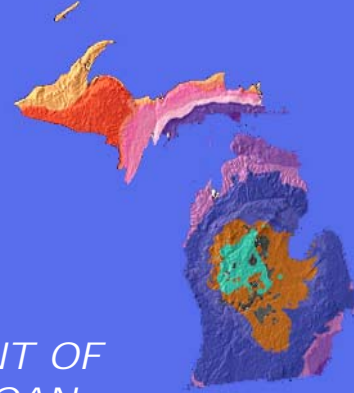


# GEOSCIENCE NEWS

FOR THE ALUMNI AND FRIENDS OF THE DEPARTMENT OF  
GEOLOGICAL SCIENCES, THE UNIVERSITY OF MICHIGAN



FALL 2006

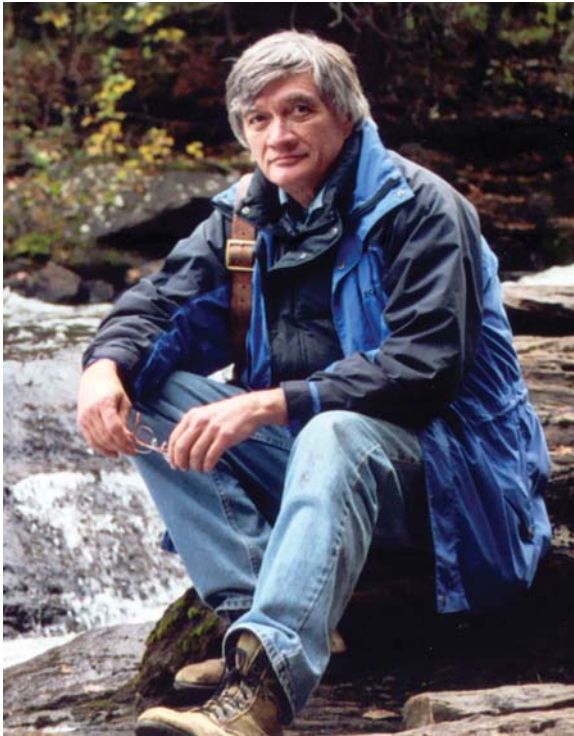
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SARAH RILLING AND FRANEK HASIUK -- SOFT ROCK FIELD EXCURSION 2006

## GREETINGS FROM THE CHAIR



### The beginning of another great year . . .

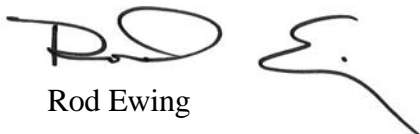
I am writing this letter to you during the week after Michigan's impressive win over Notre Dame – needless to say we are all in a good mood! The weather offers fine fall days – cool and clear – punctuated with hard rain and cool nights. This is the most exciting time of year for students and faculty, as we return to campus, classes and a routine that is one hundred and seventy years old at the University of Michigan.

The semester is off to a fast start. New faculty – **Marin Clark, Nathan Niemi and Jeroen Ritsema** – are in their offices and newly renovated laboratories. They were introduced to you in the last *Geoscience News*. On October 6<sup>th</sup>, Jeroen was formally recognized by the Dean of LS&A, Terry McDonald, as the Henry Pollack Professor of Geological Sciences. Jeroen presented a lecture entitled, “Imaging Earth’s Interior with Seismic

Waves.” The Henry Pollack Chair was endowed by **William T. Smith (BS '47, MS'48)** and named for **Henry Pollack (PhD '63)**, an active member of the faculty for over forty years, and an even more active emeritus professor during the past few years. An evening dinner honored the donor and recipient of the Henry Pollack Chair. As an added surprise, Henry and Lana Pollack announced a \$100,000 gift as an endowment to establish a student activities fund, to be named in honor of **Jean and John Greene (BS '63, MS '70)**. John Greene was one of the founding members of the Department’s Alumni Advisory Board. This is a fine example of the faculty and alumni working together and making a common investment in the future of the Department.

We have had a highly successful year of recruiting graduate students, eighteen in all. The mix represents small colleges, such as Carleton, and large universities, such as Boston University and University of California, Davis. The international students are arriving from three directions – China, Russia and Canada – to study the full range of topics from the atomic- to global-scale, including biogeology, vertebrate paleontology, geochemistry of petroleum, and whole Earth geophysics, to name just a few. This is one of our largest entering classes in years – and every new student benefits from our first year fellowship program.

In summary, our program of teaching and research continues to thrive. We are ranked #5 among geoscience programs in the latest US News & World Report, but most importantly, we are ranked #1 by our alumni and friends. My thanks to all of you for your generous and continuing support. We look forward to meeting you when you next are on campus, or at a GSA, AGU or AAPG reception.

  
Rod Ewing

## ALUMNI CAPITAL CAMPAIGN COMMITTEE

This April, the Department hosted a meeting of the Alumni Capital Campaign Committee that is chaired by **John Greene (BS '63, MS '70)**, **Steve Henry (BS '73, MS '78, PhD '81)**, and **Larry Davis (MS '79)**. The Department and this committee have identified several fundraising objectives that can lead to the sustainable the excellence of Geological Sciences at the University of Michigan. These objectives relate to aspects of maintaining prominence in research, educational breadth and depth provided to our undergraduate and graduate colleagues, and of enhancing our teaching and research infrastructure. The broad areas of support include: graduate and undergraduate fellowships, post-doctoral fellowships, field excursions, Camp Davis scholarships and infrastructure renovations, facility support for instructional and research laboratories, and instructional resources.

Currently, the Department has about 1700 identified alumni, and of these some 13% provide support to our Department and the University. Gifts and endowments range the full spectrum of amounts and include a wide variety of programs and fund raising goals for our Department. The objective of the Michigan Difference Campaign is to significantly increase the level of participation. Faculty giving is at a 33% level; alumni support is at 13%. Our goal is to bring faculty to near 100% and alumni up to 40% or greater. While the level of giving ranges from large endowments for the naming of professorships and other gifts of thousands of dollars annually, the median gifting level for all donors is about \$100 per year. One immediate goal is to increase the median level to \$250 per year. Given the financial challenges that face many of us, this goal may be optimistic, but it is one that we can all help to accomplish. Help us continue to build and maintain the excellence of this Department and University. Help us keep Michigan Geology the home of the champions and the best.

During the coming months, alumni volunteers will be contacting you about ways that you may contribute to the Department.





**John Dorr  
Graduate Academic Achievement Award**

**Carmen Nezat (PhD '06)** received the Jack Dorr Graduate Award in recognition for the excellence in her scholarly contributions and outstanding dissertation research on mineral dissolution in soils. Carmen is currently a postdoctoral fellow in the Department and is continuing her research under the tutelage of Joel Blum.

**Outstanding Graduate Student Instructor Awards**

The quality of our undergraduate program is dependent on excellence in teaching by both faculty and the graduate student instructors. As a Department, we recognize these contributions by honoring the *best of the best*. Congratulations to this year's award recipients.



**Jason Barnes (PhD Cand.)**



**Andrea Stancin (PhD Cand.)**



**Undergraduate Awards**

**Undergraduate Academic Excellence Award:**  
**Karen Kim (BS '06)** pictured on the right.

**Alumni Undergraduate Award:**  
**Megan Tuura (BS '07)** pictured on the left.

**Camp Davis Field Geologist Award:**  
**Kory Pund (BS '06)** not pictured.

# EARLY POLAR ICE CORES

by  
*Chester C. Langway Jr. (PhD '65)*

The scientific knowledge of the Greenland and Antarctic ice sheets has been greatly increased during the past half-century, with much of the new information gleaned from deep ice cores obtained by different national and international research teams. Scientists from the University of Michigan have played important leadership roles in these endeavors, particularly in promoting the concept of deep ice cores as climatologic archives. Early deep ice core investigations clearly demonstrated that ice sheets are new and valuable sources of detailed Earth history for climate, and its variegated high- and low-frequency changes, and other important paleoenvironmental parameters (e.g., atmospheric gases, stable and radioactive isotopes, eruptive volcanic activity, baseline atmospheric chemistry levels and variations due to anthropogenic contributions, such as CO<sub>2</sub>, the Industrial Revolution, and more). Adding to their significance is the fact that these records occur in reliable chronological sequences on regional and global scales, back hundreds of thousands of years. Most of these investigations, and others, continue to this day.

Modern polar ice core drilling and science began with the incipient pit study by Ernst Sorge in 1930, and continued through the trying efforts of three separate projects mounted around 1950. This article follows these efforts, and includes an overview of the early role and achievements made by two related U.S. Army Corps of Engineers research labs, the Snow, Ice and Permafrost Research Establishment (SIPRE) and the Cold Regions Research and Engineering Laboratory (CRREL). SIPRE initiated deep ice core drilling research just before the IGY program started in the early 1950's, under the scientific leadership and direction of Henri Bader, Chief Scientist. CRREL, was established in 1961, and carried on with the research, essentially ending their active technological engineering participation with the conclusion of the Greenland Ice Sheet Program (GISP), about 1985. For the first decade SIPRE/CRREL were solely responsible for the



development and progress of the entire U.S. polar ice core drilling and research program. Thereafter, from about the mid-1960s, they entered into strong international research collaboration with the University of Copenhagen and the University of Bern, as well as with other U.S. and foreign universities and institutes. I participated in and was responsible for developing the SIPRE/CRREL field and laboratory ice core science program from late-1956 to 1975, along the way earning my PhD at the University of Michigan in 1965, with a dissertation entitled "Stratigraphic Analysis of a Deep Ice Core from Greenland". In 1975 I accepted a faculty position at SUNY at Buffalo and continued active ice core research activities there until retiring in 1994.

