GEOLOGY NEWS

Department of Geological Sciences ■ University of Colorado at Boulder ■ Spring 2002

Polar ice caps cover the Benson Earth Sciences granite globes. (Photo by Casey A. Cass)

Letter from the soon-to-be ex-Chair

Charles Stern

Many good things have happened for the Department during the last year, in part because this year has been a little bit longer than previous years.

We have added two new faculty members. Karen Chin, a paleontologist who specializes in coprolites large and small, is a joint hire with the University Museum. Matt Pranter, a petroleum reservoir geoscientist, joins both the department and EMARC.

Currently we are in the process of conducting five national searches for new faculty. One is for another paleontologist to replace Peter Robinson, who will retire at the end of this year. One is for a vadose-zone geohydrologist. One is for a biogeochemist to replace Greg Asner, who has gone to Stanford. One is for a glaciologist and/or Quaternary geologist to replace John Andrews, who will retire at the end of 2003. The last is for a paleoclimatologist. This has kept us very busy.

Last spring Paul Weimer and Jim White were promoted to Full Professor. This year we have nominated Karl Mueller for tenure and promotion to Associate Professor, and Kathryn Nagy for tenure. I want to thank all of you who wrote letters on their behalf.

Bill Hiss has provided the department with $30,000 again this year to fund the "William Hiss Award for Creativity in the Earth Sciences." This award provides $1,000 to help offset travel expenses for any student presenting a paper at a national or international meeting. At our annual spring awards ceremony last spring, Bill was here in Boulder to meet the first 25 winners of this award. Both the students and our faculty greatly appreciate Bill's support in helping them make it to their talks!!

In the spring, two members of our advisory board, Matt Silverman and Dave Peterson, organized a luncheon at the Petroleum Club in Denver in honor of Bruce Curtis, and to kick off a campaign to raise a $250,000 graduate student fellowship endowment in Bruce's name. The old geology building, now renovated for the research laboratories of the University Museum, will also bear Bruce Curtis's name!! The dedication is April 5th. This is a great honor for a man who has had a profound influence on our department for many years

The bp Visualization Center, a new research center on campus, established with a $10 million dollar gift from British Petroleum after their merger with Arco, opened for business on October 30. This new center, under the direction of Goeff Dorn, is co-sponsored on campus by our department, and represents an important addition to the resources available for EMARC and our petroleum geology program.

We graduated 22 undergraduate geology majors with B.A. degrees, as well as 19 M.S. and 14 Ph.D. students during this last calendar year. At the moment we have 120 undergraduate majors and 90 graduate students, 24 of whom just entered the program this last year. As usual approximately 3,500 undergraduate students enrolled in geology classes last year. We are currently reviewing 100 new applications from students wanting to enter our graduate program next year. So our program remains strong in terms of interest and numbers at both the undergraduate and graduate levels. With regard to research, our faculty, research associates and students currently have over $7 million dollars of active research grants and contracts!!

Next year will be the 100th anniversary of the Department of Geological Sciences, which opened its doors in 1902 with a single faculty member, N.M. Fenneman. Fenneman taught courses in general geology, historical geology, geometrical crystallography, optical crystallography, systematic and determinative mineralogy, petrology, paleontology, and the physical geography of the United States, all in 1902-03, after which he understandably resigned. In 1903, Russell George became the head of the department, and was the head of the department until 1933, by which time we had grown to employ a number of other faculty members. Now we have 28 faculty members, none of whom were even born in either 1902 or 1933. Over the last 100 years the department has graduated more than 2000 B.A., M.S. and Ph.D. students! That's you, the alumni!

We expect to celebrate our anniversary in some form next year, and try to round up all our living ex-faculty members and alumni for a grand event, which has not yet been planned in detail, but will probably occur in the spring of 2003. However, to kick off the anniversary year we will have a cocktail party at the Geologic Society of America Annual Meeting, which will again be in Denver next October. Come and join us Monday evening, October 28, at this get-together in Denver. Check the GSA meeting announcements, when they appear, for the exact time and place.

This also is likely to be my last letter from the chair, as the department has just selected Mary Kraus as the next chair. YES!!!!! Congratulations Mary! I'm outa here!

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NEW FACULTY

Karen Chin
Assistant Professor

Another paleontologist has joined the faculty of the Department of Geological Sciences. Karen Chin is a paleobiologist whose research focuses on understanding ancient ecosystems. She started her joint position as an assistant professor in the Department of Geological Sciences and a curator of paleontology in the CU Museum of Natural History in August, 2001.

Karen's academic path began with a strong interest in modern ecosystems. This interest intensified during many seasons' work as an interpretive naturalist for the National Park Service, and led to a master's degree in biology at Montana State University. She began to look back in time at past environments, however, after working for dinosaur paleontologist Jack Horner at the Museum of the Rockies. A new-found fascination with fossils motivated her to continue her education at the University of California at Santa Barbara where she completed her doctorate in geology in 1996.

Karen's doctoral dissertation was not the run of the mill research project. It focused on the identification and analysis of fossilized dinosaur feces. Fossil feces—known as coprolites—were first recognized in the early 1800's, but very little was known about dinosaur coprolites. Part of Karen's dissertation described an assemblage of large coprolites from the Upper Cretaceous Two Medicine Formation that were produced by herbivorous dinosaurs, most likely *Maiasaura* duck-billed dinosaurs. These coprolites are particularly interesting because they are riddled with distinctive back-filled burrows that reveal dung beetle activity. This find demonstrated that dinosaurs and dung beetles had established a symbiotic relationship by the Late Cretaceous Period.

After graduation, Karen continued her research on ancient ecosystems as a Ford Foundation postdoctoral fellow at the U.S. Geological Survey in Menlo Park, and then as a National Science Foundation postdoctoral fellow at Stanford University. Now Karen is delighted to have joined the CU faculty and to be back in the Rocky Mountains! She enjoys teaching CU students about the history of the earth, and appreciates the opportunity to be a part of the illustrious Department of Geological Sciences and the broadly interdisciplinary CU Museum of Natural History. Like several other geology faculty members, Karen has a joint appointment, so she has curatorial duties and works with graduate students in the Museum and Field Studies graduate program. Her lab is in the Bruce Curtis Building—this was the old Geology Building and now houses the museum collections and research lab. Karen is busy getting her lab set up so she can continue her research. She is analyzing more coprolites, including some intriguing specimens from the Canadian Arctic and some theropod (carnivorous dinosaur) coprolites. She is also investigating other aspects of Mesozoic paleoecology, such as fossil evidence for a fire that occurred 90 million years ago.


Karen Chin displaying her tracking skills

Matthew J. Pranter
Assistant Professor

Matt Pranter began in the fall 2001 as an Assistant Professor in the Department of Geological Sciences. He joins the department in the new reservoir geosciences faculty position. Matt's research interests are in the areas of reservoir characterization and modeling, stratigraphy, and seismic analysis.

Matt earned a B.S. in geology from Oklahoma State University, B.S. in engineering from Colorado School of Mines, M.S. in geology from Baylor, and Ph.D. in geology from Colorado School of Mines. During his Ph.D. program, Matt worked in the Reservoir Characterization Project (RCP), an industry-sponsored research group within the Geophysics Department at CSM that focused on integration of 3-D multicomponent seismic data in reservoir characterization and modeling. While earning his degrees, he worked as an intern with Sun Exploration and Production, ARCO Research, and Exxon Production Research.

Following his master's degree, Matt was a Geoscientist with Conoco in Midland, Texas for five years. He worked on reservoir production and development programs within the Permian basin that were primarily focused on carbonate reservoirs. While at Conoco, Matt was project team leader for a reservoir development program that involved acquisition, processing, and interpretation of Conoco's first onshore 3-D seismic survey in North America.

Prior to coming to CU, Matt was a Senior Research Geologist with ExxonMobil Upstream Research Company in Houston, Texas. Matt's work at ExxonMobil involved exploration, reservoir characterization, and 3-D geologic modeling of deep-water siliciclastic reservoirs in the North Sea and offshore West Africa (Angola). In addition, he was a co-instructor for one of ExxonMobil's internal 3-D geologic modeling courses.

Matt's research and teaching program at CU is both field and laboratory-based. He is particularly interested in stratigraphic and petrophysical controls on reservoir heterogeneity and in multi-scale reservoir characterization and modeling. As part of Matt's research program, he is currently pursuing collaborative projects with David Budd on the Madison Formation in Wyoming and with Paul Weimer on deep-water outcrop analogs including the Ross Formation in Ireland. Research on Madison Formation carbonates will address lateral stratigraphic and petrophysical controls on reservoir heterogeneity and fluid flow. This research will provide valuable analog information for existing and newly discovered carbonate reservoirs within the region of the north Caspian Sea and other areas. Research on the Ross Formation and other deep-water outcrops will provide similar information for comparable deep-water clastic reservoirs. Matt teaches *Introduction to Geology I* (physical geology) and will teach two new graduate-level classes in reservoir geosciences. A new course entitled *Reservoir Characterization* will start in the spring 2003 and will be co-taught with Dr. Neil Hurley from Colorado School of Mines. The *Introduction to 3-D Reservoir Modeling* course will begin this spring 2002 and will focus on various aspects of reservoir modeling.

Matt is active in several professional societies and serves as an Associate Editor for the American Association of Petroleum Geologists (AAPG) Bulletin and as a member of the AAPG Foundation Grants-in-Aid Committee and AAPG Distinguished Lecture Committee.


Matt Pranter hard at work

Faculty Activities

Bill Atkinson

The year 2001 has been a difficult one for Bill.

Classes in the Spring semester included Mineral Resources for non-majors, which is always entertaining, and a field geology module, the field study of mineral deposits. As in previous years, we mapped underground in the Clipper Mine, just eight miles from campus (see photo). The emphasis was on making geologic observations, on the structure, cross-cutting relations of four different types of veins, a porphyry dike, pebble dikes and hydrothermal alteration, and making geologic sense out of it. Quite a challenge! But they did an excellent job, and enjoyed the experience.

Mohammad Karimpour, Bill's first Ph.D. student, arrived with his family in the late spring for a year's sabbatical. He graduated in 1982 and spent a couple of years in the U.S. before returning to his native Iran. He was a university professor there, and a university president for five years, then decided he would rather be a scientist than an administrator. He and Bill are collaborating on a few papers on geology in Iran.

The health of Bill's mother, 88, deteriorated in the spring, and he spent his time outside of work caring for her. She passed away in June. Although her death was expected, Bill was surprised to spend the next two months in a curious state of confusion.

