenlooper, a former geologist, to hear his unusual perspective on government, life, and science.

This field trip was made possible by the generous support of ChevronTexaco, ExxonMobil, ConocoPhillips, BP and the Penn State Institutes of the Environment, which combined to make this experience extraordinarily affordable for our students.

Story Contributed by Peter Wilf

Dinosaur bones in place, Dinosaur Ridge

Xiphactinus (giant Cretaceous fish), Denver Museum of Nature & Science

FURLONG'S STUDENTS ENJOY HIS CHALLENGES

This story is an excerpt from an article originally appearing in Penn State Live. To view the story in it's entirety, please visit: http://live.psu.edu/story/6419

Dr. Kevin Furlong
Professor of Geosciences

''Everyone's got something that drives them. If you tap into it, you're in great shape"

Kevin Furlong, Professor of Geosciences, tells the following story about the influence professors can have on students.

He was waiting at the University Park Airport a couple of years ago when members of the women's volleyball team, en route to a tournament, came up to chat. The women were students in his 100 level class, "Natural Disasters: Hollywood vs. Reality." Before Furlong got on his plane, the coach stopped the professor and told him he was dying to meet him because the team "is always talking about your class at practice."

"As a scientist," Furlong said, "that is so wonderful that a mixed group of students, none of whom are scientists, think what you talk about is so important that it is the focus of their discussions."

Furlong, who is marking his 20th year of teaching at Penn State, is one of the many professors at the University who balance research and teaching duties. Furlong's research area is lithospheric geodynamics, the study of modern tectonics and what happens at plate boundaries. He recently returned from the Australian Geological Society Meeting where he spoke at a special symposium on New Zealand's plate boundaries.

Furlong is the recipient of several University teaching and research awards and in 2002, he was a Fulbright Senior Scholar in New Zealand.

This spring, he taught two sections of the 400 level, "Natural Disasters," a course he characterized as a "writing-intensive" look at hurricanes, floods, tsunamis, quakes, landslides, etc. He has a total of 55 students, mostly from the meteorology, geography and geosciences departments.

Furlong described the upper-level course as "mostly chaos." The group meets twice a week. They do five case studies working from primary data. For example, they study Hurricane Agnes data and calculate when and where flooding occurred. The students are developing an expertise they can apply elsewhere, such as developing a preliminary flood analysis for another city.

Furlong lectures for awhile, then sets the students to working on their problems. "Two hours of lecture would drive me insane and them, too," he said.

The scientific goal of his class is to have the students work with real data and reach conclusions.

"I'm of the mindset to think who I'm aiming for," he said. "Students at the 400 level are sophisticated enough to understand that there isn't a single formula; they learn to work with real data sets".

"Too often we give students laundered data to give guaranteed results — simple systems of data cleaned up. This is misleading. Students coming into geosciences learn that the Earth is messy. We can't control all the variables."

"Kevin has the ability to translate complex scientific concepts into language that nonscientists understand, but he's able to do it without diluting the meaning or the importance of the work," according to Tanya Furman, Associate Head for Undergraduates in Geosciences. "You read a lot of textbooks that have oversimplified things until someone in the business looks at it and says, 'this isn't quite right,' and Kevin avoids that trap."

During a recent class, students were seated around a series of conference tables. They picked up their nametags as they arrived. Furlong insists on the nametags to help familiarize the class with each other since students work as cohorts.

The professor reviewed calculations to track the flow of lahar, volcanic mudflow, down a New Zealand mountainside, based on the slope. Then, the group flipped open calculators and laptops to do the work. Each table had a topographical map of the site. The mountain featured a crater lake and glacial ice pack at the top. The students' job was to calculate the slope and predict the flow. As they worked their calculations, Furlong walked among the tables offering encouragement and advice. He reminded them of what he called "gotchas," things that could skew their calculations, such as negative

(Continued on page 6)

FURLONG CONTINUED

(Continued from page 5)

numbers. "We want numbers that make us happy," he said. "We don't want results that are bogus."

Sarah Knuth, a senior in earth sciences, was hunched over a map plotting coordinates with Andrew Boyce-Lewis, a senior in letters, arts and sciences. She said she was enjoying the course. "It's a lot of hands-on work," she said. "It's good in that way. It's not a sit-in-the-class-and listen-to-lectures-style class."

The professor said he finds teaching rewarding, joking, "I do it for the money and fame."

"I never have been a fan of typical introductory classes," he remarked. "I find it depressing. There seems to be a tacit assumption that students outside our own disciplines are stupid. We water things down so they can understand."

He disagrees. Furlong said students sign up for his classes even though the requirements are rigorous."

They don't know they're working hard because they're enjoying it. That kind of class is rewarding."

As a teacher, Furlong said he has learned to tap into student motivation. "Academics may not be what's driving them but they are willing to commit themselves," he said. "Everyone's got something that drives them. If you tap into it, you're in great shape."

The students have taught him to be a little less arbitrary. "You need to get inside their heads and find out why they're doing things," he said.

Furman said, "Kevin cares deeply and personally about students and their learning and that's reflected in the respect he brings to the classroom and that inspires

FIELD STRATIGRAPHY EXPLORES GUADALUPES

In May 2004, the Advanced Stratigraphy course journeyed to the Guadalupe Mountains of West Texas. The eclectic group of 14 graduate students and two faculty members included paleobiologists, ice seismologists, stratigraphers, rock mechanicians, structural geologists and petroleum engineers.

Many of our graduate students are tied to the workstation or the laboratory bench. This course gives them a hands-on field experience measuring and describing sedimentary rocks and interpreting their stratigraphic relationships. In a broader context, students have the opportunity to integrate observations from the scale of the grain to the basin in order to interpret the evolution of geological systems.

We go to the Guadalupes because the students can see for themselves an entire shelf-to-basin system complete with exquisite exposures of clastics and carbonates. To see it all requires 14 hour days, lots of hiking, long drives, and windy nights in tents. Calluses and cacti wounds were relieved by hot Mexican food and refreshments in scenic downtown Carlsbad.

The Advanced Stratigraphy Class in the field

In seven days we visited and measured section at Salt Flat Bench, Bone Canyon, Algerita Escarpment, Dark Canyon, and McKittrick Canyon. Highlights included the appearance by Rick Abegg (Geosciences B.S. '83), now with ChevronTexaco) and his elegant explanation of Bouma sequences at Salt Flat Bench and the silicified reef organisms on the Permian reef trail.