The original inspiration to probe into the deep interior of ice sheets followed the path breaking research made by Ernst Sorge during the Alfred Wegener Expedition to central Greenland in 1930-1931. This was also a time when **William H. Hobbs**, Chairman of U-M's Department of Geology, was conducting a series of expeditions to Greenland. Sorge was the first to systematically and quantitatively study the near surface snow/firn strata in a 15 meter deep pit at Station Eismitte. He hand-dug the pit adjacent to the snow-cave which served as his living quarters during his seven-month long over-winter stint. After meticulous examination of the structural features and careful measurement of continuous density and



other physical properties, Sorge determined the individual limits of annual snow accumulation over the pit's depth. This research validated the feasibility of measuring the preserved annual accumulation cycles, like measuring frozen precipitation in a rain-gauge, at least for the upper surface layers.



Hobbs and Wegener in Berlin  
U-M Professor and polar scientist William H. Hobbs (right) with famous polar explorer and geological iconoclast Alfred Wegener, on the street in Berlin in 1928. It is likely they were sharing ideas about upcoming field work in Greenland. Wegener perished in Greenland in 1930. Hobbs conducted several expeditions in the late 1920s and early 30s.

With the marking of the Third International Polar Year research activities for 1957-1958 (soon renamed the IGY), the early 1950s was a time of renewed and stimulated interest in polar latitude research by the entire international science community. At long last, the neglected and long overdue research in the high latitudes, in some of the most distant, desolate and inhospitable regions

on Earth, would be targeted and investigated. The IGY Antarctic program involved the effort of 12 nations, with 48 stations; the Arctic program involved 14 nations with 302 stations, north of the 60th parallel. The US was a major contributor in the preplanning stages and in the communications, logistics and transportation phases during the entire field operations, as well as conducting a broad interdisciplinary scientific research effort.

One of the high-priority research projects recommended by the US NAS/National Committee for the IGY (chaired by **Laurence M. Gould, PhD '25**) was to deep core drill into polar ice sheets for scientific purposes. Subsequently, NSF entrusted to SIPRE the challenge and responsibility for developing and conducting the entire US ice core drilling and core studies research program, under a joint interagency agreement.

The SIPRE pre-IGY pilot drilling trials were successfully conducted at Site-2 NW Greenland in 1956 (305 m) and 1957 (411 m) by Robert Lange and Jack Tedrow and a group of Dartmouth College student roustabouts. **William Marshall (PhD '77)** and I were responsible for processing the cores in 1956. The 1957 core was of better quality and selected for the laboratory investigations on this



B. Lyle Hansen and Chet Langway examining morainal sub-ice core from Camp Century in 1966.

first-ever deep exposure of an active polar ice sheet. Cooperative studies were made on the 900-year-old ice core profile with samples provided to Samuel Epstein for the initial measurements of the stable

oxygen isotope ratios, and Russell Werby for measuring the ionic concentration levels on horizontally adjacent core samples. I published a complete CRREL Research Report (No. 77) on the Site-2 core study in 1967 (later published as GSA Special Paper 125, 1970). The Greenland drillings were closely followed by the successful IGY drillings in Antarctica, at Byrd Station in 1957/58 (309 m), and at Little America V, Ross Ice Shelf in 1958/59 (258 m, into sea water). Bill Marshall and Anthony Gow processed and recorded the ice cores.

The overall successes of SIPRE's core drillings and early core analyses in Greenland and Antarctica during the IGY program drew widespread interest. Once started ice core drilling appeared to embark upon a life of its own. The first leg of the CRREL post-IGY bedrock core-drilling projects began at Camp Century, Greenland in the summers of 1961 and 1962, with preliminary testing for all systems of the new hoist-operated, cable-suspended, deep thermal coring auger to be used in a newly developed fluid-filled hole concept. This system was replaced with an "electromechanical" drill in 1965 and successfully reached sub-ice material, at 1387 m, in the summer of 1966. Hansen, H. Ueda and D. Garfield drilled both the Camp Century and Byrd Station (2164 m) to bedrock ice cores.

The multidisciplinary laboratory analyses of the Camp Century core began soon after receiving the ice core from Greenland to the CRREL laboratory the fall of 1966. As the program evolved and expanded I reached out to other U.S. (16), and foreign (9) scientists or institutions to solicit research expertise, and when appropriate to collaborate in disciplines not available at CRREL. In the late fall of 1966 Willi Dansgaard and associates at the University of Copenhagen, were already operating a successful world-class, high-capacity mass spectroscopy laboratory. He was measuring oxygen isotope ratios on Danish samples of ice from Greenland, and also on a global collection of water samples on an IAEC contract. Dansgaard joined the CRREL ice core study program as a collaborator on a joint cost-sharing basis. His entire program of measuring several thousands of stable oxygen isotope ratios on the initial study of the Camp Century deep core, and

later, more on the Byrd Station 1968 deep core from 2164m, (after an earlier oxygen isotope study was completed), and still later, more on all three Greenland Ice Sheet Program (GISP) intermediate depth cores, and finally the 2037 m deep core from Dye-3, was fully supported by Danish funds.



Removing ice core from core barrel at Dye-3, Greenland during GISP, 1980. Final depth of coring at this site was 2037 meters.

Hans Oeschger and associates, at the University of Bern, were also early and long-term collaborators in the CRREL ice core study program from 1962. Oeschger had already established an internationally recognized low-level carbon dating laboratory at Bern. He was first in developing techniques to extract atmospheric gases entrapped in polar ice cores in order to measure, as a function of depth/age, the variability in CO<sub>2</sub> concentration levels and the <sup>14</sup>C content and others radioactive isotopes. Joint field trips were taken to Greenland in 1964 and 1966 and to Antarctica in 1969 /1970, to obtain large volumes of prehistoric atmospheric gases from the ice sheets.

In the spring of 1970, a group of scientists and engineers from the United States, Denmark, and Switzerland gathered to discuss the possibility of conducting an ambitious new major ice core drilling investigation of the entire Greenland ice sheet. Out of this meeting, the group conceived, planned and developed GISP as a joint international, coordinated, interdisciplinary, cost-sharing investigation. CRREL was identified as the lead laboratory (B. Lyle Hansen and Langway, co-PIs), with major contributions from the University



of Copenhagen (Dansgaard, co-PI), the University of Bern (Oeschger co-PI) and the remote sensing capability for ice sheet soundings at the Technical University of Denmark (Preben Gudmansen, co-PI). The logistics and field support would be arranged mainly by the Polar Ice Coring Office (PICO), directed by **James Zumberge**, a U-M faculty member from 1950-62, and Robert Rutford,



**James Zumberge and Chester Langway, 1982**

operating from the University of Nebraska-Lincoln where Zumberge was serving as University President. A comprehensive science plan was prepared and submitted to all the national science oversight committees and funding agencies for review and acceptance. Final approval was made in the U.S. by NSF's National Science Board.

The GISP field operation was scheduled for a 10-year period. The first seven years were occupied by various preparatory and auxiliary science studies to garner more field data and to determine the better deep drilling site locations. Airborne-radar depth-sounding surveys and many surface geophysical and glaciological investigations were carried out. Three intermediate depth ice cores were taken by Hansen and John Rand of CRREL using a newly developed intermediate depth (300-500 m) thermal coring device. New ice cores were obtained at Dye-3 in 1971 (372 m deep), Milcent in 1973 (398 m) and Crete in 1974 (405 m, and in the general vicinity of Station Eismitte). Three-bedrock core drillings were originally planned for GISP but later reduced

to one. Available data pointed to an optimum site location for the projected GISP deep drilling to be at a north central Greenland site. However, other funding and equipment restrictions required the technically and logistically convenient Dye-3 location to be chosen. All major field objectives and goals of the modified field operations were completed on schedule, and within budget. In June 1982, one year after completing the core drilling, results were presented at a GISP science symposium held in Philadelphia and later published as an AGU Monograph (Langway et al., 1985)

Because of GISP, an invitation was later received by Oeschger and me from the Dahlem Conference Center, Berlin, Germany (Silke Bernhard, Director), to organize and to convene an international workshop and symposium to assess and interpret the environmental records in glaciers and ice sheets. The workshop was financed by the City of Berlin and held at the Dahlem Conference Center in March 1988. The Symposium Proceedings, "The Environmental Record in Glaciers and Ice Sheets", were published a year later (Oeschger and Langway, 1987).

In conclusion, the successful recovery of the early ice cores enabled the entire physical and chemical properties and nature of the complete inner-body of ice sheets to be investigated. Ice cores opened a new portal to the past, unsealing detailed data and continuous records of climate; rapid climate change; and natural, artificial and baseline atmospheric chemistry. Foremost, in the multiple analyses conducted on the first core to reach bedrock at Camp Century in 1966, now 40 years ago, was the University of Copenhagen's detailed measurements of the annual snow accumulation layers for the past 8000 years, as well as obtaining records of high- and low-frequency climate events and shifting background levels of environmental conditions back more than one thousand centuries— through the present Holocene warm period; the previous major world-wide Wisconsin ice age; and back to the preceding interglacial warm period, the Sangamon (Eem), through a complete climate cycle (Dansgaard et al., 1970). The Camp Century ice core provided the first direct evidence that a long-term chronology exists within the massive ice sheet's body, is



measurable, and continuously connected from today's surface, as a living relic, into and beyond the last great ice age on Earth. Consequently, ice sheets became a new and welcome addition to the limited paleodata sources available, and in effect, transformed the ice sheets into virtual databases of Earth history.

