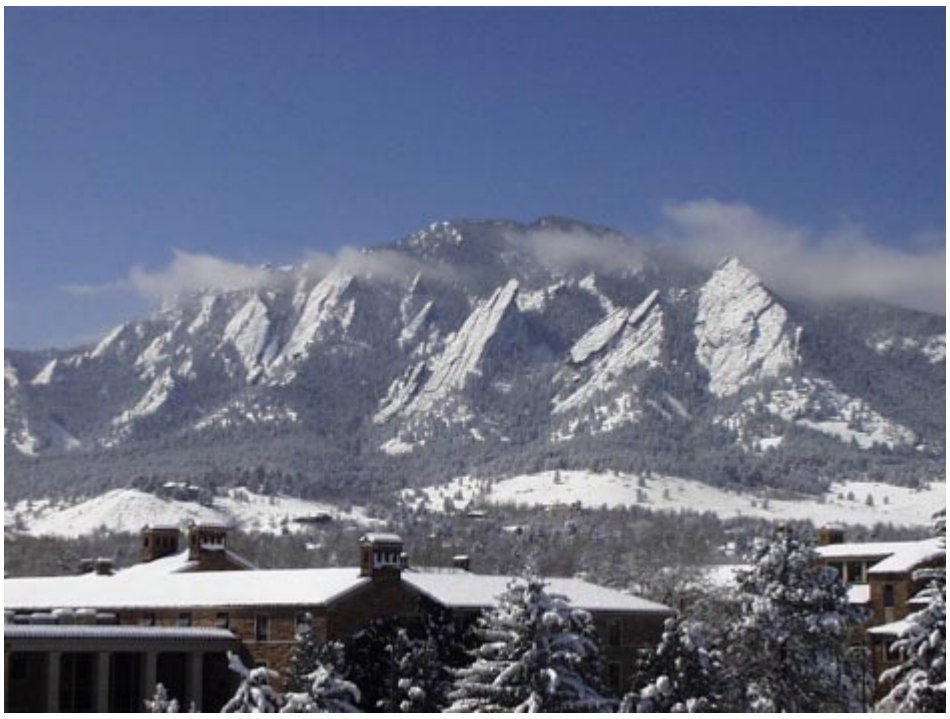
GEOLOGY NEWS

Department of Geological Sciences ■ University of Colorado at Boulder ■ Spring 2001

The aims of the Advisory Board include fostering closer ties among the Department, alumni, friends, and private industry, and guiding and assisting the Department in improving the quality of education for undergraduate and graduate students in the geological sciences.



Snowy Day on the Flatirons - another day of bad weather in Boulder.....

Letter from the Chair

Charles Stern

Many good things have happened for the Department during the last year, as detailed within this newsletter. I will mention just a few.

We have added four new faculty members: Ray Fletcher in the fields of structural geology and rock mechanics; Peter Molnar in the fields of tectonics, geophysics and climate; Steven Mojzsis in the fields of petrology and astrobiology; and Dena Smith, a joint hire with the University Museum, in the field of paleontology. Currently we are in the process, again in conjunction with the University Museum, of making an offer to Karen Chin, a paleontologist who specializes in coprolites large and small. We are also conducting a national search for a reservoir geoscientist to enhance our petroleum geology program.

Last spring Anne Sheehan and Shemin Ge were both awarded tenure and promoted to Associate Professors. This year we have recommended Paul Weimer and Jim White for promotion to Full Professor. I want to thank all of you who wrote letters on their behalf.

We opened 3,000 square feet of previously unfinished basement space for research labs, a new classroom and a drill-core storage and teaching facility. This extra space, and the new building in general, have been key in allowing us to expand our faculty, and we still have 3,000 square feet of unfinished basement space to open up if we can raise the money to do it.

The Advisory Board met twice this year as usual. In the spring some of the board came the night before the meeting to conduct our first annual "Career Night" at which board members discussed with our students career opportunities in their own special areas of interest, and described their own career development and what they felt were the key aspects of their educational background that allowed them to take advantage of different job opportunities. In the fall some board members came the night before the meeting to conduct a telethon with the goal of encouraging other alumni to contribute to the "In the Field Endowment" created by the board. William Hiss had provided a $25,000 matching grant for all such contributions, and the board raised this amount and more to bring the total value of the endowment up to $70,000. I personally want to thank Jeff Abbott, Matt Silverman, Ron Stokes and Jerry Grocock for putting their good name on the line requesting money for the department. It is not fun to call up people and ask for money, even when one has a good glass of Scotch as a bracer.

Bill Hiss has pledged another $25,000 matching grant to help the board continue to raise more funds towards their ultimate goal of $500,000 for the Geology In The Field endowment. I describe this and other fund raising efforts by the department in more detail within the newsletter in an effort to explain why private donations are important for our program, what our most important needs are, and how we manage the donations.

We received the first portion of a $240,000 gift from the estate of Waldo Rennie, class of 1916, to endow a fellowship for a graduate student. This gift will be matched by money from a challenge grant for graduate student fellowships established by Melissa and Anthony Moores, to provide us each year with a full year of support for a new graduate student. This is our first endowed fellowship for full support of a graduate student, although we also have many smaller endowed graduate fellowships that provide partial support for students. We hope to develop a few more endowed full-fellowships for graduate students in the future.

We graduated 25 undergraduate geology majors with BA degrees, as well as 15 MS and 7 Ph.D. students during this last calender year. At the moment we have 120 undergraduate majors and 99 graduate students, 22 of whom just entered the program this last year. Approximately 3,500 undergraduate students enrolled in geology classes last year. We are currently reviewing approximately 100 new application 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!!

This June we expect to hold a reception and open house here in Boulder on Tuesday, June 5, in the late afternoon, in conjunction with the AAPG meeting which will take place in Denver. We also hope to arrange an open house for the bp Visualization Center, a new research center on campus that was established with a $10 million dollar gift from British Petroleum after their acquisition of Arco. This new center, which previously developed 3D visualization applications for the oil and gas industry within Arco, represents an important addition to the resources available on campus for EMARC and our petroleum geology program. As our plans for the open house in geology and the bp Visualization Center become more concrete, we will announce them on our web page.

Contents

Colorado
University of Colorado at Boulder

Department of Geological Sciences
399 UCB
Boulder, CO 80309-0399

Nonprofit Org.
U.S. Postage
PAID
Boulder, CO
Permit No. 257

NEW FACULTY

Raymond Fletcher
Research Professor

Ray Fletcher became a Research Professor in the department in the fall of 1999. Ray is a structural geologist who specializes in mechanical analysis of tectonic structures at all scales, from small folds and boudins in outcrops in the local Precambrian rocks to salt sheets in the Gulf of Mexico and accretionary wedges. During his career, he spent ten years as a professor in the Geophysics Department at Texas A&M and in the Center for Tectonophysics there, and four years at Exxon Production Research Company in Houston, Texas.