In August, Bill took a trip to Arizona to supervise two of his students, Lorna Jaramillo and Eric Anderson. Lorna is studying the dispersion of elements around the Silver Bell porphyry copper mine, and determining what can be detected in this regard by remote sensing. So far, it appears that there is very little dispersion due to the presence of limestone throughout the district, and caliche at the surface, both of which neutralize acid water and precipitate heavy metals. Eric is studying a mineralized breccia pipe in the Copper Creek district north of Tucson. The district is remarkable in having 500 known breccia pipes, related to an underlying batholithic center of mineralization. Eric had an undergraduate assistant, Roy George, who helped him avoid rattlesnakes, among other chores. Bill spent a week in the field with each student, then took them on an excursion to Moctezuma, Sonora, Mexico, where Bill has been doing field research.

Bill has one other graduate student actively working in the field, Worth Cotton, who is doing a study of clay minerals and weathering of two porphyry copper deposits in Chile. Bill intends to visit Worth in the field in June 2002. Bill is also supervising three other students who are at various stages of finishing their theses. These include Erin Marsh, studying a gold district in the Yukon, who is just putting finishing touches on her thesis prior to turning it in. Lupe Espinoza is currently doing the same thing in Hermosillo, Sonora, Mexico. Bill also was the scientific supervisor for Stephen Redak, who is finishing a master's degree at the Colorado School of Mines. His thesis was a study of zonation of ore shoots in the underground Au-Ag mine at Tayoltita, Durango, Mexico.

Bill was granted a year's sabbatical starting in the fall, but was diagnosed with prostate cancer in October. Side effects of the problem caused severe sleep problems, so Bill was able to change the fall semester from sabbatical to sick leave. Fortunately, prostate cancer is usually very slow to develop, even after metastasis, so most prostate cancer is curable. Bill had a "radical prostatectomy" Jan. 17, and is currently recovering slowly. The doctors say that the cancer was discovered very early, and his chances of dying of something else are excellent!

Despite the health problems, Bill was able to put together a paper with Larry James on silver deposits of Utah, and present a paper at the GSA in Boston. The year 2002 will be the sabbatical now, which Bill will dedicate

Faculty Activities

continued.....

to writing papers. He will owe the University a year of teaching after that. The future beyond is uncertain. Gold prices are going up, so he may retire and do consulting. If that is not possible, he may continue teaching and research for a few more years.

Roger Bilham

In his report on the Great Assam earthquake of 1897, Richard Oldham, the geologist who discovered p-waves, s-waves and the core of the earth, remarked that the 10 m of vertical offset he observed on the Chedrang fault on the northern edge of the Shillong Plateau was merely a secondary fault, and that the causal fault of the M=8.1 earthquake must lie elsewhere. Despite dammed rivers, newly-created waterfalls, overturned and snapped trees near this prodigious rupture, he speculated that the fault that caused the earthquake lay 9 miles beneath the Earth's surface. Since then numerous investigators have sought this mystery fault.

The definitive clue to what happened in 1897 lay dormant in the archives of the Survey of India for more than a century. A surveying party led by Captain J. Bond (!) had been dispatched to the epicenter in the months following the earthquake. His data didn't make sense to Sir Sydney Burrard, the Director General of the Survey of India ("Bond's work is of inferior quality"), nor to Oldham who realized that the incomplete survey of the northern edge of the plateau rendered the data ambiguous. The critical survey along the northern edge of the Shillong Plateau was not completed until 1936. Unfortunately Oldham died that year and no one connected the two surveys.

In 2000 Philip England and Roger Bilham found the musty reports of the two surveys roughly 2 feet apart in the labyrinthine stacks of the Bodleian library in Oxford. By merging the geodetic data it was relatively easy to calculate what had happened in 1897. The northern edge of the plateau had apparently risen 15 m by rupture of a reverse fault between 9 and 35 km depth. Bond's work was not at all inferior. True his triangles did not add up to 180° but this was because his triangles were changing shape during his measurements. Oldham relates how an eyewitness observer recorded the emergence of an hitherto obscured peak in the months following this gigantic earthquake, suggestive of massive post-seismic deformation. In a 2001 article we speculate that the Shillong Plateau owes its current 2 km elevation to many thousands of violent earthquakes. We named the invisible blind thrust fault that slipped in 1897 after Richard Oldham.

Oldham's interest in earthquakes had been kindled by the completion of manuscript notes on earlier earthquakes inherited from his father, Thomas Oldham, a director of the Geological Survey of India, who published the first ever history of earthquakes in India. It was his father's notes on the Allah Bund earthquake of 1819 that must have driven Oldham to write two accounts of this curious earthquake whose main effect was to dam one of the distributaries of the river Indus and to create a huge lake in the Rann of Kachchh. In the first of these accounts in 1896 he published a map that had been lost for 40 years. The article described a survey across the Allah Bund – a coseismic surface fold above a blind thrust fault – so named to distinguish it from the five artificial dams across the River Narra. The report by Captain Baker in 1846 was intended to support Lyell's speculation that earthquakes caused uplift as well as subsidence, but in the absence of the cross-section illustrating his findings, his article was all but forgotten until Oldham found the map during spring-cleaning operations in Bombay.

We digitized Baker's survey profile, and with the assumption that all the observed deformation was caused by a single earthquake, deduced that a blind M=7.7 reverse fault had slipped 10 m in 1819. We went further to suggest that future reverse faulting earthquakes might occur along-strike, threatening the Pakistan city of Karachi.

What we did not realize is that we were about to be proved right about the strike but wrong about the direction. On January 26th 2001 the most devastating earthquake in recorded history hit mid-plate India demolishing the towns of Bhuj and Anjar and two dozen villages – the very same villages that had been destroyed in 1819. In the days following this event students Becky Bendick and Grant Kier joined Indian geodesists to re-measure the epicentral positions of a number of survey marks that had been installed by the survey of India in 1860. Because of disaster relief activities it was difficult to find many of these old survey marks in February, but student Kali Wallace, Vinod Gaur and Roger Bilham returned in June and located more than a dozen markers. These remeasurements confirm that slip in the Bhuj 2001 earthquake occurred below 7 km depth on a third blind reverse fault. Our activites in Bhuj were featured in half hour programs on the BBC world service in March and July.

The 2001 earthquake (M=7.6) occurred on a blind reverse fault to the east of the Allah Bund, but despite the fact that it was smaller than the other two blind thrusts, and occurred in a region where earthquake building codes prevailed, caused more fatalities than either. The problem with blind faults is that they leave little on the surface for geologists to find.

Petrology field class in the Ojos Caliente hot springs, New Mexico. Only six of the faces are real people, the others are just floating heads: Can you tell which are which?

Danish model, Heidi Albertsen, and Roger Bilham, between scenes at 19000 feet while filming the IMAX movie Kilimanjaro (released March 2002). The picture is taken in front of part of the Furtwangler ice sheet. The ice sheet may soon disappear partly because of global warming, and partly because of melting from the dormant volcano below.

Liquefaction effects, fractures and secondary faulting tell little of the violence of the event.

The Bhuj earthquake resulted in 19,700 fatalities, almost identical to the number killed in the 1905 Himalayan earthquake that destroyed the towns of Kangra and Dharmsala, the present seat of the Tibetan government in exile. According to the geologists of the Survey of India who searched in vain for slip on the frontal thrusts of the Himalaya, this too appears to be have been a blind thrust, although Steve Wesnousky (Reno) working with Indian geologists has recently exhumed a possible 1905 surface rupture south of Simla.

We spent the rest of June measuring a dozen ancient survey points in the Himalayan foothills near Kangra. Many of these points were in a good state of repair but had never been remeasured with a view to identifying what happened during the earthquake. In 1905 Oldham had retired from active field work and Burrard, who had scathingly dismissed Bond's work in 1897, suggested with some precience, that on the basis of 15 cm of apparent uplift of the Survey Headquarters in Dehra Dun, perhaps the Himalaya had been formed from the repeat of millions of earthquakes. But perhaps because of his experience in 1897, coupled with observations of unchanged horizontal angles around Dehra Dun (250 km from the epicenter), he was dubious that anything had moved in 1905. He consequently never ordered the remeasurement of the Kangra 1860 survey. We have yet to process these data but they are of good quality and we expect soon to learn more about this devastating Himalayan thrust event.

In March, and again in July, Bilham visited Pakistan with a view to establishing a project to measure convergence across the western Himalaya, the Salt Ranges and the Chaman fault transform system bordering the western edge of India. His visit resulted in the establishment of a GPS tracking site in Peshawar, and the remeasurement of a half dozen points established earlier by the Great Trigonometrical Survey of India along the Karakorum highway. The measurements vary in elevation from a few hundred meters in the Salt Ranges to more than 5 km near the Chinese border. It is too soon to tell whether events of September 11 may delay or simplify our planned expansion of these geodetic measurements across the Salt Ranges and into Baluchistan.

October found our GPS teams again in the field, this time working with Anne Sheehan to install a seismic array in eastern Nepal. While waiting for the cement of seismic stations to cure it was possible to remeasure a number of geodetic points in the Nepal Himalaya. Although all is not quite peaceful in this small mountain kingdom, Maoist activities appear to be targeted at government officials and Coca-Cola bottling plants rather than seismic hazard studies.

It is sometimes forgotten how much the study of earthquake and the entire subject of seismology owes to Richard Oldham's pioneering work in India. He would have been delighted with our ability to examine the kinematics of subsurface motions using space geodesy. He would be astonished at the intricacies of the seismic stations currently running in Nepal. Although our view of future seismic hazards in India is more educated than it was 100 years ago, the vulnerability of Indian cities has much worsened since then. There remain numerous questions that remain unanswered in the Himalayan collision zone, and CU students and faculty feel privileged to be working in this great man's footsteps.

Alan Lester

Alan continues to teach several classes that he enjoys very much. In addition to serving as the faculty supervisor for the graduate teaching assistants associated with our Introductory Geology Laboratory, he teaches Introductory Field Geology, Historical Geology (with an honors recitation), and Natural Catastrophes. In all of these courses, the importance of science as a uniquely human endeavor is stressed. Alan sometimes appears in costume as scientists of the past, in order to help students recognize that science is done by people, and that its success requires much more than a flow-chart approach (as the "scientific method" is so often depicted in textbooks); major advances in scientific understanding involve imagination, creativity, and the ability to seek new perspectives.

Two research projects are ongoing. With Lang Farmer, Alan has been working on a program investigating the nature and timing of crust formation in the northern portion of the Southern Rocky Mountains. Lower crustal xenoliths in Devonian kimberlites provide windows into the process of crust formation, via rare earth element, Rb-Sr, and U-Pb analyses. With Paul Murphey (University of Colorado Museum), Jack Dyni and Bruce Bohor

Faculty Activities
continued.....

(USGS), Alan is continuing work on a project in the Bridger Basin of southwest Wyoming. 40Ar/39Ar dating of ash layers is being used to evaluate sedimentation rates and allow intra-basin correlation within Eocene deposits of the greater Green River Basin.

