Alumni Newsletter
1996-1997

Department of Geology and Planetary Science

Jack Sharkey investigates magnetron tube radiation, circa 1943

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Thanks to Kathleen, Todd and Candy for putting this newsletter together.

Ninth & Tenth Years
Nervous Nine and Taxing Ten

It has been a busy and productive year! So busy, in fact, that we are late in providing you with an update of departmental activities. For this I apologize. As you may be aware, last year's newsletter covered the calendar year 1995. In view of the delay in getting this year's edition to you, we have taken the opportunity to change the newsletter coverage from a calendar year to an academic year so that it better tracks departmental statistics. This year's newsletter includes activities between January 1, 1996 and June 30, 1997; next summer's report will include the 1997-98 academic year.

As I noted in the '95 newsletter, we had several irons in the fire. Clean laboratories for geochemical research were under construction, the new degree program in environmental studies was being considered at the Provost level, and fund raising activities in support of acquisition of a thermal ionization mass spectrometer (TIMS) and an inductively-coupled plasma spectrometer (ICP) had been undertaken. I am proud to report that we batted 1000 in these areas. The labs are completed and both instruments have been purchased (not, I would remind you, without tremendous efforts and near exhaustion of Professors Capo and Stewart). The ICP-AES was acquired as a result of the generosity of Bell and Bev Cassidy, who established a major equipment fund that was matched by Dean Koehler. Support for the TIMs are via National Science Foundation and matching grants. The environmental studies program has been approved and already more than 50 students have selected it as a major! This Fall's group of freshmen is the first to be admitted with the option of selecting environmental studies and we anticipate additional majors.

A key player in the effort to expand departmental capabilities in isotope geochemistry has been Jack Sharkey. Jack's association with the department began more than three decades ago when he offered one of the first classes in mass spectrometry in the United States. Since that time he has continually served as a teacher, advisor and administrator in this department as well as in Chemistry. Because of Jack's quiet, self-effacing manner most people do not realize that Jack was a pioneer in the development of mass spectroscopy. Last year Jack announced his retirement and we seized upon his decision to conduct a symposium in his honor. The April symposium on "Advances in Mass Spectrometry of the Earth and Environment" which brought together friends and colleagues of Jack as well as other outstanding scientists in the field was an unqualified success. The celebration also provided the opportunity to showcase the newly completed facilities for geochemical research.

About the same time the inaugural meeting of the Advisory Committee for Environmental Studies was held. Program components were vigorously discussed and debates over the number of courses emphasizing science versus those on policy took place. The differences of opinions about and the diversity of the approaches to environmental issues clearly demonstrated how the fabric of daily life is affected by things environmental.

Earlier in the year, our department had participated in a series of reviews conducted by the Dean of Arts and Sciences and his staff. During a series of meetings, quality, centrality, size and productivity were intensively scrutinized. Among the points which we strongly emphasized are:

1) the addition of energetic, ambitious, innovative junior faculty has contributed to the marked increase in outside research funds (206% from 1993 to 1996 reaching more than $1.1 million in current active grants);
2) frequently cited research articles;
3) intensive curriculum planning leading to new course offerings and enhancements;
4) new high-quality undergraduate programs, such as the major in environmental studies and the certificate program in geographic information systems, that focus upon relevant student interests and emphasize interdisciplinarity;
5) high teaching productivity by tenure/tenure stream faculty with 100% participation;
6) personalized student advising;
7) new or renovated laboratories in selected research areas; and,
8) highly successful graduates who have remained in the field.

Currently ten computer workstations are being installed in support of popular course activities developed in concert with the new certificate program in geographic information systems.

In January as I returned from field work in northern Mexico, I had the opportunity to visit with departmental graduates working in the Houston area. Franco Corona, who was the organizational leader, picked a great restaurant. After dinner I got some excellent advice about how to make courses and programs more applicable to the exploration for hydrocarbons. Franco capped the evening by initiating a scholarship fund in honor of Harry J. Werner, an oilman who taught in the department between 1963 and 1979 . Harry influenced many students especially during trips to the Virginia Blue Ridge where he conducted his dissertation research. Franco, who participated on more than one of Harry's fabled trips, was convinced by them that geology was the career for him. This fund, The Harry J. Werner Oil Finders Fund, which supports graduate student activities, commemorates the contributions of graduates from the department who searched for oil and gas.

From the Chair's viewpoint last year was a barnburner. We learned a lot about ourselves while at the same time making sufficient changes that improve and enhance teaching and research activities in G&PS.

Signed,

Tom Anderson

News

Thomas H. Anderson *[taco@vms.cis.pitt.edu]*

At the end of 1995 I wrote describing how snowy it was in western Pennsylvania. That January I left just after another strong storm and inched off to Sonora, Mexico. Frankly, the weather wasn't much better there as the nighttime temperatures were consistently in the twenties!

Aside from being somewhat cool, it was typically dry, and for the most part, brisk, clear Sonora weather. Got lots done and found more evidence which may support the idea that deep basins formed during the late Jurassic where splays of the Mojave-Sonora megashear stepped left to form pull-apart basins.

Summer of '96 was a blur and somewhat disappointing in that I just did not seem to accomplish much. Frustrating! Fall was much better. My term as co-chairman of the University Senate Plant Utilization and Planning Committee (PUP) came to an end and with its completion my duties on several other related committees also ended. I must say that it has been quite pleasant to be relieved of the PUP duties, especially because I had more time to devote to teaching two courses, structural geology and plate tectonics.

In the middle of the term, I took time off from school work to attend the Geological Society of America convention in Denver. I generally participate in either a short course or field trip on one end or another of the meeting. A trip to the Hanna Basin near Medicine Bow, Wyoming was advertised. An attractive aspect of the trip was that structures related to Late Cretaceous deformation, somewhat similar to those in Sonora, were to be visited. The trip description included a caution that Wyoming weather was changeable at this time of the year and that participants should be prepared for a wide range of temperatures. Well, I thought, how bad can it get in Wyoming in October?? Might get pretty bad. So, I cautiously assembled my cold weather desert clothes and set out. Three days later, an hour or so outside of Medicine Bow, I was huddled behind a van as snow rushed by at about 50 mph with temperatures in the 20's. I must say that I was truly impressed, never having spent much time in blizzards! The field trip leaders in their snow parkas said "we warned ya" and participants from western Canada commented how Spring-like it seemed!! I had visions of a frozen desert geologist covered with ice in the middle of Wyoming!

Subsequently, during the conference, I presented a paper on the structures in Sonora some of which formed as a consequence of reactivation of pre-existing crustal faults during Late Cretaceous mountain-building. I was co-author on four other papers, one with John Dembosky, a current student and three others with research colleagues, two of whom (Mary Beth McKee and Patti Campbell) earned PhDs in the department.

In January, I was invited to a conference in Hermosillo, Sonora sponsored by the National Science Foundation. The objective of the meeting was to assess the likelihood of correlation between sedimentary rocks in Nevada and California and those purported to have been displaced southward along the Mojave-Sonora megashear to Sonora. There I was in the midst of paleontologists focused upon bioherms and diastems! These folks don't have a problem with either the proposed correlation nor the offset. I liked that a lot.

Also during the first months of the year, GPS was under going a series of reviews, which I mentioned in the Chair's letter. I confess that it was a tense and stress-filled few months, perhaps the most unpleasant period of my tenure as chair. As the review activities were ending, I spent a

Anderson continued

couple weeks in Coahuila with Jim and Mary Beth McKee collecting information to use in writing a June NSF proposal. I also stopped for a day in El Paso to give a paper on the geophysical expression of major faults in northeastern Mexico (with Carlos Aiken of University of Texas at Dallas), before continuing to Houston and Dallas where I met with Pitt grads. As soon as I reached home, I was involved in the Environmental Studies Advisory Board meeting followed by the symposium in honor of Jack Sharkey.

During the past few months I have been an administrator as well as a writer (National Science Foundation says - publish or we will forget about you!!).

Sara Lee has moved to a downtown location in Washington D.C., which has an inspiring view out the front door of the capitol! Garrett came back from China, hung out at home for several months while he took exams and recently enrolled at Cornell in a PhD program having to do with plant genetics. Tanna is managing plumbers as they replace ninety-year old pipes in our old but expensive house.

Cheers to all.

Kathi K. Beratan *[kathib@vms.cis.pitt.edu]*

I have nearly completed the transition in my research from field sedimentology/stratigraphy to remote sensing and GIS. One of the things that I enjoy most about my new research is its diversity, with research questions ranging from tectonics to global climate change to ecology. Several research projects are currently keeping me busy. (1) Mapping quaternary alluvial geomorphic surfaces in the eastern half of the Mojave Desert of southern California, using a combination of remote sensing and field techniques. This research will provide information about Quaternary climate change and neotectonics. (2) The origin and distribution of potassium metasomatism and economic mineralization associated with crustal extension, Whipple Mountains, eastern Mojave Desert, California. In collaboration with Steven Losh of Cornell University, I am using remote sensing analysis combined with field observations and laboratory studies to explore the origin and transport history of detachment-related fluid systems. (3) Large-scale ecological assessment in western Pennsylvania. In collaboration with the Pymatuning Laboratory of Ecology and the Western Pennsylvania Conservancy, this project involved analysis of remotely sensed data, particularly Landsat Thematic Mapper data, and field work to map land cover distribution at a scale appropriate for regional level ecological assessments. (Plants are a little different to work with than rocks, but the same basic principles apply). Results will be added to the Geographic Information System database for the region. (4) Detailed sedimentological analysis of Mississippian Loyalhanna Formation in southwestern Pennsylvania, emphasizing interpretation of allocyclic controls (relative sea level, climate). This field work is in collaboration with Jack Beuthin at the Univ. of Pittsburgh Johnstown Campus.

Computers are taking over the world. In acknowledgement of that, Bill Harbert and I are in the process of instituting a new Undergraduate Certificate Program in Geographic Information Systems. With help from the University, we are putting together a "Spatial Data Instructional Computer Laboratory" containing a SPARC Ultra Serv-2, networked with 10 lower-capability

Beratan continued

workstations. The certificate and the computer lab will move us well on our way to accomplishing our aim of becoming a regional Center for GIS and remote sensing research and education.

Bob Anderson is still at the Jet Propulsion Laboratory. In fact, he's working on the Mars Pathfinder Project with Matt Golumbek, the very enthusiastic Project Scientist who we've been seeing on TV so much lately. Congratulations, Bob! Glad it worked.

Michael Bikerman *[bikerman@vms.cis.pitt.edu]*

The 1996-97 year-and-a-half has passed quickly with the usual variety of work and outside activities. During my 30th year at the University, I taught the usual schedule [Physical Geology and with Ted Weaver and Jim Pottinger the associated laboratory; Geology of the National Parks; Freshman Studies, and a topics course on Kimberlites in the Fall 97-1 semester, and Geology 0800 and half of Historical Geology with Bud Rollins in Spring semesters of 1996 and 1997]. A National Parks class was done at night in Mt. Lebanon H.S. in the 96-2 term which included an optional field trip to Ohiopyle after the class was over. Field Methods has been shared with Kathi Beratan and Bill Cassidy for the past two years, and has attracted its first Environment students. I expect that the trend for more Environmental Geology and Environmental Studies majors will continue, and hope that the number of true geologists will at least stay steady.

Research continues at a slow but steady pace. The paper on the Masontown kimberlite dike was accepted for publication and should be out by the time this reaches you. A new project on manganese ores from Pennsylvania with Bill Smith of the Pennsylvania Geological Survey was started this summer. The argon mass spectrometer is up and working after a series of repairs to its electronics and its associated vacuum systems.

In the summer of 1996 we went to Hawaii for the first time. We spent a week on the big island looking at basalts, visiting the Hawaii Volcanoes National Park, and even flying over the active vent in an open cockpit biplane [a newly built Waco trainer] which my wife enjoyed somewhat! We also spent several days on Maui with friends from Semester @ Sea, and visited Haleakala National Park with them.

Spring Break 1997 was spent checking out the Manuel Antonio National Park and Arenal Volcano in Costa Rica. The Park is beautiful with lovely beaches, great wildlife, and good geology largely covered by tropical vegetation. Arenal volcano is active - we saw lava flows on its flanks beneath the ever present cloud banks, and climbed over some recent flows further down the slopes. Costa Rica is a pleasant country with a great variety of accommodations from no-star to 5+ star places with commensurate pricing. Aside from roads which make ours look good, we found little to complain about, and a lot to like there.

Other activities included field trips to Bancroft, Ontario and to the Masontown dike with the undergraduate Geology Club, for which I still serve as advisor. Pete Briggs asked me to help him lead the Pittsburgh Geological Society field trip which he had laid out to look at the old Forbes Trail, which I was pleased to do. That trip was enjoyed by a bus-full of geologists and history buffs. Equally pleasant was the Pennsylvania Field Conference trip in the Chambersburg area in 1996.

Bikerman continued

With the help of Henry Prellwitz, Nick DeLillo and Bill Harbert, I organized and did a session on earth sciences for Investing Now - a cooperative program for 11 and 12th graders. In February I was invited to the Freshman Year Experience conference in Columbia, SC, and found it to be worthwhile for both the Freshman Studies class and my non-major classes.

This past summer I did interviews with KQV and WTAE-TV on a local landslide problem - still trying to spread the worth of geology to the community.

Rosemary C. Capo *[rcapo@vms.cis.pitt.edu]*

This has been an exciting year for me; the clean chemistry and instrument laboratory renovations were completed, and Brian Stewart and I have been busy getting them operational. The instrument lab now has a new Spectro axial ICP-MS with alkali polychromator for elemental analysis. Last term my Environmental Geochemistry class used the ICP to analyze lead, iron and copper content of filtered and unfiltered local water. Our project was written up in the Pittsburgh Post-Gazette (with a photo featuring graduate student Sherry Stafford). Brian and I received funding from the Provost Fund and the Jet Propulsion Laboratory to buy a Merchantek laser ablation system that we're using for experiments in conjunction with researchers and engineers from the Microdevices Laboratory at JPL. We also were awarded $275K in matching funds from the National Science Foundation to buy a thermal ionization mass spectrometer; the Finnigan MAT 262 TIMS will arrive later this year. It was a real thrill to bring guests from the Symposium in Honor of Jack Sharkey through all the renovated G&PS facilities, and it's great being part of a long tradition here of mass spectrometry research.

We've made several trips to the Island of Hawai'i for meetings and fieldwork; graduate students Greg Ayres and Chuck Whipkey accompanied us to collect soil, rock and vegetation samples (and to examine very fresh parent material in the form of actively flowing basalt). Greg finished his project examining rare earth element transport in Hawaiian soils and received his Master's degree this summer; Chuck will continue his work on chemical weathering on the Big Island. Chuck's work is partially funded by a 3-year NSF grant awarded to me this January. Ted Weaver will be presenting preliminary results of his MS thesis work dealing with acid and alkaline mine drainage at the national GSA meeting in Salt Lake City this year. He and grad student Sherry Stafford have been busy analyzing water and sediment samples on the ICP. Brian Stewart, our daughter Emma and I also spent a wonderful week at St. Catherines Island with Bud and Judy Rollins and Nick and Tracy DeLillo, exploring alligator infested waters, digging up clams, sampling sand, releasing sea turtles, and consuming vast quantities of Bud's bread. Somehow, with all that, Emma came away with a fascination for snails....

William A. Cassidy *[ansmet@vms.cis.pitt.edu]*

The 1996 news is that I now have an asteroid named after me. This makes two of us in the department who can make this claim: Bruce Hapke is the other one. My first thought on hearing of my asteroid was to wonder if it is bigger than Bruce's! I found out that they are both so small, and so far away, that we will probably never know the answer, so we can still be friends.

Cassidy continued

I will probably retire at the end of this year, after 30 years in the department. I expect to remain active, however, and in fact I will be returning to Antarctica in November to lead a CMU field team at Patriot Hills, where they will be testing component parts of a robot they are building to search for meteorites on the ice. I'm curious to see if I can still function in that environment. If I cannot, well,.....!