While at EPRC, he proposed that salt sheets in the Gulf of Mexico were emplaced as submarine salt glaciers, with salt dissolution inhibited by a thin sheet of pelagic sediments. This hypothesis ran counter to the then current model of emplacement into sediments as "salt laccoliths." The model was shown to be correct by duplication of the thick sediment sequence that the salt glacier progressively overrode with angular truncation by a condensed section in the overlying pelagic sheath. The model has important implications for petroleum exploration. Formulation of the model was prompted as much by mechanical insight as observation: he thought it would be tough to emplace a salt laccolith without disrupting the overlying sediments, and worked out the expected deformation. In a growing salt glacier, salt flows up into the sheet at about ten pounds a second, during the sheet's three to five million year period of emplacement.

Ray is currently collaborating with Ed Waddington, a glaciologist from the University of Washington, on a study of deformational processes that might lead to disruption of layer-cake stratigraphy near the base of ice sheets. This phenomenon has been observed in the comparison of borehole records of climate-indicating quantities such as dO_{18} from nearby sites in Greenland. Applying his expertise in folding and other instabilities in layered and anisotropic media, he has shown that a heretofore-unsuspected instability in anisotropic medium is present in the layer-parallel shearing flow that occurs near the base of ice sheets. This process, or other processes, such as an initial breakup of the layering by shear zones with normal fault motion and the later overturn of the resulting structure by large shear strain, may lead to scrambling of the stratigraphy. Since ice is a metamorphic rock, these ideas and results apply as well to deformation in strongly deformed gneisses, and analogs to basal ice sheet structures might be found in Precambrian shear zones.

In another collaboration with Bernard Hallet (U. Washington), Ray is studying the mechanics of surface folding on rock glaciers, and of Antarctic ice/sand wedge polygons. Ray and Enrique Merino, a geochemist at the University of Indiana, have shown how the "force of crystallization," really supersaturation, may lead to mineral growth in a solid rock by either replacement or deformation of the surrounding material. Veins with fibrous mineral habit are likely to form in this way, and they have worked out a quantitative model for the process.

Ray participated with teammate David Pollard from Stanford in a Geological Society of America "Hot Topics" debate at the 2000 Reno meeting. The debate question was whether tectonic structures could be understood primarily based on kinematic reasoning, a position currently in vogue in structural geology, or whether one needed, instead, an understanding of the complete mechanical picture (which includes kinematics!).

Ray Fletcher about to hijack a helicopter at Marble Point, Antarctica

In the 2000 spring semester, Shemin Ge and Ray taught a graduate course in Quantitative Methods in Geology. He is teaching an introductory course in solid mechanics in the 2001 spring semester, with emphasis on applications of interest to the students taking the course.

Stephen J. Mojzsis
Assistant Professor

Steve Mojzsis arrived on the threshold of the 21st century on January 2, 2001 as an Assistant Professor in the Department of Geological Sciences. He came to the Department through the newly established NASA Astrobiology Center at CU. The field of Astrobiology explores the emergence of life on Earth and its distribution in the universe. His appointment is through the Department of Geological Sciences unit, but broadly reaches between disciplines representing Astrobiology on campus (from molecular biology to planetary geology) with connections to the NASA consortium that extends across 11 member institutions in North America and affiliated centers in Europe and Australia. Steve is teaching Historical Geology (GEOL1020) in the Spring 2001 semester and in the Fall he will teach a critical thinking course (Geol 4500) on Early Earth and the Origin of Life. In that class, students will read, analyze and present material in a seminar format that explores what is known about conditions on the early Earth's surface at the time of the emergence of life.

His research embraces many topics of the biogeochemistry of the early Earth from atmospheric chemistry and biological evolution, the origin of the crust and hydrosphere and the impact record of the early Earth to meteorites, martian exploration and mineral physics and chemistry. Steve is assembling a geochemical materials research laboratory in astrobiology to accommodate his growing collection of the oldest rocks from around the world being used to search for evidence of the earliest environments for life on this planet and the processes that led to the development of the present biosphere.

Steve Mojzsis earned his B.A. and M.A. in mineralogy and remote sensing at Boston University in 1992 working under Prof. F. El-Baz. His thesis work explored the geomorphology and paleohydrology of the largest, driest place on Earth: the Western Desert of Egypt. This study was used as an analogue study of process, for similar geomorphological as seen in the Western Desert are found on the ancient surface of Mars. In 1992, Steve moved to California to take up a research post at the Scripps Institution of Oceanography and entered the Ph.D. program there in 1993 under the supervision of G.O. Arrhenius. There he studied prebiotic chemical evolution models for the phosphate system, the carbon isotopic record of life on Earth, isotopic biomarkers in ancient sediments and meteoritics. During this time, Steve published several papers on the earliest records of life on Earth, on searching for biomarker minerals in martian meteorites and on RNA origins and evolution.

Following completion of the Ph.D. in 1997, Steve went on to receive two postdoctoral fellowships at the UCLA National Ion Microprobe facility where he developed his interests in geochronology and metamorphic petrology. Research there was used to develop new techniques in secondary ion mass spectrometry of light stable isotopes (sulfur, carbon and oxygen in sulfides, graphite and zircon) as well as radiogenic isotopes (U, Th, Pb) in zircons and apatite. Steve helped to develop new methods for measuring non-mass dependent sulfur isotope fractionations in Archean sulfides, depth-profile studies of U-Th-Pb in zircon (at nanometer scale resolution) to understand inheritance vs. protolith Pb ages of highly metamorphosed rock and melt-provenance work on the oldest terrestrial minerals. These are ca. 4.3 billion year old zircons from Western Australia that have chemical and isotopic signatures indicating the presence of liquid water on this planet within 200 million years of its formation, about 4.56 billion years ago.

Steve spends time with field studies every summer (June to August). His work to explore the Earth's earliest rock records regularly takes him to coastal areas of southern West Greenland and the West Australian outback. He comments that "…there's a lot of material out there to investigate: What one really needs in this line of work is a keen geological eye for detail, a sense of excitement for unraveling the mysteries of an old planet and to be able to ask the right questions." He looks forward to working with other members of the academic community at CU in pursuing new methods of exploring the Earth and records of its ancient environs and invites anyone to stop by his office or laboratory and have a discussion about these or any other topic.

Peter Molnar
Professor

Peter has moved recently to the Department after 27 years at MIT. Much of his work over that period has addressed large-scale tectonics, particularly in Asia. He plans to continue that work, but as much in New Zealand as in Asia, in collaboration with Roger Bilham, Craig Jones, and Anne Sheehan. They have ongoing GPS and seismological studies in New Zealand. Peter's other main focus, however, will be on climate change, both on how large scale tectonics influences climate, and if possible on how climate affects erosion and shapes the landscape. He has launched a promising new collaboration with Mark Cane at Lamont-Doherty Earth Observatory of Columbia University. They have concluded that the closing of the Indonesia Seaway in the last 3-5 million years has effected the aridification of East Africa (when and where humans evolved), and may have provided the switch that initiated the cooling leading to the ice ages, (Cane, M.A., and P. Molnar, Closing of the Indonesian Seaway as the missing link between Pliocene East African aridification and the Pacific, Nature, 2001, in press.)