In his role as undergraduate academic advisor, Alan has been developing programs that help to engage students in research, prepare for graduate school, and locate jobs. Additionally, a "no-surprises" approach is being implemented in which students are able to keep abreast of where they stand in terms of graduation.

In Spring 2002, Alan was promoted to senior instructor.

Peter Molnar

Together with Mark Cane at Lamont-Doherty Geological Observatory, Peter continues to pursue the idea that the closing of the Indonesian Seaway was the key to the initiation of the ice ages roughly 3 million years ago. Underlying this is the supposition that Indonesia has blocked warm water from the South Pacific and thereby enabled the current east-west difference between a cold eastern Pacific and the warm pool of the western Pacific. Hence before the Ice Ages, the tropical Pacific would have been a state close to a permanent El Niño. Peter and Mark have compiled information on pre-Ice Age climates around the world, both on continents and in the tropical Pacific. What data they found suggest that in Pre-Ice Age time, the eastern Pacific was relatively warm, and the thermocline there was deep, both of which are consistent with an El Niño-like state. Moreover, in many regions (but not all), the differences between pre-Ice Age climates and those today resemble the teleconnections (or anomalies) associated with El Niño. Thus, the idea that pre-Ice Age climates were like those of a modern El Niño passes a test, if demonstrating a cause-and-effect relationship remains a distant hope.

Peter also continues to work on questions of large-scale tectonics. One study, with Erik Brown of the University of Minnesota in Duluth, Becky Bendick of CU, and others, shows that the rate of strike slip on the Karakorum fault in India (western end of the Tibetan Plateau) is only 3-4 mm/yr, roughly an order of magnitude lower than what had been thought. The lowering of this rate, like that of others in Asia, casts in doubt the idea that India's penetration into the rest of Eurasia has manifested itself in rapid eastward extrusion of material that lay in front of India's path.

Peter continues to work with Greg Houseman of Leeds University on the mantle dynamics that might occur beneath mountain belts where crust, and presumably mantle lithosphere has thickened. They have been trying to develop scaling laws for growth of the instability that might develop if cold dense mantle lithosphere, after it has thickened, abruptly plunges into the asthenosphere. Currently, they are addressing the extent to which the buoyant overlying crust affects flow beneath; for different ratios of viscosity, density, and thickness of crust to mantle lithosphere, regional thickening of crust can lead to either a single downwelling of mantle lithosphere, or paired downwellings on the flank of the growing mountain belt.

Peter also spent a couple of weeks in China in November, after a 6-year gap since his last visit. (He used to go nearly every year for fieldwork somewhere in western China.) He and colleagues there are considering how they might launch a study to understand how the growth of Tibet has affected the Indian Monsoon and the onset of loess deposition in northern China at approximately 8 million years ago.

Rebecca Bendick undertaking GPS measurements south of the Thakola Graben near Annapurna.

Karl Mueller

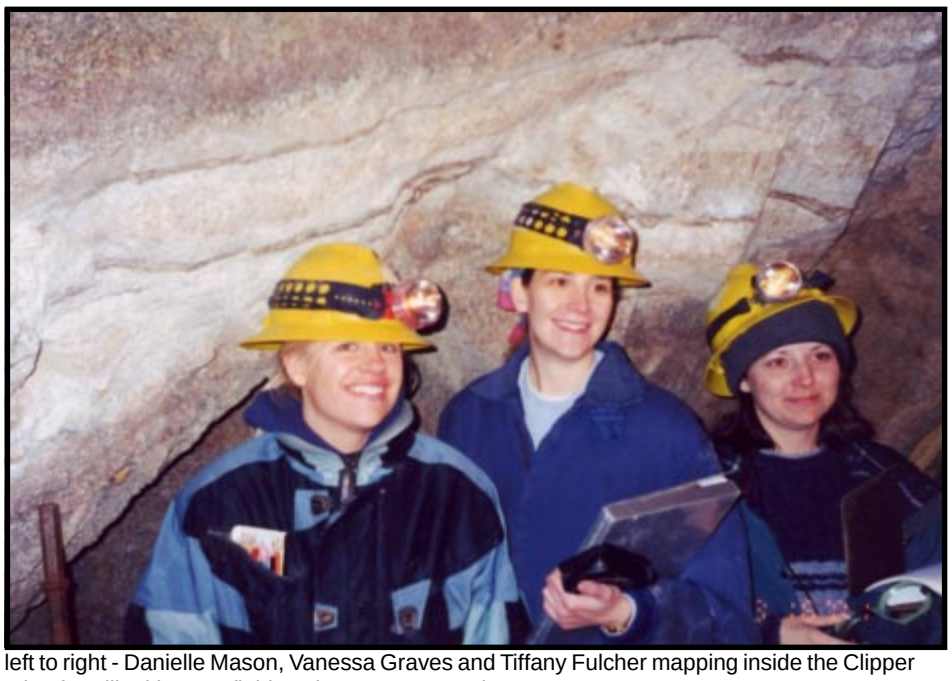
The past year was a busy year for Karl Mueller's research group in active tectonics and earthquake hazards. Lauren Powell joined the group as a new graduate student and will undertake work to understand how erosion affects backstepping of active thrust faults in west-central Taiwan. Grant Kier continued his work on the origin of regional uplift and denudation in southern California and northern Baja California and its relation to lithospheric flexure, while Eric Cannon spent the summer in Japan working on the kinematic and mechanical development of active fault-related folds in the Osaka and Tokyo metropolitan areas. Sean Sundermann is undertaking a similar study of active folds and blind thrusts in the southern Los Angeles basin. Alex Tate graduated in the fall of 2001 from the group after completing a thesis on fault-related folds, or wrinkle ridges, on the Lunae and Solis Plana regions of Mars. Alex has since moved back to England to begin work for the British Antarctic Survey.

Karl was kept busy providing materials for his spring 2002 tenure review and finalized papers for publication in Geomorphology, Engineering Geology, the Seismological Society of America Bulletin, Eos and Seismological Research Letters. Additional funding for work in Los Angeles and Mars came through from NEHRP and NASA that he is using to recruit new students for 2002.

A highlight of the year was a week-long field trip to Death Valley, Fish Lake Valley and Owens Valley that was assisted by Marith Reheis and Ralph Klinger (past CU PhD's with Pete Birkeland) who provided maps, imagery and directions to sites of interest. Karl ran the trip in October with a graduate class in active tectonics who collectively withstood temperatures ranging from 115 in Death Valley to below freezing in the eastern Sierra. Washed out roads, flat tires, hot springs and a Dutch Bakery were combined with spectacular active faults and folds to create a wonderfully memorable, if sometimes painful trip. (see image on page 10)

Besides the research on active structures and geomorphology mentioned above, Alex Tate, Sean Sundermann and Grant Kier worked with very high resolution digital terrain data of the Front Range provided by Intrasearch Corporation to create new undergraduate and graduate field and structure curriculum. We are also working to provide the Park Service with images of Rocky Mountain National Park for a revamped visitor center on Trail Ridge Road.

On a more personal note, Karl enjoyed time on a mountain bike last summer and fall, riding single tracks along the Front Range while trying to forget about his tenure review. Other frequent rides up Flagstaff on a road bike with Giff Miller and Harmut Spetzler continue to suggest that a lesser age does not alway correlate with higher speed.



left to right - Danielle Mason, Vanessa Graves and Tiffany Fulcher mapping inside the Clipper mine for Bill Atkinson's field geology course - Spring 2001

Kathy Nagy

In the past year, Kathy Nagy taught introductory physical geology to a large lecture class and also a small honors class. The highlight of her lecture on deserts and sand dunes was a brief performance of the 1940s tune "The Singing Sands of Alamosa" which she played on her flute while the students sang along… mostly enthusiastically. Coverage of timely topics such as the hypothesized use of clays to disperse anthrax and the geology behind searching for oil in ANWR added to the relevance of the class material. Her spring teaching in undergraduate geochemistry will emphasize some of her recent consulting work related to the current recommendation to store all of the nation's high-level nuclear waste at Yucca Mountain, Nevada.

Kathy's two post-doctoral associates Barry Bickmore and Michel Schlegel have gone on to career positions as Assistant Professor at Brigham Young University and researcher at the Commissariat à l'Energie Atomique in Saclay, France, respectively. Barry was working on reactions related to the leaking radioactive waste tanks at Hanford, Washington, and Michel made extensive investigations of reactivity at the mica-water and quartz-water interfaces using high brilliance X-rays at the Advanced Photon Source at Argonne National Laboratory. New post-doctoral researcher Sherry Samson arrived this past September from the University of Wyoming by way of Harvard University to continue work on the Hanford project.

Kathy's first two students obtained their master's degrees in spring 2001. Bradley Wakoff studied how the element rhenium (an analogue for technetium, the most important long-lived radionuclide in the Hanford waste tanks that remains in dissolved form in ground water) is incorporated into the structure of iron-oxide minerals as they age. He is now employed at Eltron Research in Boulder. Jake Waples determined the role of dissolved natural organic matter (fulvic acids) in the dissolution of the mercury-sulfide cinnabar. He is now a geochemist for Golder Associates Inc. in Golden. Terry Church will be finishing her master's thesis work on dissolution of biotite mica in the presence of Hanford tank simulants this spring and new student Paul Sandlin is investigating the mechanism of formation of kaolinite clay in the presence of solutions containing natural organic matter.

Kathy will be co-hosting, with colleagues Denny Eberl and Alex Blum of the USGS in Boulder, the 39th Annual Meeting of The Clay Minerals Society in Boulder June 8-13. As part of this meeting a one-day workshop on "Teaching Clay Science" will be held on June 8. She invites you to consider attending (see http://www.colorado.edu/geolsci/cms for more information).

Anne Sheehan

Professor Anne Sheehan's research this year took her to New Zealand and Nepal for two National Science Foundation funded seismic field studies. In New Zealand she is studying the Marlborough Fault Zone on the north part of the South Island, which is located at an interesting transition between compressional and transform style plate boundaries. Graduate students Charlie Wilson and Oliver Boyd spent several months each in New Zealand maintaining the seismic array, and postdoctoral associates Hersh Gilbert and Frederick Blume helped out for shorter stints. CU Professors Craig Jones and Peter Molnar are also PI's on the project and have participated in the field work.

In October a team of four CU researchers led by Sheehan deployed 14 broadband seismometers throughout eastern Nepal in order to study the seismicity at the edge of the creeping thrust faults of the Himalaya. The work will provide depth control on the tectonic models proposed by Prof. Roger Bilham and co-workers based

upon their years of GPS and leveling work in the Himalaya. Roger Bilham and postdocs Rebecca Bendick Kier and Frederick Blume, as well as CU alum and current University of Wyoming graduate student Brian Zurek, participated in the deployment along with Sheehan. The seismograph stations will remain in place for one year, recording both local and distant earthquakes.