Density measurements in covered snow trench, 1956



Ice cores in storage area (1956)

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- Dansgaard, W., *Frozen Annals: Greenland Ice Sheet Research*, Narayana Press, Odder, Denmark, 2004, 122 p.
- Cox, J.D. *Climate Crash: Abrupt Climate Change and What it Means for Our Future*, Joseph Henry Press, 2005 215 p.
- Sweet, W., *Kicking the Carbon Habit: Global Warming and the Case for Renewable and Nuclear Energy*, Columbia University Press, 2006, 256 p.

Background Photo: Gas bubbles trapped in ice were analyzed to reconstruct atmospheric concentrations of carbon dioxide and methane. These bubbles were formed about 600 years ago.

## HONORS AND AWARDS



**Megan Tuura** -- Goalkeeper and Geologist

**Megan Tuura** (senior undergrad geology major) is the star goalkeeper of the University of Michigan women's soccer team. Tuura, who ranks second on Michigan's all-time career goals-against average chart (1.21), has been the starting goalkeeper in all but four of the almost seventy career games she has played during her U-M career. She has allowed just 78 goals in over 5,796 minutes and accumulated 271 career saves, and currently sports a career record of 30-20-11, including 16 shutouts.

Tuura has been named four times as the Big Ten Defensive Player of the Week, and also earned All-Big Ten second team honors at the conclusion of her sophomore season. She has been given the honor of Academic All-Big Ten Conference in 2005 and 2006, and has received the U-M Athletic Academic Achievement Award three years running. Megan suffered from a shoulder separation sustained in a spectacular save. However, it has not prevented her from wielding a geology hammer on field trips.

**Ben van der Pluijm (Professor)** and Director of the Global Change Program is the recipient of the 2005 Geological Society of America Distinguished Service Award. In addition to honoring his service activities for the society, the award recognizes his efforts in publications and for serving as editor of the leading earth sciences journal, *Geology*.

**Josh Trapani (PhD '04)** received a AAAS fellowship to serve as a congressional fellow in Washington. He is still looking for a good fit in a congressional office "to get involved with the right issue rather than being issue driven". Josh's interest in this fellowship grew out of what he saw as a "huge disconnect between the scientific community and policy community. Neither side really understands the other and there have to be people who work as go-betweens".

**Carlton E. Brett (PhD '78)**, now a professor at the University of Cincinnati, is the recipient of a Humboldt Prize for research at the Research Institute in Senckenberg, Germany.

**Rob Van der Voo (Professor)** has been awarded the Margaret and Herman Sokol Faculty Award for his excellence in graduate education reflected in life-time accomplishments in the quality of research and impact on the quality of graduates.

**Lynn Walter (Professor)** has received the Rackham Distinguished Graduate Mentor Award.

**Robyn Burnham (Professor of the Museum of Paleontology)** has received the LSA Excellence in Education Award.



**Klaus Mezger (Post-doc, 1991-92)**, a geochemist and professor at the University of Muenster, was named a 2006 winner of the prestigious Gotfried Wilhelm Leibniz Prize by the German Research Foundation. The Leibniz Prize provides up to 1.5 million euros for research over a five year period, and is the most valuable research prize in Germany. He and his research group have developed new isotopic methods to determine the ages of minerals and rocks with far greater precision than previously possible. Klaus studied at the University of Wuerzburg and at SUNY-Stony Brook. He was a postdoctoral researcher at U-M for two years (1991-92), after which he moved to the Max Planck Institute for Chemistry in Mainz. He was appointed to the University of Muenster in 1997, where he has since headed the Central Laboratory for Geochronology. The Leibniz Prize is the most valuable research prize in Germany. The award, of up to 1.5 million euros, funds research work over a five-year period, and can be used flexibly by the prizewinners. Of the almost 150 nominations received for the 2006 prize, only eleven researchers in all fields of science were selected.

**K.C Lohmann (Professor), Peter van Keken (Assoc. Professor) and Youxue Zhang (Professor)** were honored as Fellows of the Geological Society of America.

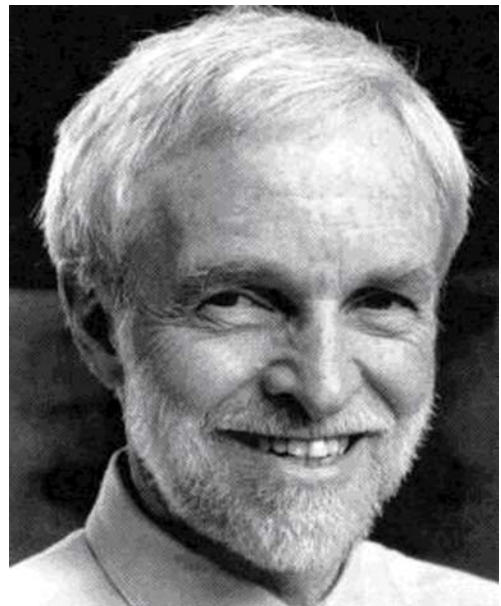
**Rod Ewing (Professor and Chair)** has recently received the Dana Medal from the Mineralogical Society of America. This award recognizes mid-career scientists for continued outstanding scientific contributions through original research. Rod also was the Michel T. Halbouty Distinguished Lecturer at the 2006 GSA Annual Meeting in Philadelphia.

**Henry Pollack (Professor) and John Geissman (PhD '80)** recently became Fellows of the American Geophysical Union in recognition of their past and continuing contributions in research.

**David S. Chapman (PhD '76)**, Professor of Geology & Geophysics and Dean of The Graduate School at the University of Utah, was awarded the Rosenblatt Prize for Excellence, the University of Utah's most prestigious award. The \$40,000 prize is presented annually to a single faculty member who displays excellence in teaching, research and administrative efforts.

University of Utah President Michael K. Young remarked that “the Rosenblatt honor recognizes Dave’s award-winning teaching skills, his valuable and ground-breaking research into global warming and other geothermal processes and his admirable and efficient administrative skills. The award also recognizes the extraordinary contributions he has made, not only in his field and to the University over a 30-year period, but as an internationalist, having taught on four continents—in Africa, Europe, New Zealand and North America.”

Chapman has been recognized for a high dedication to teaching. Frank Brown, professor of geology and Dean of the College of Mines and Earth Sciences, notes: “To my knowledge, David is the only current faculty member who has captured the ‘triple crown’ of University of Utah teaching awards—University Professor, Distinguished Teaching Award, and the most coveted of teaching awards, the Calvin S. and JeNeal N. Hatch Prize for Excellence in Teaching.”



**Erik Kneller (PhD Cand)**, a graduate student under the tutelage of Prof. Peter van Keken, recently received recognition for his research presentation “Finite Strain in the Forearc Mantle: Testing the B-type Fabric Anisotropy Hypothesis” at the Fall Meeting of the American Geophysical Union in San Francisco. This award, presented as part of the MARGINS research program, recognizes outstanding student presentations based upon the quality of research results, clarity of presentation, and the significance research to the objectives of the MARGINS Program Initiative. Judges comments include: “Shocked that this was a student”; “very impressive talk”; and “outstanding scientific effort”. Erik continues to excel in path toward national fame with a recent invitation for a session talk at the upcoming AGU convention.

**Sam Mukasa, Lars Stixrude, and Ben van der Pluijm** have been elected 2006 Fellows of the American Association for the Advancement of Science.

**Monamie Bhadra (BS ‘05)** received the prestigious Hopwood Award of the University of Michigan for recognition of her talents as a skilled and imaginative writer.

**Elizabeth Anderson (PhD Cand)** received a Graduate Fellowship from the National Science Foundation in support of her dissertation research.

**Alexandra Abrajevitch (PhD Cand)** is the recent recipient of the Schlanger Fellowship provided by the Joint Oceanographic Institutes for her research project entitled: “Rock Magnetic Record of the Asian Monsoon Preserved in Sediments of the Bengal Fan: A New Look at an Old Problem”.

**Frederick E. Nelson (PhD ‘85) and Ken Hinkel (MS ‘82, PhD ‘85)** were elected President and Secretary, respectively, of the United States Permafrost Association for the 2006-2007 biennium. Both Nelson and Hinkel were PhD students of Professor S. I. Outcalt in the 1980s.

**Samuel Haines (PhD Cand)** has received an American Association of Petroleum Geologists Research Grant in support of his dissertation research under the direction of **Ben van der Pluijm**.

**Clara Castro (Assoc. Professor)** was promoted with tenure in the Department during this last year. Her research combines numerical modelling of groundwater flow with analysis of noble gas chemistries to provide insights into Earth surface temperatures at the time of recharge. She has recently received a National Science Foundation CAREER grant in support of her research on calibrating and developing noble gas thermometry. This current research has necessitated drilling of a new water well on **Kacey Lohmann’s** home property that will be instrumented to continuously record subsurface conditions of temperature, water levels and chemistry.

## ***THE FUTURE PRESIDENT OF AAPG? A WIN-WIN BATTLE FOR MICHIGAN***

Two highly talented and successful candidates are up for becoming the next president of the American Association of Petroleum Geologists. **Niel F. Hurley (PhD ‘86)** is currently a Professor at Colorado School of Mines, and **Scott Tinker (MS ‘85)** is the Director of the Texas Bureau of Economic Geology and Professor at U-T Austin. Both have played significant roles in AAPG and are deserving of the honor this office would bestow. We are confident that we can proclaim: The next President of AAPG will be a Michigan graduate -- **GO BLUE!!**



## CAMP DAVIS ALUMNI GETAWAY – 2006



It was another great year for the Alumni at the the 2006 Camp Davis Alumni Getaway in Jackson Hole, Wyoming with 50 adults and 30 children. Kacey Lohmann, Peter van Keken and Colleen Currie served as the hosts from Ann Arbor this year and, while keeping busy with all of the chores of coordinating activities, they enjoyed renewing friendships with our alumni. With a full schedule of daily activities, afternoon cocktails and snacks, and nightly campfires as the week came to a close, everyone left relaxed, refreshed and looking forward to the Camp Davis Getaway in 2008.