Stephen Mojzsis pointing out K/T boundary clay in Stevns Klint, Denmark

Dena Smith
Assistant Professor

Dena Smith began in fall 2000 as an Assistant Professor in the Department of Geological Sciences and as the Curator on Invertebrate Paleontology in the CU Museum of Natural History. This joint position will allow Dena to help build the paleontology program in both departments. Her interests include insect and plant paleoecology, insect diversity through time, processes of fossilization, and modern insect ecology.

Dena earned her bachelors degree from the University of California at Santa Cruz in 1994 with a combined degree in Biology and Environmental Studies. While at UCSC, she participated in several internship programs and studied everything from hormone levels in lubber grasshoppers, to paleobotany, to the evolutionary relationships of birds based on the scales on their feet. This interdisciplinary work served as the foundation for her future work, which combined the disciplines of geology, botany, entomology and ecology.

After graduating from U.C. Santa Cruz, Dena went to the University of Arizona where she earned her Ph.D. in the Department of Geosciences. Her dissertation work titled "The evolution of plant-insect interactions: insights from the Tertiary fossil record", consisted of three studies of insect paleoecology and evolution. The first study focused on the factors that affect the accumulation and preservation of insects in lacustrine environments. This study utilized an actualistic approach to demonstrate the important role of insect ecology and morphology on the preservation potential of fossil beetles. The second study examined patterns of insect feeding damage on leaves from two tropical forest communities. This study not only examined the amount of variation in insect damage in modern forests, but also examined the potential of plant taphonomic bias in paleoecological studies. The final study examined levels of insect herbivory during the Eocene-Oligocene climate deterioration. This work showed that climate change can have dramatic effects on the interactions between plants and insects. Although insects did not feed on plants in the Eocene as heavily as they do today, many modern associations were found to have already been in existence 45 million years ago. This indicates that despites evolutionary change in plant-insect interactions; some specialized associations can be extremely robust.

Dena's dissertation work was conducted at the Florissant Fossil Beds National Monument (West of Pike's Peak and Colorado Springs) and in the Douglas Pass region of the Green River Formation (North of Grand Junction). She plans to continue her work on the evolution of plant-insect interactions and insect preservation by examining other Tertiary sites in the Rocky Mountain region.

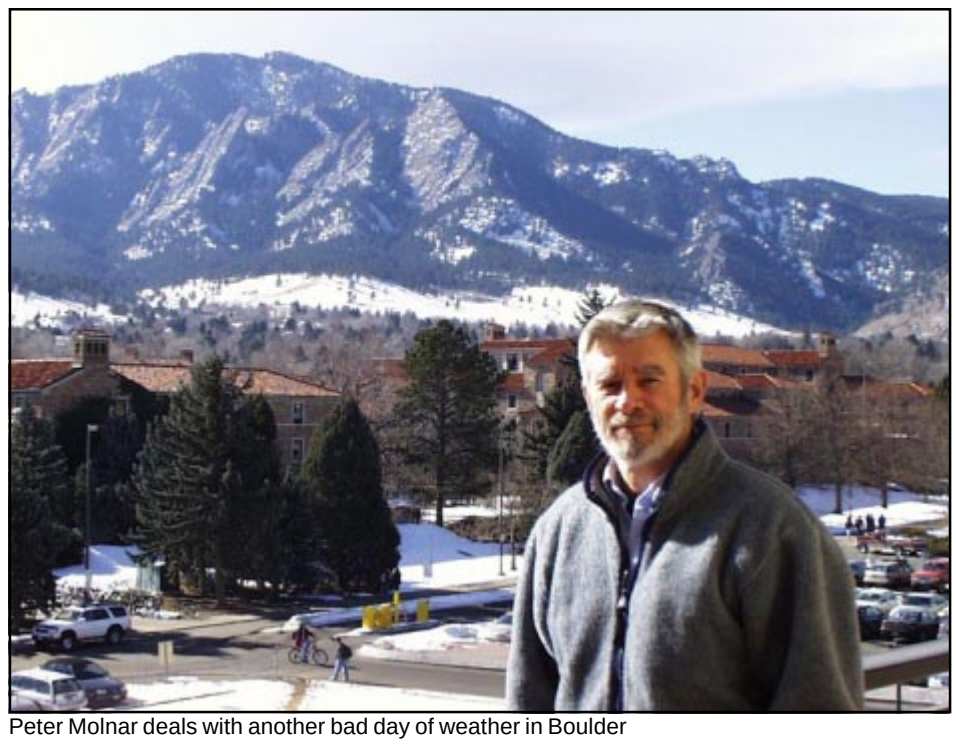
In addition to her research plans, Dena will also be teaching the geology department's Paleobiology course and undergraduate/graduate seminars in paleoecology and taphonomy. She also plans to teach a course for the Museum and Field Studies Program and geology students on Scientific Illustration. Dena is also a regular instructor for the Organization for Tropical Studies (OTS) graduate-level courses on tropical field biology, in Costa Rica. During these intensive field courses, she teaches students about geology, paleobiology and insect diversity through space and time and helps to guide student research projects.

Finally, Dena is working to improve the invertebrate paleontology collections and public paleontology programs at the CU Museum. She has already added nearly 1000 new fossil plant specimens to the collections and plans to further increase the museum's collection of Tertiary plant and insect material this summer. Other museum projects include databasing the entire fossil plant and invertebrate collection and making this information available online to other scientists. Upcoming museum exhibits that will highlight locally important paleontological sites and specimens are also on her agenda.

The study of fossil insects and their ecological interactions with plants is an exciting new field. Through her research, teaching and museum work, Dena hopes to increase our understanding of past ecosystems and the evolution of modern community interactions and to help build an active and exciting paleontology program at CU Boulder.

A few of the fine pieces from the mineral case displays in the 3rd floor atrium

Dena Smith



Peter Molnar deals with another bad day of weather in Boulder

Faculty News

John T. Andrews

2000 AD was a relatively quite year. John was on a Faculty Fellowship for the Spring semester and spent most of the time here at the University working on a series of cores that had been collected off Iceland in 1997 and again in 1999. That was interspersed in January/ February and again in July with feverish spells of grant writing and submissions. The net results was some successes and some failures. He must admit that getting research monies is not getting any easier, infact the rejection rate in some key programs for his research is down about 10%, hence it does make you wonder about the futility of life!

The fall semester saw John back teaching. He taught the 3000 level statistics course that we offer, cross-listed with Geography. John thinks in this day and age that a good basis in statistics is an essential undergraduate tool, but all the surveys indicate that "statistics" is the most hated topic in US universities. John suspects that this feeling is probably shared by students at Colorado as well.