Field work closer to home included a GPS field survey of the state of Colorado, led by postdoctoral associate Frederick Blume. Graduate student Otina Fox and undergraduate researcher Matthew Reynolds assisted with this project. The new data collected in August will be processed along with data collected ten years ago, to give the first ever satellite-derived surface velocity field for the state of Colorado. These results are important for seismic hazard analysis, as well as to better constrain the current tectonic motions of the Rocky Mountains and Rio Grande Rift.

Three members of Sheehan's research group completed their graduate degrees in 2001: Hersh Gilbert, Ph.D., Lynda Lastowka, M.S., and Otina Fox, M.S. Hersh has remained at CU as a postdoctoral research associate, and Lynda is now working as a seismologist for the USGS in Golden, Colorado.

Graduate student Brian Zurek, Nepali seismologist Prithvi Shrestha, and Pemba Sherpa at CU Namche seismograph station, near Mt. Everest, October 2001. Mt. Everest is on the left and Lhotse on the right. The CU Nepal seismic experiment is led by Prof. Anne Sheehan and Prof. Roger Bilham.

Hartmut Spetzler

Hartmut is on sabbatical this year (2001/2002) and is doing research and some traveling. Ria accompanied him to various meetings including to one in Hanoi, Vietnam. They were caught in Australia during the terrorist attacks at home. The Australian people were very supportive and understanding.

During the spring semester 2001 he taught an introductory course (Geol 1010, ~ 170 students) and used a combination of traditional lecturing, essay home-works and tests, electronic media (web-sites, e-mail correspondence) and hands-on physical demonstrations in the classroom. Joya Tetreault, a graduate student with a knack for and real dedication to teaching; and Joe Eichenauer, a clever undergraduate, were absolutely outstanding as they helped by grading almost insurmountable piles of home-works and tests. Joe, Paul Boni, who has been helping us almost forever, and Hartmut had loads of fun putting together the demonstrations. (http://www.colorado.edu/geolsci/courses/DEMOS/). One of them in particular was of interest to the students. It illustrates how it is possible for Earth to have a magnetic field without having a permanent magnet. The professor, or a student who is in good physical shape, peddles a stationary bicycle that is connected to an automobile alternator. – Safety is a concern here since the whole apparatus is placed atop the table at the front of the lecture room. – Initially the peddling is easy and no field is generated. Then a momentary contact with a battery provides a started field and the peddling becomes hard. Now the peddler generates a current that in turn generates a magnetic field and lights a bulb. This current also provides the all-important secondary field that is necessary for a self-sustaining dynamo. All in all, the course was lots of fun and satisfying, at least for the professor, and challenging for the students. Thanks to Dan, Joya, Joe and Paul.

As Associate Chair for undergraduate affairs Hartmut enjoyed his interactions with the students and especially with Alan Lester, who in his role as undergraduate advisor, has a positive impact on all of our undergraduates.

Hartmut is involved in two major research areas. In the one case, purely fundamental research, he and collaborators Joe Smyth, and Steve Jacobsen (a former graduate student) in the department and others in Europe, are studying material properties as they apply to Earth's deep interior. They do this in a diamond anvil cell where they measure seismic velocities at GHz frequencies; wavelengths are in the micron range. Steve finished his PhD in the summer of 2001, produced an excellent brew (see picture) for the occasion and moved on to the Bavarian (famous for good brew) Geoinstitute in Bayreuth, Germany. Steve received a very coveted award for young scientists from the Alexander von Humboldt Foundation. Hartmut who has been involved with the Geoinstitut from its inception will work there during part of his sabbatical with Steve and other colleagues.

In the second area of research, in collaboration with Shemin Ge, his group, consisting of Will Brunner, Rachel Shannon, one of our outstanding undergraduates and Wendy Wempe, a new post-doc, is attempting to remotely detect certain contaminants as they invade ground water. This research is maturing from early lab experiments into a field project. Laboratory results suggest that at low frequencies (mHz with wavelength on the order of the size of Earth) they should be able to detect the effects of surface contamination on the attenuation of strain waves. At this early stage in the field project, optimism is high and they will initially see if they can use natural strain sources, such as tides and microseisms to observe changes in flow due to contamination. Will Brunner has just successfully defended his PhD thesis in this area, having provided the all-important link of going from flow measurements in single cracks to measurements in sedimentary rock. It is this link that gives us the confidence to proceed to the field. Will graduates in May of 2002.

Rumor has it that Hartmut is considering retiring in the summer of 2003 after nearly 30 years at CU. He is looking forward to spending more time with family and friends, continuing in research and rekindling his K-12 outreach activities. He also expects to continue his bicycle trip across the US to the East coast. He is more than halfway now, having no gaps between the Pacific and Iowa.

Paul Weimer

Last June, Paul was the convenor of SEPM's 75th Diamond Anniversary Symposium, which was 1.5 day in length. Seventeen speakers addressed the future directions of sedimentary geology. He also chaired a one-day session on the petroleum potential of the global deep water.

In early July, Paul floated the Colorado River through the Grand Canyon - seven glorious days of geology and peace.

In late July to August, he was the Esso Australia Distinguished Lecturer. He gave 1.5 day short courses in six major cities (Brisbane, Canberra, Sydney, Adelaide, Melbourne, Perth), and twelve talks at geologic societies and Universities. The topic was Petroleum Geology of Turbidite Systems. The highlight of the trip was helping lead a 2 day workshop in the press room at the WACA Cricket Stadium in Perth. They also took a trip to the barrier reef for five days prior to the lecture tour.

Paul continues to serve as the Chair for the AAPG Distinguished Lecture committee. Fourteen speakers are selected by the committee each year (8 for domestic tours, 6 for international tours). In 2001-2002, he is candidate for AAPG Treasurer, and attended several AAPG related meetings in this capacity. Election results are announced in mid May.

In October, Paul received the GCSSEPM Distinguished Service Award in Shreveport. In December, he served as co-convenor of the 2001 GCSSEPM Research Conference on the petroleum systems of deep water, designed to be complementary to the 2000 GCSSEPM Research Conference of which he was the convenor. He is serving on the Technical Program committees for the 2002 and 2003 GCSSEPM Research Conferences.

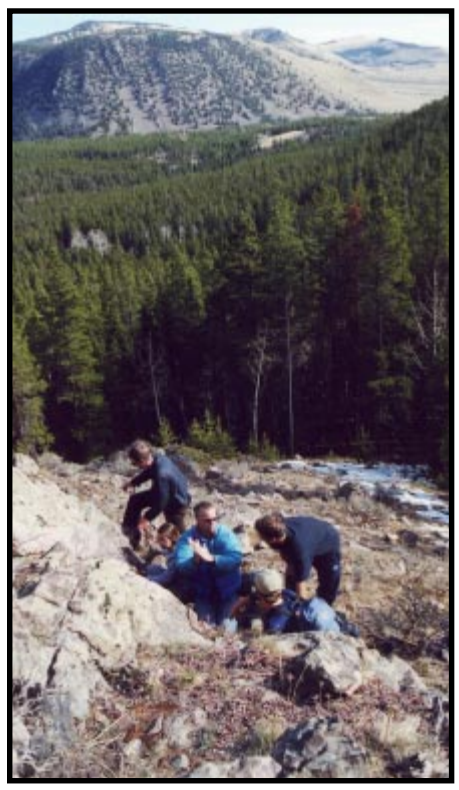
In the fall semester, he taught sequence stratigraphy to 14 graduate students. In spring, he taught petroleum geology of turbidite systems and the Honors Historical Geology class.

In March, he gave a keynote address at the Peter Vail retirement festival at Rice University: "Sequence stratigraphy and the petroleum potential of the global ultradeep water play."

At the AAPG Convention in March, he helped organize a one-day core workshop on deepwater reservoirs of the Gulf of Mexico, and is the co-convenor (with David Pyles) of the SEPM Research Conference. After the AAPG Meeting, the entire graduate class attended a field trip to examine the spectacular exposures of the deep-water Brushy Canyon Formation in the Delaware Mountains.

Paul continues to serve as the EMARC director, and associate chair for graduate studies.

Six of his graduate students graduated in AY 2001, and he chairs an additional 12 students.



Students and faculty examine mylonites along the Nash Fork shear zone in the Medicine Bow Mountains, Wyoming during a fall 2001 structure field trip.

Steven Jacobsen produced an excellent brew to celebrate the completion of his Ph.D.

Advisory Board Activies

New Advisory Board Members

Fred Barnard attended C.U. as a graduate student from 1963 to 1968. A Southern California native and a 1963 Berkeley graduate in Geology, he "came East" to see what the rest of the world was like. C.U. provided copious opportunities, especially under the influences of Ted Walker, Larry Warner, Bill Braddock, and the late Russ Honea. Fred undertook his doctoral thesis on the structural and tectonic setting of an area at the northwest margin of the Gulf of California rift, in Baja California, Mexico, under the aegis of Larry Warner.

The mystique of mineral exploration had always attracted Fred, and his research assistantship on tropical soils for Ted Walker led to an opportunity to join International Nickel Co. (INCO) on a lateritic nickel project in Guatemala. Later work for INCO in Toronto and for Anaconda Minerals in Denver gradually led from the grass-roots laterite environment to deeper, usually magmatic, levels within the Earth, including a foray into mantle-derived kimberlites.

Since 1985, Fred has been a Golden-based consultant in mineral exploration and related areas. To date his minerals career has involved work in over 35 countries, including 40 visits to South America. Solving – or attempting to solve - geological equations involving magmatic, sedimentary, meteoric, and other variables continues to be a fascinating field of inquiry.

His wife Nancy has an M.A. (1975) and Ph.D. (1989) in English Literature from Boulder. Children Adam (24) and Alexandra (22) are both recent college grads, from Purdue and CSU, respectively.

New advisory board member, Fred Barnard

Dave Peterson attended the University of Colorado from January 1979 until May 1981. He graduated with his M.S. Degree in Geological Sciences. His thesis, entitled "The Petroleum Potential of The Lyons Sandstone in Northeastern Colorado," was completed under the direction of Bruce Curtis with assistance from Ted Walker and Don Eicher.

During his time at CU Dave worked part time and in the summers for Texaco, Inc. After graduating from CU, Dave joined Dow Chemical's Oil and Gas Division in Denver as an exploration geologist. At Dow Chemical he worked the Montana side of the Williston Basin and the Utah portion of the Paradox Basin.