David A. Crown *[dcrown@vms.cis.pitt.edu]*

The past year and a half have been interesting and challenging. My recent teaching activities have included Groundwater Geology (1996 and 1997 spring semesters) and Geologic and Environmental Hazards (1996 fall semester), both team-taught with Rosemary Capo. The laboratory section added to Groundwater Geology has been quite successful, giving the students some hands on training and making the course more enjoyable for both the students and their instructors. Geologic and Environmental Hazards is a new course that we intend to offer every other year; this seems to be in demand by many involved with the new Bachelor of Arts in Environmental Studies. I also continue to teach The Planets, an introductory survey course, during the summer. Being able to incorporate results from active NASA missions makes this an exciting time to be able to interact with students of diverse backgrounds. In the fall of 1996, Brian Stewart and I offered a graduate course, Volcanism in the Western U.S., in which we discussed the development of major volcanic provinces from both chemical and physical volcanologic perspectives. Other departmental activities include membership on the Undergraduate Curriculum Committee and serving as chair of the Space Committee. In the past year the Space Committee guided some major renovations within the department. Space was exchanged with other departments which led to better integration into the Space Research Coordination Center. Most of the disruption is behind us and many of the faculty are now settling into their new offices and/or laboratory facilities.

My NASA research continues to focus on geologic mapping of planetary surfaces and analyses of volcanic processes. I am currently involved with producing geologic maps of quadrangles on Mars and Venus as part of the U.S. Geological Survey's Miscellaneous Investigations Map Series. Geologic mapping of the Martian cratered highlands surrounding Reull Vallis, a large outflow channel, is being completed in collaboration with graduate student Scott Mest, who should complete his Master's Degree in the spring of 1998. Scott spent the summer of 1997 as a Research Fellow at the Center for Earth and Planetary Studies of the Smithsonian Institution conducting analyses of this channel system. Comparisons to Ares Valles, where Mars Pathfinder landed, should be interesting. Geologic mapping of several quadrangles on Venus continues with colleagues at the Jet Propulsion Laboratory. Graduate student Matt Peitersen and I are examining the morphologic properties of Martian and Hawaiian lava flows in order to develop criteria from which to interpret emplacement processes on Mars, and I have just returned from field work on the 1969-1974 Mauna Ulu pahoehoe flows, where new graduate student Jeff Byrnes assisted me in documenting the characteristics of channel networks within a series of pahoehoe flows. After a summer of no field work in 1996, it was refreshing to be in Hawaii, especially because we were able to visit the active flow area during a

Crown continued

period of intense activity. The Planetary Geology Group (Drs. Cassidy, Crown, and Hapke) is also happy to have a new research facility, the Planetary Geoscience Laboratory, which includes computers, drafting equipment, and an extensive collection of NASA spacecraft and other remote sensing data.

In the past year and a half I have attended the 1996 and 1997 Lunar and Planetary Science Conferences, where I presented research results. I was a convener for the 1997 Planetary Geological Mappers Meeting, which was held at Caltech one week after Mars Pathfinder landed; this was an especially exciting time to be in Pasadena, and we had a special preview of some of the latest results. We all eagerly await data from Mars Global Surveyor which goes into orbit around Mars in September.

Jack Donahue *[jdonahue@vms.cis.pitt.edu]*

The 1996-1997 academic year has been one of great change for the department with the initiation of our new Environmental Studies B.A. This summer, I certified graduation for several students who completed the program by having taken many of the required courses before the degree was actually approved. Bud Rollins and I, as the departmental undergraduate advisors, are facing a dramatic increase in the number of students we will be seeing, probably over 100 additional new students within the next year.

In terms of research with my students, Brian Peer has made great strides forward in developing a computerized system for statistical analysis of grain size and composition of inclusions in Early Bronze pottery. We gave a poster at the Society for American Archaeology (SAA) last spring and were asked to prepare an abstract for a symposium being organized by the Smithsonian Analytical Lab for the SAA annual meeting in Seattle next spring. J.T. Marine is finishing his Master's thesis on the Carmichaels Formation (Glacial Lake Monongahela). He visited Dagastan on the shores of the Caspian Sea this summer in conjunction with excavation of Bronze Age sites. He is now seriously considering this project for a Ph.D. dissertation. Brian Kirchner, another Masters student, will be looking at the rounded sandstone cobbles and boulders found in the lacustrine sediments of the Carmichaels Formation in terms of their provenance and mode of formation. How do you get rounded sandstone boulders within silty clay lake sediments?

Jessie and I are adjusting quite well to our new childless state. Mike has worked in the Washington D.C. area for a computer consulting company for several years now and is presently one of the three webmasters handling the DOE's home page. Jack got married last summer and he and Lisa live in Cleveland. It is wonderful to have a daughter in our family now.

Bruce W. Hapke *[hapke@vms.cis.pitt.edu]*

In the summer of 1996 Joyce and I realized the dream of a lifetime and cruised to Alaska. After spending 2 delightful days in Vancouver (which must be one of the world's most beautiful cities) we boarded the Crown Princess and sailed north up the inner passage. The scenery and the geology were spectacular, as was the food aboard ship. After stops at Ketchikan, Juneau and Skagway, the ship sailed into Glacier Bay and College Fiord, where it held station a few hundred

Hapke continued

feet offshore while we watched mountain glaciers calving. The wild life was also spectacular, with lots of sightings of humpback whales and bald eagles. We left the ship at Anchorage and took a train across Alaska to Fairbanks, where I gave an invited paper at a conference there. From Fairbanks we flew back to Pittsburgh.

I continue to try to understand light scattering by planetary regoliths. One of the major tools we use to model light scattering in soils is the equation of radiative transfer. The problem is that this equation assumes that adjacent particles in a regolith scatter light independently of each other and do not interact coherently. Up to now we had no way of knowing how good this assumption was. Everyone just hoped it was OK. This year one of my students, Dan Schatt, looked at this problem for this MS thesis. Using an exact solution of Maxwell's electromagnetic equations, Dan calculated the light scattered by two interacting spheres and was able to show that coherent effects are negligible when the particles are larger than the wavelength, which is usually the case in regoliths. This removes a major uncertainty in models of remote sensing.

As I write this the Pathfinder spacecraft has landed on mars and the rover Sojourner is starting to explore the surface and analyze the compositions of the rocks and soils. The planetary scientists in the department are looking forward to the results. The compositions measured so far seem to be basaltic. This is a major puzzle. Everyone had expected there to be a strong interaction between the surface and the carbon dioxide atmosphere. So, where are the carbonates?!

In February I gave an hour long invited talk at the annual meeting of the Optical Society of America in Santa Fe, NM on the opposition effect. This effect causes the diffuse glow around the shadow of your head on grass or soil. It is especially pronounced on the moon and is an important remote sensing tool. Santa Fe is a delightful city, except for the snow storm I got caught in driving to the airport in Albuquerque.

William Harbert *[harbert+@pitt.edu]*

This has been a very busy year!

The major items to report include the continuing successful operation of the Paleomagnetic Laboratory, an NSF research award, and the approaching completion of the Geographical Information Systems Laboratory.

The Paleomagnetic Laboratory continues to operate. Dr. James Reynolds, a research associate from North Carolina, myself and Dr. Ira Sasowsky (Assistant Professor, University of Akron) have utilized the lab consistently. Ira purchased an AMS high-field pulsing magnetizer which is presently in the lab. Our ancient Zenith 286 computer which was driving the susceptibility instrument finally broke down. With the help of local PC experts we are "rebuilding" another 286 from scrap found on beaches, dumpsters, etc.

I was very happy that the Tectonics and Crustal Structure program at NSF awarded my proposal for paleomagnetic work in southern and central Kamchatka. This will result in one, possibly two, field seasons of paleomagnetic sampling of tectonostratigraphic terranes in eastern Kamchatka. I hope to support a graduate student with funds from this grant.

Kathi Beratan and I have reworked a proposal originally written by us, David Crown and Bruce Hapke. We were pleasantly surprised to be awarded about $30,000 for a

Harbert continued

Geographical Information Systems computer laboratory. New equipment includes a SPARC ULTRA-2 server, HP 2500CP large format (36" by 150'!) plotter and 10 discarded SPARC IPX workstations. Presently our department has proposed an undergraduate certificate in GIS and this lab places the department in a good position to utilize these new techniques.

Best wishes to all!

Chiao-min Hsieh

Jimmy and his wife Jean have published an atlas on China full of information not before available in English.

Robert J. Pavuchak/Post-Gazette

Sharing China's geography, culture their life's mission

by Alice Demetrius Stock, Pittsburgh Post-Gazette, Wednesday, November 6, 1996

Chiao-min "Jimmy" Hsieh (pronounced She) of Fox Chapel becomes animated when he describes the Japanese invasion of his homeland, China, in 1937.

"If they had captured us, they might have killed us," he recalls.

His wife, Jean Kan Hsieh, nods her agreement. The Hsiehs, now in their 70s, were among several-thousand students of the Zheijiang University who were forced to move en masse inland – more than once – to avoid capture.

"But we continued our studies all the while," Jimmy said, "We were both majoring in geography."

Those studies served them well, eventually bringing them to the United States, where they built stellar careers and are considered among the leading authorities in Asian geography, mapping and culture.

Hsieh continued

Jimmy and Jean were married in 1947, and the couple came to America when Jimmy was chosen top student in his field by the Chinese government and awarded the opportunity to study abroad.

In 1953, Jimmy earned a Ph.D. and Jean a master's degree in geography from Syracuse University. Jimmy eventually became a full professor, and Jean taught cartography.

Jean's special interest is the Hachuring method of map making, a drawing technique making use of contour lines from survey maps to produce a three-dimensional effect on a flat surface such as a page. Mountains appear to have been photographed from the air.

"The technique produces an immediate visual understanding of a landscape," Jean said.

In China, Jean also is well-known as a novelist and newspaper correspondent who, for years, has described her life in America for "the folks back home." But recently, she has turned from prose to a difficult, classical styles of Chinese poetry that she uses to describe her life "on both sides of the Pacific" in more intense terms.

"My poems usually have a wistful feeling," Jean said, "that always ends up making me homesick for China."

Jimmy, who retired from the University of Pittsburgh's geography department in 1992, has published several titles here and abroad. Among them, "China: Ageless Land and Countless People" (D. Van Nostrand, 1967) and "Analytical Slope Maps of Taiwan" (Research Council of China, Taiwan, 1972).

The Hsieh's latest joint endeavor is a 300-page reference book, "CHINA: a Provincial Atlas," (McMillan, 1995). At $150, the atlas will most likely be purchased by libraries rather than individuals, but it's packed with information, unavailable until now in English in one volume, making it an important tool for students, businessmen, travelers, and sinophiles alike.

The text opposite many unusual maps describes, for example, China's 56 nationality groups, its political divisions, populations, occupations, languages and religions, soil and vegetation, highways and industrial sites, and 14 major travel routes such as the Ancient Silk and Emperor's roads.

"One-fifth of the population of the world lives in China," Jimmy said. "but squeezed into a small area. Everyone there works hard, and they are becoming more technologically advanced every day. I worry that Americans still do not understanding China's potential for power."

Through their books, articles, lectures and poetry, the Hsiehs, have attempted to foster understanding about the history and culture of their vast homeland.

By 1956, Jimmy was teaching geography a Catholic University in Washington, D.C., where he became the focus of an international *cause celebre* when he was banned from swimming at a public beach.

"It was July 4,m and an American friend of mine took me to Beverly Beach. Orientals were banned form the beach, and my friend, who was also a professor, wrote a letter to the Washington Post about it. The New York Times picked it up, and then a newspaper in Canada. It spread all over Europe on the radio."

Soon a public outcry brought crowds of Orientals and others to the beach.

"After that," Jimmy said, "Orientals – and Jews, also banned – were permitted to bathe there."

The Hsieh's two children, graduates of Yale University, are lawyers: daughter, Eileen, of Bethesda, Md., and son, Anping, of Boston. They have four grandchildren.

Edward G. Lidiak *[egl@vms.cis.pitt.edu]*

Most of my research activities in the past year have been concerned with the Caribbean region. A colleague of mine (Wayne Jolly, Brock University) and I have been concentrating on the geology and geochemistry of the igneous rocks of Puerto Rico and adjacent islands. Several papers have now been published. In addition, I am the senior editor and contributing author of a new volume on the "Tectonics and Geochemistry of the Northeastern Caribbean" which has been accepted for publication as Geological Society of America Special Paper 322. It should be published in early 1998.

In November of 1996 I had the wonderful opportunity of attending an International Geological Correlation Project field workshop and business meeting in Santiago de Cuba, Oriente Province, Cuba. Both the Paleogene arc and Cretaceous ophiolites were visited during the 4-day meeting. It was an excellent opportunity not only to see the Cuban rocks but also to visit and talk to the Cuban geologists. The main objectives of this type of workshop is to encourage exchange between various investigators of the Caribbean region by holding conferences in the form of field workshops at selected, well exposed and documented arc and ophiolite localities. As a result of the workshop and other initiatives, I am hoping to develop a collaborative research project with some of the Cubans. I also had the opportunity to visit San Juan Hill, the famous site of Teddy Roosevelt and the Rough Riders. It is curious that there is hardly a mention that the U. S. participated in this famous charge. I did notice that some of the plaques have been removed. Perhaps that is not too surprising in light of the present political situation.

I continue to be an active participant in the departmental teaching mission. During the year 1996/1997, I taught a total of 6.5 courses. It was indeed a busy year. Part of the course load was caused by the fact that we have revised the undergraduate course requirements. Optical mineralogy has now been merged with mineralogy and igneous/metamorphic petrology has been moved to the Spring Term. Thus, in the Fall, Bill Cassidy and I shared the teaching duties in mineralogy, and, to allow students to meet their requirements, I taught the ig/met course in both the Fall and Spring terms. I shall not bore you with the other courses I taught.

My best wishes to all of you.

Harold B. Rollins *[snail@vms.cis.pitt.edu]*

The last year has been an extremely busy one for the Department, and for me. The successful launching of our new Environmental Studies major has been rewarding, but also very labor-intensive for those of us directly involved. We expect to have somewhere between 100 and 200 E.S. majors by the end of next year. An increasing amount of my time is spent advising our undergraduates in Environmental Studies, as well as our other two majors. In addition, I team teach a new set of courses in Environmental Science, Ethics, and Public Policy. One of these is the Honors version, and both are part of the core curriculum of E.S.

With the establishment of the E.S. major, the field course in Yellowstone Ecology, partly supported by the Honors College, has found a growing number of interested students - So many, in fact, that we have a long waiting list. I spent much of this last summer, in fact, flying back and forth to Wyoming in order to teach the geology segments of this course. After all, somebody has to go to the beautiful Sunlight Basin, fight off the grizzlies, and expose young minds to the

Rollins continued

Flathead, the Chugwater, and yes, even those unspeakable granite gneisses of the Beartooth range - don't they?

Research activities over the last year have been divided between work on St. Catherines Island and work with El Niño. Our El Niño group had two publications in Science this year, and we feel that we are finally "getting the press" that we had wanted with our publications in the late 1980s dealing with the origin of El Niño. I have had some graduate students finish this year: Jim Pottinger defended his Masters thesis on the origin of beach ridges of St. Catherines Island, and Cindy Venn defended her PhD dissertation of St. Catherines Island salt marsh foraminifera. Other graduate students continue their research activities: Nick DeLillo visits S.C. Island frequently to study the mobilization of iron in salt marshes; Roman Kyshakevych can be found canoeing on French Creek, chasing the wily unionoideans as he attempts to understand the ecosystem dynamics of that riverine system; Albert Kollar is wrapping up his thesis on Waverly Group brachiopods; Henry Prellwitz is belly-deep in the Nine Mile Run slag pile, interacting more and more with CMU and the City of Pittsburgh in their respective attempts to formulate reasonable, yet functional development of this valuable area of city real estate. Paul Robb is coming close to deciding on a research topic involving molluscan shell geochemistry in one way or another.

Judy is helping me, as always, cope with these various activities and we both are closely following the adventures of our son Steven, who has left his job at Sea World in Orlando and, at this writing, is en route to Seward, Alaska. He has taken an aviculturist position with the newly established Alaska Sea Life Center. We are anxiously looking forward to visiting him next year; perhaps we can time things to mesh with Seward's Silver Salmon Festival - and break out the old fly rod!