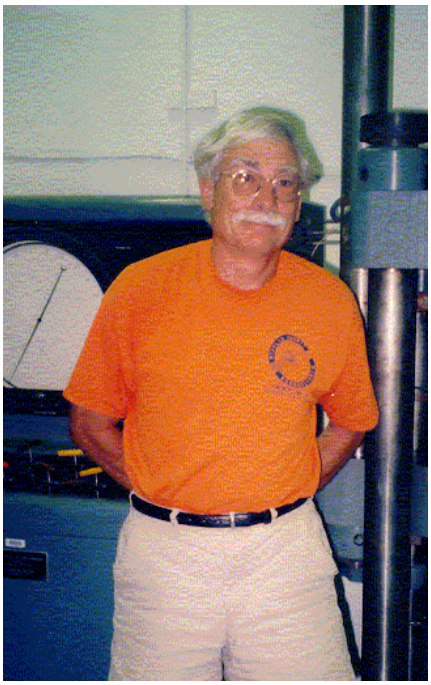
Field trips are a critical need for our department and they are only possible through the generous support of industry to the Geosciences Field Fund. The field trip fund has been supported by ChevronTexaco, ExxonMobil, ConocoPhillips, and British Petroleum.

Contributed by Peter Flemings

Students exploring the area

DEPARTMENT HONORS 4 NEW EMERITI

On April 3, 2004 the Department celebrated the careers of Professors Alexander, Deines, Eggler and Kerrick who have each achieved Emeritus status. Please join us in recognizing this outstanding accomplishment



Dr. Eggler today

Prof. David Eggler has made fundamental contributions to our understanding of mantle petrology and to the educational program at Penn State. Dave received his A.B. in Geology from Oberlin in 1962 and his Ph.D. from the University of Colorado in 1967. His first residence in the Nittany Valley occurred as a Research Associate at Penn State from 1967 to 1970. Dave then assumed an assistant professorship at Texas A&M from 1970 to 1972, but he returned to the East Coast to work as a staff member at the Carnegie Geophysical Laboratory in Washington, D.C. from 1972 to 1977.

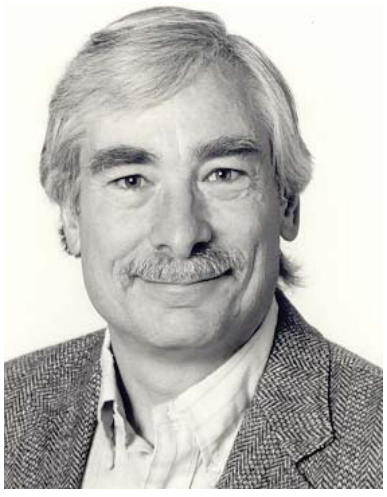
Many of Dave's most important manuscripts emerged from this experience, and his 1974 article on the "Effect of CO_2 on the Melting of Peridotite" was selected as a Benchmark Paper in the 1984 volume "Basalts," edited by Ragland and Rogers. Much of Dave's work on the solubility of CO_2 in mantle melts laid the foundation for the intense interest in volatile generation at plate boundaries today. For this research, Dave was recognized in 1979 with the award of the L.R. Wager Prize in volcanology by the International Association for Volcanology and Geochemistry of the Earth's Interior.

Dave continued his important work on magma geochemistry and kimberlite petrology when he was hired as an Associate Professor at Penn State in 1977 and through his promotion to Full Professor in 1985. During this time Dave also was heavily involved in undergraduate and graduate education, serving as the Associate Head of the Graduate Program from 1983 to 1994.

As part of his reign, he developed the complex algorithm for calculating the number of new graduate students who can be admitted to the department each year. Known as the "Eggler Factor," this algorithm remains a closely guarded state secret. Dave also has taught across all levels of the curriculum from such general education courses as GEOSC 20: Planet Earth to graduate courses in phase equilibria. For decades he has collaborated in the summer field course, becoming a connoisseur of Idaho wines as he helped create the next generation of observational geologists.

Dave's participation in activities outside the department is as much a cause for admiration as is his professional life. He has run competitively in long-distance races for many decades. Through this experience he became engaged in the Special Olympics, for which he performs a variety of tasks when the event comes to State College each year. In light of Dave's tireless contributions to our department and our community, we presented him with a first edition of N.L. Bowen's "The Evolution of the Igneous Rocks," of which only 550 copies were published in 1928. Perhaps by reading the original description of Bowen's reaction series, Dave may at last be convinced of its proper place in the pantheon of great geological ideas.

Contributed by Peter Heaney



Dr. Eggler as Graduate Program Head, circa 1986

NEW EMERITI CONTINUED

Dr. Deines today

Peter Deines' lifelong dedication to Penn State, his tireless service to the Department of Geosciences and the University, are all the more remarkable because of the international reputation he has achieved in geochemistry, particularly stable isotope geochemistry, and the role he has played in training new generations of geochemists. Few faculty have been able to make such significant contributions to the teaching, service and research missions of their university.

This love affair with the University began quite early in Peter's life. Although he was born in Germany and completed his Geologen Vordiplom at the Rheinische Friedrich Wilhelms Universitat, Bonn, the rest of his academic training, including his M.S. and Ph.D. degrees, and all professorial appointments have been at Penn State. He began, and now ends his administrative service to the Department as Graduate Program coordinator, first for the Geochemistry and Mineralogy Graduate Program, and now for the merged Geosciences Graduate Program. At the University level he has served on the Graduate Council and has been a member of the Faculty Senate for a remarkable 24 years, including serving as chair of this prestigious group.

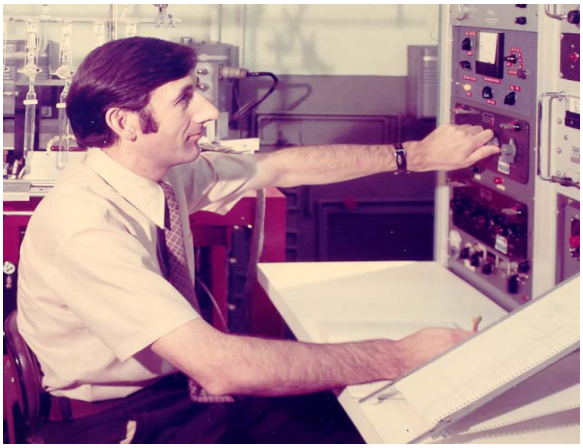
Not one to shortchange his colleagues outside of the University, Peter has been an active contributor to his professional societies, including a long run as editor-in-chief of Isotope Geoscience and numerous contributions to the Geochemical Society. His work for the Geochemical Society focused on promoting its International Goldschmidt Conference, and included multiple stints as meeting chair or co-chair. The Goldschmidt Conference is a much-anticipated opportunity for geochemists from around the world to share their new knowledge of geochemistry, and the meeting's origin and continuation is, in a significant way, the result of Peter's contributions.