In 1983 Dave joined Transcontinent Oil Company, a small, Denver-based, independent oil and gas producer. During his five years with Transcontinent, he oversaw the company's exploration and production activities in the Rocky Mountain region. In 1987 he formed Heartland Oil and Gas Company. From inception until the middle 1990's, Heartland's primary focus was on the acquisition of producing oil and gas properties. Since that time, Heartland has refocused its efforts back towards exploration and is currently involved in a number of active exploration projects in the Rockies. Heartland has offices in Boulder and Parker, Colorado.

Dave serves on the Board of Directors of the Colorado Oil and Gas Association. He is an AAPG Certified Petroleum Geologist and is a licensed professional geologist in Wyoming.

Dave and his wife, Mary, and their two children, Andy (16) and Maggie (12), live in Boulder County.

LUNCHEON HELD TO HONOR BRUCE CURTIS

By Matthew R. Silverman

Professor Emeritus Bruce Curtis was honored April 19, 2001, at a department-hosted luncheon at the Denver Petroleum Club. Fifty of his friends and former students gathered to enjoy a couple of hours with Bruce and to kick off a campaign to endow the Bruce Curtis Graduate Student Fellowship in Geological Sciences at CU.

Among the alums present were: **Doug Callier**, who was one of Bruce's college roommates; **Tommy Thompson**, who told the crowd how his father, **Prof. Warren O. Thompson**, had hired Bruce over 40 years ago; **Bruce Benson**, who spoke warmly of the impact Curtis made on his career; **Bill Hiss**, who guessed that he held the record for most years as a graduate student, and thanked Bruce for his patience.

Curtis profoundly affected the careers and lives of two generations of geologists. Through decades of service at CU and in the petroleum industry, he educated, mentored and led hundreds of students and professionals. A Denver native, Bruce completed his graduate studies in Geology at CU and Harvard, following service in the U.S. Navy in World War II. He worked as Rockies Regional Exploration Manager for Conoco until 1957, when he began three decades of teaching and research at CU. During that period he taught subsurface methods, geology of organic fuels, and related subjects to hundreds of undergraduate and graduate students. He authored and edited several important volumes, including the 1958 RMAG Guidebook on the Pennsylvanian and AAPG's 1968 Natural Gases of North America. Bruce directed scores of graduate theses, many focused on E & P topics that are still vital today. He retired in 1983 and lives in Boulder.

The CU program in petroleum geology is one of the very best in the country and needs the generous financial assistance of its alums to continue to attract the best graduate students to CU. Prof. Paul Weimer, one of Curtis's former students, now directs CU's program in petroleum geology. Its graduates and professional scientists are being placed in positions of responsibility throughout the industry. They have received best paper awards from AAPG and Paul has been named Distinguished Lecturer by that organization. The departmental petroleum program is expanding, with a new permanent position in reservoir geosciences having been filled in 2001 by Prof. Matt Pranter, who worked previously at ExxonMobil in reservoir modeling. BP recently gave CU a $10 million 3-D visualization center, the finest facility of its kind in a university petroleum geology group.

The outstanding program in petroleum geology at CU has distinguished itself in the past decade in ways that few other programs have. Support for graduate studies is the key to maintaining and expanding this center of excellence within the department.

The Curtis Fellowship Committee has set a goal of raising $250,000 to endow the Bruce Curtis Graduate Student Fellowship in Geological Sciences at CU. The support of CU Geology alumni is crucial to achieve this goal. Approximately $50,000 has been raised to date for the Fellowship. This fund raising effort is continuing.

Contributions may be sent to:
The Bruce Curtis Graduate Fellowship
Department of Geological Sciences
University of Colorado
UCB399, Boulder, CO 80309-0399

Bruce Curtis, with John Harms and Bruce Benson in the photo on the left, and with Bill Hiss and Dave Rhoade in the photo on the right, at the luncheon held to honor Bruce in the Denver Petroleum Club - April 2001.

EMARC

Many positive developments have occurred this year for strengthening the applied program of the department.

Colleen Velie (administrative assistant) and John Roesink (systems adminstrator) continue to provide the daily support so necessary for the lab to function. Renaud Bouroullec, Olivier Serrano, and Veit Matt work as research scientists in our Gulf of Mexico research consortium. Ten students work on projects associated with this research consortium. We held our Gulf of Mexico industrial sponsors meeting on January 9 and 10, 2002. We had 55 attendees from our 29 sponsoring companies. The company response was most positive. This consortium focus is on petroleum systems of the Mississippi Canyon/Atwater valley area in the northern deep Gulf of Mexico. This consortium will be in May 2003.

During the summer of 2001, Matt Pranter, our new reservoir geosciences professor, arrived at CU-Boulder. Matt will be teaching courses in Reservoir Modeling (Spring 2002: 14 students enrolled), and in Reservoir Characterization (Spring 2003). He is developing a research program in reservoir characterization. His background is in both carbonate and siliciclastic reservoirs.

This past fall, 8 companies recruited at CU: Amerada Hess, bp , Chevron, Conoco, Enterprise, ExxonMobil, Marathon, and Shell. We are most grateful to these companies, and we invite more companies to recruit here.

In June 2001, we dedicated the Wayne T. (Dusty) and LaFawn Biddle Core Facility in the basement of Benson Earth Sciences Building. This is a 1200 square foot facility that houses cores from many reservoirs, ore deposits, and a cool storage area for unconsolidated reservoirs (e.g. northern Gulf of Mexico). We are actively building our collection of cores from different kinds of sedimentary environments. The core facility will be used in several graduate classes: Reservoir Modeling, Reservoir Characterization, Sequence Stratigraphy, Petroleum Geology of Turbidite Systems, and Sedimentology.

A new graduate teaching lab has been established that has several PC workstations with the most recent PC based software in Applied Geosciences. This laboratory will be used for instruction of many graduate classes. Those EMARC classes related to the lab include: Reservoir modeling, 3-D seismic interpretation, and Reservoir Characterization. The ability to describe cores from a reservoir, and then walk across the hall into this lab and build reservoir models is unique in academia and industry.

The bp Center for Visualization (bp COV) was established in October 2000 as the result of the $10.5 million donation by bp. This state-of-the-art visualization center was originally established at the Arco Research Lab in Plano, TX by Geoff Dorn and colleagues. As a result of the purchase of Arco by bp, the research facility and much of its staff came to CU, and is now working on East Campus. EMARC is working towards integrating our research and teaching program with the bp COV. Geoff Dorn will be teaching a new graduate course in fall 2002 on 3-D seismic interpretation and visualization. Students will be taught how to interpret using the immersive visualization system. Our Gulf of Mexico industrial sponsors took a two hour tour of the site in January.

For additional information on EMARC, see our website at:
http://emarc.colorado.edu

The Geology Club

The Geology Club provides students at CU with a fun, exciting, socially educationally enriching experience. It is entirely student run and open to both undergraduate and graduate geology majors. All students are welcome to attend! Highlight events for the club this year have included adventures in caving with research associate Dr. Fred Luiszer, frequent trips to Imax, and the Denver Museum of Nature and Science. Future trips will include a one day trips to Rocky Mountain National Park, weekend trips to Thermopolis, Wyoming, and extended spring break trips to Moab, Bryce, and Zion. These trips are supported by the department through the "Geology In the Field" endowment raised by our Alumni Advisory board through contributions from former students.

In conjunction with the Alumni Advisory Board, the club sponsors an annual career night that brings in professional geologists to speak to interested club members and students about their experience as professionals in the real world.

The club meets bi-weekly in the basement of the Benson Earth Sciences building in the student lounge(1B57). The club government includes President Krystyna Kowalska, Vice President Tiffany Yesavage, and Secretary Ben Lowry. If you have any questions, feel free to contact these students or call our departmental office at (303) 492-8141.

Vanessa Graves, Patrick, and Danielle Mason exploring K-T boundary in Trinidad, Colorado during volcanology field trip - Fall 2001

Geology club field trip to Cave of the Winds - Spring 2001

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http://www.colorado.edu/geolsci

The Library of the Future is here Now!

by Suzanne T. Larsen

Close your eyes. Think of a library. What do you see? A wooden card catalog with little drawers full of 3x5 cards? Rows of shelves with an aisle between each? Volumes of indexes where you need a magic knowledge of peculiar vocabulary to find what you are looking for?

Now walk into the Jerry Crail Johnson Earth Sciences and Map Library and what do you see? Computers, computers, computers. Shelves that move on tracks and save space by having only one aisle that opens when a button is pushed. Indexes that search by any word anywhere in an article and then connect you to full text - online. And now, disappearing bound journals. Does it make your head swim? Join the club. When I began as a librarian in the dark ages (yes, they had migrated from cuneiform tablets to print by that time), there was not a computer in sight or even on the horizon. Now my life is full of them.

The University Libraries subscribes to over 5000 individual electronic journals. In many cases we continue to subscribe to print while also subscribing to online versions journals. In general, the electronic access costs from 10-30% more than print and will cost that much whether the print is dropped or not. This all changed drastically at the end of 2001. The University of Colorado system, comprised of CU-Boulder, CU-Denver, CU-Colorado Springs and the CU-Health Sciences Center, entered into an agreement with one of the largest publishers in the world, Elsevier, to receive the journals they publish that we subscribe to full text online back to 1997. Part of the agreement is to cancel all paper copies of those journals. Since a number of titles were duplicated between campuses, a savings was realized by canceling multiple subscriptions. This savings will allow us to purchase titles that none of us held previously or re-subscribe to some of the journals we had to cut because of cost last year.

The economics of the move is clear. While Elsevier journals are quite expensive, we were given an agreement that was basically cost neutral. In addition, we no longer have to bind and shelve journals, which saves money, and an even scarcer commodity, space. This huge step was not taken without much trepidation; it is a new concept to the library and the library user. The most obvious concern is the continuous availability of back files, which we feel, has been adequately addressed.

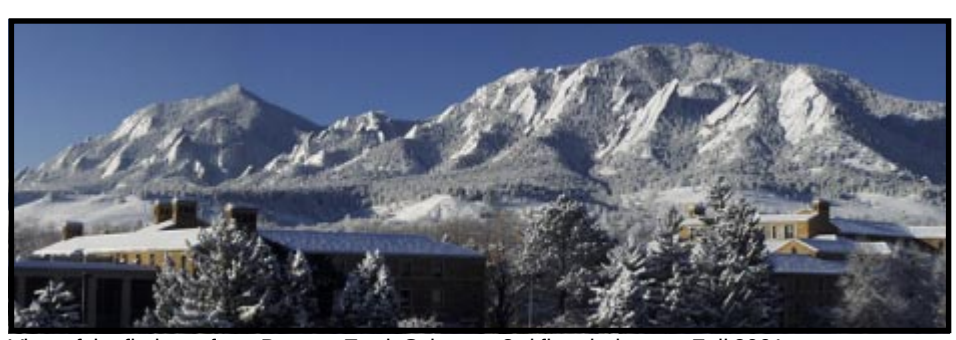
Our electronic journals are not available remotely but please drop by to view them when you are in the area. And yes, we still have books!!