Other professional activities saw John organizing one of the sessions at the December AGU meeting with a theme of the preliminary results from the long (3 months) international cruise that they were involved with in 1999 as part of the International Past Global Change (IMAGES) program. They had 39 talks and posters, so the session was well received and lots of friends and colleagues from Norway, Iceland, Denmark, Germany, the UK, USA, and Canada attended.

On the personal level Martha and John had the pleasure of seeing Melissa getting married in February, and Thomas went down the aisle in September. That plus vacations in Maine for 2 weeks, about 25 Rockies' baseball games, and a February trip to North Carolina for a Blue Grass Festival have kept them going!

Gregory P. Asner

Gregory P. Asner, assistant professor in the Department of Geological Sciences and the Environmental Studies Program at CU Boulder, received the Presidential Early Career Award in May 2000. Greg was one of 60 people receiving the award in a White House ceremony. He was nominated by NASA for his leadership in developing innovative approaches to analyzing remotely sensed data from multiple satellite sensors and applying them to regional and global biochemistry. Greg's work involves understanding how human land use; including ranching, agriculture and logging; interacts with climate variability.

Bill Atkinson

Bill Atkinson's year 2K was not full of adventures. It was busy, but not adventurous. The principal reason was some health problems that were not life-threatening, but nuisances. First, there was an aging prostate that robbed him of sleep. This was resolved by an operation in April…well, we can skip the details of the operation he saw on live TV! Then there was something nagging him that sapped his energy, and had been getting worse year by year. After a long medical evaluation, it appeared to be due to a heart medication taken to relieve weak occasional arrhythmia. When he stopped this medication, he began to feel better than he had in five years! So these trivial, but annoying factors occupied most of the year, and interfered with trips to Mexico, etc.

Bill taught four courses: mineral resources, field mapping of mineral deposits, intro physical geology and geochemistry of hydrothermal ore deposits. The field class was the most fun, concentrating on the Clipper Mine, with its four different types of veins, alteration, the pebble dikes and faulting. His graduate students also took a lot of time. Abbas Sharaky, Sara Martinez and Alex Iriondo all finished their Ph.D. theses, and Bill went through drafts of each, thesis defense final exams and graduation. Abbas was happy to return to Egypt with his family, where he had a faculty position waiting for him at the University of Cairo in September. Sara graduated in December, and took a post-doctoral position with Alex Goetz. At this writing, she is driving around the pampas and cordilleras of Argentina, collecting data for a remote sensing study of some prominent hydrothermal alteration zones. Alex Iriondo wrote two papers for publication for his thesis, and now has a position with the USGS. Bill also

Faculty News

Continued.....

went to Arizona to help two students with their theses. Eric Anderson started work on a blind breccia pipe, i.e., no yet opened by erosion, that contains a copper orebody at depth. Eric logged a 3000-foot drill hole in fine detail, standing out in the hot, hot Arizona sun all summer. Lorna Jaramillo took her prelims and continued her Ph.D. work on the effect of mined and unmined porphyry copper deposits on water quality, using remote sensing. She will study water resources around the Silver Bell deposit near Tucson, while working for the USGS. Worth Cotton was able to convince a Chilean mining company to fund a Ph.D. study of alteration at the Cerro Colorado deposit in the Atacama desert of Northern Chile. Bill plans to go there to help him next summer. Other students continue to make progress. Erin Marsh is working for the USGS, while she finishes her thesis on a gold deposit in the Yukon. Lupe Espinoza completed a draft and submitted it to Bill and Lang Farmer late in December. Paul Boni continues to inch along, prodded along by Bill from time to time.

Bill held weekly research meetings all year, featuring talks by students on their thesis research. A wonderful addition were talks arranged by adjunct Rich Goldfarb, given by students visiting from Australia, Alaska and elsewhere. Adjunct Fred Kruse continued to serve on committees of theses involving remote sensing. Adjunct Larry James was on leave the entire year in Korea, teaching and doing research. Alumna Michele Murray sold voice-logging software in Finland, and in Indonesia, where she visited the Grasberg deposit in Irian Jaya. On the latter trip, she became acquainted with the chief geologist of Freeport, Dr. George MacDonald, and persuaded him to come to our department to give a talk at an economic geology student-alumni dinner, which she graciously organized herself.

Bill was granted a sabbatical for the academic year 2001-2002, which will run from next September till the following May. He intends to finish up a number of research projects, some in Mexico, and to travel to several locations in Latin America to give seminars in Spanish on the geochemistry of mineral deposits.

Part of Craig Jones huddle test, Red Deer Lodge and St. Arnaud Range

Shemin Ge

The hydrogeology research group continued an active research growth from 1999 into 2001. Two new students joined the group, Steve Shultz from Dartmouth and Paula Cutillo from Colorado State University. Steve is working on his MS thesis, focusing on the impact of surface water and ground water interaction on stream water quality in mountainous regions. Paula, pursuing a Ph.D., is concentrating on the hydrology in active marine environments. Continuing MS student, Stephanie Tomusiak, has been characterizing the hydrology of fractured crystalline aquifers. She has conducted numerous field aquifer tests and fracture flow modeling for the Turkey Creek watershed, southwest Denver (below). Stephanie presented her preliminary work at the GSA Rocky Mountain Section meeting in the spring and is working hard to complete her thesis in spring 2001.

Ph.D. student, Chereé Stover, was awarded 1st place at the 2000 annual AAPG conference for her poster presentation on oil migration response to structural and stratigraphic evolution in the northern Gulf of Mexico Basin. She has written two papers on this topic that are in press in the AAPG Bulletin and Petroleum Geoscience Journal. Chereé has also been selected as an Associate Editor for the AAPG Bulletin and was the invited guest speaker for the Lafayette and the New Orleans Geological Societies. Chereé's most recent work involves investigating the hydrologic properties of shallow marine sediments from Woodlark Basin, Papua New Guinea, and modeling sediment compaction in this region.

Steve Shultz and Stephanie Tomusiak are conducting aquifer tests in Turkey Creek, CO

Shemin taught one class in the spring and three classes in the fall. One of the courses, particularly interesting, was a new advanced hydrogeology class that attracted graduate students from geology, geography, civil engineering, and CU Law School. In teaching this class, striking the right balance between teaching the hydrologic principles and keeping sufficient interest in societal relevant applications proved to be a challenging and fulfilling experience for all. On the research front, Shemin has focused her own efforts on the response of ground water to earthquake induced rock deformation, which resulted in a paper in JGR. She was invited to present her research at Imperial College in London, the Johns Hopkins University, CU-Denver, and Colorado State University. Off campus, Shemin chairs a hydrogeology planning group for a three-year term from 1999 for the international ocean drilling program (ODP). The group, consisting of 12 earth scientists in hydrology related fields, is charged with advising the ODP on the main scientific issues in submarine hydrogeology and strategies for studying fluid flow in seafloor environments.