Brian W. Stewart *[bstewart@vms.cis.pitt.edu]*

It has been a very busy, interesting and rewarding couple of years for me since our last Alumni Newsletter. The isotope geochemistry facility set up by Rosemary Capo and me has moved into full operational mode, and most of our students are working hard in the chemistry lab and on our new inductively coupled plasma-atomic emission spectrometer (ICP-AES). The ICP-AES allows us to measure major and trace element concentrations in most geologic and hydrologic materials, and was purchased in part with funds from the G&PS Major Equipment Fund, which was initiated by a major donation from Bill and Bev Cassidy. Rosemary and I also received NSF funding for a Finnigan MAT 262 thermal ionization mass spectrometer, which is scheduled for installation in late 1997. The instrument will provide the capability for a wide range of isotopic studies, including Rb-Sr, Sm-Nd, and U-Pb geochronology. Our mass spectrometer "shopping" this spring came at about the same time as the G&PS symposium in honor of Jack Sharkey entitled "Mass Spectrometry of the Earth and Environment." This symposium was a great success, and all of the participants (including those in fields outside of Jack Sharkey's) came away with a sense of awe about Jack's career, character and accomplishments.

In 1996, Rosemary and I were invited to the Jet Propulsion Laboratory (JPL) in Pasadena to discuss geochronology with some engineers who wanted to build an instrument for dating rocks

Stewart continued

on Mars. As a result of this interaction, we became involved in an effort to design and build such an instrument with a team of scientists and engineers from Pitt and JPL, including David Crown, our local Mars expert. This has led to numerous trips to Pasadena for consultation, as well as funding for new equipment in our lab such as a Merchantek laser ablation system for the ICP-AES. If all goes well, we hope to be working on this fascinating endeavor for several years to come. In the meantime, graduate student Keith Stewart is finishing his work with me and Tom Anderson on geochemistry of Fe-Mn deposits in the Appalachian mountains, and I am continuing work in soil evolution, isotopic studies of lacustrine deposits, and several other projects. Rosemary and I and our daughter Emma have done an awful lot of traveling lately; besides trips to JPL, we have gone to meetings and done field work in Hawaii, Tucson Arizona, and St. Catherine's Island Georgia (with Bud and Judy Rollins). On the home front, the new Environmental Studies major has provided us with lots of curriculum development tasks, as well as a large and talented group of students in Geochemistry (now called Chemistry of the Earth and Environment). My plate is full, but luckily I'm very hungry . . . !

Publications

Thomas H. Anderson

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Brezinski, David K. and **Anderson, Thomas H.**, and Campbell, Patricia, 1996, Evidence for a Regional Detachment at the Base of the Great Valley Sequence in the central Appalachians, *in* Brezinski, David K. and Reger, James P., eds., Studies in Maryland Geology: State of Maryland, Department of Natural Resources, Maryland Geological Survey, Special Publication No. 3, p. 223-229.

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Kathi K. Beratan

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Rosemary C. Capo

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William A. Cassidy

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David A. Crown

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Bruce W. Hapke

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William Harbert

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Edward G. Lidiak

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Harold B. Rollins

Article(s):

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Brian W. Stewart

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Publications – *In Press*

Kathi K. Beratan

Article(s):

Beratan, K.K., Peer, B., Dunbar, N.W., and Blom, R., *in press*, A Remote Sensing Approach to Alteration Mapping: AVIRIS Data and Extension-related Potassium Metasomatism, Socorro, New Mexico: International Journal of Remote Sensing.

Beratan, K.K., Hsieh, J., and Murray, B., *in press*, Pliocene/Pleistocene Stratigraphy and Depositional Environments, southern Confidence Hills, Death Valley, California, *in* Troxel, B. and Wright, L., eds., Geological Society of America Special Volume.

Beratan K.K., *in press*, Relationship between Transfer Faults and Monolithologic Breccias, Colorado River Extensional Corridor, southeastern California – western Arizona, *in* Faults, J., and Stewart, J., eds., Geological Society of America Special Volume.

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Rosemary C. Capo

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Stewart, B.W., **Capo, R.C.,** and Chadwick, O.A., *in press*, Quantitative Strontium Isotope Models for Weathering, Pedogenesis, and Biogeochemical Cycling: Geoderma.

Abstract:

Weaver, T. J., **Capo, R.C.,** and Hedin, R. S., *in press*, Chemical Evolution of Acid Mine Drainage in northern Appalachia: Implications for Passive Wetland Remediation [abs.]: Geological Society of America Abstracts with Programs, National Meeting, Salt Lake City.

David A. Crown

Article:

Gregg, T.K.P., **Crown, D.A.,** and Greeley, R., *in press*, Geologic Map of MTM Quadrangle -20252, Tyrrhena Patera Region of Mars: U.S. Geological Survey Miscellaneous Investigations Series Map I-2556.

Bruce W. Hapke

Article(s):

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Nelson, R., **B. Hapke**, W. Smythe and L. Horn, *in press*, Phase Curves of Selected Particulate Materials: The Contribution of Coherent Backscattering to the Opposition Surge: Icarus.

Brian W. Stewart

Article(s):

Capo, R.C., **Stewart, B.W.** and Chadwick, O.A., *in press*, Strontium Isotopes as a Tracer of Earth Surface Processes: Theory and Methods: Geoderma.

Stewart, B.W., Capo, R.C. and Chadwick, O.A. *in press,* Quantitative Strontium Isotope Models for Weathering, Pedogenesis and Biogeochemical cycling: Geoderma.

Awards in Support of Teaching and Research

Kathi K. Beratan and William Harbert
Instructional Computer Laboratory for GIS and Remote Sensing, *University of Pittsburgh*

Rosemary C. Capo
The Effect of Quaternary Climate Change on the Balance of Silicate Mineral Weathering and Eolian Input in Desert Soils, *National Science Foundation*

Rosemary C. Capo & Brian W. Stewart
Acquisition of a Thermal Ionization Mass Spectrometer, *National Science Foundation*

David A. Crown
Models for the Emplacement of Lava Flows: Styles of Effusive Volcanism on Mars, *National Aeronautics and Space Administration*

David A. Crown
Geologic Mapping of Reull Vallis, Mars, *National Aeronautics and Space Administration*

Bruce W. Hapke
Photometric Analysis of Spacecraft Images, *National Aeronautics and Space Administration*

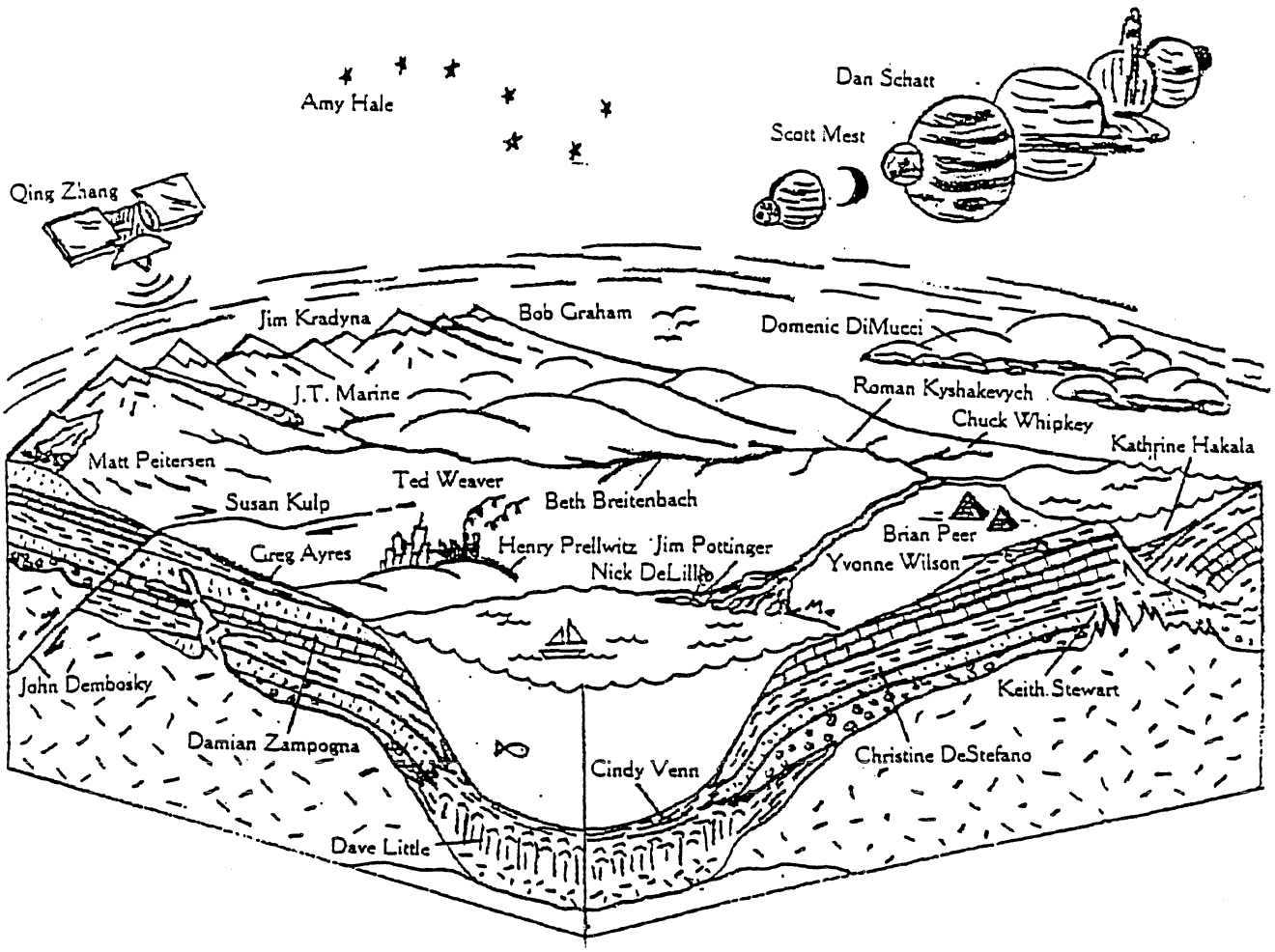
William Harbert
Collaborative Research: Tectonics and Paleomagnetism of Kamchatka Peninsula Composite Terranes, northeastern Russia, *National Science Foundation*

Harold B. Rollins
Origin & Development of Dune/Beach Ridges, St. Catherines Island, Georgia, *American Museum of Natural History*

Brian W. Stewart and Rosemary C. Capo
Development of Variable Environmental Laser Ablation System for Mars *In Situ* Geochronology Instrument, *Jet Propulsion Laboratory*

Brian W. Stewart, Rosemary C. Capo and David A. Crown
In Situ Miniature Age-Dating Laboratory for Planetary Surface Deployment, *Jet Propulsion Laboratory*

GRADUATE AND UNDERGRADUATE RESEARCH *1996*



University of Pittsburgh

Geology and Planetary Science Department

Graduate Students

Graduate Student Enrollment*

Gregory A. Ayres
Jeffrey M. Byrnes
Nicholas J. DeLillo
John A. Dembosky Jr.
Dominic C. DiMucci*
Robert B. Graham*
Katharine K. Hakala*
Amy Snyder Hale
Mary Lynn Hronakes-Yurko
John O. Izzo*
Andrew W. Kendrick*
Brian T. Kirchner
Albert Kollar*
James Kradyna
Roman G. Kyshakevych
James T. Marine
Scott C. Mest
Jeffrey P. Orient*
Brian Peer
Matthew N. Peitersen
Kristie M. Pinkerton
James E. Pottinger
Henry S. Prellwitz
Paul A. Robb
Daniel E. Schatt
Steven J. Schatzel*
Sherry L. Stafford
Keith H. Stewart
Cynthia Venn*
Theodore J. Weaver
Charles E. Whipkey
Qing Zhang
Jiang-yun Zheng

*part-time graduate student
*Registered Students - All Campuses for Terms 96-2, 96-3, 971, and 97-2

Graduate Degrees Awarded

Master of Science Degree

Daniel E. Schatt

Analysis of Coherent Light Scattering by Two Spheres with Applications to Planetary Regoliths
Date: April 1997
Advisor: Bruce W. Hapke

Robert B. Graham

A Reconnaissance Paleomagnetic Investigation of the Mamet Peninsula, Koryak Region, NE Russia
Date: April 1996
Advisor: William Harbert

James E. Pottinger

Origin and Development of Beach Ridges on St. Catherines Island: Impact of Storm Events
Date: December 1996
Advisor: Harold B. Rollins

Doctor of Philosophy of Science Degree

Cynthia A. Venn

Recent Benthic Forminiferida of Two Salt Marshes on St. Catherines Island, Georgia: Paleoecological Implications
Date: December 1996
Advisor: Harold B. Rollins
Committee Members: Thomas H. Anderson, Jack Donahue, Leon Gleser, Lance Lugar

Jiang-yun Zheng

Magnetostratigraphy of a Miocene Sedimentary Sequence in Railroad Canyon, Idaho
Date: August 1996
Advisor: William Harbert
Committee Members: Jean Blachére, Jack Donahue, Edward Lidiak, Walter Pilant

*Registered Students - All Campuses for Terms 96-2, 96-3, 971, and 97-2

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Hapke, B., **DiMucci, D.,** Nelson, R., and W. Smythe, 1997, The Cause of the Hot Spot in Vegetation Canopies and Soils: Remote Sensing Environments, v. 58, p. 63-68.

Mest, S.C., and Crown, D.A., 1997, Geologic Mapping of the Reull Vallis Region, Mars [abs.]: Lunar and Planetary Science Conference, v. XXVIII, p. 945-946.

Peitersen, M.N., and Crown, D.A., 1997, Intraflow Width Variations in Martian and Terrestrial Lava Flows [abs.]: Lunar and Planetary Science Conference, v. XXVIII, p. 1085-1086.

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THE HENRY LEIGHTON MEMORIAL GRADUATE SCHOLARSHIP

1996-1997

James Kradyna

The 1996-97 winner of the Henry Leighton Memorial Graduate Scholarship was James Kradyna.

Jim is a PhD candidate who is interested in the tectonic processes associated with the uplift and subsequent modifications of mountain belts. His research title is Analysis of a Shear Zone Anorthosite: New Evidence for a Late-Stage Extensional Shear Zone in the Adirondack Grenville.

1995-1996

Gregory Ayres
Brian J. Peer
Matthew Peitersen

The 1995-96 winners of the Henry Leighton Memorial Graduate Scholarship were Gregory Ayres, Brian Peer and Matthew Peitersen.

Greg is working on a research topic focusing on the weathering and mobility of rare earth elements (REE) along a climate transect in Hawaii.

Brian will continue to finish his research for his PhD. He has studying an extensive selection of pottery sherds from Middle Eastern Bronze sites collecting data using advance quantitative procedures, a new descriptive terminology, and innovative computer image acquisition and shape recognition techniques. This data, combined with traditional archaeological data in a geographic information system (GIS), will provide a more comprehensive relational dataset for these sites than ever before.

Matt works with Dr. David Crown on research involving Hawaiian and Martian lava flows and expects to use this award to defray the costs of field work.

Sigma Gamma Epsilon 1996-1997

Sigma Gamma Epsilon had its first meeting of the academic year in September 1996 with expectations of its greatest growth in years. Later, on September 25, 1996, we inducted ten new members into the Beta Chapter. The names of the new initiates are as follows: Jonathan Anstey, Jeffrey Byrnes (graduate), Tim Drop, Ron Mart, Matt Peitersen (graduate), Dan Schatt (graduate), David Sherman, Sherry Stafford (graduate), Ted Weaver (graduate), and Damian Zampogna. Also, Scott Mest has transferred from the chapter at West Chester University of Pennsylvania. After the first full, candle-lit ceremony conducted for quite some time, we discussed plans for the year and enjoyed pizza and pop. In addition, our chapter inducted Alexander Lau, Michael McIntyre, and Mary Lynn Yurko (graduate) in January 1997 along with having John Izzo reactivate his membership in the Beta Chapter.