If you have any questions concerning the Library, please contact:
Suzanne T. Larsen, Head, Jerry Crail Johnson Earth Sciences and Map Library Suzanne.Larsen@colorado.edu

The University Museum

During the fall, the growing group of the paleontologists (Karen Chin, Peter Robinson, and Dena Smith) moved into the now renovated old Geology building. This building will be named the Bruce Curtis Museums Collection Building after long-time CU Geological Sciences Professor Bruce Curtis. The geological collections are housed in the renovated basement and the offices, labs and student space for the paleontologists are on the second, third and fourth floors. The Hunter Building, where the collections were housed before, was demolished during the winter break.

Peter Robinson will retire next September and the search for his replacement is going on at the moment.



View of the flatirons from Benson Earth Sciences 3rd floor balcony. - Fall 2001

Degrees awarded

B.A. Geology Majors

Spring 2001

Brian Bachmann
Stephanie Campbell
Breann DeBlieck
Jason DenOtter
Joseph Eichenauer
Joseph Flaherty
Erica Manteuffel
Maxwell Thompson

Summer 2001

Olivier Hippert
Douglass McDaniel
Hans Rasmussen
Charles Richardson
Beth VanVurst

Fall 2001

Russel Bak
Jennifer Bredt
Michael Carnelli
Roy George
Daniel Goldstein
Vanessa Graves
Danielle Mason
Matthew Thomas
Luke Paulson

Isla Castaneda, Sarah Principato and Krystyna Kowalska at the AWG awards ceremony in Golden, CO - Spring 2001.

M.S. Candidates Graduating with Degrees

Spring 2001

Gretchen Bolchert	Weimer	Structural and Stratigraphic Controls on Petroleum Seeps, Northern Green Canyon, Northern Gulf of Mexico: Implications for Petroleum Migration
David Daitch	Robinson	Evolutionary patterns in Didymictis protenus (Mammalia: Carnivora) from the Willwood Formation, Bighorn Basin, Wyoming
Noah Daniels	Miller	Diatom-inferred salinity changes and drought history of the last 3000 years from Round Lake, Nebraska
Peter Morris	Weimer	Structural Geology and Evolution of the Mississippi Fan Foldbelt, Northern Deep Gulf of Mexico
Bradley Wakoff	Nagy	Rhenium uptake by iron and aluminum oxy(hydr)oxide precipitates: An analog for the fate of technetium-99 in high level nuclear waste

Summer 2001

Isla Castaneda	Andrews	Holocene, oceanographic and climatic variations of the inner N. Iceland continental shelf
Tim Farnham	Kraus	Paleocene/Eocene alluvial paleosols in the Denver Basin, CO; their lateral variability, hydromorphic features, and significance
Chris Morton	Weimer	2-D and 3-D Seismic Interpretation of Pliocene - Pleistocene Submarine Fans, Alaminos and Mississippi Fans, Northern Gulf of Mexico
Sean O'Connor	Weimer	Structural Evolution of Northern South March Island, Northern Gulf of Mexico: Analysis of a Hybrid Roho-stepped Counter-Regional Salt Systems and Kinematic Evolution of Fault Growth and Linkage Patterns
Stephanie Tomusiak	Ge	Hydrogeologic Parameterization of a Fractured Crystalline Aquifer Utilizing Field Data and a Discrete Network Modeling Approach
Jacob Waples	Nagy	Cinnabar Dissolution Kinetics in the Presence of Dissolved Organic Matter: Importance of Chemical Characteristics and Sorption
Ann Wold	Kraus	A Study of Thin Sections from the McCullough Peaks Area of the Lower Eocene Willwood Formation, Bighorn Basin, Wyoming

Fall 2001

Jon Bennett	Robinson	The Ankle Joint of the First Artiodactyls
Sarah Earley	Jakosky	Phosphorus on Earth and Mars
Otina Fox	Sheehan	Seismic Anisotropy across Precambrian Province Boundaries: Southern Rocky Mountain Region
Hector Gonzalez	Weimer	Sequence Stratigraphy of upper Miocene to Pleistocene sediments of the central Mississippi Canyon and northern Atwater Valley areas, northern Gulf of Mexico
Linda Lastowka	Sheehan	The uppermost mantle of the southwestern United States
Steve Schultz	Ge	Groundwater flow in the French Creek Basin, Southwest Colorado
Alex Tate	Mueller	Geometry and kinematics of wrinkle ridges on Lunae and Solis Plana, Mars: implications for fault/fold growth history

Ph.D. Candidates Graduating with Degrees

Spring 2001

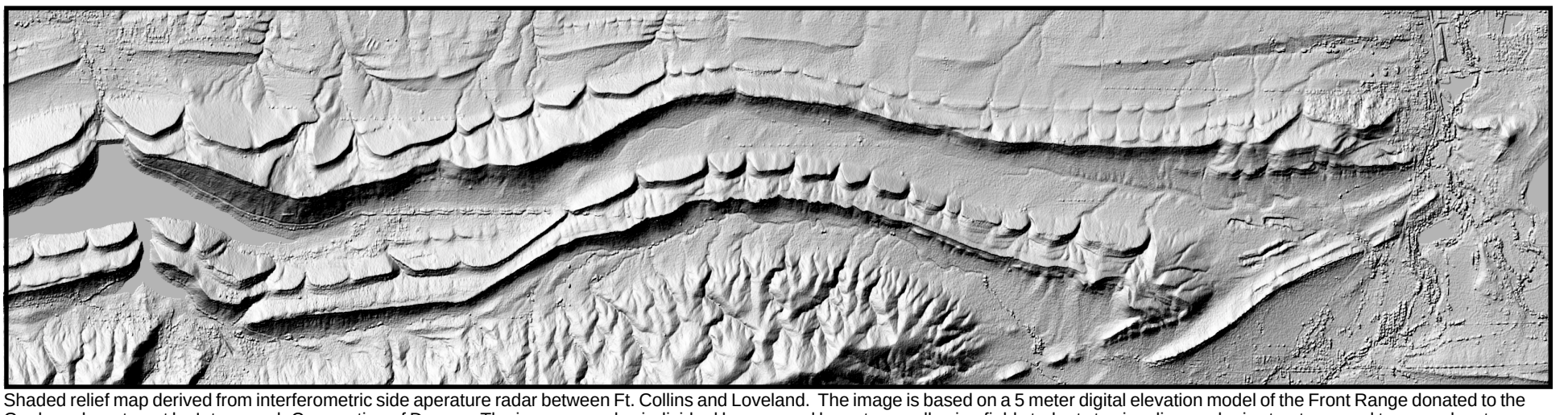
David Bowen	Weimer	Regional Sequence Stratigraphic Setting and Reservoir Geology of Morrow Incised Valley Sandstones (Lower Pennsylvanian) Eastern Colorado and Western Kansas
Lisa Doner	Andrews	Late Holocene Paleoclimnology and Paleoclimatology from Sub-Arctic Lakes in Nunavut, Canada and Iceland
Peter Furey	Gupta	Towards a Space-Time Theory for Estimating Base Flow in River Networks
Alex Iriondo	Atkinson	Proterozoic Basements and Their Laramide Juxtaposition in NW Sonora, Mexico: Tectonic constraints on the SW Margin of Laurentia
Paul Murphy	Robinson	Stratigraphy, Fossil distribution, and Depositional environments of the Upper Bridger Formation (middle Eocene) of southwestern Wyoming, and the Taphonomy of an Unusual Bridger Microfossil Assemblage
Damian O'Grady	Syvitski	Sedimentary Geomorphology of Siliciclastic Continental Slopes
Mikie Smith	Andrews	Holocene paleoenvironmental reconstruction of the continental shelves adjacent to the Denmark Strait, North Atlantic
Shannon Cheree Stover	Ge	Fluid Flow and Sediment Deformation in the Evolution of Sedimentary Basins: One-Dimensional Application to Woodlark Basin, Papua New Guinea and Two-Dimensional Application to the Northern Gulf of Mexico Basin

Summer 2001

Don Barber	Andrews	Laurentide Ice Sheet Dynamics from 35 to 7 ka: Sr-Nd-Pb Isotoic Provenance of NW North Atlantic Margin Sediments
Hersh Gilbert	Sheehan	Thermal and compositional structure of the upper mantle
Steve Jacobsen	Robinson	Structure and elasticity of a lower mantle oxide (MgFe)O and a new method of generation shear waves for GHz-ultrasonic
Karen Lewis	Pfeffer	Solar-forced roughening of Antarctic glaciers & the Martian icecaps: How surficial debris & roughness affects glacial melting in Taylor Valley, Antarctica & how this can be applied to the Martian icecaps
Seth McGinnis	Rundle	On the Effects of Geometry in Discrete Element Numverical Earthquake Simulations

Fall 2001

Ulli Huber	Markgraf	Linkages Between Climate, Vegetation and Fire Fuego-Patagonia during the Late Glacial and Holocene



Shaded relief map derived from interferometric side aperature radar between Ft. Collins and Loveland. The image is based on a 5 meter digital elevation model of the Front Range donated to the Geology department by Intrasearch Corporation of Denver. The images resolve individual houses and large trees, allowing field students to visualize geologic structures and topography at very fine scales. Additional images from Ft Collins to Castle Rock are archived in the Jerry Crail Johnson map library. Images created by Sean Sundermann, Alex Tate and Ryan Tolene.

William L. Hiss Creativity Awards for 2001

Peter Birkeland
Oliver Boyd
Jason Briner
Will Brunner
Eric Cannon
Amanda Cook
Paula Cutillo
Otina Fox
Hersh Gilbert
Erich Heydweiller
Stephen Jacobsen
Grant Kier
April Kinchloe
Greta Kristjansdottir
David Lobell
Dan Miggins
Valerie Morris
Damian O'Grady
Sarah Principato
David Pyles
Sean Sundermann
Alex Tate
Joya Tetreault
Charlie Wilson

Graduate Awards for Spring 2001

AWARD	RECIPIENTS
Association of Women Geoscientists (AWG)	Isla Castanada Sarah Principato
Bruce Curtis Fund	John Martin David Pyles Susan Riggins
Jefrey Deen award	Eric Anderson
Longley, Wahlstrom, Warner	Eric Anderson Seth Mueller
RMAG Graduate Award	Oliver Boyd
W. O. Thompson Award	Paula Cutillo David Mixon
Waldrop Memorial Scholarship	Eric Cannon Otina Fox Joya Tetrault

Undergraduate Awards for Spring 2001

AWARD	RECIPIENTS
AWG	Krystyna Kowalska
Estwing	Matt Jason Reynolds
Johnston Memorial Scholarship	Rachel Shannon
RMAG pick	Valerie Morris
T. Keith Marks Scholarship	Breana Deblieck Ryan Thomas
RMAG pick	Valerie Morris

DEPARTMENT NEWS

ADMINISTRATIVE OFFICE NEWS

By Beth Hanson

The front office remains the "meeting/greeting" place, and operations center in the department. Our staff of four put in many hours to meet the needs of Geological Sciences faculty and students in an efficient, friendly, and timely manner. We will also gladly assist alumni and friends of Geological Sciences with any questions they have regarding the department, faculty, former faculty, students, and staff.