Alex Goetz

Alex Goetz is director of the Center for the Study from Space in CIRES as well as a Professor in the Department. His interests are in using remote sensing techniques covering the electromagnetic spectrum from the ultraviolet to the microwave wavelengths to extract and map information about the solid surface of the Earth. The applications being worked on currently by his group include modeling the potential for reactivation of Holocene dunes and sand sheets on the High Plains and developing new and rapid spectral reflectance techniques for measuring the swell potential of clay soils in construction sites along the Front Range, both in situ and from airborne hyperspectral imagers. He and his post doc Zheng Qu are also working on better algorithms to measure atmospheric transmission and path radiance on a pixel-by-pixel basis using the hyperspectral image data themselves.

Alex is a member of the Landsat 7 Science Team and also a member of the EO-1 Science Team. EO-1 is a new breed of satellite that was launched in November to test new sensor technologies for follow-on Landsat imagers and carries the first imaging spectrometer (hyperspectral imager) flown in space. Alex was instrumental in getting this technology started at NASA-JPL 20 years ago.

Two of Alex's students graduated in 2000, Amanda Warner with an MS working on the Landsat Holocene dune project and Sara Martinez-Alonso with a PhD on the " Study of the infrared spectra of phyllosilicates through direct measurements, quantum mechanical modeling and analysis of AVIRIS imaging spectrometer data: Relationships with environment of mineralization". Sara had seven committee members to cover all the aspects of this quality thesis.

Alex spent the AY 99-00 on sabbatical, but didn't leave town for any great length of time. A book on hyperspectral imaging is in the works but didn't get finished, unfortunately. Too many projects going on simultaneously. In the fall he taught GEOL/GEOG 4093/5093, Remote Sensing of Environment to 30 students. The course is taught by Koni Steffen in the spring in Geography to an equal number of students. Remote sensing is of interest to many disciplines and as many as ten different majors are represented in any one course.

Larry James

Larry is completing an interesting year as Visiting Research Professor at Pukyong National University in Pusan, the southernmost and largest port city in South Korea. He was invited by a program in science and engineering, in which the Korean government brings people with diverse specialties to assist with perceived national needs.

For Larry and his family, some adjustments were required: Korean culture and food, and learning to read signs in a new 22 character alphabet. He is slowly learning the spoken language. However, everyone has been wonderfully helpful. The Earth and Environmental Sciences Division at this university has good laboratories with modern equipment. Larry continued work begun in years past on metallic ore deposits in the U.S.A., Asia and Latin America, and developed new areas for research. In Korea he has worked on skarns and distal disseminated gold mineralization. His mentor and colleague there, Professor Park Maeng Eon, plans to spend some time in the U.S. next year, including a brief visit to the Boulder campus.

Larry's email address is james@mail1.pknu.ac.kr, but at times the server here loses things. He has a non CU email provider also, please note, jamesgeoa@cs.com. Larry hopes to hear from Boulderites. He returns to the U.S. in February, and there appears to be a good chance of further work over here. Contacts and visitors are most welcome.

Support from the Department in Boulder is making all this possible and is greatly appreciated. Here's hoping the Korean Won (in which he is paid) stays strong.

Look up Faculty Online at:
http://www.colorado.edu/geolsci

Geology News

Craig Jones

The past year was an active one, with lots of time in the field. Joya Tetreault joined Charlie Wilson in working with Craig. She and Craig went out last November and braved cold rain to discover that the Cretaceous shales in New Mexico are every bit as muddy when wet as those in Colorado. (The relevant experiment is to stand on said shales and try and push a core drill into rock—you find this as often as not slides you back!) She is currently examining the cores obtained on that trip in a paleomagnetics laboratory at Caltech, where she hopes to test the idea that right-lateral shear in Laramide time was absorbed by vertical axis folding along the trend of the Nacimiento monocline.

Charlie, meanwhile, cleared the double hurdle of general exams and comprehensive exams just in time to go to New Zealand for several months, where he and Craig and Anne Sheehan and new faculty Peter Molnar are working on a seismological field experiment to find out how the strike-slip faults forming the plate boundary in New Zealand are connected to the mantle. Deploying 50 seismometers has provided lessons in patience and weight lifting as they have dealt with customs, broken seismometers, 220V/50 Hz power, land permission, wind, rain, Keas (alpine parrots), sheep, and cows in putting the roughly 100 lbs. piles of equipment hither and yon across the landscape. But now they probably have the most computers ever assembled in a room in St. Arnaud, and gigabytes of data are now being processed and studied to see what clues can be found about the area. Charlie has been thinking of staying longer ever since he was offered a free ski pass to service stations that were deployed at a ski area. Craig is spending a research semester in spring 2001 (well, Boulder spring) in New Zealand in large part to help oversee the field experiment.

Teaching has also seen some new tricks. The first ever GEOL4717 trip was made last spring, taking students from Colorado to Death Valley and back by road, looking at the geology along the way. The trip went amazingly well, with rain only marring the night they had planned to be in a motel anyways (well, some of them stayed and slept, but rumor has it that some students explored the 24-hour life of Laughlin instead). They saw some pieces of mantle, stratovolcanoes, chaos, monoclines, fault scarps, ignimbrites, diamictites, canyons, and more. The field geophysics course in the fall was also a bit unusual. First, the field site near Caribou in the mountains was the venue for the informal and illegal "Mudfest" offroad rally during their field work. The classes subsequent gravity survey was visited by a television helicopter and two TV trucks on the ground. Second and more germane was their response to a request from Jim Miller, mayor of Nederland, to help survey the old Nederland cemetery. Recently given historic designation, the historical society had found records were a bit lax, and there was some interest in knowing if there was any room for some longtime residents in the future.

Geology 5410, Ancient Sedimentary Environments, in the Thermopolis, Wyoming. The class, team-taught by Mary Kraus and David Budd, spent a week in early October examining Eocene fluvial sands and Permian carbonates. Standing, from left to right, David Budd, Ryan Sincavage, Hector Gonzalez, John Martin, David Pyles (hidden behind Martin), Stephen DeVogel, Susan Riggins, Isla Castaneda, Emily Bray, Eric Heydweiller. Knelling are Tim Farhnam and Greta Kristjansdottier.

Their efforts were covered by several newspaper and wire stories and given nice air time on two local TV stations; Joya and Eric Cannon presented the class's final results to the Nederland town council and in turn were voted letters of appreciation from the town. Since then towns have been lining up to have them study their old cemeteries....

Alan Lester

Alan continues to wear several hats in the Department, as our Undergraduate Advisor (see Undergraduate Student News), Instructor, and most recently the Faculty Coordinator for Introductory Physical Geology Lab courses.