Although Peter taught over ten different courses during his time at Penn State, he'll be best remembered for his course in introductory geochemistry. Meant principally for undergraduates, this course proved indispensable to graduate students who aspired to be geochemists. His patience, persistence, and compassion, married to an effective, comprehensive teaching style, transformed nervous geochemistry neophytes into confident and competents geochemists. His original course (Geosc 415) serves as the model for the two current offerings in introductory geochemistry, one for undergraduates (Geosc 202) and the other for graduate students (Geosc 533).

In Peter's research he has made fundamental contributions to our knowledge of natural variations of the stable isotopes of carbon, hydrogen, nitrogen, oxygen and sulfur, analyzing both natural samples from meteorites and Earth's crust and mantle and experimental materials from his laboratory. He is perhaps best known for elucidating the surprising heterogeneity of the carbon isotopic composition of the mantle and its implications for the geochemical cycling of this most important element.

One of Peter's favorite conversational segues was "Meanwhile, back at the ranch . . ." meaning "let's cut the chit-chat and get down to business!" Given Peter and his wife, Melissa's love of horses, we do hope he'll use some of his extra time in retirement away from the office and lab and actually out at the ranch. But any time day or night that Peter is NOT in the building will be a noticeable and regrettable departure from the status quo for the Department of Geosciences.

Contributed by Lee Kump



Dr. Deines at the Mass Spec circa 1968

NEW EMERITI CONTINUED

Dr. Kerrick in his lab, circa 1972

Derrill Kerrick received his BS from San Jose State College in 1963 and his Ph.D. from Berkeley in 1968. He began early on his teaching career as a skiing instructor while in California. Next, he spent two years (1967-1969) as a lecturer at Manchester University in the UK before coming to Penn State as an Assistant Professor in 1969. He was promoted to Associate Professor in 1973 and Full Professor in 1979. Derrill was Chair of the Geochemistry andf Mineralogy graduate program from 1978-1983 and many PSU Geosciences alumni remember him fondly from that period.

Derrill is an author on over 60 publications (first author on more than 31 of these). He was instrumental in establishing equations of state for metamorphic fluids, for contributions toward our understanding of the kinetics of metamorphic reations, and for quantification of the role of CO2 degassing from subduction, volcanism, and mountain building within the global carbon cycle. His career thus spanned from experimental work with cold-seal bombs and other high-temperature high-pressure apparatus to field work involving rates of degassing and textural and field analysis of metamorphic rocks. His experimental skill is apparent—he never lost a student nor himself. Derrill is well known for classic papers in metamorphism and degassing and for two Mineralogical Society of America Short Course volumes.

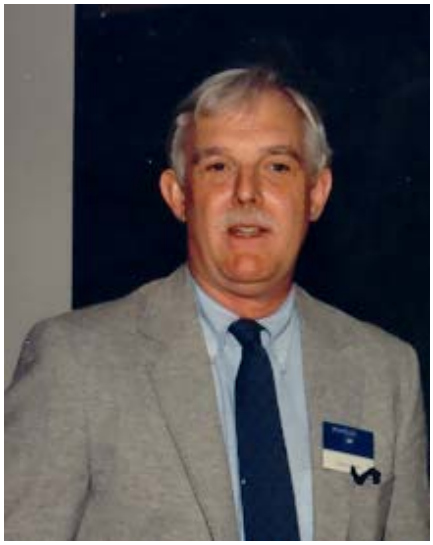
Derrill's contributions do not stop within the confines of the university: he is also remembered for his fun-loving personality and excellent sense of humor.

Derrill's contributions to Entropy party skits will not soon be forgotten, including one memorable appearance that involved volleyball knee pads and a dress. The Department of Geosciences salutes Derrill as he retires and is proud to have hosted one of the finest, internationally known, metamorphic petrologists of the latter half of the twentieth century.

Contributed by Susan Brantley and Peter Deines

Dr. Kerrick today

New Emeriti Continued



Dr. Alexander, 1982

Shelton Alexander, for over 40 years, has made many outstanding contributions to the Department, the University, and the geophysics community. Shelton joined Penn State in 1969 as an Associate Professor, after receiving his Ph.D. from Caltech in 1963 and teaching, from 1963 to 1966, at the Air Force Institute of Technology in Ohio. Shelton was promoted to Professor of Geophysics in 1972.

Shelton's commitment to the Department and University has been tireless and his dedication to helping students is unsurpassed. Shelton has supervised over 50 graduate students, while contributing advice to countless others as a member on thesis committees. His students have gone on to influential careers in academia, industry and government organizations, where they continue to spread Shelton's positive influence on earthquake seismology in particular and geoscience in general.

In the past decade, Shelton played an influential role in the undergraduate program though his direction of the senior thesis course. Shelton has served the University in countless administrative positions, including important stints on Department, College, and University tenure committees, as Program Director for Geophysics (1971-1985) and as Department Head (1985-1990).

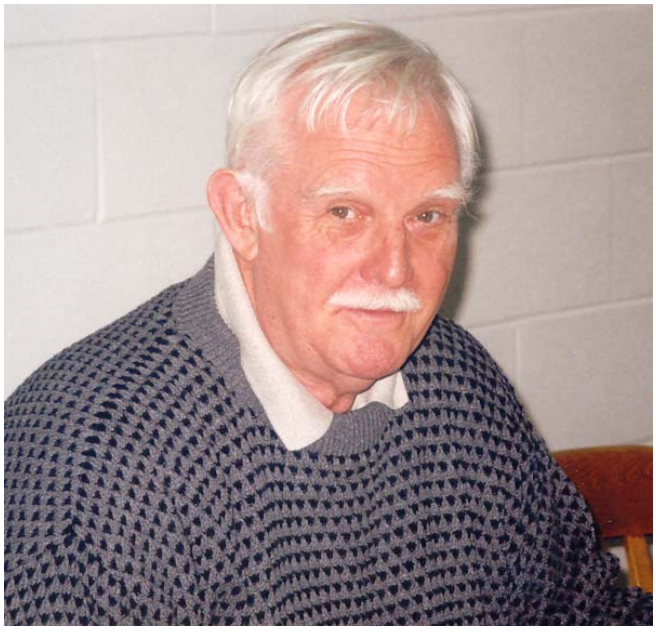
Shelton has also had a strong impact on the broader geophysics community. He has served on too many national and international advisory panels and committees to count dealing with just about every topic imaginable, from earthquake prediction to space research to the transborder flow of scientific data. Shelton was a founding board member of the Incorporated Research Institutes of Seismology (IRIS), and he played a pivotal role in the creation of the IRIS Data Management Center. In addition, he has consulted widely for electric utilities on seismic safety and siting of nuclear of power plants.