We are fortunate to have had minimal turnover in our office personnel during the last year. Lisa Massengill continues as front office first contact, answering phones, greeting and assisting students, and visitors to the department, doing the departmental academic scheduling, plus a myriad of other duties necessary for the smooth operation of the department. Lisa carries out her duties efficiently, and enthusiastically with a cheerful willing demeanor. Ya-Wen Zhang moved to Engineering in April 2001 and Joanne Brunetti assumed the responsibilities of departmental accounting, assisting with ordering equipment, teaching and technical supplies, grant account management and many other duties associated with the accounting technician position. Joanne is a great addition to our staff with a contagious sense of humor. Marge Atkinson continues to assist the graduate students with information and paperwork necessary from application to graduation, which she accomplishes with persistence, quiet patience and congeniality. We also welcomed a new student assistant, Christen Palumbo, at the beginning of the Spring 2002 semester. She carries out her assignments with initiative and accuracy, and is an enthusiastic welcome addition to the front office. Beth Hanson continues as lead administrative officer, office supervisor, and assistant to the Chair seeking to manage a smooth and efficient front office operation to facilitate the daily accomplishment of a multitude of large and small tasks.

The departmental office can be contacted at:
Phone: 303-492-8141
FAX: 303-492-2606
EMAIL: geolinfo@Colorado.Edu

Colloquium speakers, 2001

Dr. David M. Anderson, NOAA
The Changing Rhythm of El Nino During the Past 15,000 Years

Suzanne Anderson, University of California - Santa Cruz
Tracking the wily Jökulhlaup: Real time observations of the Hidden Creek Lake Outburst Flood.

Ross Angel, Virginia Tech
Deep Exhumation and the X-discontinuity - An Odyssey with Pyroxenes

Dr. John Bartley, University of Utah
Thin Interpluton Wallrock Screens and Pluton Emplacement Processes, Sierra Nevada, California

Ray Beiersdorfer, University of Colorado
Soils for the Space Age

Dr. Becky Bendick, University of Colorado
The Bhuj (India) Earthquake of 2001: Field Observations and Ongoing Analysis

Dr. Roger Bilham, University of Colorado
Gigantic Earthquakes Beneath the Himalaya: Historical and Future Energy Release Beneath Elastic Mountains

Andy Davis, Geomega
Investigation into the Biodegradation of Chlorinated Solvents and Pesticides at a Site Near Marseilles (France)

Dr. Eric Erslev, Colorado State University
Piecing Together the Laramide Puzzle

Michael Hamburger, Indiana University
What's Moving in Luzon? GPS Measurement of Tectonic and Volcanic Deformation in the Northern Philippine Island Arc

Dr. Mary C. Hill, USGS - Boulder
Guidelines for Effective Model Calibration (Any Model!)

Dr. JoAnn M. Holloway, USGS - WRD
Geologic Nitrogen: Occurrences and Implications for Water and Soil Quality

Dr. John Humphrey, Colorado School of Mines
Application of Oxygen Isotope Fractionation to Studies of Dolomization

Dr. Anne E. Jennings, University of Colorado
Ice-Ocean-Atmosphere Interactions on the East Greenland Margin Over the Last 14 ka

Dr. Craig Jones, University of Colorado
Cryptic Orogen: Seismology and Tectonics of the Sierra Nevada

Mohammad H. Karimpour, Ferdowsi University, Mashhad, Iran
Geology, Geochemistry and Genesis of Qaleh-Zari Cu-Ag-Au Deposits (Iran)

James F. Kasting, Penn State University
Did Earth Look Like Titan During the Late Archean?

Dr. Karl Mueller, University of Colorado
How Folds Grow

Dr. Mike Ritzwoller, University of Colorado
The Crust and Upper Mantle Beneath Antarctica and Surrounding Oceans

Demian Saffer, University of Wyoming Topographically-driven Groundwater Flow, Heat Transport, and The San Andreas 'Heat-Flow Paradox' Revisited.

Dr. Ross Stein, USGS - Menlo Park
Looking Past Izmit's Fate to Istanbul's Future (or, Living with Dread and Doubt)

John Suter, Conoco
Deltas of the World

Department of Geological Sciences Office Staff: (left to right) Christen Palumbo, Beth Hanson, Lisa Massengill, Joanne Brunetti, Marge Atkinson

UNDERGRADUATE STUDENT NEWS

The Department of Geological Sciences is presently home to over 100 undergraduate majors and a partial home to nearly 40 students pursuing minors. As opposed to the 64 credits of combined geology, calculus, chemistry, and physics courses, the minor program requires only 18 hours of geology coursework; it is therefore quite popular with students in allied fields, particularly Geography, Environmental Studies, and Anthropology. Although the major program is challenging, our students have a combined grade point average of 2.9. Last year, over 20 students graduated; most students obtained their degrees via the standard "Geology" track, with approximately 20% using the "Environmental Geosciences" track, and a few via the (math/physics demanding) "Geophysics" track.

With the help of Shemin Ge (Vice-Chair for Undergraduate Affairs), various other faculty, staff, and alumni, our undergraduate advisor, Alan Lester, works with students to examine academic requirements and regulations, academic performance, study abroad, graduate school, and career possibilities. Alan also responds to questions from potential students considering major changes within Arts and Sciences; degree program changes (from other CU colleges); and inquiries from students at other institutions. Both individual and group meeting formats are used, with appointments and announcements generally accomplished by e-mail.

For more information, Alan can be reached at Alan.Lester@Colorado.EDU

Department Elects New Chair

Chair-elect Mary Kraus

On Tuesday, February 19th, the Department of Geological Sciences elected Mary Kraus as the next department chair.

Mary has been with the department since 1983. She has a B.S. in biology from Yale University (1973), M.S. in geology from the University of Wyoming (1979) and her Ph.D. in geology from the University of Colorado (1983).

Mary is a clastic sedimentary geologist interested in reconstructing ancient fluvial systems, particularly alluvial paleosols, and the large-scale processes (e.g., climate, tectonics) that influence them. In addition to graduate courses in clastic sedimentology, she teaches the undergraduate course in sedimentology & stratigraphy and historical geology.

Mary is currently working on a collaborative research project that focuses on the effects of the Paleocene-Eocene thermal maximum, an episode of rapid and intense global warming, on alluvial soils, floras, and mammalian faunas in northern Wyoming. She currently serves as co-editor of the Journal of Sedimentary Research (with David Budd).

Graduate Students Grant Kier and Lauren Powell examining spectacular mega-breccias in Titus Canyon during a field trip to Death Valley, Fish Lake Valley and Owens Valley as part of a week long field trip for a course in active tectonics.

2001-2002 undergraduate mentoring program

MENTOR	MENTOREE	PROPOSAL TITLE
Eric Anderson	Roy George	A petrographic and geochemical study of the mineralogy and alteration within the Mammoth Breccia Pipe, Copper Creek, Arizona
John Andrews	Jess Richter-Foley	Tracing of evolutionary change in a lineage of early Tertiary mammals. (The lineage of Arctodontomys - Microsyops, closedly related to primates).
William Atkinson	Seth Fetters	Copper Creek, AZ and Montezuma, Sonora. Undergrad research will categorize drill core, prepare thin sections, perform x-ray diffraction, and sample preparation. Student will also assist with mineral separation for stable isotope analysis and Fluid Inclusion microthermometry.
Roger Bilham	Brian Clarke	Satellite image study of 1950 Assam earthquake
Greta Bjork-Kristjansdottir	Charles Richardson	Paleoclimatic and environmental changes. Student worked in the INSTAAR sedimentology, micropaleo and core processing labs to provide important information on the last major deglaciation of Iceland.
Jason Briner	Daniel Goldstein	The late Quaternary history of the Laurentide ice sheet, northeastern Baffin Island, Nunavut, Canada. Student does sample processing for cosmogenic exposure dating in the Benson Earth Sciences Cosmogenic Isotope Laboratory.
David Budd	Andy Pruett	Outcrop mapping of Dinosaur Ridge outside of Morrison, CO for the Friends of Dinosaur Ridge. Information will be delivered in digital format and possibly a CD report.
Worth Cotton	Erik Oerter	Objective of this project is to fully describe the mineral zonation in the Cerro Colorado porphyry copper deposit in Northern Chile, and to publish the results in a scientific journal. The undergraduate research will also be trained in vital analytical and interpretive skills that will benefit his professional development.
John Drexler	Tiffany Yesavage	Column leaching study designed to determine the mobility of lead and arsenic in Colorado soils and a sorption study to look at competitive stubstitution of As, Pb, Cd, Cu, and Zn onto amorphous iron oxide surfaces.
Gita Dunhill	Michael Lanahan	Surface deformation in the 181 1/12 new Madrid earthquake sequence as inferred by folded sediments and past water levels across Reelfoot Lake, Tennessee.
Henrietta Laustsen	Sarah Jackel	Undergrad will assist in devleoping, teaching and grading the labs for Geol 3050 -- "computer assisted geological techniques. Undergrad assistant will further develop GIS skills, gain teaching experience in the lab setting.
Steve Mojzsis	Nick Strohecker	Organization and curation of all Australia and Greenland samples which represents the Astrobiology Materials Research Laboratory collection to be sued for research in Astrobiology.
Paul Murphey	Ali Jaffri	Petrographic study of 50 rocks collected during the 2001 field season combined with x-ray diffraction and chemical analysis to characterize sedimentary rocks, optical petrography, and whole rock chemistry.
Sarah Principato	Matt Thomas	Late Quaternary History of the Hunafloi Region, NW Iceland.Student will conduct sedimentology and foraminifera analyses. Student may also have opportunity to run samples for magnetic anistropy at the USGS in Denver on their Kappabridge AMS device.
John Roesink	Byron Boyle	A compilation of Colorado Geology for Geology 1020 and a Museum project.
Anne Sheehan	Matthew Reynolds	GPS project to accurately remeasure positions of 20-30 existing GPS control points throughout Colorado and to compare those measurements combined with measurements made in 1991 to determine the horizontal motions within Colorado over the past 10 years to assist in assessing the active tectonics and earthquake hazard of Colorado.
Alex Skewes	Krystyna Kowalska	Understanding the genesis of Central Andes breccias using petrological and thermometric techniques. Student prepares and analyzes rock samples using transmitted and reflectedlight microscope and fluid inclusion in minerals of the matrix of the breccias using heating and freezing stage.
Alexander Tate	Joseph Flaherty	Creation of a geographical information system(GIS) that can be used by geology students in various courses as a visualization and analysis tool.
Paul Weimer	Jay Austin	Student will be assisting in the development of digital interactive teaching modules.