The Alumni Getaway has really become a family gathering with a broad range of activities ranging from whitewater rafting, scenic float trips, horseback riding, geological field trips and hikes into the mountains. The traditional field trip and geologic overview began the activities with a journey up the tram to Rendevous Peak where Kacey lectured to the group about the geologic evolution of the western US and about the geomorphic and structural features visible from the mountain's top. In addition, a morning fossil hunting excursion for a group of young future geologists visited the Jurassic Twin Creek Formation in search of fossil clams, crinoids. and oysters. It was difficult to convince them to measure the section using the traditional Jacob staff and compass. Perhaps next time, we will see whether we can train this group of young aspiring geologists how to use plane tables and alidades, a skill that will remain with them for a lifetime.



Most of us think of the Getaway as a time for the alumni to revisit Camp with all of its memories, but these days, it is a time for creating new experiences for their children. Where else can parents feel comfortable while leaving their kids unattended to play and explore in nature? Creating new games, “capturing the flag” in intense evening competitions and becoming avid and imaginative junior photographers include only some of the adventures for this years “Camp Davis Kids”.

Outfitted in their new fancy hats and shoes, Savanna (5) and Julia (8), the daughters of Laura Badalamenti and Steve Hoin, became real western cowgirls. Here they are shown discussing the finer aspects of their latest photographic creations.



Bea McLogan relaxing at Rendezvous Peak after ascending the Tetons by tram. Bea's father, Professor Harry Bouchard, was the first director of Camp Davis.

For those of you that have signed the official visitors book, you will likely recall that the long list of past camp participants begins with Harry Bouchard, the first Director of Camp Davis. Bea McLogan, a daughter of Professor Bouchard, remembers the early days of Camp in the late 20's, when travel was by unreliable automobiles and living conditions were constantly changing as the new camp was under construction. The legacy of Camp Davis continues with the return visit of the extended Ted and Bea McLogan family to this year's Getaway. This included: Mary, Dan, Claire, Dan, Charlie, Carl, Helen, Elaine, William, Henry, Debby, Matt, Ryan, Liz, Bob, Hannah and Betsy. Liz and Helen are alumni of Camp Davis, and we expect that their children will join us in GS 116 in the near future. The family recently initiated the *Harry Bouchard Camp Davis Fund* to help with the rejuvenation of the aging facilities. For those of you who remember the plush restrooms and cabins at Camp, we urge you to help by contributing to this fund.

### **Mark Your Calendars -- AUGUST 2008**

We look forward to seeing you at the next Camp Davis Getaway.





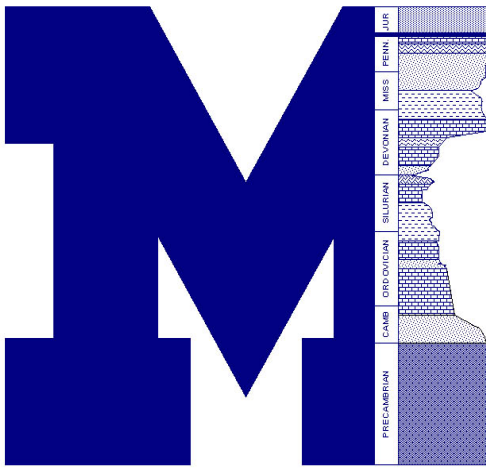
Who would have guessed that they were twins? Here Jack Barnes (MS '48) and Chuck Wooden (former Camp Manager) reminisce about fishing for the big ones while sitting outside the Mess Hall on the "wooden" bench.

*The Department is especially thankful to all of the getaway alumni whose generous donations help provide scholarships to both needy and deserving students, enabling them to share in the educational experiences of Camp Davis.*

### **"HELL CAMP -- 1986" TWENTIETH REUNION AT CAMP DAVIS**



Another decade has passed; the 1986 Camp Davis crew returned for their twentieth reunion. This included the GS 440 group of **Anne Fitzpatrick, Kevin MacKey, Dan Wiitala, "Tex" Ferrito, Karen Werner, David McCabe, Kacey Lohmann and Heather Daas** from GS 116. In addition to the old folks, all the young *wigglers* (children) joined in on the celebrations. The GS 440 of 1986 coined the name "Hell Camp" in response to Tex's most common descriptor. There were *Hell* rocks, *Hell* mountains, *Hell* days, and *Hell* Professors, all of which became known as *Hell Camp*. To commemorate each reunion, a new version of the traditional Hell Camp T-shirt was designed for the adults and the kids, replacing images of beer cans with Similac bottles and backpacks with child carriers. As the kids began to attend public schools, however, teachers began to question the bold brazen "Hell Camp '86" which has led to a gentler and kinder design — **Once We Were Geologists, and Young.**



## THE GEOLOGICAL SCIENCES MICHIGAN DIFFERENCE

### ***WHY THE DEPARTMENT NEEDS YOUR HELP***

The mission of the University and Department is to provide the best education for students whose future will provide the growth and advancement of our science and of our society. To fulfill this mission, we need to provide them with the opportunity to individually experience geology in the field, to undertake research utilizing the best tools available, and to take the challenge of pursuing advanced degrees without assuming the burden of a crippling debt for their education. While the costs of meeting these needs continue to grow, the state and federal government are reducing funding to public schools and universities. The Department must continue to develop its endowment funds and flexible resources to aid students during these difficult times.

The Department has identified several target areas that are deemed priorities for this and future capital campaigns. They represent areas of student fellowship support and growth of facilities and programs that can provide students from diverse fields with the means to excel in their educational experiences and research accomplishments. To reach these goals we need the combined strength of all of our faithful alumni and friends and of our faculty. This includes alumni that are only now developing their careers as well as those that have benefited from the opportunities of the past. As former undergraduate and graduate student members of the University, you certainly recognize the many ways that the Department has helped you, both financially and educationally, to develop successful professional careers. The soul of the Department lies in the quality of its students, those who share in its intellectual accomplishments and who extend the tradition of Michigan Excellence into the corporate, academic and public spheres. Help us provide for the next generation. Help us ensure that the Department has the capability and flexibility to provide students with the best opportunities. Let's make certain that our next and future generations build upon the tradition of Michigan Excellence.

## *JOHN AND JEAN GREENE STUDENT ACTIVITIES FUND*

**Henry and Lana Pollack** have established the **John and Jean Greene Student Activities Fund** with a substantial gift to the Department of Geological Sciences. This gift is intended to support the academic and social activities of graduate and undergraduate students of the Department. It will perpetuate the collegial spirit and intellectual growth of this and future generations of students who participate in building the legacy of our Department and University.



Jeroen Ritsema (Henry Pollack Professor) and John Greene

Henry and Lana have set a new standard for participation of faculty in supporting the short and long term capital campaign goals of the Department. This contribution reflects their combined appreciation of the many years during which students, faculty, friends and alumni have created an atmosphere of learning and of mutual growth, personally and professionally. This fund is intended to extend this atmosphere to future generations, providing opportunities for students to develop new life-long professional relationships, and to foster enduring ties between the Department, its faculty, and its graduate and undergraduate students.

The dedication of this endowment to **John and Jean Greene** is significant. It is heartening when one considers the full scope of contributions the Greene family has made to the Department. They have dedicated their time and resources, generously and unselfishly, to help provide for a better Department and University. While this endowment will provide recognition of their efforts in perpetuity, it can never fully acknowledge the totality of their generosity, donated energy, effort and time, and dedication to the this Department. Thank you John and Jean, and thank you Henry and Lana.

### *TINKER FAMILY ENDOWMENT FOR AAPG PUBLICATION ACCESS*

**C. N. (Tom) Tinker (BS '54, MS '55) and Rose Marie D'Alosio** have endowed a perpetual online subscription to the AAPG Foundation Digital Products Fund for the University of Michigan Library. The gift honors the Tinker Family of Geoscientists, each of whom either studied at Michigan and/or studied under Michigan graduates at other universities. In addition to Tom, the next generation of Tinker geoscientists includes **Scott Tinker** (Trinity University BS '82, **U-M, MS '85**, University of Colorado PhD '96), and **Mark Tinker** (Trinity University BS '91, University of Arizona MS '93, PhD '97). Scott is now Director of the Texas Bureau of Economic Geology in Austin and a Professor at UT Austin, and a member of the U-M Geological Sciences Alumni Advisory Board. The AAPG Digital Products Library enables online access to all AAPG publications, the Journal of Sedimentary Research, Journal of Petroleum Geology, Bulletin of Canadian Petroleum Geology, all of the transactions of the Gulf Coast Association of Geological Societies, and much more.



# FIELD EXCURSIONS – 2006

This year the Department was able to sponsor two field excursions for graduate and undergraduate students with the aid of the Field Excursion Endowment, one to West Texas and the other to Arkansas. For each of these field trips, students and faculty met in weekly seminars to discuss the regional geologic background to prepare them for observing and interpreting the rock record in the field. The Arkansas trip was organized by the GeoClub and included graduate and undergraduate students from every part of the Department. The Soft Rock Field Trip spent two weeks in the New Mexico and Texas region. We again thank our alumni and corporate sponsors for their continuing support of these hands-on experiences.

*Photo above is a mosaic of syndimentary slump features in Pennsylvanian fore delta deposits of Kentucky.*

## Soft Rock Field Trip Geology from Michigan to West Texas and New Mexico

**Shanan Peters (Research Scientist), Franek Hasiuk (PhD Cand) and Kacey Lohmann (Professor)** organized the Soft Rock Trip this year to explore the rich geological features of West Texas and New Mexico. The purpose of this excursion was to provide students with direct exposure to the Paleozoic and Mesozoic stratigraphy and structure of the southwest. In addition to numerous trail hikes, underground excursions, and road stops, this year students also measured sections to provide them with more direct field training in sedimentary rocks.