Spring 2000 saw the completion of Alan's Fellowship with the Center for Humanities and the Arts "Rethinking Time" program. As the token scientist amongst a group hailing from History, Comparative Literature, Philosophy, Anthropology, and Law, it was an intellectually broadening experience—kind of like being a liberal arts undergraduate once again, but able to enjoy it this time! His work as a Fellow with the Center lead to the presentation of colloquia lectures for the Department and the University community.

Alan teaches the undergraduate non-major courses (e.g. "Historical Geology" and "Natural Disasters") as platforms from which to examine the role of science in society, creativity in science, and the interplay between culture and scientific advances. Spring 2000 brought an important addition to his 1998 University-wide SOAR teaching recognition award, presented by students. This year, Alan received the Boulder Faculty Assembly's "Excellence in Teaching" award.

Alan continued his advising duties during the summer with Freshman orientation programs; managed to complete a manuscript on isotopic dating of kimberlites; led field trips for the Rocky Mountain Association of Geologists and the Rocky Mountain National Park Nature Association; and also found time to do plenty of climbing locally and in Grand Teton National Park with his wife (and M.S. candidate) Melissa.

In the Fall, with the help of TA Grant Kier and new Departmental resources, students in Introductory Field Geology were exposed to mapping with GPS units and computerized digital elevation models. In order to be competitive in today's job market, students must learn about new technology in addition to the traditional map and compass skills.

Gifford Miller

Life after a stint as Department Chair and a years' sabbatical does eventually return to normal, reports Giff Miller. Teaching in the new building is such a pleasure that Giff taught two courses in the Spring and three in the Fall. It almost feels normal again.

Summer was a time for field work and meetings. In June, he ran a meeting in Iceland with former graduate student Áslaug Geirsdóttir, evaluating the role of sea ice in the climate system under the umbrella of CAPE (Circum-Arctic PaleoEnvironments), a program within the International Geosphere Biosphere Program (IGBP). The meeting attracted almost 60 participants from ten countries who contributed to formal talks and directed discussions over the five-day meeting. The recommendations from the meeting appeared in Eos early this year. The Nebraska Sand Hills were next on the agenda. With graduate student Noah Daniels and other colleagues, the team cored lakes in the Sand Hills from which they expect to reconstruct high resolution records of water chemistry change over the past 2000 years. Changes in water chemistry are then related to intervals of drought, using the severe 1930s drought and the period of instrumental record as a calibration. The June weather showed the Sand Hills at their best as storms associated with a tornado alert dumped 4 inches of golf-ball hail in less than two hours just as the coring was in full swing.

In July, seeking to escape the heat and accompanied by new graduate student Steve DeVogel, Giff returned to Australia to begin a new project there to better evaluate the role of humans in the extinction of the Australian megafauna and to investigate the cause of widespread vegetation change that may have occurred around the same time.

Accompanied by colleagues from the ANU in Canberra, they visited three major field sites in central and southern Australia. A film crew from the Discovery Channel joined them for three days at Lake Tandou; their production aired late in 2000. The Australian effort is a collaborative project with former Geological Sciences graduate student Bev Johnson and Marilyn Fogel, a colleague from the Geophysical Laboratory in Washington, D.C., as well as John Magee, Malcolm McCulloch, Rainer Grün and Nigel Spooner, all colleagues from Australia.

Karl Mueller

Karl continued to work in 1999/2000 on active tectonics and structural geology problems. Work in the United States included ongoing studies in the New Madrid seismic zone, aimed at understanding the late Quaternary record of folding and faulting in the Mississippi River floodplain in western Tennessee. Studies by grad student Alex Tate defined the geomorphic development of the region and characterized deformation produced in a large earthquake in AD 1812. Further west, work continued in the Los Angeles Basin to characterize growth of active blind thrusts, with the help of student Sean Sunderman who is working on the Coyote Anticline, a fold formed above an active blind thrust in east Los Angeles. Grant Kier completed an analysis of regional uplift of southern California and northern Baja California he began as an undergrad in the department. Grant used concepts in lithospheric flexure, topography and the record of uplift from marine terraces along the Pacific coastline to relate late Quaternary uplift of southern California and northern Baja to crustal thinning in the Gulf of California.

Karl was fortunate to visit Taiwan last spring as a member of an NSF-sponsored team of American

Structural Geology field trip to Moab, Fall 2000

earthquake geologists. They toured the surface rupture of the Mw 7.6 Chi Chi earthquake that occurred in September of 1999 and excavated a trench during their stay. Subsequent work is aimed at understand how patterns of erosion have reorganized the location of current strain in the Taiwanese orogen, resulting in out-of-sequence thrusting emphasized by the earthquake. Pierre Dick joined the structure group as a postdoc hailing from the University of Neuchatel in Switzerland where he did a PhD on the structural development of the western Alps. Pierre is working to characterize uplift along thrust sheets in the central part of the Taiwanese orogen and relating it to the record of erosion. Grant Kier is also working on the project for his master's thesis on coulomb wedge theory.

Other work in Asia includes a multiyear effort in southwest Japan with Eric Cannon, a PhD student. Eric is using seismic reflection profiles, dense borehole surveys and geomorphology near the cities of Osaka, Kobe, Nagoya and Tokyo to understand deformation mechanisms that govern growth of active fault-propagation folds and thrusts. These structures look liked dead ringers for the now inactive Laramide structures in the Colorado Front Range such as Big Thompson anticline - although sedimentation around the Japanese examples is modulated by the late Quaternary eustatic record. As a prelude to this effort, Karl spent five weeks at Kyoto University funded by a Japanese government fellowship. Spouse Christine and daughters Katie and Taryn joined in the fun over the holidays during a two week visit. Both parents appreciated Katie and Taryn's ability to adapt to the new environment, especially when it came to typical Japanese food like octopus and squid that is often served raw. Everyone tried most everything, including raw fish eggs and marinated eel, but drew the line when a dish of raw fish livers was served up and pronounced a "delicacy".

Finally, in a project much further "afield" grad student Alex Tate and Matt Golombek of JPL are undertaking an effort to define the kinematics of "wrinkle ridges" or fault propagation folds formed in compressive belts on the planet Mars. This project started with a serendipitous comment by Bruce Jakosky who brought Matt's attention to the active tectonics group at CU-Boulder during his sabbatical visit to the Lunar and Space Physics Department.

Structural geology and field mapping filled out the teaching schedule for the year and included a lengthy trip in the fall to Utah where structure students enjoyed perfect weather and spectacular structures. The trip was topped off by an overflight around the Moab area that many students thought was a highlight of their field experiences at CU. In a local effort, Alex Tate constructed a high resolution digital elevation model of the Front Range that promises to illustrate landforms such as the frontal folds and glacial features in Rocky Mountain National Park in spectacular detail.