Through his research, Shelton has made a number of important contributions in seismology. His publication record includes over 75 peer reviewed papers, and he is most frequently cited for pioneering work on the structure of the core-mantle boundary using diffracted P waves and on the deep structure of continental lithosphere using surface waves.

Shelton's career is one that exemplifies academic life in many ways, not least in his accumulation of knowledge, well displayed in his office, where students and faculty for years have had to dig behind stacks of papers and reports to find Shel busy at work in the few remaining inches of unfilled space. Shel's day-to-day contributions to the life of our Department will be greatly missed, but the example he has set of combining outstanding student mentoring with scholarship and administrative service will no doubt endure for a long long time.

Contributed by Chuck Ammon and Andy Nyblade

Dr. Alexander Today



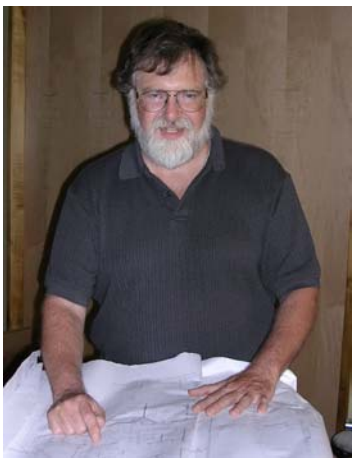
NEW FACES
DEPARTMENT WELCOMES 4 NEW FACULTY

Dr. Demian Saffer

My research interests focus on the relationships between fluid flow, deformation, and tectonics. Specifically, my research centers on two basic themes: (1) understanding factors that control the distribution and magnitude of fluid pressure, particularly at active plate boundaries, and (2) constraining the flow pathways and fluid budgets in these dynamic hydrologic and tectonic settings. This research presents a unique opportunity to integrate field data, laboratory experiments, and computer modeling, and for exciting collaboration with colleagues in the fields of geochemistry, structural geology, tectonics, and hydrology.

My interests in sediment deformation processes and regional scale fluid flow also extend to developing a better understanding of basin consolidation processes in a general context. Similarly, my interest in the hydrologic behavior of fault and fracture systems is directly applicable to problems in the energy industry and regional groundwater resource management.

My research group includes 4 current graduate students and a part-time post-doctoral researcher. Our work focuses on tectonic geohydrology problems, but includes projects aimed at understanding recharge mechanisms in our local fractured aquifer, as well as the fate and transport of surface water co-produced with natural gas.



Dr. Russell Graham

Dr. Russell W. Graham was born in Hammond, Indiana, on May 28, 1947. He graduated from the University of Iowa with a B.S. in Zoology in 1969 and a M.S. in Geology in 1972. He received his Ph.D. in Geology from the University . Dr. Graham spent a year at the Smithsonian Institution as a Postdoctoral Fellow in Systematic and Evolutionary Biology. While at the Smithsonian, he studied Pleistocene mammals from archaeological sites in Mexico and Colorado.

In 1977, Russ assumed the position of Assistant Professor of Geology at Indiana University-Indianapolis.

He moved to the Illinois State Museum in 1978 where he became Curator and Head of Geology in 1983. He then moved to the Denver Museum of Nature & Science in 1996 as Curator of Vertebrate Paleontology and Head of Earth Sciences.

In December 2000, Russ was promoted to Deputy Chief Curator and in June of 2001 to Chief Curator or Head of the Collections and Research Branch of DMNS. In 2004, Russ accepted the position as Director of the Earth and Mineral Sciences Museum and Associate Professor of Geosciences at the Pennsylvania State University.

Dr. Graham's research focuses on the evolution, biogeography, and extinction of mammals as well as the taphonomy of mammal fossil deposits. He has extensive experience in the excavation and analysis of fossil mammal sites, especially those of the latest Eocene and late Pleistocene. Most of Russ' field work has been in the mid-continent of the United States but he has conducted taphonomic studies in Nunuvat (formerly the Northwest Territories of Canada).

Dr. Graham was elected a Fellow of the American Association for the Advancement of Science in 1996 for his studies of the spatial response of mammals to environmental change. Russ enjoys hiking, bird watching and reading, especially biographies of scientists and explorers.

NEW FACES CONTINUED

Dr. David Bice

I was born and raised in Minnesota, which probably explains my present affinity for mountains and Mediterranean climates. After receiving my BA in Geology from Carleton College in 1981, I spent a year working for the USGS monitoring Mt. St. Helens. I then moved down the coast to Berkeley for my Ph.D., working with Walter Alvarez on impacts and extinctions, but mainly on the stratigraphy, structure, and tectonics of the Northern Apennines of Italy.

I returned to Carleton in 1988 and spent the next 16 years there teaching a wide range of courses to an unending stream of fantastic students.

My teaching interests include structure, tectonics, earth system science, ocean and atmosphere dynamics, and a field geology seminar in Italy.

The Italy field program is based out of the Osservatorio Geologico di Coldigioco, which was created from the ruins of a small village in the Apennines by a group of my colleagues and myself.

My research interests include computer modeling, paleomagnetism, structure/tectonics, stratigraphy; but most recently have centered on exploring the rhythms of Tertiary paleoclimate recorded in the pelagic sediments of the Northern Apennines.

Extracurricular interests include cooking, wine-making, mushroom hunting, and playing with my little boy, Luca.

Dr. Jenn Macalady

I grew up in Northern Michigan, the Florida keys, Georgia and Colorado. As a child, I spent many vacations in Pennsylvania visiting grandparents (my parents are Penn State alumni).

I received my B.A. in Geology from Carleton College in Northfield, MN and M.S. and Ph.D. degrees in Soil Science from the University of California at Davis.

For 18 months, I worked as a postdoctoral researcher in geomicrobiology at the University of Wisconsin Madison and then at University of California Berkeley.

During the past 2 years, I developed undergraduate Geomicrobiology and Introductory Geology courses and launched an undergraduate-powered research program after joining my husband Dave Bice on the faculty at Carleton College.

My current research projects involve the geomicrobiology of cave formation, the microbial role in weathering and soil processes, stable isotope tools for geomicrobiology and environmental geochemistry, the chemistry and evolution of microbial membranes, and ecological interactions in microbially dominated ecosystems.

I also am an avid traveler, like to hike, fish, hunt and play soccer, and speaks Italian. In addition to geology and microorganisms, I am passionate about food, wine and my son Luca (age 1.5).

FACULTY ADVISE PENNDOT ON LOCAL ACID ROCK DRAINAGE

This article was contributed by Professors Duff Gold and Art Rose.