The first day of the trip included several stops in the Paleozoic of Indiana, including the classic exposures of the Harrodsburg, Salem and St. Genevieve Formations near Bloomington. This set the stage for passing up through the Ozark Dome region to examine the Cambrian-aged clastics and carbonates of the St. Francois Mountains which included a half day underground tour of an active Pb-Zn mine near Viburnum and visits to exposures of the nonconformity between the Precambrian Stouts Creek Rhyolite and Cambrian LaMotte Sandstone. The Doe Run geologists provided both excellent underground instruction as well as above ground lectures on their interpretations of what controlled sulfide mineralization. The trip proceeded to the classic cyclothem sequences in the Pennsylvanian of southeastern Kansas. Even though the the trip was plagued with rain the first three days which made camping difficult, the perpetually wet surfaces of limestones made field examination of the petrologic fabric much easier.



Sarah Rilling and Alex Janevski mining some MVT Pb-Zn

Our next destination was the Sacramento Mountains near Alamogordo, NM, where the class measured stratigraphic sections in carbonate-clastic cycles of the Holder Fm. in Dry Canyon. After a day long hike up the Mississippian Muleshoe Mound, we then focussed on the Permian Reef complex



and associated basinal facies of the Delaware Basin area. The Permian succession in McKittrick Canyon, and the adjacent basin, remains one of the most spectacular and informative sections for teaching sequence stratigraphic relationships.

In continuous rain, Shanan Peters provides his unique perspectives on the significance of regionally extensive black shale facies in upper Pennsylvanian cyclothem of Kansas. Shanan Peters has become a key addition to the teaching and research effort in sedimentary geology after the retirement of Bruce Wilkinson this last Fall.



The group proceeded southward through the Davis Mountains to examine the thick alluvial sequences of Precambrian age and associated metamorphic rocks around Van Horn, Texas. Past trips typically have spent time in the Franklin Mountains in El Paso, but this year we chose to explore the region around Big Bend and Marathon in far greater detail. Shanan Peters has had extensive field experience in the Cretaceous and Tertiary of the Big Bend region and he was able to provide a level of geological insight that we lacked during many of our previous explorations of this area.

Turning eastward, we began our trip homeward across the Edwards Plateau with frequent road stops in the Cretaceous shelf limestones and shales, finally reaching our next destination, the Llano Uplift. This area has excellent exposures of lower Paleozoic sandstones and glauconitic carbonates that are unique in their depositional character when compared to sequences examined in the mid-continent region of the Ozark Dome.

Instead of heading directly back to Michigan, we routed our return through northern Georgia to geology stops in the Ordovician and Silurian near Cloudland Canyon, and then on to the Pennsylvanian fluvial-deltaic sands and shales of the northern Tennessee and southern Kentucky that are exposed along Interstate 75. After two weeks and nearly 5,500 miles of travel, the trip arrived safely in Ann Arbor.



The 2006 Soft Rock trippers pose for a group shot at the southern tip of the Guadalupe Mountains with the Permian platform limestones and basinal sands of the Delaware Basin.

Next year -- Death Valley, the Basin and Range and the Colorado Plateau.

Sarah Rilling and Joe Murphy examining Precambrian Stouts Creek Rhyolite in SE Missouri near Viburnum.

## FROM THE STUDENTS' PERSPECTIVE

by *Megan Tuura (BS '07)*  
and *Nick Olds (BS '07)*

This year's Soft Rock Trip to Texas and New Mexico was a great educational experience and a trip that none of us will ever forget. We started off a thousand feet underground in the Doe Run Pb-Zn Mine in southeast Missouri and looked at chunks of galena the size of our heads. A day later, while debating the cyclothem successions in SE Kansas, we managed to get our vans stuck in the mud, prompting an emergency team-building exercise in the pouring rain. Then we explored much of the geology New Mexico has to offer, highlights being the Muleshoe Bioherm in the Sacramento Mountains and White Sands National Monument. Hiking up Muleshoe, we overcame many obstacles, namely heat, cacti, topography and a swarm of bees. White Sands was windy, but we had tons of fun discussing flow regimes during eolian transport while climbing the large gypsum dunes. We then journeyed back underground into Carlsbad Caverns to learn about spelean carbonates and the depositional architecture of Permian rocks of the Guadalupe Mountains. That adventure was followed by the best Mexican food any of us have ever had at our new favorite restaurant, Lucy's, and we knew it since it was the 9<sup>th</sup> consecutive night of Mexican food.

The New Mexico Police Department is still on the lookout for the hit and run driver that tagged one of our minivans the next day on our way to Permian Reef succession in McKittrick Canyon, where we hiked up the foreereef, through the massive facies and into flat-lying shelf facies beds made of pisoliths and birds-eye features. The view from the top was spectacular (as was another dinner at Lucy's that night). While barreling through a braided streambed in Big Bend National Park, we managed to get a flat tire, which was ingeniously fixed the next day by some new biker friends of ours. After dodging javalina and discussing trough cross-stratification, we visited Pennsylvanian offshore sequences near Marathon, Texas that were chock-full of turbidites and chert. Our trip across the rest of the southern U.S. involved several long drives, interrupted by interesting stops such as starved ripples in ~20 feet of a glauconite facies in the Llano Uplift of Texas and a crawfish boil in Louisiana put on by some friends of the Department. We ended the trip with a campfire in northeastern Georgia, which was quite novel since the majority of the trip was campfire-less due to the extreme dryness of the Southwestern U.S. The trip was a complete success, providing a hands-on experience to all we had learned in the semester long seminar that prepared us for this trip. Overall, we took a lot from this trip—not only the ~50 pounds of rocks apiece, but a great educational experience that complements our studies in geology.





*GEOCLUB FIELD TRIP TO  
ARKANSAS  
WINTER BREAK -- 2006*

by  
**Lindsey Waddell (PhD Cand)**

Before daybreak on Sunday, February 26, graduate students **Lindsey Waddell, Franek Hasiuk, Sam Haines, Alex Janevski, Chris Stefano** and undergrad **Megan Tuura** loaded two minivans and headed south for a week-long odyssey through the geology of Arkansas. The department-sponsored trip progressed clockwise around the state, beginning and ending in the northeast corner, and included six nights of camping (two of those particularly chilly) with dinners prepared by expert cook Sam Haines. Diverse stops on the first field day included exposures of Eocene marine sediments and Pleistocene loess on Crowley's Ridge, the Granite Mountain syenite outcrops in Little Rock, a Pennsylvanian turbidite sequence at DeGray Lake spillway in the southern Ouachitas, and a visit to Crater of Diamonds State Park to scout for gems and kimberlite samples. On the second day, the group ventured into the core of the Ouachitas, the Benton Uplift, to dig for quartz at the colossal Ron Coleman Crystal Mine and to explore the highly deformed pre-orogenic sedimentary sequence exposed at Lake Ouachita by boat. The next day brought a journey into the famed Magnet Cove Intrusive area, where the group collected minerals at Jones Mill Quarry and made roadside stops that included a rare exposure of carbonatite. The group then headed north through the mélange of the "Maumelle Chaotic Zone" and into the Arkoma Basin, viewing Pennsylvanian submarine fan deposits and deltaic sequences on their way to the Ozarks. Once in the Ozarks, the focus shifted to carbonates as the group rented canoes and floated down the scenic Buffalo National River, examining Silurian fossiliferous wackestones and stumbling across stunning orthoconic nautiloids in a Late Ordovician limestone. The culmination of the trip was a 4.5 hour wild cave tour through Blanchard Springs Caverns, an impressive cave providing excellent exposures of the Ozark stratigraphy. For more information and photos from the field trip, visit the website of Franek Hasiuk at <http://www-personal.umich.edu/~frank>.



This doesn't look like Arkansas  
*The Grand Teton, Wyoming from Rendezvous Peak. Photo by K. C Lohmann*

## SCIENTISTS PENETRATE FOSSIL MAGMA CHAMBER



In the Pacific Ocean, approximately 800 km west of Costa Rica, an international team of scientists aboard the research drilling ship JOIDES Resolution has for the first time recovered black rocks known as gabbros from intact ocean crust. Supported by the Integrated Ocean Drilling Program (IODP), the scientists drilled through the volcanic rock that forms the Earth's crust to reach a fossil magma chamber lying 1.4 kilometers beneath the seafloor.

By sampling a complete section of the upper oceanic crust, we've achieved a goal scientists have pursued for over 40 years, since the days of Project MoHole, says **Damon Teagle (postdoctoral Fellow in the '90's)**, National Oceanography Centre, University of Southampton, UK, and co-chief scientist of the drilling expedition. Our accomplishment will ultimately help science answer the important question, how is new ocean crust formed? Formation of ocean crust is a key process in the cycle of plate tectonics; it constantly repaves the Earth's surface, builds mountains, and leads to earthquakes and volcanoes. Project MoHole, begun in the 1950's, aimed to drill all the way through the ocean crust, into the Earth's mantle.

Expedition Co-Chief Scientist **Jeffrey Alt (Research Scientist)** of the University of Michigan explains that having this sample from the deep fossil magma chamber allows us to compare its composition to the overlying lavas. It will help explain, he says, whether ocean crust, which is about six- to seven- kilometers thick, is formed from one high-level magma chamber, or from a series of stacked magma lenses. He emphasizes that the size and geometry of the melt lens affects not only the composition and thermal structure of the ocean

crust, but also the vigor of hydrothermal circulation of seawater through the crust. Alt states that such systems lead to spectacular black-smoker vents -- modern analogs of ancient copper deposits and deep-ocean oases that support exotic life.