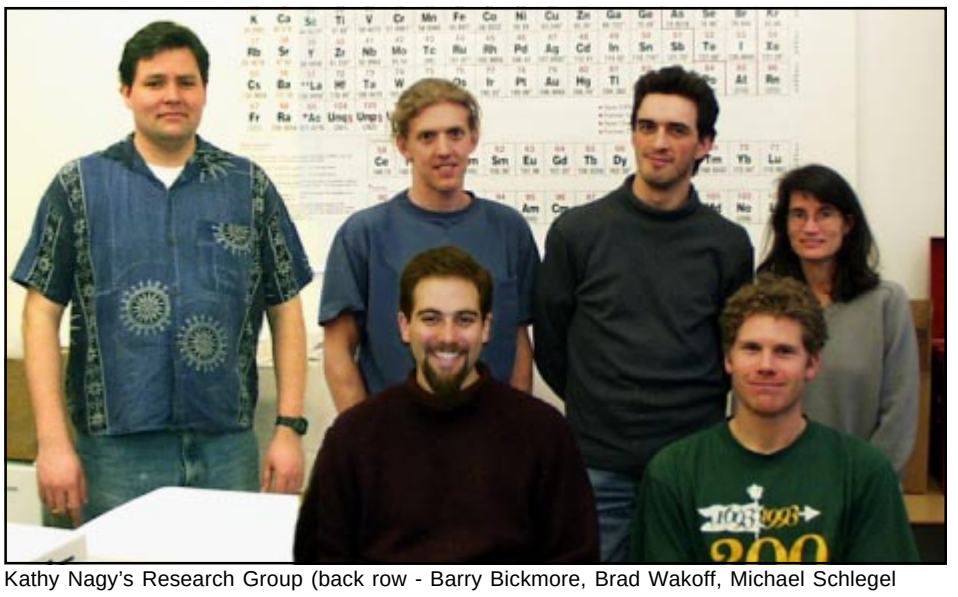
Kathy Nagy

During Spring 2001, Kathy Nagy again is teaching the graduate class in aqueous geochemistry and the undergraduate geochemistry class with Lang Farmer. She is including more geochemical modeling in her instruction using computational codes common in academia, environmental consulting, and national and industrial research laboratories. In her research, she and her group are applying new software to perform molecular modeling of geochemical reactions, specifically reactions at the mineral-water interface. The software runs on a Silicon Graphics computer and is being used, for example, to simulate reactions at the muscovite-water interface that post-doc Michel Schlegel and she have observed using synchrotron-based X-ray reflectivity. Their new X-ray data provide near-Angstrom-scale resolution of the relaxation of the mica surface and the structure of the overlying solution, data useful in developing a fundamental understanding of cation-exchange reactions in clays and also sorption of organic molecules to mineral surfaces.

Barry Bickmore, post-doctoral researcher on a project to study reactions of vadose zone minerals with leaking tank fluids from the Hanford (Washington) radioactive waste tanks, has made some significant observations regarding the effect of Al on the dissolution of quartz and also the secondary precipitation of a zeolite-like phase (nitrate cancrinite) that could sequester radionuclides such as cesium in the subsurface. Transport of radioactive wastes 100 to 200 feet beneath the tanks may be facilitated by the formation of colloidal particles, such as the type he has synthesized experimentally. Undergraduate Amy Gray and student Paul Sandlin have been assisting Barry with this work.

Kathy's first two students will defend their master's degrees in March, and her two other students are midway through or starting their theses. Brad Wakoff has been investigating 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 has found that the amount of rhenium permanently retained in the Fe-solids increases with aging time of simulated tank sludges. This is significant in terms of understanding how an element such as technetium which occurs as an anion in natural waters could become irreversibly "sorbed" in a ground water environment. Jake Waples is determining the role of dissolved natural organic matter (fulvic acids) in the dissolution of the mercury-sulfide cinnabar. He has discovered that the rate at which cinnabar dissolves is proportional to the aromaticity of the organic molecules, suggesting a mechanism for the dissolution reaction and also the binding of aqueous mercury in dissolved organic matter. Graduate student Terry Church is studying lithium exchange reactions on clay minerals in order to assess effects on isotopic fractionation of this element as an indicator of global weathering. New student Morgan Moschetti is beginning experiments on the dissolution of feldspar and precipitation of related secondary minerals in simulated Hanford tank solutions.

Kathy was elected to the Council of the Mineralogical Society of America in August. Among her trips, she was invited to be a keynote speaker at a EURESCO conference on "Mineral Surface Reactivity" in San Feliu, Spain in May and at a Swiss Federal Institute of Technology conference on "Surface Chemical Processes in Natural Environments" in Ascona, Switzerland in October. She made presentations on her group's Hanford research in October to the Colorado Scientific Society and in November to the Department of Chemistry and Geochemistry at Colorado School of Mines.



Kathy Nagy's Research Group (back row - Barry Bickmore, Brad Wakoff, Michael Schlegel Terry Church front row - Jake Waples, Morgan Moschetti)

The first Geol 4717 "Tectonics of the Western U.S." class at the Grand Canyon

Anne Sheehan

Anne Sheehan is spending the first half of 2001 in New Zealand on sabbatical, with time spent at Victoria University in Wellington and in the Marlborough Fault Zone region for field studies. Anne is realizing what a small world it is after meeting CU geophysics graduate student Vicki Rystrom in Christchurch, New Zealand for lunch (Vicki just happened to be there at the same time as Anne – Vicki just returning from a rough trip to Antarctica including pulmonary edema...), talking to Eric Erslev (CSU geology professor) on vacation that next day in Christchurch, finding CU geophysics alum Mike Kozuch lives within a kilometer of her house in Wellington, and more. Anne is already finding that the time in New Zealand is going by much too quickly.

Other activities of the past year have centered on the Continental Dynamics of the Rocky Mountains (CDROM) project, which included a one-year seismometer deployment in Wyoming, Colorado, and New Mexico. Instruments were removed in May and graduate students Otina Fox and Lynda Lastowka have been busy with data analysis, resulting in presentations at AGU, GSA, and a RIDGE conference in Iceland. Undergraduate intern John Godchaux also presented a poster at the national AGU meeting. A CDROM workshop was held at CU in April, with participation from over 40 researchers at 15 different institutions. Graduate student Hersh Gilbert attended IRIS, Margins, and AGU meetings to present results of his studies of deep Earth structure, and 'new' graduate student Oliver Boyd (CU MS '97) has joined the group and is quickly becoming an expert on seismic attenuation. In August, Research Associate Ken Dueker moved up the road to Laramie to begin a faculty position at the University of Wyoming. Professor Leslie Sonder from Dartmouth spent August through December on sabbatical in the department as a CIRES Visiting Fellow.