Many of you will remember the scenic view from Skytop of the Allegheny Front, with Gene Williams, Robert Schmalz and Rudy Slingerland trying to convince you that you were looking at the prograding Catskill delta sediments across the Bald Eagle Valley. Others may recall the pyrite and galena occurrence and the colorful gossan of hematite, limonite and goethite in the small US 322 roadcuts near Skytop, as well as the inevitable discussion on the nature of veins that commonly underlie oxidized "cap rock." This scenario has become fact with the construction of I-99 and local residents and state officials are regretting the exposure of more than 900 feet of pyretic veins in bedrock, and the "nasty red acid" leaking from fills and waste dumps where the excavated rock was placed.

A view overlooking the Skytop I-99 Extension Project. Photograph from Centre Daily Times, used with permission

Interstate 99 is being constructed from Tyrone past State College to connect with I-80 near Bellefonte, and crosses Bald Eagle Ridge in several major cuts at Skytop. The Ordovician Bald Eagle Sandstone, Juniata Formation and Silurian Tuscarora Quartzite on Bald Eagle Ridge are vertical to overturned. The sulfide-bearing veins appear to be concentrated in the more competent and well-jointed arenaceous units of the Bald Eagle, Juniata, and Tuscarora formations in one of the cross-strike facture zones associated with the wind and water gaps along Bald Eagle Ridge.

Their reducing nature is evident in the gray and bleached zones surrounding the veins where they transect the red shales and siltsones of the adjacent Juniata Formation. Part way through excavating a large cut through the Bald Eagle Sandstone last year, pyrite was recognized, but its full significance was not realized until the broken rock was distributed to several "fill" sites, up to 10 miles from Skytop, and in three local waste dumps. Lime was added to some rock to neutralize acid. In early 2004, red seepages from some piles were recognized, and the media aroused residents on the problem.

Pyrite is present in discrete sets of NNW-trending veins up to 2cm thick, that cut across the bedding, and in clusters of vein networks, several feet thick. Pyrite also occurs as coatings on a myriad of fracture surfaces, and locally in the pore space matrix along bedding planes, throughout most of the 900 feet of Bald Eagle Sandstone exposed by the road cut in the Skytop wind gap. Traces of sphalerite, galena, chalcopyrite, marcasite, pyrrhotite and Ni-As sulfides have been identified. Besides the gossan minerals, there is a transient group of efflorescent sulfate minerals (gypsum, copiatite and melanterite). Some seepages emerging from the piles of pyretic rock have pH from 2 to 3, Fe, up to 2700 mg/L, Al 800 mg/L and acidity up to 18,000 mg/L as Ca CO_3. Concentrations of Zn, Cd and other heavy metals are at the mg/L level in the worst seepages. The runoff, currently being treated with lime and sodium hydroxide, still generates lots of red precipitate, a potential contaminant to high quality streams and groundwater in the Nittany and Bald Eagle valleys.

PennDot is faced with two challenging problems. The short-term problem is what to do with the 800,000 cu. Yd. of rock excavated from the cut. This would fill a 100 mile-long railroad train.

(Continued on page 14)

Acid Rock Drainage Continued

(Continued from page 13)

Present proposals are to haul the worst rock to an abandoned strip mine near Phillipsburg, where severe acid problems already exist, and to mix it with lime. Less pyretic rock would be placed in a lined landfill on the west slope of Bald Eagle Ridge. Unfortunately, some of this material was used to elevate the roadbed of a mile-long section of the northbound lane of I-99 as it approaches Skytop from Bald Eagle Valley.

The debate is whether to treat this already paved-over road-bed *in situ*, or to dig it up for removal to a toxic waste site. The long term challenge is how to treat the pyrite veins exposed in the road cuts at both sides of the ridge at Skytop, and at two other localitites on the new road between Bald Eagle and Port Matilda. However, PennDot's time table, in human rather than geological terms, means alternate methods to control acid rock drainage must be employed while nature reestablishes and oxidized caprock over the sulfide veins in the road cut. Some of these include impregnation with acid suppressing grout, capping with fly-ash cements, and the construction of passive treatment systems, using compost and limestone to neutralize the acid in the runoff and groundwater discharge. But worries abound, and continue to challenge the scientific and technical community.

Iron-rich water being treated with lime.
Photograph by Art Rose

The Coal Research Section & Its Geological Roots and Fruits

This article is a continuation of our feature story in the Summer, 2003 edition, contributed by Dr. William Spackman. We are appreciative of Dr. Spackman's efforts in preparing this story for print

The research focused on the occurrence of uranium in lignite coal seams encountered difficulty because of the need to know when and how the uranium came to be preferentially concentrated in the seams. This led to an extensive program of research focused in the "coal-forming swamps" of the Florida Everglades and the Okefenokee Swamp in an attempt to learn more about the formation of the organic and inorganic constituents in coals and the origin of the differing strata forming the lignite seams. The program was funded by The National Science Foundation and continued for more than twenty-five years. Arthur D. Cohen pioneered in the study of the origin of the organic and inorganic constituents in peats including description of the origin of pyrite and including a technique for accurately reconstructing the environments of peat deposition. Significant contributions were also made by W. Gill Smith, Fred Rich, Jesse Yeakel, Deborah Kuehne and C. Philip Dolsen. Tom Davies, in what has been called a "landmark study" and using an imaginary "grid", a pocket compass, a 14' rowboat and an extendable pole probed the depths of Florida Bay producing a valuable contour map on the bedrock underlying the Bay and demonstrating that the islands in the Bay had developed over depressions in the bedrock surface. Two other interesting by-products of the research were the discovery of the fact that uranium was being extracted from the Gulf of Mexico and concentrated in certain brackish, peat-forming environments, and, sea level had been rising at the rate of 3 to 4 inches per century for the past 4000 years.

With the completion of Deike Building in 1963 the Coal Research Section moved from its sumptuous quarters in Ihlseng Building to the fourth and fifth floors of Deike occupying about half of these areas in-

(Continued on page 15)

COAL RESEARCH CONTINUED

(Continued from page 14)

cluding sections designed for the palynological program, modern sediment studies, thermal microscopy, the Catalog of Fossil Spores and Pollen, coal microscopy, sample preparation, publication services, an instructional laboratory for paleobotany, palynology, and coal geology and petrology, a computer room and library and administrative offices for the Coal Research Section. Alfred F. Traverse was added to the staff of the Coal Research Section and to the faculty of geology to further develop the palynological program at Penn State and to oversee the production of the Catalog of Fossil Spores and Pollen, R. R. Dutcher was appointed as Assistant Director of the Coal Research Section and as a faculty member in geosciences to expand the coal geology and coal petrology programs. Richard Thompson, who had recently completed his PhD. with Dr. F. M. Swartz in Paleozoic stratigraphy joined the staff to oversee the sizeable program sponsored by Bethlehem Steel.