Continuing members of Beta Chapter are: John Dembosky, President; Jim Pottinger/Sherry Stafford, Vice-Presidents; Susan Kelp, Secretary/Treasurer, Katharine Hakala, Roman Kyshakevych, and Henry Prellwitz. In addition, our chapter hopes to expand further in the Spring of 1997. Our faculty advisor continues to be Dr. William Harbert.

The officers of ΣΓΕ would like to congratulate the recent graduation of the following active members in 1996: undergraduates Jonathan Anstey (fall, 1996), Tammy Strally (spring, 1996), and Damian Zampogna (fall, 1996), and graduate Jim Pottinger (fall, 1996). At the end of the spring 1997 semester, undergraduates John Danihel, Tim Drop, Alexander Lau, Ron Mart, and Mike McIntyre graduated. Also, Daniel Schatt (graduate) graduated at the close of the summer 1997 semesters. We wish them much success in future endeavors.

The Beta Chapter has had a successful t-shirt sale within the past year. We calculate that we earned a modest $75. The design on the t-shirt features a perspective view geologic and topographic cross-section combination designed and drawn by John Dembosky. On the cross-section, each graduate student's name was placed beside something in the diagram relating to his research. Also, for the first time, undergraduate research was integrated into our t-shirt design. A copy of the design is included in this issue of the departmental newsletter. All t-shirts sold through ΣΓΕ, past and present, were finally "liquidated" at the end of the spring 1997 semester resulting in a gross profit close to $100.

A more successful and ongoing fund raising project is the sale of ceramic departmental mugs. Each mug is $9 (plus $4.50 S&H if shipped). Please see the order form in this issue of the departmental newsletter for additional ordering information. The Beta Chapter would like to thank Barbara Frey for sketching the design on the mug.

Sigma Gamma Epsilon held the Annual Departmental Banquet, aka. "Geoprom", at Paski's Restaurant in March 1996 and at the University Club in March 1997. According to tradition, we formally presented membership cards and shingles/certificates to our new initiates at both banquets. In addition, we presented the 1996 W.A. Tarr Award to member Amy McConnell, whom we would like to doubly congratulate on her marriage to member Gregory Ayres in September 1996, and the 1997 W.A. Tarr Award to Damian Zampogna.

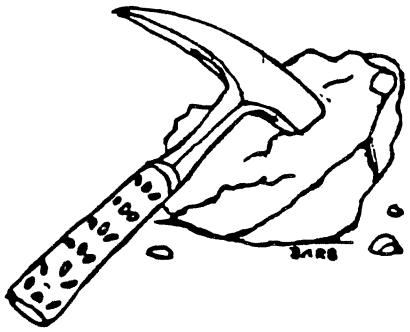
Financially, ΣΓΕ has been staying adequately solvent. Another fund-raiser of some kind is anticipated for 1997-1998. Our loan to the Geology Club of $150 has been repaid in full. We have also purchased Corel WordPerfect 7 for the graduate computer lab.

Future plans and activities for our chapter will be formally discussed in a meeting to be held in the fall of 1997, hopefully along with an initiation ceremony.

UNIVERSITY OF PITTSBURGH GEOLOGY AND PLANETARY SCIENCE DEPARTMENT
SIGMA GAMMA EPSILON, BETA CHAPTER
MUG SALE

The Beta Chapter of Sigma Gamma Epsilon, the honor society for the earth sciences, is selling mugs with the design illustrated below for a fund raiser. The mugs sell for $9.00 and are dark blue with gold (microwave safe) lettering. Funds raised will enable the Beta Chapter to sponsors field trips, purchase supplies for the department, etc. The phrase below the rock and pick is the motto for Sigma Gamma Epsilon. It is Greek for "companions searching the Earth" and is pronounced "soon'-no-moy gain air-you-non-tace." Your purchase and support is greatly appreciated.

University of Pittsburgh
Geology and Planetary Science



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Please complete the order form below **and return to***: **Sigma Gamma Epsilon, University of Pittsburgh, Department of Geology and Planetary Science, 321 Engineering Hall, Pittsburgh, PA 15260-3332.*** Checks should be made out to ***Sigma Gamma Epsilon***. Mugs are available for pick-up at the department or can be shipped for a postage **and handling fee** of $4.50 per mug. Please allow 6 to 8 weeks for delivery. Thank you for supporting **Pitt geology!**

SIGMA GAMMA EPSILON MUG SALE ORDER FORM

Name: _____

Address: _____

City, State, Zip code _____

Phone: _____

I would like to order _____ mug(s) at $9.00 each for a total of $ _____.

I (do / do not) wish to have the mug(s) shipped at a cost of $4.50 per mug for a total shipping charge of $ _____. The total amount enclosed for my mug(s) is $ _____.

Thank you very much!

Scott Mest, of the University of Pittsburgh, discussing his poster on geologic mapping of the Reull Vallis region on Mars during Monday morning's poster session. (Down to Earth, Newsletter of the GSA 1996 Annual Meeting, Denver, CO, Tuesday, October 29, 1996, page 6.)

Darrell Sapp/Post-Gazette

*Pitt graduate student Sherry Stafford keeps an eye on the process as a Culligan brand filter does its job. (**Clear Choice. Most filters improve water's taste but around here, they're not really necessary** by Don Hopey, Post-Gazette Staff Writer.)*

Undergraduate Students

Bachelor of Science in Geology*
Current Majors

Ryon V. Allison
Michael A. Antelman
Robert M. Balkovec
Thomas L. Crow
John P. Danihel
Douglas G. Dean
John N. Demas
Susan E. Kulp
Gina M. Kunkel
Alexander J. Lau
David C. Little
James T. Marine
Michael S. McIntyre
Todd C. Myers
Thomas J. Niebrzydowski
Akilah A. Prout
Heather L. Quinn
Todd B. Rosenfeld
Matthew A. Sespico
Michael J. Sharp
Brian G. Sieffert
Christopher L. Werner
Yvonne M. Wilson
Thomas M. Wright

Graduates

Robert Michael Balkovec, August 1996
David Cain Little, April 1996
Thomas J. Niebrzydowski, April 1996
Matthew Aaron Sespico, April 1996
Christopher Lee Werner, August 1996

Bachelor of Science in Environmental Geology*
Current Majors

Jonathan P. Anstey
William P. Bishop
Elizabeth Breitenbach
Christine DeStefano
Timothy J. Drop
Ryan W. Fandray
David M. Feehrer
Tamara A. Ganzer
James Hamilton
Glen C. Lewis
Ron Mart
Lori J. Savel
David G. Sherman
Tammy L. Strally
Mark J. Torbic
Damian M. Zampogna

Graduates

Jonathan P. Anstey, December 1996
Elizabeth Ann Breitenbach, August 1996
Christine Ann DeStefano, August 1996
Lori Jean Savel, August 1996
Tammy Strally, April 1996
Damian M. Zapogna, August 1996

*Registered Students - All Campuses for Terms 96-2, 96-3, 971, and 97-2

Bachelor of Arts in Environmental Studies*

Current Majors

Frank A. Amato
Michael A. Antelman
Phonepaseut Arounleut
Joshua A. Banta
Rebecca L. Brown
Jessica P. Brunner
Susan R. Butterworth
Amanda B. Celo
Rachel B. Chilton
Lori A. Cowher
Erin P. Daly
Robin C. Dee
Patricia M. Diguilio
Michael J. Dooley
Leia A. Eckstein
David M. Feehrer
Albert D. Furedy Jr.
David J. Gallo
Kimberly Gleser
Steven M. Graham
Albert E. Hanser
Sharon L. Harden
Jill A. Harley
Andrew D. Heltibridle
Amanda B. Hoffman
Amanda L. Hutcheson
Peter L. Jonak
Robert J. Kruljac
Martha J. Lee
Kristy Lewis
Chad R. Lupp
Daniel J. Madrid
Amy C. Magarity
Mark A. McCall
Douglas Michael
Melsina M. Michaels
Lenny P. Myers
Harry L. Pappert
Christopher S. Park
Jeffrey D. Patterson
Jay C. Renton
Martha A. Riecks
Rachel S. Riedel
Scott D. Rimer
Stacy L. Schurman
Lydia A. Shreiner
Scott A. Smida
Michael J. Speerschneider
Dustin J. Stahl
Scott W. Stewart
Jeanne R. Thompson
Jason A. Trentini
Michelle L. Trentini
Rachael J. Willi
Matthew A. Wolinsky
Donald M. Yoder

Graduates

Lori A. Cowher
Mark A. McCall
Lydia A. Shreiner

*Registered Students - All Campuses for Terms 96-2, 96-3, 971, and 97-2

Pitt Students Need Your Advice - Please Help Us!

The Department of Geology and Planetary Science is in the process of creating a ***Point of First Contact Program*** for G&PS students that will help smooth the transition from college to career in today's difficult job market. We want to give our students the best start on their careers we can - ***and we need the help of our alumni.*** Thanks to the alumni who responded to this request in last year's newsletter.

The goal of the a ***Point of First Contact Program*** is to build an extensive database of alumni who are willing to talk to G&PS students about companies and agencies in which they work. The database will only be accessible in the G&PS main office to our students, where they will be able to research the current job market and pursue possible summer internships.

We are asking you to agree to:

- accept a prearranged telephone call from a student, either at home or work
- explain the structure of your place of employment
- provide the name of an individual in your company to whom the student might address a cover letter and resume
- if possible, suggest a 'next step' that the student might follow

We need as many alumni as possible to join this program to make it viable. We are seeking both established and recent graduates in all disciplines. Recent graduates are especially valuable because they have just gone through the process and are able to communicate their job search experience with current students, and well-established alumni have the advantage of experiences and wider personal networks. Please show you support for the Department of Geology and Planetary science by joining this program.

---------- ***Point of First Contact Program*** ----------

I would like to join the program and will talk to undergraduates in:

_____ geology _____ environmental geology _____environmental studies

Name: _____

Job Title: _____

Company: _____

Company location: _____

Company does work in the following fields: _____

Company looks for people with skills in the following field(s): _____

Is company interested in summer interns? YES/NO: _____

If yes, what background should the students have? _____

Students may telephone me at: _____ [work] _____ [home]

FAX: _____ e-mail address: _____

Special requirements to be followed by the student (*e.g.* times to call, fax first, etc):

Comments:

RETURN TO: Thomas H. Anderson, Chair, G&PS, 321 EH, U. of Pittsburgh, Pgh, PA 15260

THE NORMAN K. FLINT MEMORIAL FIELD GEOLOGY SCHOLARSHIP

1996-1997
David G. Sherman
Alexander Lau
Ron Mart

David Sherman, **Alexander Lau** and **Ron Mart** were awarded the 1996-1997 Norman K. Flint Memorial Field Geology Scholarship. The department was pleased to be able to make three awards of $650 in support of undergraduate students attending field camp. Applications for this support were assessed on the basis of merit, need, and a letter outlining achievements and plans for field work.

Alex's achievements include being a member of SGE, Beta Chapter and tutoring Pitt's athletes taking geology courses. He has volunteered for Youth Opportunities Unlimited (Y.O.U.), a city-funded program dedicated to helping underprivileged inner-city youth. For Y.O.U. he established employment opportunities for youth, tutored general science classes, and taught computer basics for first time users. Alex attended field camp at the State University of New York at Buffalo. He plans on someday attending graduate school and/or attaining a position in the oil industry or with a geo-technical company.

Ron has had an internship with Department of Conservation and Natural Resources and the Pennsylvania Geologic Survey learning about well locations, completion reports and GIS systems as well as how oil and gas companies use the information DCNR provides them. He hopes to work in the oil and gas field and/or an environmental consulting firm. He attended the field camp at the State University of New York at Buffalo.

David served as the secretary of the Geology Club from 1995-1997 and was elected Vice President in April 1997. He is a member of Sigma Gamma Epsilon as well as the National Geographic Society. He plans to attend graduate school upon graduation. He attended the State University of New York at Buffalo.

1995-1996
Beth Breitenbach
Timothy J. Drop
Lori J. Savel

Beth Breitenbach, **Timothy Drop** and **Lori Savel** were awarded the 1995-1996 NKF Memorial Field Geology Scholarship.

Beth was the business manager for the 95-96 Geology Club and worked with Drs. Capo and Crown on undergraduate research that resulted in a map of the hydrology of the Pitt campus. She attended the field camp at the State University of New York at Buffalo. She hopes to work in the environmental field after graduation.

Tim is an environmental geology major with an interest in coastal processes. He came to the main campus after attending Pitt at the Johnstown campus.

Lori was the 1995 recipient of the American Mineralogist Undergraduate Award and was an active member in the Geology Club and Pittsburgh Geologic Society. She attended field camp in the State University of New York at Buffalo in the summer of 1996. She hopes that after graduation she will be able to work in the environmental field gaining valuable experience before possibly working on a masters degree in hydrogeology.

AMERICAN GEOLOGICAL INSTITUTE'S MINORITY GEOSCIENCE SCHOLARSHIP (AGI-MPP)

Congratulations to **Akilah Prout** who for the second year in a row is the recipient of the American Geological Institute's Minority Geoscience Scholarship (AGI-MPP). Her award encompasses the academic year 96-97 and 97-98.

Award recipients must be geoscience majors who are U.S. citizens and members of ethnic minority groups that are underrepresented in the geosciences. Individual scholars are selected by the AGI-MPP Advisory Committee because the student appears to have particular potential for success in the geoscience profession.

The awards are supported by funding from the National Science Foundation and by contributions from geoscience corporations, professional societies, and individuals.

W.A. TARR AWARD

Amy S. (McConnell) Ayres won the W.A. Tarr award, which was presented by the Beta Chapter of the Sigma Gamma Epsilon for the academic year of 1995-96.

BACHELOR OF ARTS IN ENVIRONMENTAL STUDIES
A New Degree Program

BACKGROUND

Rapid growth in human population and development has led to complex environmental problems on local and global scales. The way in which we address these issues will have a profound effect on our society and planet in the coming century. Enlightened solutions require a strong component of scientific knowledge and an awareness of the relevant societal issues. The Bachelor of Arts in Environmental Studies will equip students with an understanding of earth systems and the environment, including the role of geologic processes on human activity, and the impact of humans on the biosphere, atmosphere, hydrosphere, and global climate. Courses in the natural and social sciences supplement a traditional liberal arts curriculum to provide a comprehensive, interdisciplinary background in the scientific, economic, political, and social aspects of human interaction with the environment.

The Environmental Studies degree will provide a strong, balanced background for students who seek careers in fields such as resource development and management, environmental policy and regulation, risk assessment, land use planning, public policy, and education. Potential employers include local, state or federal government organizations, consulting firms, or companies that are affected by environmental issues or regulations. Graduates of the Environmental Studies program can also pursue postgraduate study in fields such as business, law, medicine, public policy, education, international relations, urban and regional planning, environmental management, and public health.

The Environmental Studies Program is a combination of three basic components: (1) Core courses provide a fundamental understanding of environmental processes, issues and policy, and culminate in an environmental science field course and an interdisciplinary capstone course on science and public policy; (2) co-requirements provide the necessary background for later advanced study; and (3) electives in the natural and social sciences with a choice of focus in either allow the student to explore environmental issues with greater depth and breadth. Three to four of the elective courses are to be taken from a single department, constituting a concentration. The Environmental Studies student is encouraged to undertake an independent research project, internship, or senior thesis.