Following three years of research and multiple trips to the site in question, the borehole that rendered the magma chamber is now more than 1,500 meters deep; it took nearly five months at sea to drill. Twenty-five hardened steel and tungsten carbide drill bits were used before the scientists' work was complete. The rocks directly above the frozen magma chamber were extremely hard because they had been baked by the underlying magmas, much like tempered steel. IODP scientists want to return to the site of the unearthed magma chamber to explore deeper, in hopes of finding more secrets hidden deep within the ocean's crust.

*This article is excerpted from the University Record, 8 May 2006*

*Photo by K.C Lohmann, Leg 208*

**Steven Catlin (BS '78)** is now living in Modesto, California with his wife of 11 years. He is in this sixth year of teaching high school science (Earth Science and Advanced Placement Environmental Science). In addition to a full career, his life is full of lots of travel to exotic locales. In 2005, Steve and his wife traveled to Uganda and Tanzania and this year to the Galapagos and the Amazon. They are up to their seventh continent with their trip to Antarctica.

**Suzanne Hurter (PhD, '72)** has changed jobs from Royal Dutch Shell to Schlumberger, without even moving house in The Hague in the Netherlands. At Schlumberger she will be helping to set up a CO<sub>2</sub> business/organization, with projects in the North Sea, Australia and the USA.

**Curt Lundy (BS '54, MS '58)** continues to assist **Dr. Mark Uhen (PhD '95)** at the Cranbrook Institute of Science in computerizing the mineral inventory records. The Bloomfield Hills Museum has the third largest mineral collection at a private institution. Additional volunteer time is directed toward “making a difference” through Habitat for Humanity in Detroit.

**Joe Mandarino (PhD '58)** was contemplating the history of mineralogy at Michigan and began to compile a list of minerals named after U-M faculty or students over the years: krausite, huntite, ramsdellite, slawsonite, heinrichite, metaheinrichite, levinsonite(Y), denningite, spiroffite, donpeacorite, esseneite, rouseite, kellyite, turneaureite, dorrite, mandarinoite. He asks others to add to the list if he has overlooked a few. For the past seven years Joe has been compiling the *International Encyclopedia of Minerals* with the help of almost 100 mineralogists throughout the world.

**Leon Reiter (MS '68, MA '70, PhD '71)** is retiring from the Nuclear Waste Technical Review Board staff after 15 years of dedicated service, and 31+ years in the federal government. The NWTRB arranged a social evening in Las Vegas on February 1, 2006 to allow a group of friends, colleagues and associates to wish him well in his retirement.

**Jim Silliman (PhD '98)** writes from Texas that he still keeps in touch with Phil Meyers, and saw him at the last AGU Fall Meeting in San Francisco. Jim is an assistant professor of chemistry and geology at Texas A&M University-Corpus Christi, and has just finished his fifth year. He comes up for promotion and tenure this fall. Jim is enjoying teaching and research and the family loves the winters in Corpus Christi. Jim notes that when he was in Ann Arbor, 1993-1998, his daughters were in elementary and middle school. Now the oldest is married and the youngest is starting college — boy, does time fly.

**Jeff Huspeni (MS '81), Mary “Robert” Huspeni (BS '81)** were in Ann Arbor recently to visit their son, Matthew, who is a sophomore at U-M. Jeff is still Vice President of Exploration Business Development with Newmont Mining Corp. and is in charge of finding 7 million ounces of gold per year. Their daughter, Elaine, just started at Stanford University which leaves them as “empty-nesters”. With this extra time, Mary is pursuing her second love (Jeff being her first) of investing and making money in the stock market, hoping to cash in on all of the baby boomers who are retiring.

Matthew, Mary, and Jeff Huspeni during their recent visit to Ann Arbor.





## IN MEMORIAM

**Marie Tharp (MA '45)** the co-creator of the first global map of the ocean floor and co-discoverer of the central rift valley that runs through the Mid-Atlantic Ridge died at the age of 86 in August 2006. Tharp was the first to map the unseen topography of the ocean floor on a global scale based on sonar readings from oceanographic vessels. Piecing together maps that they made, she and colleague Bruce Heezen revealed a 40,000-mile underwater ridge girdling the globe. With the discovery, they laid the foundation for later work that showed



the sea floor spreads from central ridges and that the continents are in motion with respect to one another — a revolutionary and controversial theory among geologists at the time. These observations and her topographic interpretations of the sea floor serve as one of the cornerstones that support the theories of seafloor spreading, continental drift and ocean basin tectonics.

Marie Tharp was born in Ypsilanti, Michigan and subsequently attended Ohio University, changing her focus several times until she graduated with majors in English and music and four minors. She later obtained a masters degree in geology from the University of Michigan and in math from the University of Tulsa. Yet, as Tharp said, she was “still searching for something more challenging,” and moved east, where she eventually joined the staff of the geology department at Columbia University in 1948 as a research assistant to Maurice “Doc” Ewing.

In 1959, Tharp and Heezen completed their first map of the North Atlantic. In 1961, they completed the South Atlantic and in 1964, the Indian Ocean. After Heezen died in 1973, Tharp focused her energy on completing a comprehensive view of the world’s oceans. The World Ocean Floor map was published in 1977 by the Office of Naval Research and is still in wide use today. Only in recent years has Tharp begun to be recognized for the breadth and significance of her contributions to science. In 1998 she was honored during the 100th anniversary of the Library of Congress’ Geography and Map Division. The following year, she was recognized by the Woods Hole Oceanographic Institution. In 2001 she was honored by her home institution with the Lamont-Doherty Heritage Award. Today, a fellowship at Lamont-Doherty to promote women in science through the ADVANCE program bears her name. (*Excerpted from Columbia News*)



**Alfred A. Levinson (Ph.D '52)** passed away on 12 December 2005 after a long and valiant battle with lung cancer. Al, a native of Staten Island, New York, received his doctorate from the University of Michigan in 1952 in the field of Mineralogy. His career as a geologist and mineralogist spanned a range of academic and industrial positions which included Gulf Research, Dow Chemical, Ohio State University, and the University of Calgary, Alberta where he served as a professor. Al Levinson was also an influential member of the Department’s Alumni Advisory Board and was instrumental in establishing and building the Slawson Endowment. He was an energetic researcher and dedicated author. The fields of geology and mineralogy will miss him.

# AL LEVINSON -- A PERSONAL REMINISCENCE



by  
**Ed Poindexter**

*Four Michigan mineralogists on an ambulatory reconnaissance of geological features and outcrops southwest of the Elk Range, near Marble, northern Gunnison County, Colorado, on a very fine day in August 1954. From the left: Alice Corey (née Seguare); Al Levinson, (back to camera); Al Corey. Photo by Ed Poindexter.*

**Alfred A. Levinson (PhD '52)** died in December 2005; I lost one of my closest — and most unusual friends. Over 55 years, we shared many hundreds of happy hours together. His unwavering concern for his close friends' welfare, and his unrivaled and focused generosity, were truly unique.

When I first met Al in our old Department of Mineralogy in 1950, I would not have guessed that things would turn out as they did. Al was a doctoral candidate, and I, a sophomore. Al became senior graduate student overseer for the Department's Navy-funded research. He was stern and frugal in managing project funds, and his own. Woe unto you if you should waste a sheet of x-ray film, leave the water running, or fail to cap the Duco cement. This trait, plus a serious and unsmiling demeanor, made him a bit forbidding. However, this initial impression was very misleading.

Al decided that I was romantically challenged, and probably needed help in other areas as well. He became my mentor and planner. As one tactic, he issued an invitation of unmatched generosity and far-reaching impact, *viz.*, to make a one-month tour of the western US, with his paying all car expenses. I was overwhelmed, uneasy about accepting such largesse.

We had a blast. With Fenneman's *Physiography of Western United States* in hand, we enjoyed many scenic wonders; and guided by Al's instincts, we enjoyed some charming *ad hoc* companions. We slept under the stars whenever feasible. I honored his generosity the best I could by the scrupulous sharing of minor expenses; so we passed a half cent stamp back and forth for precise on-the-spot settlements.

As a direct outcome of this wondrous trip, Al and I became the closest of lifelong buddies; and I changed my course in life and career — avoided employment at a prestigious but doomed eastern laboratory, and corralled a smashing California wife. In the succeeding years of our friendship, bachelor adventures now gone, Al continued with an exceptional concern for my career, my wife and children, and our home and family problems. He would spend hours over coffee listening raptly to our update, commiserating and mentoring in his gentle way.

Al's remarkable generosity continued in leadership of our C. B. Slawson Fund (*Geoscience News*, Fall 2005); and over the years, his stern facade gave way to a sly and perceptive sense of humor, a twinkle in the eye. Alas, despite his beneficent influence on my romantic life, and his own noble forays, only late in life did Al find an impressively rewarding woman companion for himself.

Being Al Levinson's friend was a tremendous privilege for me. I cannot publish our deepest joint experiences. Sharing such private memories with those close to the both of us will be my best memorial to Al.

**William J. Vaughn Jr. (MS, '48)** passed away June 23, 2005 at the age of 84 years. Bill was born on July 29, 1920 in Bay City, Michigan. At the age of 23, he served in the Army during WWII after which he returned to Ann Arbor, Michigan and began his graduate work at the University. He completed a Master of Science in petroleum geology at University of Michigan in 1948 after which he joined Texaco and eventually settled in Midland, Texas. In 1975, he retired from Texaco to become an independent oil producer. He co-founded Titan Exploration in the 1990s and was instrumental in the formation of many other oil related businesses. **Bill Langenbahn (BS '59, MS '60)** shares these memories. "Bill Vaughn [was] a member of the greatest generation and graduate of '48 class with a M.S. in Geology. He recruited me in 1960 and was a mentor when I began my career with Texaco in Midland, Texas. He was highly regarded as a geologist and a true gentleman as well as a wonderful husband and father...."