In the early 1970's national concern developed with regard to the adequacy of reserves of natural gas and oil and a concerted effort was mounted to develop the gasification and liquefaction of coal as a long-term energy source. The Office of Coal Research in the U. S. Department of the Interior awarded a contract to the Coal Research Section focused on the characterization of the Nation's coal resources. Over 1500 coal samples were appropriately collected from coal seams in all of the Nation's coal producing states. These were systematically analyzed, characterized and stored as the "Penn State Coal Sample Bank and Data Base." A new building was constructed at the east end of Campus to house the samples and the data were computerized on a PDP-9 computer, which required a full room in the Mineral Industries Building to contain its bulk. The samples and data were made available to the coal utilization and coal research communities, without charge, as a means of rendering all information and data developed on the Nation's coals more interpretable and relatable. With a view to expanding the scope of the concept, a "World Coal Sample Bank and Data Base" was developed by workers in Holland.

As the interest in coal gasification and liquefaction mounted, the United States Department of Energy was created and, because of its expertise in these areas, the Coal Research Section was awarded a $4,000,000 contract to conduct research that would aid in rendering these processes feasible. This was the largest contract issued to any university by the United States Department of Energy; a heavy burden to produce results was placed upon Drs. P. L. Walker and P. H. Given in Penn State's Department of Fuel Science and Dr. H. L. Lovell in the Department of Mineral Preparation. Numerous publications resulted and L. Walker devised a "unifying formula" to describe the gasification of coal and P. H. Given presented the Governor of Pennsylvania with a bottle of liquefied fuel derived from Pennsylvania coal.

By this time, Penn State was clearly recognized as a leader in coal research and representatives of corporations were frequent visitors to the Campus. This spawned the idea of creating a "Cooperative Program in Coal Research" modeled to some extent on existing "cooperative programs." The coal research "Cooperative Program" however was unique in a number of ways. Corporations were invited to join the program by giving the Coal Research Section a grant of $10,000 as a "participation fee." Payment of this "fee" provided the corporation with the privilege of sending two representatives to a two-day, semi-annual meeting on Campus. This afforded them with an opportunity to interact with representatives of other corporations and with PSU coal researchers (including faculty, staff and graduate students). The University's obligation was to provide two-day programs acquainting the participants with an "up-date" resume of recent coal research results from around the world. The program met with great success and at one point participation had to be limited to 30 corporations. Representatives of the steel, aluminum, oil, gas, and coal industries were involved.

In 1970 R. D. Dutcher left his posts as a faculty member in geology and as Assistant Director of the Coal Research Section to become Chairman of the Geology Department at Southern Illinois University, ultimately becoming Dean of the University's College of Science.

Shortly after Dutcher's departure, Spackman received a request for a letter of recommendation for Dr. Alan Davis, who was in Australia at the time. He wrote a glowing letter of recommendation and included the comment that he would pay twice the sum offered to obtain Davis' services. Davis apparently saw the letter and accepted the idea of returning to Penn State, rejecting the Australian offer. Upon his arrival, Dr. Davis became the Assistant Director of the Coal Research Section with the added responsibility of carrying on the instruction and research in coal geology and petrology at Penn.

FACULTY HONORS AND AWARDS

Wilson Award for Outstanding Service

Dr. Peter Deines has dedicated himself to the service of the Department, College and University for over 38 years. He has served as Graduate Coordinator, Graduate Program Head, Program Chair, Faculty Senator, Graduate Council Member, College Scholarship Committee Chair and on a multitude of Department, College and University Committees. He served on the Faculty Senate for an amazing 24 continuous years, from 1980-2004. As examples of the respect afforded his abilities by our University colleagues, he served on the Faculty Advisory Committee to the President and Provost (1998-2001), was Chair and member of the Committee on Academic and Physical Planning (1998-2002) and Chair of the Subcommittee on General Education (1997-1999).

Roger Cuffey, Ph.D. '66 is the 2003 recipient of the **Richard Owen Award**, the Indiana University Department of Geological Sciences' highest award for an alumnus. Each year the award is given to an outstanding alumnus of the Department for contributions to the understanding and advancement of geological sciences in the pursuit of their careers. This award is named in honor of Richard Owen, who taught courses in geology, natural history, botany, and geography at IU from 1864 to 1879. He was the first IU professor to publish papers concerning geology. Also, Owen was an early state geologist of Indiana. The Owen Award was established in 1985 in celebration of the 100 year anniversary of the founding of the Department. Dr. Cuffey is the 25th recipient of the award.

Dr. Richard B. Alley, Evan Pugh Professor of Geosciences, was awarded the **G. Montgomery and Marion Mitchell Award for Innovative Teaching**, in recognition of his role in the development and teaching of Geosc 010, "National Parks." This highly successful course is a model for teaching scientific principles to non-scientists by combining relevance with intrigue, featuring fabulous imagery that leaves a lasting impression on the student. He uses a variety of effective methods to attract and hold the students' interest, developing their understanding of processes while making them think that they are taking an enjoyable ride through the National Parks. His very inexpensive text is a wonder of clarity and folksy expression, but packed with cogent explanations of basic principles and processes, expounded upon by a master of effective analogy and simple, but lucid explanation of concepts. He is a superb teacher with an inimitable classroom style. His infectious enthusiasm, boundless energy and dedication to his task make him a consummate teacher.

FACULTY HONORS AND AWARDS

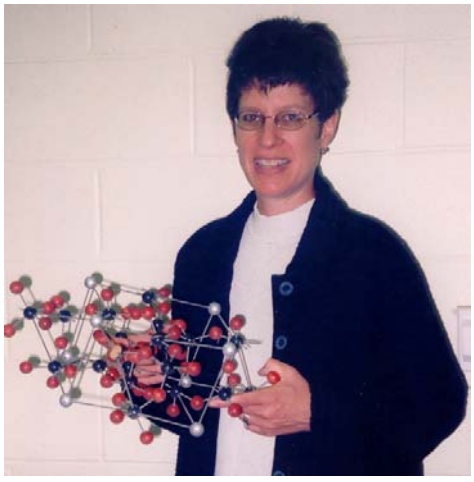
Wilson Award for Excellence in Teaching

Dr. Kate Freeman, Professor of Geosciences, is a superb professor in every aspect of her professional role. She is an enthusiastic classroom lecturer who engages students in large general educational courses and creates a positive and open environment for them to learn. She challenges students to think critically, and works individually with them to write more clearly and communicate more effectively. She is inspirational to female graduate students in the way she adeptly balances her teaching, dedication to students, considerable service to the Department and her major research program, yet still makes time to put her family first.