Pitt inaugurates environmental studies program
New major was designed with help from industry

by Karen Kovatch, Special Report, Environmental Quarterly, October 07, 1997, pages 15-16

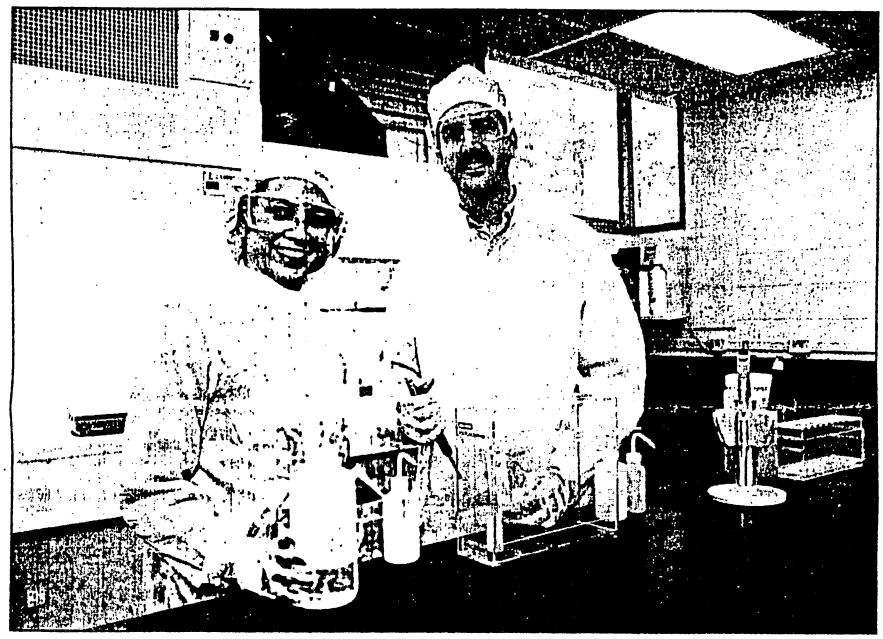
If products don't meet the demands of consumers, companies can choose to redesign them. When the University of Pittsburgh found its students weren't getting the training they needed to land jobs in the environmental field, it redesigned its curriculum.

In the past, Pitt undergraduates who wanted to major in environmental studies had to design their own programs. This changed in August, when the university launched an official major.

"One impetus for this was that we knew that a lot of our students were self-designing majors, through which they were attempting to get a broad information base to tackle things related to the environment," said Thomas Anderson, chairman of the department of geology and planetary science.

It took nearly two years to pull it together, but Mr. Anderson and several colleagues were able to come up with a curriculum to give those students what they were looking for.

They didn't do it alone.



Rosemary Capo, left, is an assistant professor of geology and planetary science at the University of Pittsburgh who helped to design the university's new environmental studies program. Brian Stewart, right, is also an assistant professor of geology and planetary science who works in the program.

"As we started to develop this, we recognized that we needed advice from industry people right off the bat," Mr. Anderson said. "And through talking to them, we came to appreciate how many issues there are with respect to the environment, where the jobs are and what students need to do to get them."

Tony Lisanti, CEO of Chester Engineers – a water and wastewater treatment firm in Moon Township – believes industry input is vital to the success of any degree program.

He has given his share of it as a member of the advisory committee that helped form the construction management program at Pitt's School of Engineering and on a similar committee in the civil engineering department at Pennsylvania State University.

"I really think it's a sanity check," Mr. Lisanti said. "I think it provides a basis of what we are really looking for."

And, Mr. Lisanti adds, companies can benefit from the relationship as well.

"It enables us to have input for a vast majority of students so that when they do come out, they're available to work right away," he said.

Pitt's bachelor's degree in environmental studies covers everything from basic sciences like biology, chemistry and geology to macroeconomics, environmental ethics and law, public policy, and risk assessment.

"The modern environmentalist, concerned with green areas in a company, needs training in all of these areas," said Harold Rollins, a professor geology who is on the executive committee that oversees administration of the program.

Rosemary Capo, an assistant professor of geology and planetary science, who helped develop the new curriculum, agreed.

"Whether they're going to be in policy, government or business, students need to understand broad issues," she said. "And this degree gives students the ability to get the experience they need."

What do students need to actually get a job in the highly competitive environmental market?

According to Laura Langer, a member of the program's industry advisory committee and director of corporate risk management for Equitable Resources, Inc., there is a need for professional with a wide-ranging scientific background.

"With downsizing and reorganization and corporate mergers taking place all over, companies are looking for people with broad backgrounds," she said. "They don't expect people to come out of school with an expertise – the expert them to gain that on the job."

They do expect them to have solid communication skills, though – skills that are often lacking in new grads.

"That's one of the areas that I find people have trouble with," said Michelle Slinkard, president of CIH Services, Inc., a Harmarville-based occupation and environmental health and safety consulting firm.

Mr. Anderson said Ms. Slinkard isn't alone in her discovery.

"I think industry in general feels that students need more reading, writing and arithmetic," he said.

University trustees are already in the midst of efforts to strengthen basic education in areas like English, math and science.

Ms. Langer believes students pursing degrees in environmental studies will benefit if stronger math requirements are enacted, since most work in the field involves statistics and probability. But she said potential environmental professionals also need to be familiar with public policy issues and understand business.

Pitt's environmental studies program is targeting these areas, with required courses at the university's schools of business, public health and engineering, public and international affairs and engineering.

These classes provide background, but Pitt is also implementing a regimen of hands-on training – training that many companies look for when hiring.

Field experience and internships are a mandatory part of the program.

"If (students) can go out and see where the things they are learning have some use, it makes them more enthusiastic," Ms. Capo said, "And it can actually help shape their experience because they get to interact with people, and experience the work environment, and see if they like it."

The department and the university's internship office will work to help students secure such opportunities. And given the number of environmental companies based in Pittsburgh – 850 according to the Green Book published by the Pittsubrgh High Technology Council's Environmental Business Network – Ms. Capo doesn't think this should prove too difficult.

She believes the presence of these companies will contribute to the program's overall success. "In some places, environmental studies is a fad," she said. "But not in Pittsburgh. I really think this is something that will be important to the city and the region."

PROGRAM STRUCTURE

A. Core Courses (32 credits)

Department of Geology & Planetary Science:

GEOL 0860 Environmental Geology (3) OR GEOL 0800 Geology (3) **OR** GEOL 0040 Physical Geology (3) **OR** *GEOL 0840 Our Restless Earth (3)
GEOL 0055 Geology Laboratory (1)
GEOL 0896 World Physical Geography (3)
GEOL 1500 W-Chemistry of the Earth and its Environment (3)

Department of Biological Sciences:

BIOSC 0150 Foundations of Biology 1 (3)
BIOSC 0050 Foundations of Biology Laboratory 1 (1)
BIOSC 0160 Foundations of Biology 2 (3)[P]

Department of Economics:

ECON 1210 Microeconomics (3) **OR** ECON 0800 Introduction to Economics (3) **OR** ECON 0100 Introductory Microeconomic Theory (3)

School of Law:

LAW 5340 Environmental Law (3)[P]

School of Public Health:

EOH 1200 Introduction to Risk Assessment (3)

Environmental Science Field Course:

At least two credits from one of the following:
BIOSC 0740 Yellowstone Field Course (4)
OR an approved environmental science field course run through an outside institution

Interdisciplinary Capstone Course:

GEOL 1055 Environmental Science, Ethics, and Public Policy (3)
UHC 1056 (taught jointly by Geology & Planetary Science and University Honors College)

B. Co-requirements (12 credits)

Department of Chemistry:

CHEM 0110 General Chemistry 1 (4)

Department of Mathematics:

MATH 0220 Analytic Geometry and Calculus 1 (4)

Department of Statistics (choose one of the following):

STAT 0200 Basic Applied Statistics (4)
STAT 1000 Applied Statistical Methods (4)
STAT 1100 Statistics and Probability for Business Management (4)
STAT 1151 Introduction to Probability and Mathematical Statistics 1 (3)

C. Electives (27 credits)[†]

Social Sciences option: 15 credits from Social Sciences and Humanities elective list
Related Area: 12 credits from Natural Sciences and Engineering elective list
Natural Sciences option: 15 credits from Natural Sciences and Engineering elective list
Related Area: 12 credits from Social Sciences and Humanities elective list

Three Elective credits may be earned through independent study projects or internships.

[†]At least 21 elective credits must be earned from non-elementary or upper level courses, and 9 credits must constitute a concentration from a single department.

LIST OF ELECTIVES

A. Social Sciences and Humanities

Department of Economics

ECON 0230 Public Finance 1 (3)
ECON 0330 Urban Economics (3)
ECON 0360 Introduction to Environmental and Resource Economics (3)
ECON 0470 Industrial Organization (3)
*ECON 0530 Economics of Underdeveloped Areas (3)
ECON 0630 East Asia's Dynamic Economies (3)
ECON 1360 Environmental Economics (3)
ECON 1530 Development Economics (3)
ECON 1560 World Food Economy (3)
ECON 1610 Latin American Economic Development (3)
ECON 1630 Economic Development of China (3)
ECON 1640 Japanese Economic Growth (3)

Department of History and Philosophy of Science

HPS 0517 Thinking About the Environment (3)
*HPS 0633 Science, Philosophy and Public Policy (3)

Department of Political Science

PS 1261 American Public Policy (3)
*PS 1301 Theories and Concepts in Comparative Government (3)
PS 1541 Politics of Global and Economic Relations (3)

Department of Sociology

SOC 0003 Technology and Social Change (3)
SOC 0312 Science in Society (3)
*SOC 1445 Society and Environment (3)

Urban Studies Program

URB 0080 Introduction to Urban Studies (3)

Graduate School of Public and International Affairs

PIA 2114 Environmental and Economic Sustainability (3)
PIA 2115 Environmental Management and Policy (3)
PIA 2116 Environmental and Resource Economics (3)

Joseph M. Katz Graduate School of Business

BUS 0060 Ethics and the Business Environment (3)

B. Natural Sciences and Engineering

Biological Sciences

BIOSC 0060 Foundations of Biology Laboratory 2 (1)
BIOSC 0370 Ecology (3)[P]
BIOSC 0390 Ecology Laboratory (1)
*BIOSC 1170 Limnology (3)[F]
BIOSC 1320 Population Ecology (3)
BIOSC 1330 Field Botany (3)[F]
BIOSC 1350 Introduction to Plant Biology (3)P
*BIOSC 1380 Global Ecology (3)

Department of Chemistry

CHEM 0120 General Chemistry 2 (4)
CHEM 0250 Introductory Analytical Chemistry (3)
CHEM 0310 Organic Chemistry 1 (3)
CHEM 0810 Contemporary Issues and Their Impact on Public Policy (3)
*CHEM 1540 Introduction to Mass Spectrometry (2)
*CHEM 1560 Interpretation of Mass Spectra of Organic Molecules (2)

Department of Computer Science

CS 0110	Computers and Networks (3)
CS 0131	Software for Personal Computing (3)

Department of Geology and Planetary Science

GEOL 0060	Historical Geology (4)
*GEOL 0802	Geology of the National Parks (3)
GEOL 0890	Physical Oceanography (3)
GEOL 1051	Groundwater Geology (4)
GEOL 1060	Geomorphology (4)
GEOL 1079	Field Methods (1)
*GEOL 1080	Geoarchaeology (3)
*GEOL 1200	Paleontology (4)
GEOL 1410	Exploration Geophysics (3)
*GEOL 1413	Well Logging (2)
GEOL 1445	GIS, GPS Surveying, and Computer Methods for Earth Scientists (3)
*GEOL 1460	Remote Sensing of the Earth (3)
*GEOL 1515	Environmental Geochemistry (3)
GEOL 1602	Mineral and Energy Resources (3)
*GEOL 1640	Geologic and Environmental Hazards (3)
GEOL 1903	Undergraduate Research (1-12)
*GEOL 2054	Soils and Micromorphology (3)
GEOL 2447	Introduction to Arc/View and Advanced Arc/View Programming (3)

Department of Physics

*PHYS 0087	Nuclear Science and Society (3)

School of Engineering: Civil and Environmental Engineering Department

CE 1503	Introduction to Environmental Engineering (3)
CE 1513	Environmental Engineering Processes (3)

*May not be offered during 1997-1998 academic year

(P) Additional prerequisite(s) or instructor consent required

(F) Field course at Pymatuning Laboratory for Ecology

The inaugural meeting of the Environmental Studies Advisory Board for the Bachelor of Arts program convened April 03, 1997.

The components of the new degree program were discussed intensely with debate over courses emphasizing science verses policy. We continue to work with them to improve the Environmental Studies degree and how it relates to daily environmental issues.

Current Advisory Board Members

Mr. Thomas S. Baily, CPCU, ARM
President
Halliwell Consulting Group

Mr. Ronald S. Cusano
Co-Chair, Environmental Practice Group
Schnader, Harrison, Segal & Lewis

Mr. Stan Galanski
President
New Hampshire Insurance Company

Mr. Richard E. Gray
Senior Vice President
GAI Consultants Inc.

Dr. Robert M. Hamilton
Science Vice-Chair, Federal Subcommittee on Natural Disaster Reduction
Geophysicist, U.S. Geological Survey

Ms. Leslie V. Horne
Director
INVESTING NOW

Mr. Richard A. Jacobs
Senior Manager of Environmental Operations, Chemicals
PPG Industries, Inc.

Dean Peter F.M. Koehler
Faculty of Arts and Sciences
University of Pittsburgh

Dr. Howard Kunreuther
Co-Director, Wharton Risk Management and Decision Process Center
University of Pennsylvania

Ms. Laura L. Langer
Director, Corporate Risk and Resource Management
Equitable Resources

Mr. Andrew S. McIlwaine
Program Office and Director of Environment Programs
The Heinz Endowment

Provost James V. Maher, Jr. (Chair)
Office of the Provost
University of Pittsburgh

Mr. Samuel R. Pitts
Vice-President, Law & Environmental Affairs
Westinghouse Electric Corporation

Dr. Vijai P. Singh
Associate Chancellor for Academic Affairs
Office of the Chancellor
University of Pittsburgh

Ms. Diana J. Stares
Regional Chief Counsel
Southwest Regional Office
Commonwealth of Pennsylvania
Department of Environmental Protections

Ms. Bette J. Walters
Vice President, Secretary and General Counsel
ALCO Industries, Inc.

Mr. Paul G. Wiegman
Director of Science and Conservation
Western Pennsylvania Conservancy

BACHELOR OF SCIENCE IN GEOLOGY

Required Courses (credits shown in parentheses; 66 credits minimum):

Core Courses: (28 credits)

GEOL 0040 Physical Geology **OR** GEOL 0800 Geology **OR** GEOL 0860 Environmental Geology (3)
GEOL 0055 Geology Laboratory (1)
GEOL 0060 Historical Geology (4) [Bikerman/Rollins]
GEOL 1001 Mineralogy (4) [Cassidy/Lidiak]
GEOL 1003 Igneous and Metamorphic Petrology (4) [Lidiak]
GEOL 1020 Sedimentology and Stratigraphy (4) [Beratan]
GEOL 1100 Structural Geology (4) [Anderson]
GEOL 1960 Field Camp (4-8)

Note: GEOL 1003, GEOL 1020, and GEOL 1100 together fulfill one writing (W) requirement.

Electives: (9 credits)

Three additional formal courses (a minimum of 3 credits each) are also required and must be selected from those numbered between GEOL 1000 and GEOL 1900. Approved graduate courses offered by the Department of Geology and Planetary Science also may be taken to fulfill this requirement.

Current Electives Offered in Geology and Planetary Science (updated yearly):

GEOL 1050 Regional Geology of the U.S. (4) [Anderson]
GEOL 1051 Groundwater Geology (4) [Capo/Crown]
GEOL 1052 Paleoclimates (3) [staff]
GEOL 1055 Environmental Science, Ethics, and Public Policy (3) [McCord/Rollins]
GEOL 1060 Geomorphology (4) [Crown/Donahue]
GEOL 1079 Field Methods (1) [Beratan/Bikerman]
GEOL 1080 Geoarchaeology (3) [Donahue]
GEOL 1200 Paleontology (4) [Rollins]
GEOL 1201 Extinctions (3) [Rollins]
GEOL 1240 Evolution of the Vertebrates (3) [staff]
GEOL 1400 Introduction to Solid-Earth Geophysics (3) [Harbert]
GEOL 1410 Exploration Geophysics (3) [Harbert]
GEOL 1413 Well Logging (2) [Harbert]
GEOL 1445 GIS, GPS Surveying, and Computer Methods for Earth Scientists (3) [Harbert]
GEOL 1460 Remote Sensing of the Earth (3) [Beratan/Hapke *et al.*]
GEOL 1500 W-Chemistry of the Earth and its Environment (3) [Stewart]
GEOL 1501 Analytical Geochemistry (3) [staff]
GEOL 1515 Environmental Geochemistry (3) [Capo]
GEOL 1601 Economic Geology of Ores (3) [Bikerman]
GEOL 1602 Mineral and Energy Resources (3) [Bikerman/Donahue]
GEOL 1640 Geologic and Environmental Hazards (3) [Capo/Crown]
GEOL 1701 Geology of the Planets (3) [Hapke]

Co-requirements: (29 credits)

MATH 0220 Analytical Geometry & Calculus 1 (4)
MATH 0230 Analytical Geometry and Calculus 2 (4)
MATH 0240 Analytical Geometry and Calculus 3 (4)
CHEM 0110 General Chemistry 1 (4)
CHEM 0120 General Chemistry 2 (4)
PHYS 0104 Basic Physics for Science & Engineering 1 (3)
PHYS 0105 Basic Physics for Science & Engineering 2 (3)
PHYS 0106 Basic Physics for Science & Engineering 3 (3)

Note: The Graduate Record Examination (GRE) in Geology, which is required for entrance to many graduate programs, is divided into the following three parts: 1) Stratigraphy, Sedimentology, Paleontology, Geomorphology, and Hydrology, 2) Structural Geology and Geophysics, and 3) Mineralogy, Petrology, and Geochemistry.