**Margaret J. Kitchen (BS '44, MS '46)** recently died at the age of 83. She was born in Noblesville, IN in 1922 and attended the University to study astronomy. Margaret Ann Kitchen, her daughter, describes her mother as "upbeat, friendly, and intelligent with a sense of humor." "She told me she couldn't handle the math [in astronomy], so she looked for something else ... She absolutely loved geology. She loved the sense of time with it. She could look at a rock and tell you everything about it – where it was from, how it formed and its age." Margaret J. Kitchen worked for the U.S. Geological Survey from 1944-45, was an assistant in the Department of Geology at Michigan from 1945-46 before joining Sun Oil Company. After retiring from the oil industry, she attended law school and received her JD from the University of Toledo in 1952. She taught geology at the University of Toledo from 1963 to 1993 while simultaneously practicing law with her husband in their law firm Kitchen and Kitchen. She was a member of the American Association of Petroleum Geologists and The Michigan Basin Geological Society.

**Robert V. Kesling (Professor Emeritus)** died of cancer on December 25, 2005. Bob was an invertebrate paleontologist and joined the faculty in 1949, jointly appointed in the Geology Department and the Museum of Paleontology. He was director of the Museum from 1966 until 1974, and retired from the University in 1983. Bob is survived by his wife Amelia, who lives in the family home in Ann Arbor.

**Margaret Stearns Bishop (AB '29, MS '31, PhD '33)** emeritus professor at the University of Houston died May 17, 2005. Margaret was the Department's first woman to earn a PhD in Geology with her dissertation entitled: "The Petrology of the Marshall Formation in Michigan". She subsequently began her career as a petroleum geologist, initially with Pure Oil of Chicago and later as a partner in Bishop and Bishop Consulting which was based in Michigan. With increasing work in Texas, she and her husband moved to Houston, where she began a career as professor in at the University of Houston until her retirement in 1971.



Two of **Rob Van der Voo's** graduate students have completed their PhD studies in the past year and successfully defended their theses. As reported already frequently in previous *Geoscience News* issues, **Daming Wang** studied the magnetic properties of ocean-floor basalts and was co-supervised by Rob and emeritus professor **Don Peacor**. Daming's work was supported by a grant from the National Science Foundation. Graduate student **Maodu Yan** (working also with **David Rea** and **Josep Parés**), defended in Fall 2005; he completed magnetostratigraphic studies of Neogene deposits of northeastern Tibet, and coupled this with a determination of local clockwise rotations in the Guide Basin that occurred during the mid-Miocene. Both Daming and Maodu departed for California, Daming to work for an e-company called Cataphora and Maodu to be a postdoctoral fellow at the University of California, Santa Cruz. **Sasha Abrajevitch** continued to work during the past year on the Paleozoic paleomagnetism of Kazakhstan, in a collaborative project with **Drs. Misha Bazhenov and Natasha Levashova**, who were Visiting Scientists in the Department for much of the past academic year 2005-2006, supported by a grant from NSF. Sasha wrote a successful application for a Schlanger Fellowship, which is funded by the Joint Oceanographic Institutions. The work she will be carrying out with this support in the coming year is rather different from her Kazakhstan studies: she will be looking into the magnetic properties of Bengal Fan sediments, trying to distinguish hematitic from goethite-bearing strata in order to deduce the climate (monsoonal) variations in the source areas of the Himalayan foothills. Graduate student **Jim Hnat** is continuing for the PhD degree, investigating whether vertical-axis rotations occurred in the Tennessee, Georgia and Alabama Appalachians, by means of calcite-twinning and paleomagnetic studies, co-supervised by **Ben van der Pluijm** and Rob. Postdoctoral fellow **Belén Oliva Garcia**, originally from Zaragoza, is studying the paleomagnetism and tectonics of Cretaceous and earliest Tertiary carbonates in the central Pyrenees, and just started a project looking into the paleomagnetic record

(reported to contain an unusually rare reversal) of Late Carboniferous-Early Permian paleosols in eastern Ohio and West Virginia, called the Dunkard Formation. **Matt Domeier**, a new graduate student, joined Rob's group this Fall. He is planning his research for the coming years by investigating the Early Triassic paleomagnetism of the Gondwana continents. He hopes to sample igneous rocks in Argentina's Mendoza Province. The ultimate goal of this project is to test Pangea configurations for latest Permian and Early Triassic times.

This past summer, **Dan Fisher** and graduate student **Adam Rountrey** had intended to stay around Ann Arbor and focus on laboratory phases of a new NSF-sponsored project on the paleobiology and extinction of woolly mammoths in Siberia, a collaborative project with former graduate student **David Fox (MS '95, PhD '99)**, now at the University of Minnesota. However, with very little notice, an opportunity emerged to travel to Yakutia, in eastern Siberia, and investigate a recently discovered baby mammoth carcass (i.e., not just bones, but soft tissues as well). Since Adam's dissertation will deal with stable isotope evidence of diet and life history of juvenile woolly mammoths, this was an opportunity not to be missed. Boarding one aircraft after another, each smaller than the last, they crossed fourteen time zones to the city of Yakutsk, where they met Russian and Yakutian colleagues in a -10°C "ice cave" and were introduced to "Mammu-shen," as the youngster had been dubbed. His body had been badly damaged by the encounter with a bulldozer that had led to his discovery, but it preserved the unmistakable rounded profile of a baby elephant. Better yet, although knocked loose by the bulldozer's blade, one of the bones from the front of the skull had been recovered, containing the diminutive, first-formed portion of a permanent tusk. As you may remember from previous issues of this newsletter, tusk structure and composition yield clues about many aspects of growth history. Details of an agreement are still being worked out, but the prospects seem excellent that Dan and Adam will be able to borrow this tusk for analysis and will reconstruct details of the history of this

too-short life. Once in Yakutsk, other specimens came to light that may also be available for analysis, and opportunities developed to participate in fieldwork in northernmost Yakutia and the Taimyr Peninsula. The excitement of new specimens and new experiences in the other-worldly Arctic now combine in retrospect to give those few weeks a dream-like quality. Reluctant still to fully unpack, Dan and Adam are already looking forward to next summer.



**Bruce Wilkinson (Professor Emeritus)** retired from the University of Michigan during the Summer of 2006 after a long and glorious 33 years of a productive career. Bruce was the central member of the “Soft Rock Group”, providing constant energy, guidance (sometimes with loud, seemingly critical remarks), and encouragement to the students and his colleagues. Bruce’s contributions ranged from innovative teaching to cutting edge (and often controversial) research. Bruce initiated the now famous Geology Mini-courses and with **Skip Simmons (PhD ’73, Adjunct Professor)** initiated the “Geology of the Rockies” introductory field course at Camp Davis in Wyoming. This course continues today and serves as a gateway for many of our geology concentrators. His expertise as a sedimentary geologist and talents as a teacher were also

expressed in his organization of the yearly “Soft Rock Field Trip”. Few can provide the level of insight for interpreting the sedimentary sequence with unique style and flair possessed by Bruce in



the field. While maintaining an active research and teaching program, Bruce also contributed to the Department’s administrative tasks, most recently serving as the Associate Chair of Graduate Studies, for which he is lauded as the “most influential mentor” by the graduates. Bruce is now living near Syracuse with **Linda Ivany (Michigan Fellow)**, where he continues to teach part-time and pursue his research as an Adjunct Professor at Syracuse University. We will all miss him and the contributions he has made to the Department and University.

**Youxue Zhang** and his group had a fruitful and pleasant summer. Youxue is writing a book on “Geochemical Kinetics”, aiming it to be the “bible” on geochemical kinetics. He served as the Volcanology/Geochemistry/Petrology Program Chair for the 2006 Western Pacific Geophysics Meeting in Beijing in late July. He and all of his students (**Hejiu Hui, Yang Chen, and Huaiwei Ni**) attended the meeting, and presented research on volatiles in magma, viscosity of silicate melts, volcanism in Northeast China, and diffusion of water in dacitic melt.



## *Special AGU Session Honors Eric Essene*

A special session, entitled *Thermocubed: Combining Thermodynamic, Thermoisotopic, and Thermotectonic Data in Addressing Petrologic Problems*, will take place at the December AGU meeting in San Francisco. This session is being convened to honor **Eric Essene** by some of his former students: **Michael Cosca (MS '85, PhD '88)**, **John Bowman (PhD '78)**, **Zachary Sharp (MS '84, PhD '88)** and **John Valley (MS '77, PhD '80)**.

Fundamental questions in modern metamorphic petrology and petrogenesis are often addressed by approaches pioneered by Eric Essene through the combination of thermodynamic, thermo-isotopic, and thermotectonic data. Field and petrographic observations combined with data from thermodynamic modeling of experiments, stable and radiogenic isotopes, X-ray tomography, electron microprobe, ion microprobe, and other geochemical methods have improved our understanding of processes and phenomena such as elemental and isotopic diffusion, crystal nucleation and growth, mineral stability, geothermometry, geobarometry, P-T-t histories, and fluid-mineral equilibria. This session is an opportunity to highlight recent advances from such investigations inspired by the integrative approach of Eric that further our understanding of the physical and chemical nature of metamorphic processes at scales both large and small.



## *Pollack and Gore -- Exploring Climate Change*



U-M Professor Henry Pollack discussing global warming with Tipper Gore at Al Gore's Climate Project.