Kasting Named AGU Fellow

Dr. James Kasting, Professor of Geosciences, was recently honored as an AGU Fellow. Professor Kasting's research has made profound contributions to our understanding of planetary habitability and evolution, focusing on the evolution of the atmosphere, oceans and life on our planet and the atmosphere of other terrestrial planets.

Dr. Susan Brantley received the Department's Faculty Mentoring Award. Sue has designed, developed and run the highly successful and nationally acclaimed NSF-IGERT program, *Biogeochemical Research Initiative for Education (BRIE)*. Her hands-on style of mentoring has enriched the educational experiences of a large number of top-notch graduate students.



STUDENT AWARDS AND HONORS

Please join us in recognizing the outstanding achievements of the following students.

Graduate Awards

Sara Bier, George H. K. Schenck Teaching Assistant Award, April 25, 2004

Heather Buss, 7th Annual CECG Environmental Chemistry Symposium Poster Award, March 20, 2004

Courtney Turich, 7th Annual CECG Environmental Chemistry Symposium Poster Session Award, March 20, 2004

Katya Bazilevskaya, 7th Annual CECG Environmental Chemistry Symposium Poster Session Award, March 20, 2004

Aubrey Zerkle, 7th Annual CECG Environmental Chemistry Symposium Poster Session Award, March 20, 2004

Matt Bachmann, 7th Annual CECG Environmental Chemistry Symposium Poster Session Award, March 20, 2004

Margaret H. Benoit, 36th Annual Graduate Student Colloquium 1st Place Award for a Paper Presentation by a Post-Comprehensive Ph.D. Student, April 23, 2004

Amy C. Whitaker, 36th Annual Graduate Student Colloquium 2nd Place Award for a Paper Presentation by a Post-Comprehensive Ph.D. Student, April 23, 2004

Redescal Uzcategui, 36th Annual Graduate Student Colloquium 3rd Place Award for a Paper Presentation by a Post Comprehensive Ph.D. Student, April 23, 2004

Derek Sawyer, 36th Annual Graduate Student Colloquium Award for the Best Petroleum Industry Oriented Paper, April 23, 2004

Christopher K. Junium, 36th Annual Graduate Student Colloquium First Place Award for a Paper Presentation by a Master's Degree Candidate, April 23, 2004

Leo Everett Peters, 36th Annual Graduate Student Colloquium Second Place Award for a Paper Presentation by a Master's Degree Candidate, April 23, 2004

Winchelle Ian Sevilla, 36th Annual Graduate Student Colloquium Third Place Award for a Paper Presentation by a Master's Degree Candidate, April 23, 2004

Kideok Kwon, 36th Annual Graduate Student Colloquium Shared First Place Award for a Paper Presentation by a Pre–Comprehensive Ph.D. Student, April 23, 2004

STUDENT AWARDS AND HONORS

J. Paul Winberry, 36th Annual Graduate Student Colloquium Shared First Place Award for a Paper Presentation by a Pre Comprehensive Ph.D. Student, April 23, 2004

James R. Bonelli Jr, 36th Annual Graduate Student Colloquium Third Place Award for a Paper Presentation by a Pre – Comprehensive Ph.D. Student, April 23, 2004

Christina L. Lopano, 36th Annual Graduate Student Colloquium First Place Poster Presentation Award, April 23, 2004

Alexis Navarre, 36th Annual Graduate Student Colloquium Second Place Poster Presentation Award, April 23, 2004

Courtney H. Turich, 36th Annual Graduate Student Colloquium Third Place Poster Presentation Award, April 23, 2004

Tyrone Rooney, First Place, Graduate Teaching Award. May 2004

Undergraduate Awards

The Benjamin F. Howell Jr. Award in Geosciences

Heather Albert & Duane Castaldi

The William Grundy-Haven Memorial Award

Sarah E. Knuth

The Ronald A. Landon Endowment in Hydrogeology

Susan Potisk & Heidi Smidansky

7th Annual CECG Environmental Chemistry Symposium Poster Session Award

Katie Detweiler

This Spring, the Department also awarded funds to 23 students participating in the Summer 2004 Geosciences Field School program, from the **Thomas F. Bates Undergraduate Research Fund**, the **David P. Gold Undergraduate Scholarship Fund in Geosciences**, the **Kappmeyer-Isaacs Field Camp Award**, the **Earl S. Lenker Fund for Field Studies in Geosciences**, and the **Reif Undergraduate Summer Field Camp Endowment.**

We appreciate the generosity of the many contributors who make these funds possible.

GRADUATE STUDENT RESEARCH

The origin of the Cenozoic rifting, volcanism, and plateau uplift in Ethiopia is enigmatic. Though many geochemical, gravitational, and global seismic studies suggest that a mantle plume may be the cause of the Ethiopian hotspot, this hypothesis has not been fully evaluated.

To further examine the source of the Cenozoic rifting, volcanism, and plateau uplift in Ethiopia, I am investigating the upper mantle seismic velocity structure beneath Ethiopia using a variety of seismic techniques for my PhD. thesis work.

Between 2000 and 2002, my advisor Andy Nyblade, fellow graduate student Mulugeta Tuji, and I, with the help of our colleagues in Ethiopia, performed the Ethiopia Broadband Seismic Experiment. We maintained 27 seismic stations throughout Ethiopia which recorded earthquakes from all over the world.

Using this data, I computed body wave and surface wave tomographies to examine the upper mantle seismic velocity structure beneath Ethiopia. The results of this work help us to determine where hot and cold areas exist in the upper mantle between 150 – 400 km in depth so that we may evaluate different models for the Ethiopian hotspot. Additionally, I am a currently working on a receiver function study to investigate phase transformations in the mantle transition zone. The results of this experiment will also help us to constrain temperatures in the mantle between depths of 400 – 660.

The results of my work so far show evidence for a broad thermal upwelling from lower in the mantle, instead of a simple mantle plume head. The implications of this work are related to how mantle upwellings are associated to plate tectonics and continental rifting.

Contributed by Maggie Benoit

Maggie Benoit, Ph.D. Student, is working with Dr. Andy Nyblade

UNDERGRADUATE STUDENT RESEARCH

Heidi Smidansky is a Senior Geosciences student and Schreyer Honor's College Member. She is working with Dr. Richard Parizek on her senior thesis project.

A new class of pollutants has caught the attention of environmental scientists. Many pharmaceuticals and personal care product additives have been found to survive the wastewater treatment process and are subsequently introduced into the environment. Although these compounds exist at ng to ug/L concentrations, their inherent purpose of eliciting biological responses is cause for concern. Furthermore, risk assessment for non-target species has not been completed for many compounds and the occurrence and fate is not well understood.