Departmental Honors Requirement for the Bachelor of Science Degree in Geology: To graduate with departmental honors, a student must complete the requirements for *one* of the following three options:

Course Option:

1. Satisfactorily complete the minimum degree requirements.
2. Satisfactorily complete a total of at least nine additional credits. These may be selected from other formal GEOL courses (excluding the 0800 series) or from any of the following: BIOSC 0370; CHEM 0250, 0260, 0310, 0320, 1410, 1540; MATH 0250; PHYS 0160, 0577, 1150.
3. Include within the requirements listed above a minimum of three credits in geochemistry (GEOL 1500, 1501, 1515, 2500, or 2520) or three credits in geophysics (GEOL 1400, 1410, or 1460).
4. Maintain an overall QPA of 3.25 or more.

Research Option:

1. Satisfactorily complete the minimum degree requirements.
2. Maintain an overall QPA of 3.25 or more.
3. Complete a minimum of three credits of Undergraduate Research (GEOL 1903) under the supervision of a faculty member from the Department of Geology and Planetary Science which culminates in a written thesis that documents original research conducted by the student. Acceptance of the thesis will be contingent upon approval of the faculty supervisor and two additional faculty members. The results of the student's research are to be presented orally in a departmental seminar.

Internship Option:

1. Satisfactorily complete the minimum degree requirements.
2. Maintain an overall QPA of 3.25 or more.
3. Under the supervision of a faculty member from the Department of Geology and Planetary Science, the student will work as an intern for a professional consulting geologist or firm in the field of geology. A minimum of three credits of Independent Study (GEOL 1901; to be changed to Internship in Geology) will culminate in a written and oral report documenting the project conducted by the student. Acceptance will be contingent upon approval of the faculty supervisor and two additional faculty members.

Bachelor of Science Degree in Geology: Suggested Elective Concentrations

Students pursuing the Bachelor of Science degree in Geology are required to complete three formal courses in Geology in addition to the core requirements (i.e., GEOL 0040, 0055, 0060, 1001, 1003, 1020, 1100, and 1960). Listed below by subject area are groups of courses that students may choose from to satisfy this requirement. *These groupings are recommendations for those students who wish to focus in a particular subject while completing their Geology course electives.*

Computer Methods in Geosciences:

GEOL 1410	Exploration Geophysics
GEOL 1445	GIS, GPS Surveying, and Computer Methods for Earth Scientists
GEOL 1460	Remote Sensing of the Earth

Economic Geology/Mineral Exploration:

GEOL 1050	Regional Geology of the U.S.
GEOL 1400	Introduction to Solid-Earth Geophysics
GEOL 1410	Exploration Geophysics
GEOL 1445	GIS, GPS Surveying, and Computer Methods for Earth Scientists
GEOL 1460	Remote Sensing of the Earth
GEOL 1500	Chemistry of the Earth and its Environment
GEOL 1601	Economic Geology of Ores
GEOL 1602	Mineral and Energy Resources

Geochemistry:

GEOL 1051	Groundwater Geology
GEOL 1500	Chemistry of the Earth & Its Environment
GEOL 1501	Analytical Geochemistry
GEOL 1515	Environmental Geochemistry

Geophysics:

GEOL 1400	Introduction to Solid-Earth Geophysics
GEOL 1410	Exploration Geophysics
GEOL 1413	Well Logging

Paleontology:

GEOL 1052	Paleoclimates
GEOL 1200	Paleontology
GEOL 1201	Extinctions
GEOL 1240	Evolution of the Vertebrates

Planetary Science:

GEOL 1060	Geomorphology
GEOL 1400	Introduction to Solid-Earth Geophysics
GEOL 1460	Remote Sensing of the Earth
GEOL 1500	Chemistry of the Earth and its Environment
GEOL 1701	Geology of the Planets

BACHELOR OF SCIENCE IN ENVIRONMENTAL GEOLOGY

Required courses (credits shown in parentheses; 68 credits minimum):

Core courses: (28 credits)

GEOL 0040 Physical Geology **OR** GEOL 0800 Geology **OR** GEOL 0860 Environmental Geology (3)
GEOL 0055 Geology Laboratory (1)
GEOL 1001 Mineralogy (4) [Cassidy/Lidiak]
GEOL 1003 Igneous and Metamorphic Petrology (4) [Lidiak]
GEOL 1020 Sedimentology and Stratigraphy (4) [Beratan]
GEOL 1051 Groundwater Geology (4) [Capo/Crown]
GEOL 1100 Structural Geology (4) [Anderson]
GEOL 1960 Field Camp (4)

Note: GEOL 1003, GEOL 1020 and GEOL 1100 together fulfill one writing (W) requirement.

Electives*: (12 credits)

(1) At least 9 credits of upper division or graduate level GEOL courses from the following:

GEOL 1055 Environmental Science, Ethics, and Public Policy (3) [McCord/Rollins]
GEOL 1060 Geomorphology (4) [Crown/Donahue]
GEOL 1080 Geoarchaeology (3) [Donahue]
GEOL 1200 Paleontology (3) [Rollins]
GEOL 1201 Extinctions (3) [Rollins]
GEOL 1410 Exploration Geophysics (3) [Harbert]
GEOL 1413 Well Logging (2) [Harbert]
GEOL 1445 GIS, GPS Surveying, and Computer Methods for Earth Scientists (3) [Harbert]
GEOL 1460 Remote Sensing of the Earth (3) [Beratan, Hapke *et al.*]
GEOL 1500 W-Chemistry of the Earth and its Environment (3) [Stewart]
GEOL 1501 Analytical Geochemistry (3) [staff]
GEOL 1515 Environmental Geochemistry (3) [Capo]
GEOL 1602 Mineral and Energy Resources (3) [Bikerman/Donahue]
GEOL 1640 Geologic and Environmental Hazards (3) [Capo/Crown]
GEOL 1903 Undergraduate Research (2-4) [staff]
GEOL 2447 Introduction to Arc/View and Advanced Arc/View Programming (3) [Harbert]
GEOL 3960 Topics in Environmental Geology (3) [staff]

(2) One upper division BIOSC, CHEM, CE, MATH or CS course such as:

BIOSC 0370 Ecology and Evolutionary Biology (3)
CHEM 0310 Organic Chemistry (3)
CE 1503 Introduction to Environmental Engineering (3)

Co-requirements: (28 credits)

MATH 0220 Analytical Geometry and Calculus 1 (4)
MATH 0230 Analytical Geometry and Calculus 2 (4)
CHEM 0110 General Chemistry 1 (4) or equivalent
CHEM 0120 General Chemistry 2 (4) or equivalent
PHYS 0104 Basic Physics for Science and Engineering 1 (3) or PHYS 0475 (UHC) (3)
PHYS 0105 Basic Physics for Science and Engineering 2 (3) or PHYS 0476 (UHC) (3)
BIOSC 0150 Foundations of Biology 1 (3)
BIOSC 0160 Foundations of Biology 2 (3) **OR** GEOL 1200 **OR** BIOSC 0740

*These courses must have the approval of the departmental advisor. Approved graduate courses and courses from the University Honors college may fulfill this requirement. Note: the Graduate Record Examination (GRE) in Geology, which is required for entrance to many graduate programs, is divided into the following three parts: 1) Stratigraphy, Sedimentology, Paleontology, Geomorphology, and Hydrology, 2) Structural Geology and Geophysics, and 3) Mineralogy, Petrology, and Geochemistry.

Related courses that fulfill General Education requirements:

ANTH 1762	Human Ecology
ECON 0360	Introduction to Environmental and Resource Economics
HPS 0517	Thinking About the Environment
PS 1541	Politics of Global Economic Relations
SOC 1476	Urban Policy and Planning

Departmental Honors Requirement for the Bachelor of Science Degree in Environmental Geology:
To graduate with departmental honors, a student must complete the requirements for one of the following three options:

Course Option:

1. Satisfactorily complete the minimum degree requirements.
2. Satisfactorily complete a total of at least nine additional credits. These may be selected from other formal GEOL courses (excluding the 0800 series) or from any of the following: CHEM 0250, 0260, 0310, 0320, 1410, 1540; PHYS 0160, 0577, 1150; BIOSC 0370, 0740, 1000, 1160, 1260, 1320, 1370; CS 1910, MATH 0240, 0250; CE 1503, 1513, 1620.
3. Include within the requirements listed above a minimum of three credits in geochemistry (GEOL 1500, 1501, 1515, 2500, 2515 or 2520) or three credits in geophysics (GEOL 1400, 1410 or 1460).
4. Maintain an overall QPA of 3.25 or more.

Research Option:

1. Satisfactorily complete the minimum degree requirements.
2. Maintain an overall QPA of 3.25 or more.
3. Complete a minimum of three credits of Undergraduate Research (GEOL 1903) under the supervision of a faculty member from the Department of Geology and Planetary Science which culminates in a written thesis that documents original research conducted by the student. Acceptance of the thesis will be contingent upon approval of the faculty supervisor and two additional faculty members. The results of the student's research are to be presented orally in a departmental seminar.

Internship Option:

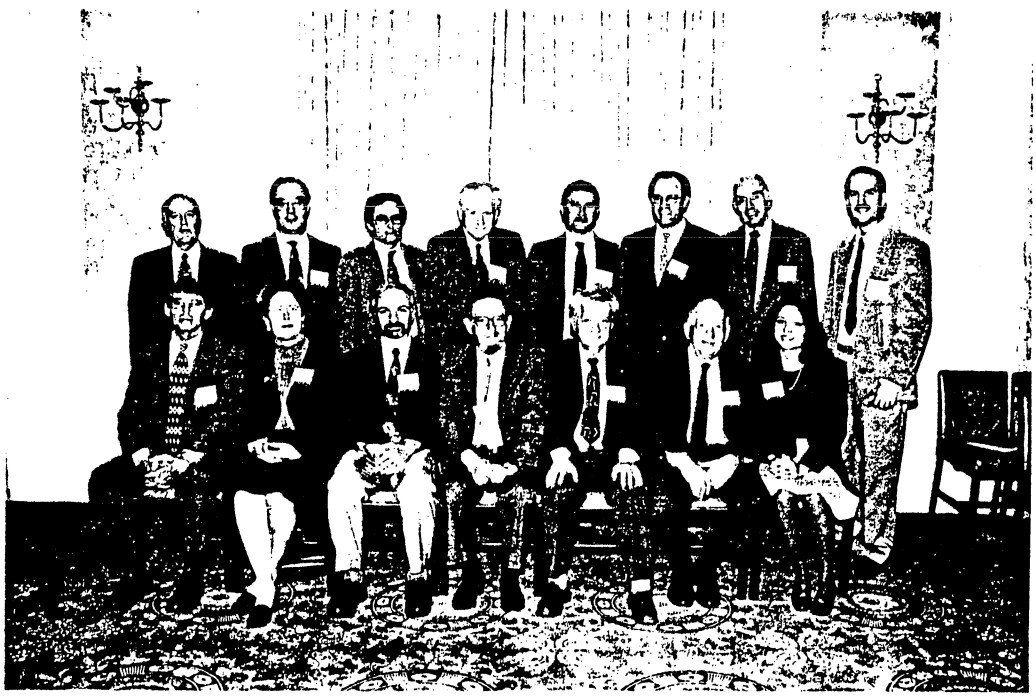
1. Satisfactorily complete the minimum degree requirements.
2. Maintain an overall QPA of 3.25 or more.
3. Under the supervision of a faculty member from the Department of Geology and Planetary Science, the student will work as an intern for a professional consulting geologist or firm in the field of environmental geology. A minimum of three credits of Independent Study (GEOL 1901; to be changed to Internship in Geology) will culminate in a written and oral report documenting the project conducted by the student. Acceptance will be contingent upon approval of the faculty supervisor and two additional faculty members.

A Symposium in Honor of A.G. (Jack) Sharkey Jr
Advances in Mass Spectrometry of the Earth and Environment

Jack Sharkey was a pioneer in the field of mass spectrometry 50 years ago; his contributions, including over one hundred research publications, helped establish mass spectrometry as an analytical tool. Jack contributed much to his field of study and to the University of Pittsburgh where he served as an adjunct professor and member of the graduate faculty of the Department of Geology and Planetary Science since 1964. He has also been a member of the Research Faculty of the Surface Science Center since 1985. He is well known by both graduate and undergraduate students for his mass spectrometry course - one of the few of its kind in the country. His studies of high resolution mass spectra compounds and of coal and coal-derived fluids have consistently bridged the gap between chemistry and geology. With Jack's help, the University of Pittsburgh has long been recognized as a center for mass spectrometry research. A half century of tradition continues with the construction of state-of-the-art isotope geochemistry labs and the recent National Science Foundation award of matching funds for a thermal ionization mass spectrometer in this department [*see Faculty News section, news items of Rosemary C. Capo and Brian W. Stewart*].

Mass spectrometry, however, is a diverse field and a two-day symposium, April 11th and 12th, 1997, could not begin to cover all of its applications to the earth and environmental sciences. We were honored to have at Jack's symposium distinguished speakers who have themselves pioneered many different fields of mass spectrometry. In fact, some of the work discussed was built upon Jack's early research. However, the speakers are recognized internationally as leaders in their areas of chemistry and earth science mass spectrometry research. Among this group are awardees of one of the highest honors in their fields, including four members of the National Academy of Sciences and a Crafoord Laureate. The symposium honoring Jack Sharkey was sponsored by the Department of Geology and Planetary Science with the generous support of the Society of Analytical Chemistry of Pittsburgh and the Spectroscopy Society of Pittsburgh.

The presentations were a fitting tribute to Jack Sharkey's productive and varied career as an administrator, a dedicated instructor, an excellent mentor for students and an outstanding research scientist.