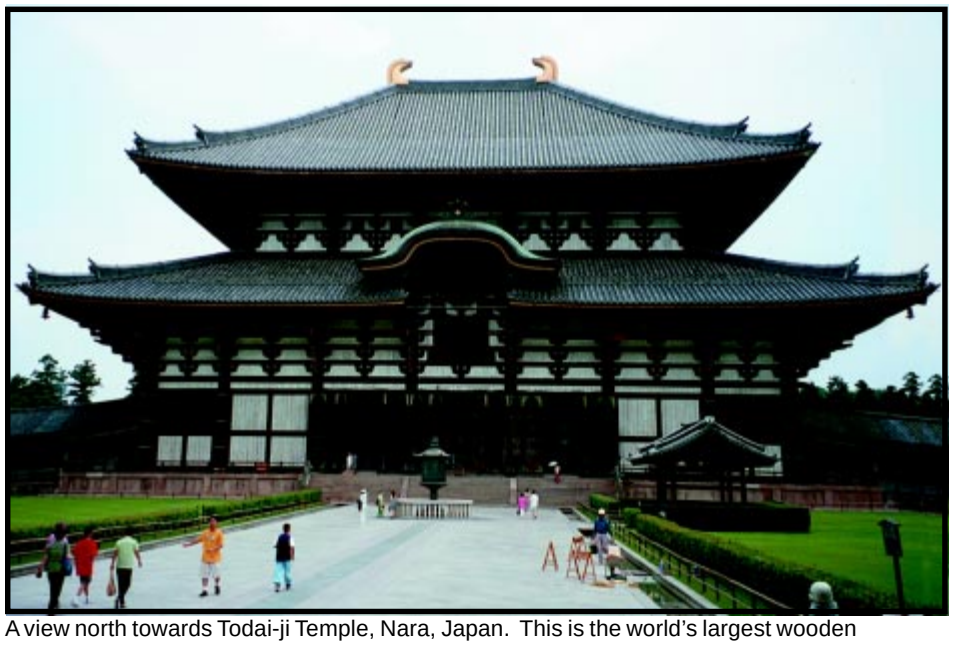
GRADUATE STUDENT NEWS

The most common question folks asked **Eric Cannon** when he returned from completing research this past summer in Japan was “so did you like the food?” His reply “Well, of course I liked the food!!” - there seemed to be an infinitely amazing variety of all sorts of seafood, vegetables, and treats. But besides eating, Eric did need to get some work done! His dissertation research focuses on the growth of earthquake faults hidden within sedimentary basins, faults termed blind thrust faults. Eric spent about eight weeks with colleagues of Dr. Karl Mueller in Osaka and a city near Tokyo called Tsukuba. After the disastrous 1995 Kobe, Japan earthquake, the Japanese government has put a major effort into locating active earthquake faults. With newly acquired data from Japanese agencies, the researchers are working on improving our understanding how these blind thrust faults grow with each earthquake event. Their efforts should be applicable to hazard assessment of blind thrust faults in other regions, for example, Los Angeles. Eric feels very fortunate to have this opportunity to work with his Japanese colleagues. From an earth science view, he was intrigued by how the Japanese culture has incorporated natural hazards; for example, volcanic eruptions, earthquakes, and tsunamis, into daily life. It seems here in the United States that people are more caught off guard when a natural disaster occurs. Here’s another commonly asked question for Eric, what was his favorite food? His response is takoyaki, sort of a fried dumpling containing octopus, six of them packed into an egg container-like box. Takoyaki is commonly served at venues such as festivals and baseball games. If you get a chance, try some takoyaki.

Worth Cotton spent the month of January in Region I and II of northern Chile working at the Cerro Colorado and Spence porphyry copper deposits. Worth is conducting a project studying the clay and sulfate mineralogy of porphyry copper deposits as part of his Ph.D. research. In addition to delineating interesting compositional zoning patterns of illite/muscovite, chlorite, and alunite using a portable near-infrared spectrometer, Worth had the pleasure of being invited to a dinner by Cerro Colorado geologists and engineers where he ate Cuy Asado (Roast Guinea-Pig, “Cavia porcellus”). Cuy is the region’s most symbolic and important main dish, eaten during the most important feasts and celebrations, such as when University of Colorado graduate students come to town. Guinea pigs may have been one of the most important food sources in ancient South America since well before Inca times. Worth says he enjoyed his meal, although he admits that the several glasses of Chilean wine and Pisco Sour cloud his memory of the event.

Steve & Vickie Jacobsen hiked a long section of the Great Wall, about 100 kilometers north of Beijing, China, in July 2001

In July 2001, **Steven Jacobsen** (graduate student of Hartmut Spetzler and Joe Smyth) traveled to Beijing, China, where he gave a three-part seminar at Peking University on the composition and mineralogy of Earth’s interior. While in China, Steve also attended the Eighteenth International Conference on High Pressure Science and Technology and traveled with his wife, Vickie, to the city of Xi’an to see the famous Terracotta Warriors. Steve graduated in August 2001 from the Geophysics Program, and has accepted a postdoctoral fellowship from the Alexander von Humboldt Foundation. He will be moving to the Bavarian Geoinstitute at the University of Bayreuth, Germany, in October 2001.



A view north towards Todai-ji Temple, Nara, Japan. This is the world’s largest wooden structure containing a 16-meter tall bronze Buddha. The “lotus-matrix world-system” suddenly becomes clear as you stand in silence before the Great Buddha. (Photo by Eric Cannon)

Worth Cotton’s dinner of Cuy Asado (Roast Guinea-Pig, “Cavia porcellus”)

NEWS OF ALUMNI

Bill Siapno
(MS ‘53)

Bill is registered as a professional engineer and is consulting when he can find something interesting to do. He occasionally visits with Linus Litsey, PhD Geology CU who lives in Taos, NM. Bill also visits Leo J. Wanek, MS Geology CU 1953 in Littleton and Ross Kinnaman, MS Geology CU 1954 in Cedaredge. Bill says it is nice to visit Boulder and remember his long youth, professors and fellow students.

Herbert Black
(MS ‘75)

Herbert currently works for the United States Department of the Interior.

P. Thompson Davis
(PhD ‘80)

Promoted to a full professor of geology at Bentley College in Waltham, Massachusetts in 2001. He is working with Giff Miller on a project near Clyde River on northern Baffin Island. He also keeps busy renovating the house in Thornton, NH with 600 square feet of Siluvian metavolcanics from Vermont under the supervision of Chad Anderson, who oversaw placement of the two granite spheres outside Benson Earth Sciences building.

Steve Ludington
(PhD ‘74)

Steve retired from USGS in 1997 and became a “re-employed annuitant” the next day. He is still trying to figure out the mineral deposits of the U.S. Cordillera.

Leo C. Wilson
(MS ‘74)

Leo is a property manager at Snowmass Village, CO. Leo also teaches geology classes at Colorado Mountain College.

S. Dave Hixon
(BA ‘52)

Dave is “semi-retired.” We are sorry to hear his wife Helen died on 12-27-99. He most recently has worked on two consulting jobs with the USGS in Houston and at Guadalupe Mountain National Park

Warren E. Yeend
(MS ‘61)

Warren retired in 1995 after 30 + years with the USGS. He currently likes hiking, gardening and buying things off ebay. Warren climbed Mount Whitney in Sept. 2000. His daughter who graduated from CU with a BA in Business is now making more money after 5 years with United Airlines than he did with 3 degrees in Geology and working for the US Government for 3 years!

Ralph L. Langenheim Jr.

Ralph is a professor emeritus at University of Illinois. Currently Chairman of Environment and Land use committee, Champaign Illinois county board.

OBITUARIES

James Abercrombie Pendleton
MS ‘73, PhD ‘78)

James Abercromie Pendleton of Boulder died of cancer Thursday, Dec. 13, 2001, at Boulder Community Hospital. He was 55. He was born Nov. 6, 1946, in Reading, PA., to Joseph Saxton Pendleton II and Mary Vernon Pendleton. He married Nancy H. Haffey on Aug. 2, 1969, at Princeton University Chapel, Princeton, NJ.

For 27 years Mr. Pendleton was the scientific and technical coordinator for the Division of Minerals and Geology in the Colorado Department of Natural Resources. He also served as automated data processing coordinator and supervising geologist for the Coal Program Conference Office.

He graduated cum laude from the Choate School, Wallingford, Conn., and magna cum laude from Princeton University in 1969, where he specialized in geomorphology, ground water hydrology and engineering geology. He earned a master’s degree in 1973 and a doctorate in 1978, both from the University of Colorado. His areas of specialization were urban geology, geological hazards and developmental constraints.

Mr. Pendleton was the author of numerous papers and abstracts, and a symposia leader, lecturer, and educator. Among awards he received are the National Defense Education Act Fellowship and the John Wesley Powell Award, presented by the director of the U.S. Geological Survey. He is listed in the 18th edition (1982-1983) of “Who’s Who in the West.”

He was a licensed professional geologist whose professional affiliations included the American Institute of Professional Geologists, Association of Engineering Geologists, Geological Society of America, National Water Well Association (technical Branch), Society of Mining Engineers and the Society of Sigma Xi. He was also a member and past president of the Colorado Engineering Council.

From 1971 to 1979, he served as staff geologist for the Division of Engineering, Department of Public Works/Public Utilities of the city of Boulder, and was responsible for the supervision of the Urban Geology Program, providing earth science professional consultation services.

Survivors include his wife of Boulder; his mother of Reading, Pa.; two brothers, Joseph Pendleton III of Reading, Pa., and Philip Pendleton of Oley, Pa.; three sisters, Mary Conway Phypers of New Canaan, Conn., Stephanie Pendleton of Middletown, Va., and Jeanne Davis of Larkspur, Calif.

Contributions may be made to the University of Colorado Cancer Center, 4200 E. Ninth Ave., Box A-065, Denver, CO 80262.

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Attention Alumni

By completing and mailing in this form, you can help us do a better job of keeping up with you, your whereabouts, and your career or family news. We all enjoy reading about classmates and not-so-close-mates who survived Boulder in whatever era! So send us some news or some recollections—we promise to use them.

Name _____ Date _____

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We need more alumni news!!

Let us hear from you!

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