At Penn State, the treated wastewater is spray irrigated unto croplands and woodlands as the Living Filter Project. This provides a unique opportunity to study the fate of these compounds in the environment. As a senior thesis project, Heidi Smidansky, under the direction of Dr. Richard Parizek and Dr. Henry Lin, is investigating the role of soils in determining the fate of the pharmaceuticals and personal care products.

For the project, three lysimeter nests were installed in woodland areas of the sprayfield. These nests represent three different soil textures and soil water can be extracted from 4 depths, the deepest being 20 feet. Pan lysimeters were also installed to sample shallow soil water and compare methods of water collection. Solid phase extraction followed by GC-MS analysis is used to detect the trace concentrations of the compounds in the water. Basic soil analysis will allow a comparison between soil properties and pharmaceutical movement.

As a part of a larger investigation of pharmaceuticals in the surface and groundwater at the sprayfields, this project will add to the understanding of fate and occurrence of these new pollutants in an artificial recharge setting.

Contributed by Heidi Smidansky

FRIENDS OF GEOSCIENCES

The following families and individuals have given generously to the Department during this past fiscal year (July 1, 2003 - June 30, 2004). Without their thoughtful contributions, we would not be able to recruit, retain and reward outstanding students each year. If you wish to make a contribution to any of the Department's Endowments or Scholarships, please contact : Mr. John Dietz, Director of Development at (814)863-2289, or via email at jld5@psu.edu.

Steven & Karen McLaughlin Allison
Michael & Carol Apgar
Mike Arthur & Jan Jenkins
E. Scott & Julia Reddick Bair
Joseph, Glenda, & Lillian Berg
Gale C. Blackmer
Charles & Patricia Brinkley
Robert A. Brozdowski
Tucker & Danielle Burkhart
Laura & Jeffrey George Catalano
Helen Huckins Chelius
Robert & Karen Stierman Cohen
David & Kathy Cox
Ronald S. Cunfer
Beverly & Jeffrey DeJarnett
David & Laureen Bogan Demshur
Anil Deshpande
David Doan
Christopher & Jennifer Zuck Duerr
Brandon E. Dugan
Douglas W. Duncan
Dougas & Beth Moore Duncan
Helen Lee & Robert Ellison
Terry & Janice Wicks Engelder
P. Richard & Karen Engelder
Robert & Marjorie Folk
Kevin P. Furlong
Leonard & Jennifer Gardner
John M. Garihan
Thomas & Pamela Gebbie
Marston T. Giddings, Jr.
David & Giselle Gordon
Charles & Karen Grenot
Michael R. Gross
Paul & Susan Hite Hare
James & Nancy Marshall Hedberg
John & Letitia Hess
Philip & Marie Farrar Holbrook
Joyce & Gerald Holzhauser
Andrew & Alexandra Nickel Hoover
Benjamin F. Howell, Jr.
Solomon & Esther Jarmell
Stephen A. Johnson
David E. Johnston
Richard & Mary Flaherty Johnston
J. Robert Jones
Nathan Kaleta
Janet & Andrew Isaacs Kappmeyer
William & Mary Kardosh
Robert & Kathleen Peer Kleinmann
Charles E. Knopf, Jr.
Bruce J. Kobelski
Leonard & Phyllis Konikow
Garry & Sharon Kimble Kramchak
Lee & Michelle Kump
Ihor & Zenovia Kunasz
Ronald & Joyce Landon
Daniel & Tanya Furman Larson
Earle S. Lenker
Alvis L. Lisenbee
Steven & Sarah Steele
Michelle & Richard Lovett
Stanley & Eleanor Shearer Luft
Jacek A. Lupa
Thomas P. Maher
Jon J. & Michelle Peters Major
Rocco Malservisi
Christopher & Debora McCann
John & Janette Metzger
Michelle E. Mirigliano
Beth & Douglas Duncan Moore
Kent & Helen Hail Newsham
Thomas J. Nicholson
Hiroshi & Yasuko Koya Ohmoto
Allison & Patricia Palmer
Robert Pocreva
Melvin & Patricia Podwysocki
Henry & Linda Turnley Reif
Fredrick & Sharon Allshouse Rich
Michael R. Robison
Teresa & Jeffrey Berta Royek
Robert & Marlene Myers Ryder
Stephen & Joanne Salyards
Jonathan & Janelle Woodside Sartell
Erica J. Schneider
Stephen O. Sears
Susan & Michael Seger
Benjamin J. Seldon
Roger & Jody Sherburne
Barry & Claudia Siegal
Cameron O. Smith
Robert & Gloria Smith
Teresa Kaktins Smith
David & Margaret Speidel
Allen & Karen Holgren Spelman
Ira & Bonnie Lapham Star
Beth Bishop & Bradley Stump
Frederick & Frances Swain
Alastair M. Swanston
George & Anita Thompson
Kristen L. Underwood
Stephen J. Urbanik
James F. Villaume
Carmen M. Vito
Ilse-Rose Hofer & Jamison Warg
Daniel & Suzanne Weedman
John & Anne Weitz
Matthew L. Werner, III
Kathryn A. West
Robert & Barbara Ann Williams
Jesse & Claudia Meeder Yeakel
Ming & Qiong Zhao

The Pennsylvania State University

Department of Geosciences
Pennsylvania State University
503 Deike Building
University Park, PA 16802

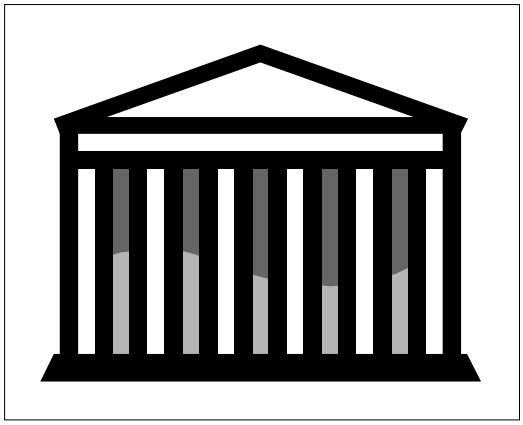
Phone: 814-865-6711
Fax: 814-863-7823
Email: alumni@geosc.psu.edu

Learn more about us on the web at:
http://www.geosc.psu.edu

Organization

Mailing Address Line 1
Mailing Address Line 2
Mailing Address Line 3
Mailing Address Line 4

COLOPHON HERE...



Caption describing picture or graphic.

Upcoming Alumni Events

- 2004 Obelisk Society Rception and Dinner: Friday, September 17, Nittany Lion Inn
- GEMS Tailgate: September 18, 2004 at Beaver Stadium
- Penn State Homecoming Weekend: October 22-23