Front row (left to right): Dr. Thomas H. Anderson, Dr. Catherine Fenselau, Dr. Donald J. DePaolo, Dr. Gerald J. Wasserburg, Dr. Samuel Epstein, Dr. Leon T. Silver, Dr. Rosemary C. Capo*. Back row (left to right): Dr. Robert E. Finnigan, Dr. Donald A. Hites, Dr. Samuel M. Savin, Professor Andrew G. (Jack) Sharkey, Jr., Dr. L. Peter Gromet, Dr. Alexander N. Halliday, Dr. David M. Hercules, Dr. Brian W. Stewart.*
* conference organizers

A Symposium in Honor of A.G. (Jack) Sharkey Jr
Advances in Mass Spectrometry of the Earth and Environment
Invited Speakers

Sponsored by the Society for Analytical Chemists of Pittsburgh and the Spectroscopy Society of Pittsburgh

Professor Andrew G. (Jack) Sharkey Jr.
Department of Geology and Planetary Science
University of Pittsburgh
The development and applications of early commercial mass spectrometers

Dr. Donald J. DePaolo
Department of Geology and Geophysics
University of California
and Lawrence Berkeley Laboratory
Systematic use of strontium isotope ratios for quantifying flow and transport in groundwater systems

Dr. Robert E. Finnigan
Consultant, Thermo Systems Inc.
Founder, Finnigan Corporation
Early development and commercialization of quadrupole mass spectrometers

Dr. L. Peter Gromet
Department of Geological Sciences
Brown University
$^{207}Pb/^{206}Pb$ geochronology by direct evaporation in a thermal ionization mass spectrometer: Roasting zircons at 10^{-7} torr

Dr. Alexander N. Halliday
Department of Geological Sciences
University of Michigan
Multiple collector ICP-MS: From the origin of the solar system to the dynamics of our climate

Dr. David M. Hercules
Centennial Professor and Chair
Department of Chemistry
Vanderbilt University
Laser mass spectrometry: Quantitative analyses and coupling with thin-layer chromatography

Dr. Samuel Epstein
William E. Leonhard Professor of Geology
California Institute of Technology
Climatic temperatures as recorded in deuterium/hydrogen ratios in trees which grew during the past 200 years and during the glacial and post-glacial periods

Dr. Catherine Fenselau
Chair, Department of Chemistry and Biochemistry
University of Maryland Baltimore County
Mass spectrometric analysis of proteins and other involatile sample

Dr. Ronald A. Hites
School of Public & Environmental Affairs
and Department of Chemistry
Indiana University
Mass spectrometry used to trace the movement of contaminants through the atmosphere

Dr. Samuel M. Savin
Professor of Geological Sciences
And Associate Dean of the College of Arts and Sciences
Case Western Reserve University
As isotopic and mineralogic study of laterite formation in Amazonia

Dr. Leon T. Silver
W.M. Keck Foundation Professor of Resource Geology
California Institute of Technology
U, Th-He dating: A new-fangled revival for an old-fashion geochronometer

Dr. Gerald J. Wasserburg
John D. MacArthur Professor of Geology and Geophysics
California Institute of Technology
Negative ion mass spectrometry: Osium and oxygen

Seminars

August 1996

29 **Introduction and Welcome**, Thomas H. Anderson, Geology and Planetary Science, University of Pittsburgh

September 1996

05 **Field Robots for Planetary Geology**, Red Whittaker, Field Robotics Center, Carnegie Mellon University

12 **Chemical and Physical Processes at the Surfaces of Particles in Bulk Solution**, Eric Borguet, Chemistry Department, University of Pittsburgh

19 **Risk Assessment in the Oil and Gas Industry**, Laura L. Langer, Corporate Risk and Resource Management, Equitable Resources

26 **Habitable Zones Around other Stars**, James Kasting, Department of Geosciences, Pennsylvania State University, University Park

October 1996

03 **Searching for Extra-Solar Planets**, George Gatewood, Allegheny Observatory

11 **Fault-Seal Analysis Along the Western Flank of the Xihu Trough, East China Sea**, Franco Corona, UNOCAL Corporation

17 **Is Technology a Magpie? A New Perspective on Environmental Stewardship**, Rick Jacobs, PPG Industries

24 **The Health Implications of Low Level Lead Exposure**, Herbert L. Needleman, School of Medicine, University of Pittsburgh

31 **Origin and Development of Beach Ridges on St. Catherines Island, GA: Impact of Storm Events**, James E. Pottinger, Geology and Planetary Science, University of Pittsburgh

November 1996

07 **Geoarchaeological Evidence from Peru for a 5000 Years Onset of El Niño**, Harold B. Rollins, Geology and Planetary Science, University of Pittsburgh

14 **Cretaceous Deformation in Northeastern Sonora: A Record of Block-Faulting, Gravitational Gliding, Structural Inversion, and Syn-Depositional Sliding**, Thomas H. Anderson, Geology and Planetary Science, University of Pittsburgh

20 **Late Holocene Lake Superior - Isostatic and Climatic Lake-Level Change**, Curtis E. Larsen, U.S. Geological Survey

21 **Tectonics of the Lantern Hill Fault, southeastern Connecticut: Evidence for the Embryonic Opening of the Atlantic Ocean**, R.J. Altamura, Geology & Planetary Science, University of Pittsburgh, Johnstown

December 1996

05 **The Increasing Potential for Catastrophic Natural Disasters**, Robert M. Hamilton, U.S. Geological Survey

Seminars

January 1997

08 **The Last Days of *Tyrannosaurus rex* and the Morning After**, W.A. Clemens, Museum of Paleontology, University of California

16 **Plate Tectonics of Kamchatka Peninsula, Russia**, Dr. William Harbert, Geology and Planetary Science, University of Pittsburgh

30 **Some Applications of Geochemical Fingerprinting of Natural and Landfill Gases for Identifying Methane Sources in Environmental Hazard Migration**, C.D. Laughrey, Pennsylvania Geological Survey

February 1997

06 **Career Services Presentation**, Robert Perkoski, Office of the Vice Chancellor for Student Affairs, Placement Services, University of Pittsburgh

13 **Seismic Attribute Analysis: Upper Devonian - Central Pennsylvania**, Mike Canich, Eastern States Exploration Company

20 **Exploration Strategies And Blind Luck - The Historical Search For Gas In The Lower Devonian Oriskany Sandstone,** John A. Harper, Pennsylvania Geological Survey

27 **A Model of Depth Zone Facies for Central Core Carbonatites: Implications for Concentration of Primary Secondary Ore Deposits**, David P. Gold, Department of Geosciences, The Pennsylvania State University

March 1997

13 **Iceland -- Living On The Edge**, Robert G. Wiese, Jr., Department of Geology, Mount Union College

20 **Risk Assessment,** Gregg Claycamp, Graduate School of Public Health, University of Pittsburgh

27 **The Pennsylvanian-Mississippian Unconformity In Northwestern Pennsylvania**, Paul T. Ryberg, AGES Department (Earth Science), Clarion University

April 1997

2 **Evolutionary and Biogeographic Implications of an Antarctic Jurassic Dinosaur Fauna –Special Seminar, AAPG Distinguished Lecturer Tour**, William R. Hammer, Department of Geology, Augustana College

9 **Recent Benthic Foraminiferida of Two Salt Marshes on St. Catherines Island, Georgia: Paleoecological Implications**, Cynthia Venn, Department of Geography and Earth Science, Bloomsburg University

17 **Characterization of a Late Alleghanian Fluid Migration Event in the Central Appalachians**, Mark A. Evans, Geology and Planetary Science, University of Pittsburgh

May 1997

15 **A Tooth, an Ear, and a Shoulder Blade: Reconstructing the Phylogeny of Mesozoic Mammals from Bits and Pieces**, James A. Hopson, Department of Organismal Biology and Anatomy, University of Chicago

News

Beth Breitenbach (BS, 1996) is working for an environmental company in San Diego doing Phase I environmental assessments. The company's name is Environmental Business Solutions and with training hopes to work on Phase II and Phase III assessments.

Dave Cercone (BS, 1987) and Cindy are enjoying their son Matthew and a new edition to their family, Jessica, that arrived June 1996. Dave is a project hydrogeologist with ICF Kaiser and he oversees technical tasks on site assessments, performs groundwater modeling and aquifer restoration.

Franco Corona (MS, 1980) hosted a meeting of Houston alumni in January 1997 at a great restaurant where T. Anderson got some advice on how to make G&PS courses and programs more applicable to the exploration of hydrocarbons. Franco capped off the evening by initiating a scholarship fund in honor of Harry J. Werner.

Diana DeRubertis (BS, 1996) in the news (*Pittsburgh Post Gazette - Sunday, July 21, 1996)* with a Letter to the Editor.

Not a Waste

"Recycling: What a Waste" (Forum, July 14) completely condemns the recycling process. Given that a much stronger case can be made for the importance of recycling, such an article should have focused on why states must adopt more stringent environmental laws.

The author neglected to mention the most crucial reason for recycling: It prevents our society from tapping into an increasingly limited virgin resource base. By reusing materials that have already been extracted from the earth, we reduce a wide range of environmental problems from greenhouse warming to soil erosion.

For example, Americans dump the equivalent of 500,000 trees. Forests certainly are not replaced at the rate in which they are destroyed. Instead, clear-cut land becomes a site of agricultural, industrial or urban development.

While spouting the benefits of landfills, the author also ignored the fact that they release toxins into groundwater and the greenhouse-gas methane into the atmosphere. Moreover, 70 percent of America's 20,000 landfills closed between 1978 and 1988, requiring that communities seek new sites.

Finally, recycling significantly reduces energy consumption. We can produce 20 aluminum cans from recycled material with the same energy it takes to produce one can from new material.

Paul Etzler (MS, 1981) is now working for the Bechtel Nevada Project which deals with the Nevada Test Site and other DOE facilities. Three large companies, Bechtel, Lockheed-Martin and Johnson Controls support the Bechtel Nevada Project. He works for Lockheed-Martin. This project is very large and has many job opportunities as well as summer internships.

Paul works at the Remote Sensing Lab and his work emphasizes the use of calibrated (to true reflectance) airborne scanner data which can address the problems worked on by the DOE and other agencies. Problems include environmental cleanup of the nuclear-related production and storage areas as well as preparation of materials and procedures to deal with nuclear emergencies. Data Fusion (GIS) with other data sets is increasingly part of his work and he doesn't use his geology skills much anymore he mostly is involved with remote sensing and image processing and interpretation.

Paul is now living in a tiny settlement of Mountain Springs, which is on NV HWY 160, west of Las Vegas, which consists of ~100 characters, a saloon and a firehouse...a real wild-west kind of place. It has an elevation of 5500' and snow is a regular winter event. He has been here for almost 3 years and is single now, and trying to stay that way, but doesn't know if he will be successful. He spends a lot of time exploring the desert and mountains in his vicinity. The Spring Mountains are the site of a massive

Etzler continued

overthrust of Paleozoic limestones over Mesozoic sandstones and have a lot of interesting geology. His explorations have already identified a couple of large unmapped faults. There is a Geology Field camp held there yearly.

Samuel B. Frazier (MS, 1950) retired from petroleum exploration at the Gulf Oil Corp (which merged with the Chevron Corp.). He was the Vice President of Geoman, a division of Gulf Oil. He and his wife Barbara are enjoying retirement. He has made a donation in honor of former graduate student Professor Doctor Joseph W. Poborski (1949) of Krakow, Poland.

William Lowrie (PhD, 1967) is running for president of the GP section of the AGU. His history and a statement are listed below. This information is from *EOS Transactions, American Geophysical Union, Volume 78, Number 40, October 7, 1997: Special Election Issue, page 433.*

William Lowrie: American Geophysical Union AGU) member since 1968, Professor of Geophysics at Swiss Federal Institute of Technology (ETH), Zurich. Research interests include magnetostratigraphy, the history of geomagnetic reversals, and the application of rock magnetism to geological problems. Research positions at Gulf Research and Development Company, 1967-1970, and Lamont-Doherty Earth Observatory, 1970-1974. Professor at ETH Zurich since 1974; Chairman of Geophysics Institute every second year; Chairman of Earth Sciences Department, 1984-1986. Member of European Geophysical Society, European Union of Geoscience, and Sigma Xi; President of Swiss Geophysical Society, 1983-1986; President of European Union of Geosciences, 1987-1989. Authored 90 refereed articles, 17 in AGU journals; author of textbook *Fundamentals of Geophysics*. AGU Fellow, 1990; Allan Cox Memorial Lecturer, 1995. AGU service as coeditor of *Geophysical Research Letters*, 1984-1988; Associate Editor, *Reviews of Geophysics*, 1984-1986.

Statement: As a European geophysicist who studied and worked for 14 years in North America, I regard AGU as the parent organization of my profession. Through its well-organized meetings, AGU fosters competition between peers and provides a forum for the exchange of new ideas and results; its strictly refereed journals are available to members at fair and affordable prices that ensure the circulation of first-rate publications; its awards policy encourages members to strive for excellence. As an office of AGU I would be committee to maintaining these important functions of the Union, while at the same time serving the particular interests of Geomagnetism and Paleomagnetism members. The GP section is one of the smallest within AGU, but it embraces a large range of research interests, including electromagnetism, magnetic anomalies, rock magnetism, paleomagnetism, magnetic polarity, geomagnetism, and the dynamo problem. I consider it an important duty of the GP President to be sensitive to this diversity and to work within the Section to preserve it. Perhaps in part due to our diversity, GP has always been a dynamic Section of the Union with a comparatively high profile. I would try to ensure the continuation of this active role. This requires trying to find solutions to some current problems such as, for example, the disparity in attendance at GP sessions at the East Coast and West Coast meetings. Moreover, I believe that AGU should make use of the Internet for the on-line circulation of some journals.

Tammy Strally Lyons (BS, 1996) went to Florida thinking that she had a technical sales job in Vero Beach but that didn't work out. She looked for about a month and found another technical sales job as a sales consultant for a small company - just herself and the owner. They sold products to the electronic assembly industry - solder, equipment, etc. Tammy says that it was ok at first, but she started to really hate the traveling. She then went to the local state unemployment office, which has private, federal, state and local job listings and found a GS13 position listing for a geophysicist at Patrick Air Force Base. She remembered that Dr. Clauter (Pitt Geology Alum) worked there so she called him to see if he knew anything about the position. He said that the opening was research position requiring a

Strally-Lyons continued

Masters or PhD, but he would let her know of anything else and to call his boss, Dr. Russell. Later that week Tammy got a call from a Dr. Kemerait, who works for a government contractor and he said that he was looking for a junior-level scientist to supplement his office. She interviewed for the job and the rest is history! The name of the company is Command Technologies, Inc. and she started in November 1996.

She finds the work the company does very interesting. They work with the Air Force on developing the technical requirements necessary to implement the Comprehensive Nuclear Test Ban Treaty (CTBT). Tammy is working on setting up and installing the worldwide seismic, hydroacoustic and infrasound networks and several other technical issues related to the treaty. She's assisting in the development of a GIS that will be used as an interactive tool for analysts and researchers. Tammy also is using her Russian language skills! Tammy says that her job is ideal because it uses her military experience as well as her education. She can't express how exciting it is and wants the faculty to know that their patience and hard work has paid off! She hopes that everyone else from her class has experienced similar fortune finding jobs that utilize their skills.

Tammy says that everything else is going well and that she got married in April (she is now Tammy Lyons). Her husband, Aaron, is enjoying his job and doing well.

She would like to keep in touch with her classmates and has included her email address. Please get in touch with her via her e-mail address: tammy-aaron@worldnet.att.net.

P.S. She says that Dean Clauter says hello!

Papu Maniar (PhD, 1987) with his wife, Julie, and his ten year old son, Justin, have moved to Mesa, Arizona from Austin, Texas. Together they are exploring Arizona and loving every minute of it.

Papu continues to work for Motorola in the Semiconductor Technologies Group. The specific organization he is involved with is called CISD (Center for Semiconductor Chips Development). He explains that this typically entails program initiation, development, prototyping and finally transferring technology to manufacturing before it actually gets sold and brings revenue to the company. He says that the challenge at Motorola in past years was technical but the challenge has now migrated to managing programs and people. He thoroughly enjoys his career with Motorola, but says that it is obviously very different from geology.

Timothy M. Murin (MS, 1988) and his wife Kathryn have a new addition to their family - Cullen Francis - born June 10, 1996. Cullen joins sisters Carolyn, age 7, and Marissa, age 5. Tim is the president of Castle Exploration Company, Inc. which manages the oil and gas properties in the United States. He is currently involved in the sale of some/all of oil and gas assets.

Michael Price (MS, 1970; BS, 1968) and Mary Ann have two wonderful kids - Jessica, 22 and Joanna, 19. He works for Amerada Hess Corporation in the Houston office as a Division Geologist, onshore U.S. He is responsible for the supervision of geological staff and wellsite operations in the Sacramento Basin, Williston Basin and Permian Basin for oil and gas exploration.

Stephen E. Ralph (BS, 1982) presently resides in Murrysville, Pennsylvania with his wife Susan and three year old daughter, Elizabeth. Following his graduation, he was employed by Huntley and Huntley Inc. as a petroleum geologist. He then received a Masters in Petroleum Engineering from the University of Pittsburgh and a Juris Doctorate from Duquesne University. He is presently employed by Keating Energy Inc. as Production Manager and General Counsel and has a private law practice. He wants to thank Wesley Posvar for sparking his interest in law when he placed Stephen on "probation" his sophomore year.