**Henry Pollack**, now Professor emeritus in the Department, has a full plate in "retirement". He was invited to present the inaugural Distinguished Lecture of the GSA Geology and Society Division at the 2005 GSA meeting in Salt Lake City. A written version of the lecture, titled "Scientific Uncertainty and Public Policy: Moving On Without All the Answers", will appear shortly in *GSA Today*. In March he presented testimony about borehole thermometry and paleoclimatology to a National Academy of Sciences — National Research Council committee preparing a report on Surface Temperature Reconstructions for the Last 2,000 Years. And in the fall he was invited to be part of the teaching faculty for Al Gore's Climate Project, an undertaking that trains community leaders to present Gore's slide show about global warming in their hometowns.

In the past school year **Ted Moore (Professor Emeritus)** followed **Kacey Lohmann (Professor)** as one of the Joint Oceanographic Institution's "Distinguished Lecturers". He traveled to nine different colleges and universities to give a lecture titled "The Once and Future Warm Earth" in which he compared the evidence for present global warming and its predicted impact with the apparent impact of global warming during the extreme warmth of the early Eocene. If time permitted, he also gave a talk on the results of the Arctic Coring Expedition (ACEX), carried out in the late summer of 2004 (IODP Expedition 302). The places Ted visited were: University of Northern Colorado, Elizabeth City State University, College of Wooster, Eastern Carolina University, Rutgers University, University of North Carolina at Wilmington, University of South Florida, New Mexico Tech, and Florida International University. "It was a lot of fun meeting with the faculty and students at each of these places, and I was particularly impressed by the quality of environmental monitoring and geologic research being carried out at even the smaller institutions. I was also somewhat surprised that in spite of the very diverse nature of our geologic community, every university or college had at least one person on the faculty whom I already knew, or at the very least, had worked with someone that I knew quite well."

The JOI lecture tour ended in February 2006 and following that Ted left in March for a drill site survey cruise on board the R/V Roger

Revelle. Among the 30 scientists and students on board were **Mitch Lyle (BS '73)** and **Steve Hovan (BS '87, MS '90, PhD '93)**. Mitch was co-chief scientist with Heiko Pälike of the National Oceanography Centre at Southampton, UK. Steve was in charge of sediment core description and Ted and Jan Backman (Stockholm University) were in charge of putting ages on the cores recovered. They sailed from Papeete, Tahiti to Honolulu, Hawaii on a course that zigzagged over the thick equatorial mound of biogenic sediments. They surveyed 8 potential drill sites and added to the previously collected data sets that defined the seismic stratigraphy of the sediments in this mound. The Roger Revelle was equipped with an array of hydrophones that allowed them to map a swath of the sea floor that was on the order of 10 km wide. These data, together with the multi-channel seismic data that were collected and processed on board, allowed them to image the rather common occurrence of what are believed to be hydrothermal "pits" in the sediments. It was a little surprising to find these pits on crust that ranged in age from 15 to 55 Ma, but others have suspected their presence based on older seismic data and heat flow measurements. An abstract on these results will be presented at the fall AGU. The surveyed sites are located at the positions of the paleo-equator through much of the Cenozoic, and the proposed drilling will document changes in the productivity of the equatorial zone of upwelling from 15 to 55 Ma. The IODP drilling expedition is presently scheduled to take place in two phases, starting in the fall of 2007.



STUDENT AND ADVISOR: It was a delightful surprise for **Henry Pollack (Professor emeritus)** when **John DeNoyer (Professor, '58-68)** joined in for the inauguration of Jeroen Ritsema as the Henry Pollack Professor. John DeNoyer was Henry's dissertation advisor at U-M from 1960 to 1963.



*PhD*

- Michela Arnaboldi** Paleooceanographic Processes Associated with the Deposition of Organic-Rich Sapropels and Black Shales
- Amanda Ash Dasch** The Isotope Geochemistry of Calcium and Strontium in Tree Tissues as a Monitor of Calcium Sources and Cycling in a Base-Poor Forested Ecosystem, New Hampshire, USA
- Noralynn Hassold** Late Miocene to Recent Changes in Abyssal Current Strength: Views from the North Atlantic and the Pacific Margin of Antarctica
- Kate Keller** Geochemistry of Streams, Soils, and Permafrost and the Geochemical Effect of Climate Change in a Continuous Permafrost Region, Arctic Alaska, USA
- Carmen Nezat** Mineral Dissolution in Soils as a Function of Landscape Position, Vegetation, and Fungi at the Hubbard Brook Experimental Forest, New Hampshire, USA
- Naila Moreira** Importance of Sulfide Oxidation in Dolomite Formation: A Field and Experimental Study
- Martin Reich Morales** Nanoscale and Atomistic Processes in Minerals: From Gold Nanoparticles in Pyrite to Helium Diffusion in Zircon
- Kati Szramek** Carbonate Mineral Weathering in Mid-Latitude Watersheds: Importance of Calcite and Dolomite Dissolution on Dissolved Inorganic Carbon Acquisition and Transport
- Daming Wang** Electron Microscopic, Rock Magnetic and Paleomagnetic Studies of Mid-Ocean Ridge Basalts

*Master of Science*

- Janine Fisler** Late Holocene Hydrographic Variability as a Causal Link to Rapid Cultural Evolution of the Southern Californian Chumash Indians: A Planktonic Foraminiferal Assemblage Record, ODP Hole 893A, Santa Barbara Basin
- Franek Hasiuk** Biotic and Abiotic Carbonate Records of Paleoocean Chemistry: Muleshoe Mound, Mississippian Lake Valley Formation, Alamogordo, New Mexico
- Nico De Koker** Dynamic Topography and the Density Structure of the Lithosphere
- Andrew Lammers** 4000 Years of Mercury Deposition as Recorded in Alaskan Arctic Tundra Soils
- Elizabeth Smith** A Petrographic and Geochemical Study of Permian Carbonates: Implications of the Mg/Ca Ratio of Permian Seawater
- Ni Sun** In Situ Investigation of Brucite and Aqueous Fluids in the MgO-H<sub>2</sub>O System at Elevated Pressure and Temperature
- Matthew Wasson** Isotopic and Elemental Evidence for Meteoric Alteration within a Pennsylvanian Phylloid-Algal Mound, Holder Formation, New Mexico



## *Bachelor of Science and Bachelor of Arts*

|                               |                                     |
|-------------------------------|-------------------------------------|
| <b>Monamie Bhadra</b>         | <i>Geological Sciences BA</i>       |
| <b>Jennifer Burnham</b>       | <i>Oceanography BS</i>              |
| <b>Mary Carnegie</b>          | <i>Geological Sciences BS</i>       |
| <b>Christopher Cunningham</b> | <i>Minor Environment Geology BA</i> |
| <b>Dana Dougherty</b>         | <i>Geological Sciences BS</i>       |
| <b>Brian Ellis</b>            | <i>Environmental Geosciences BS</i> |
| <b>John Graf</b>              | <i>Geological Sciences BS</i>       |
| <b>Jennifer Johnston</b>      | <i>Earth Sciences BS</i>            |
| <b>Karen Kimm</b>             | <i>Geological Sciences BS</i>       |
| <b>Gregory Krankurs</b>       | <i>Oceanography BS</i>              |
| <b>Jason Mailloux</b>         | <i>Environmental Geosciences BS</i> |
| <b>Jessica Malone</b>         | <i>Environmental Geosciences BS</i> |
| <b>Colin McIntyre</b>         | <i>Geological Sciences BS</i>       |
| <b>Jesus Ortega</b>           | <i>Geological Sciences BS</i>       |
| <b>Erin Pettypiece</b>        | <i>Environmental Geosciences BS</i> |
| <b>Elizabeth Siegel</b>       | <i>Minor Oceanography BSE</i>       |
| <b>Donald Soth-Kimmel</b>     | <i>Environmental Geosciences BS</i> |
| <b>William Stoddard</b>       | <i>Minor Paleontology BSE</i>       |

### *UNDERGRADUATE RESEARCH OPPORTUNITY FELLOWS: 2006*

|   |   |
|---|---|
| <b>Megan Tuura</b>                      | Brachiopod Drilling in the Cenozoic<br><i>Supervisor Tom Baumiller</i>  |
| <b>Sara Worsham</b>                     | Trace Metal and Mercury Deposition to Arctic Ecosystems,<br><i>Supervisors, Joel Blum and Abir Biswas</i>                         |
| <b>Erin Bachynski</b>                   | Correlations between Climate, Topography and Erosion in the Andes<br><i>Supervisors, Todd Ehlers and Jason Barnes</i>             |
| <b>Jordan Rhodes<br/>and Lissa Ocko</b> | Ice Age Mastodon Skeletons: Continuing the Research of<br>Extinct Mammals through Bone Replication, <i>Supervisor, Dan Fisher</i> |
| <b>Monica Wu</b>                        | Ice Age Mastodon Skeletons, <i>Supervisor, Dan Fisher</i>   |
| <b>Colene Haffke</b>                    | Influence of Gondwana Glaciation on Global Climate Change in the Permian<br>Period, <i>Supervisor, Chris Poulsen</i>              |

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Position Company

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Degree \_\_\_\_\_ College or University \_\_\_\_\_ Year \_\_\_\_\_

Spouse \_\_\_\_\_ Year of Wedding \_\_\_\_\_

Child \_\_\_\_\_ Birth Date \_\_\_\_\_ Child \_\_\_\_\_ Birth Date \_\_\_\_\_  
Name

Child \_\_\_\_\_ Birth Date \_\_\_\_\_ Child \_\_\_\_\_ Birth Date \_\_\_\_\_  
Name

Child \_\_\_\_\_ Birth Date \_\_\_\_\_ Child \_\_\_\_\_ Birth Date \_\_\_\_\_  
Name

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