Daniel Sandweiss (postdoctoral student, 1985) in the *news (The New York Times SCIENCE Tuesday, October 1, 1996).*

Rain Havoc of El Niño Dated Back 5,000 Years by the Associated Press

El Niño weather events that can cause so much disruption around the world began occurring about 5,000 years ago, according to a team of researchers who say the shift in climate may help explain cultural changes at the time.

Archeologists and climate experts study fossils in Peru report last month in the journal Science that fossils indicated that the area had a tropical climate with little year-to-year variation until about 5,000 years ago. Species dated from later periods are those that can adapt to more temperate weather with sometimes sharp changes, said Daniel H. Sandweiss of the University of Maine.

Cultural changes began occurring at about the same time, he added in a telephone interview. "I wouldn't want to say that climate drives culture, but certainly changing climate requires adaptation," Dr. Sandweiss said. "Shortly after 5,000 years ago, Peruvians began to build large temples along the coast, "he observed.

Indeed, cultural change at that time is more or less true of much of the early Americas, he said. "It was a time when cultures began to show greater complexity," he said.

The paleontological evidence has been murky on the issue of when El Niños began, said John Kutzbach of the University of Wisconsin, who was not a member of Dr. Sandweiss's team. "People have been looking for answers to this issue for some time," he said.

El Niño is a weather event every few years in which pools of warm Pacific water shift and winds change over the Pacific Ocean, bringing heavy rains to the coast of northern Peru and reducing the available fish in the region.

Peruvian fishermen named the phenomenon El Niño because when it occurs, the first effects generally become noticeable around Christmas. El Niño, meaning little boy in Spanish, is also used to refer to the Baby Jesus.

Vince Santucci (PhD, 1991) in the news (*The Pitt News, Volume XCI, Number 88, Monday, February 17, 1997, Anthony Breznican, News Editor*)

Pistol Packing Paleontologist - Pitt grad fights crime to save precious fossils

At the end of its life, a prehistoric animal was crouched against the underbrush beside a river of thundering water. Days of rain made the river swell, pushing miles of mud and broken rock over the banks, swallowing the squirming creature whole.

If it ever knew what was happening, it had no chance to escape.

Now the same rains that trapped the creature are setting it free. The South Dakota sky roars again with violent clouds churning against each other, sparking lightning and thunderclaps as they descend on the silent ocean of hardened sediment below.

The rain falls in torrents, pounding the gray stone with a sound like a million marbles smashing against concrete, burrowing into crevices, widening cracks, and washing away debris. First a claw, then a leg – an entire skeleton painstakingly emerges, embedded in the stone, as millions of years of rain wash away millions of years of rock.

When the rains are gone, the sun scorches the rock dry, and people flock to this far corner of Badlands National park to witness the escape of animals that time has trapped. But some come with more than spectating in mind.

Armed with backpacks and boxes heavy with rock hammers, fine chisels, and delicate drilling equipment, fossil hunters scour the park for signs of specimens below the rock.

They're not here for research or to collect specimens for a museum. They're commercial fossil dealers working on an international, multimillion-dollar black market that loots national parks and disrupts scientific research around the world.

Pitt graduate Vince Santucci is the man the federal government has chosen to stop them.

Santucci continued

Santucci, who studied geology and paleontology at Pitt as both an undergraduate and grad student, is a real-life "Indiana Jones," the nation's only pistol-packing paleontologist.

"I finished my graduate work in '91 and started work in the National Park Service, and I was recruited by the FBI to assist in a multi-agency investigation into fossil theft," Santucci said. "Because so much money is involved in these deals, there's a lot of danger and a lot more illegal activity involved."

Since collectors are forbidden to take fossils from national parks, and many important fossils are found there, data must be forged about the true sources and circumstances of the discovery to avoid prosecution.

But this practice can render the fossils useless to science if they ever fall into the hands of legitimate scientists.

"When you research these items, some of the most important questions are 'Where did they come from',' 'How old are they?,' and 'How do you know?'" Santucci said. "You can tell all those things based on where and how the fossil was recovered, but with stolen fossils, the locality data is falsified when they're sold.

The real data may never be recovered, and this contaminates the scientific database around the world, especially if the fossil is a very rare or previously undiscovered species."

Unfortunately, the rarer the specimens often fetch the greatest price in the shortest amount of time, according to Santucci.

"These people are like grave robbers. They'd go out and loot the whole area if they could," he said. "Many important specimens are lost that way."

Commercial fossil dealers can carry an incredible variety of merchandise, from the rather innocent fern fossils or tiny shells worth only a few dollars, to things like entire Triceratops skulls worth hundreds of thousands of dollars.

Some dealers say the government doesn't protect America's fossil riches and that commercial dealers actually protect the specimens from the elements by taking them from their natural environment.

"The skeletons are harder than the sedimentary rock around them because they're crystallized, but it's true – they can still erode away," Santucci said. "In a way, the dealers are protecting the fossils, but they're destroying their research value by not letting scientists do it."

Theft, tax fraud, customs violations, and a host of other crimes united agents from the FBI, the IRS, Customs, and the National Park Service to hunt down fossil dealers with Santucci.

"They have to hide their income and smuggle these fossils out of the country because taking the fossils is such an illegal activity," he said.

Their efforts resulted in a raid on the world's largest commercial fossil dealer and the recovery of a perfectly preserved Tyrannosaurus Rex skeleton nicknamed "Sue."

Sue's worth is estimated at around $5 million, but Santucci said that the price can go as far as $12 million at an auction.

"People in labs and doing research for museums can't afford to pay that cost," Santucci said. "These precious fossils end up in the hands of a private collector, away from the public where they really belong. These remains were taken from public land. They belong to everyone.

As part of a team of FBI agents, Santucci raided the Black Hills Institute of Geological Research in South Dakota in 1993, uncovering not only Sue, but a mountain of evidence implicating the institute and its director, Peter Larson, in nationwide fossil theft from national parks.

They also discovered that leaks within the Department of the Interior were providing Larson with information about Santucci and his colleagues.

"[Larson] knew I opposed what he was doing and was working with the Society of Vertebrate Paleontology to develop stronger fossil protection legislation," Santucci said. "He was trying to get evidence to discredit us, discredit that movement, and destroy our investigation of his business."

Santucci continued

Santucci could not comment further, saying only that these discoveries have sparked new investigations of government workers involved with the Black Hills Institute.

The controversial raid brought wide-spread public attention to the dangers of "fossil rustlers." A Feb. 25 "NOVA" documentary about the Black Hills case featuring interviews with Santucci and other members of his team has also brought attention back to the case.

Larson maintains his innocence, but was convicted of multiple felony and misdemeanor charges ranging from fraud to customs violations and government theft. Currently in a federal prison in Colorado, he is appealing the convictions.

But the case is shrouded in still more controversy. Larson discovered the Tyrannosaurus on a ranch on a Sioux Indiana Reservation in South Dakota. He says his hunt was legal because he provided the rancher with $5,000 to search the land.

Santucci said that complicates the matter, but it is still government theft.

"Because it's an Indian reservation, both a federal permit and tribal permit were necessary for Peter Larson to legally collect that specimen. The rancher's permission wasn't enough. It was reservation land and belonged to all Native Americans," Santucci said. "He knew he needed these things but also knew he would be refused. Peter Larson knowingly broke the law."

After complaints from the rancher and members of the Sioux tribe the local US attorney ordered the dinosaur confiscated.

Today, Sue is in government storage and is technically still owned by the rancher. Santucci said he's heard rumors that Sotheby's auction house will try to sell it in April.

This case may aid the completion of Santucci's mission for stricter fossil hunting regulations, serving as an example of the damage commercial dealers can do to scientific research, even when it's performed on private lands.

Some have attacked the investigation as an invasion by the government, but Santucci maintains new legislation will benefit Americans through the research it provides.

"I'm not out to stop amateurs from digging through rocks for their own personal collections. That's actually encourages," he said. "But in places like the Petrified Forest in Arizona, if every person who goes there breaks off a piece of petrified wood, there'd be nothing left."

He said amateurs can assist researchers by digging out fossils on designated sites rather than doing it on their own.

"That's a positive way of maintaining a hobby – learning on your own and assisting scientists in the process," he said.

Many of the reasons for Santucci's crusade are personal, he says.

"For young kids, dinosaurs are the easiest way to get them interested in science," he said. "We need to make sure our most important discoveries are not lost because of one person's greed. We may lose more than just valuable data. We may lose the inspiration for a new generation of scientists."

Currently on hiatus from his work as a ranger at Petrified Forest National Park, Santucci is delivering lectures at Carnegie Museum about national parks.

Because Pittsburgh's Carnegie Museum boasts one of the most important dinosaur exhibits in the world, Santucci hopes his hometown influence will raise interest in science from grade schools to universities.

"I remember sitting in Professor Harold Rollin's paleontology class here at Pitt, and I never dreamed my life would be changed by science in such a positive way," Santucci said. "I only hope discoveries that might make powerful changes in other people's lives aren't lost. That's why I do what I do."

Nancy Taylor (BS, 1985) of the U.S. Army Corps of Engineers was recognized by the Federal Executive Board as their Professional Woman of the Year.

Cindy Venn (PhD, 1996) current is an Assistant Professor in the Department of Geography and Earth Science at Bloomsburg University. She is in the news (*Denver Legal Copies, Inc.*) also.

Clues to Past Environments from Present Day Microorganisms? Evidence from Georgia Salt Marshes

In a study conducted on St. Catherine's Island, GA, by Cynthia Venn of Bloomsburg University, foraminiferans (forams) were collected and identified from two salt marshes, a newly-developing marsh (less that ten years old) fringing the north end of the island and a well-developed marsh on the eastern side of the island. Forams are one-celled, shelled organisms about the size of small sand grain. They may their shells either from calcium carbonate (the same material as chalk) or from small grains of sediment that they glue together in a mosaic-like pattern. The collections from the Georgia marshes reveal several differences between the foram populations there and populations reported in previous marsh studies along the East Coast.

The number of foram species that occur in many salt marshes, particularly those of New England and Canada, are quite limited in number and vary in their ability to survive at different elevations above the level of low tide. They have therefore been useful as sea level indicators both in present and past environments. The populations described by Venn in the younger marsh contain many species not previously reported to occur in salt marshes. The populations in the older marsh contain species reported from other marshes, but in very different proportions to each other than found in other areas. Very different groups of species also occur in very similar parts of the Georgia marshes. The techniques of using forams to identify past sea levels may not be a useful one in the ancient salt marshes of the Southwestern Coast of the U.S.

The Georgia populations are dominated by the same two species most common in other salt marshes, but have many more species (23-122) than have been reported from other marshes in New England and Canada (6-25), possibly because of the much larger number of individuals identified in the Georgia study. Salt marshes typically have been considered to support very few species of forams due to the extreme variations of temperatures and salt content in their environment. Environmental variations are not as extreme in the biodiversity of salt marsh ecosystems in the Southeastern U.S. may need to consider different sampling strategies than have been employed to date if they want to get a true idea of the biodiversity of the marshes.

This research is being presented at the internationally attended Annual Meeting of the Geological Society of America in Denver, Colorado, on October 31, 1996. The work was performed by Cynthia Venn while a PhD student in the Dept. of Geology and Planetary Science at the University of Pittsburgh. The work was funded in part by a grant supported by the St. Catherines Island Foundation, Inc., and administered by the American Museum of Natural History. The R.J. Lee Group, Inc., provided training and time on their Personal™ SEM.

Larry Wetzel (BS, 1994) has a baby girl, Morgan, who was born on February 06, 1997 and weighed in at 6 lbs 11 oz.

Harry J. Werner Oil Finders Fund

Initiated by Franco Corona as a scholarship fund in honor of Harry Werner who taught in G&PS from 1963 to 1979. Harry influenced many students during his fabled field trips to the Virginia Blue Ridge. This fund will support graduate student activities and commemorate the contributions of graduates from the department who have searched for oil and gas.

Werner: Actor, Joker, Teacher

by Don Marbury, Staff Feature Editor, Pitt News Profile, March, 1964

It seems that a course that has the ominous title of Geology 80 would be a fairly unpopular one, and that the professor would have a hard time teaching his students anything or even holding their attention. This is definitely no the case of Dr Harry J. Werner's Rocks 80 classes. His large lecture classes are always full, and never uninteresting.

Most of his students would describe Prof. Werner as "crazy," or a "complete nut." A student never knows what to expect next in his classes. He is always cracking jokes, or playfully picking on someone in the class. But through the joyful atmosphere that pervades his classes, the student is still able to learn Geology.

Dr. Werner sees a sense of humor as a very necessary quality in his teaching profession. "I've got something to sell," he said, "and if you are going to sell ideas to people you've got to first get their attention. I enjoy what I do," he continued, "and I like people to enjoy it with me." He goes about getting his student's attention, and making them enjoy his course in very novel ways. If he shows a geologic movie Dr. Werner will pull out a small flashlight and escort late comers to seats so that they will not stumble and fall in the dark. And he is always a source of jokes and humorous stories during his lectures.

On a serious note, Dr. Werner commented on some of the problems plaguing today's world. Even though he was in the Marine Corp, as a fighter pilot during the second World War he personally doesn't agree with the war in Vietnam. "I am in sympathy with those who feel they must rebel against the war, but I can't sympathize with, and am violently opposed to people who defame the flag," he said. "War is one hell of a bad situation, it's like having a tiger by the tail, but I have no sympathy for those who ridicule the country," he continued.

He gave his views on the social turmoil sweeping our country. "All I can say," he began, "is that we have problems, and these problems are not going to be improved by a lot of hotheads. I wish I had some answers. There are social injustices in this world that have to be alleviated," he continued, but burning and rioting aren't going to improve the situation in the long run." The only solution that Dr. Werner could see is that somehow everyone is going to have to become responsible citizens.

He said that the one thing that he hated was the ever growing polarization of different groups of people.

"As for me," Dr. Werner concluded, "if I can get through to a few people, through my work and actions, and help make better citizens out of that few, then I know that I have contributed something to society. When I was in college there were some wonderful people, who were very good to me, and gave me a lot of breaks, and by God I owe something to them and to the world."

Dr. Harry J. Werner, a comedy actor, a jokester, but first, a teacher. A teacher in the truest sense of the word.

_____ **Harry J. Werner Oil Finders Fund**
Initiated by Franco Corona as a scholarship fund in honor of Harry Werner who taught in G&PS from 1963 to 1979. Harry influenced many students during his fabled field trips to the Virginia Blue Ridge. This fund will support graduate student activities and commemorate the contibutions of graduates from the department who have searched for oil and gas.

_____ **Norman K. Flint Memorial Field Geology Fund**
In appreciation and recognition of devoted and inspiring teaching in the field and in the classroom, his students, friends, and colleagues have established in his honor the Norman K. Flint Memorial Field Geology Fund.

_____ **Frances Dilworth Lidiak Memorial Fund**
Money generated from this account is used for departmental seminars to which outstanding scientists will be invited to present public lectures on topics in the geological and planetary sciences.

_____ **Alvin J. Cohen Memorial Fund**
The family of Dr. Cohen has suggested that donations in memory of Dr. Cohen be made to the Department of Geology and Planetary Science for support of students conducting basic research in fields close to Alvin's interests.

_____ **Henry Leighton Memorial Fund**
The scholarship is established in response to a contribution from Professor Leighton's daughter, Helen Leighton Cannon. Mrs. Cannon requests that a permanent graduate scholarship fund be established and that the scholarship be awarded on the basis of merit and need.

_____ **Major Equipment Fund**
Bill and Bev Cassidy have provided the initial monies in an effort to augment and enhance departmental instrumentation. The initial amount, matched by Bev's employer, Westinghouse Corporation, was then matched by the FAS Dean Office.

_____ **Victor A. Schmidt Memorial Classroom Fund**
In memory of Vic Schmidt and in commemoration of his love of teaching, family, friends and colleagues have begun the memorial classroom fund.

_____ **Unrestricted Departmental Gifts Fund**

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If there are any questions, or concerns, please contact either H. Todd Bowers at (412) 624-8784 or Thomas Anderson at (412) 624-8783. We try very hard not to miss a single donor, but we aren't perfect. If we goof, please let us know. Thanks.

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