Hartmut Spetzler

Hartmut continues to serve as Associate Chair for Undergraduate Affairs and enjoys the interaction with the students and working closely with Alan Lester on their behalf. During the fall semester of 2000 he taught a new course together with Susan Buhr and Sandra Laursen. This course is part of a new two-course sequence designed for future grade and middle school teachers. During the first semester in Geol 2110 they covered aspects of physical geology in two lectures and 6 lab hours per week. The courses are inquiry based with lots of hands-on activities in the labs. The second

From left: Julian dowdeswell, Julie Brigham-Grette, Peter Clark, John Andrews, Gifford Miller, Art Dyke, John England and a subset of the many former graduate students whom he mentored through degrees at CU. Taken in October 2000 at Timberline Lodge, Mount Hood, Oregon, during a small international gathering of the EPILOG (**E**nvironmental **P**rocesses of the Last **I**ce Age: **L**and, **O**ceans, **G**laciers) working group reconstructing the terrestrial boundary conditions at the last glacial maximum.

semester will cover life sciences and will be taught for the first time in the fall of this year (2001) in MCDB (Department of Molecular and Developmental Biology). This new course development, which was sponsored by NASA, reflects Hartmut's long standing interest in out-reach activities. This semester, spring 2000, he teaches physical geology at the introductory level and with extensive help from Dan Mitchell incorporates the web, e-mail and computer presentations into his lectures. Joe Eichenauer, one of our outstanding undergraduate students, who will graduate this spring, is working with Hartmut and Paul Boni to organize our class-room demonstrations, build new ones and put information about them on the departmental web-site so it is accessible for faculty and teaching assistants.

Hartmut had planed to be on half-time during the spring semester of 2000, in part so he could visit middle and high schools in rural Colorado. His plans were slightly altered, when shortly before the end of the fall '99 semester, he got a new titanium heart valve and pacemaker installed. (The valve had to match the material of his fancy bicycle, titanium.) The end of the semester was kind of hectic since he was teaching one of the large undergraduate classes with over 160 students. With the help of two absolutely outstanding graders, Jesse Starr (then an undergraduate) and Sean Pack (a graduate student about to graduate), who worked extraordinarily hard, and the wonders of e-mail, the students took their final exam, all grades were recorded and delivered on time. Jesse and Sean lugged heavy bags of paper on a number of trips to the hospital.

As planed, Hartmut did not teach during the spring semester. This did give him the opportunity to travel to remote corners of our beautiful state and visit schools, sit in on classes and discuss teaching at the middle and high school levels with about three dozen teachers. He will be on sabbatical during the 2001/2002 academic year when he will devote about 50% of his time to a project dedicated to providing the opportunity for school teachers to hone and update their skills in the sciences they teach. Most teachers, especially those in rural areas have a great need for further education. They often have to teach biology, chemistry, Earth sciences and physics because they are the only science teachers in their school.

On the research front, Hartmut with his students and colleagues continues to be involved in the study of seismic attenuation in partially saturated contaminated rocks and in the study of the deep Earth interior. Steve Jacobsen, working with Hartmut and Joe Smyth on Earth-mantle problems, received a very prestigious award from the American Geophysical Union meeting at their fall 2000 meeting in San Francisco.

During his Colorado travels and over Labor Day weekend, Hartmut was able to close all remaining bicycling gaps between the Pacific and Rapid City in South Dakota. All titanium parts performed well on the annual trail ridge tour, a tradition since 1974. He is looking forward to his sabbatical, to the research, the out-reach activities and maybe also to making some progress toward the Atlantic on his bicycle.

James Syvitski

Professor Syvitski and Professor Tad Pfeffer (CU-Civil Engineering) have set up two super computational servers with assorted peripherals, at INSTAAR's Environmental Computation and Imaging Facility. The ECI Facility was acquired with the support of the Office of Naval Research, Sun Microsystems and the CU Graduate School. The ECI facility means that CU has become a U.S. leader in landscape evolution and stratigraphic modeling. ECI staff continues to grow with Dr. James Scott Stewart joining from Aerospace Engineering. Dr. Stewart completed his thesis on global tidal predictions using satellite data assimilation. Dr. Stewart is funded by ExxonMobil to continue developing a 3-D process-based stratigraphic model for reservoir characterization. Dr. Scott Peckham continues with system administration duties and work for ONR predicting the location and characteristics of buried channels on continental shelves. Ph.D. student Damian O'Grady nears completion of his thesis on the morphology of continental margins. His recent efforts include analysis of Arctic continental margins showing how glacier dynamics can influence slope morphology. Numerical Analyst Eric Hutton continues to lead the modeling effort of the ECI "Delta Force" adding new algorithms for seafloor hazard analysis from earthquakes and tsunamis. New members of the Delta Force include: (1) Ph.D. student Gita Dunhill who is investigating sediment dynamics off of Denmark Strait, (2) Ph.D. student Dave Kinner who is modeling the sequestration of carbon in river basins, and (3) M.Sc. student David Mixon who is studying the significance of man-made reservoirs as terrestrial carbon sinks. Visiting students this year included Shane Elipot (from France), Irina Overeem (from the Netherlands), Martin Hazlik-Valentin (from Puerto Rico) and Andy Taylor (CU-SURF student). Topics emphasized this year include tsunamis generation, earthquake induced sediment failure, global sediment fluxes, and continental shelf dynamics. Professor Syvitski continues applying his modeling efforts to support U.S. Navy interests in Anti Submarine Warfare and Mine Counter Measures. The Delta Force Group hosted a very successful IGBP (Global Change) Water Initiative workshop in Boulder on Rivers and Sediment. Professor Syvitski continues as Editor of the Arctic, Antarctic and Alpine Research, Associate Editor of Oceanography, Editorial Board member of Marine Geology, Special Editor of Computers and Geosciences, and Special Editor of Global and Planetary Change.

Paul Weimer

Paul taught two courses during AY 2000-2001. During the fall semester, he taught Applied Sequence Stratigraphy and Basin analysis (6330). A four day field trip to the Book Cliffs led by Andy Pulham, was one of the highlights of the course. During the spring, he taught Geology 1020. He also continues to serve as the Associate Chair for Graduate Studies for the Department. The main goals for this year are to rewrite the graduate rules by the end of spring semester. Paul supervises 12 graduate students.

In December, he was the convenor of the 20th Annual Bob F. Perkins Research Conference for the GCSSEPM in Houston. The theme of the conference was global deep-water reservoirs. The conference sold out three weeks prior to the event; 534 people attended. The publication was done on CD-ROM, and included 59 papers, 1104 pages, with extensive color, and oversized figures. The conference reflected a state-of the art understanding of deep-water reservoirs. Paul is also working as a co-convenor for December 2001 GCSSEPM conference, which addresses the petroleum systems of deep-water margins of the world. For his efforts, Paul was chosen to receive the 2001 GCSSEPM Distinguished Service Award.

Paul is the convenor of the SEPM 75th Diamond Anniversary Jubilee Celebration to be held in June 2,3 2001, in conjunction with the AAPG/ SEPM National Convention in Denver. This is a 1.5 day symposium that includes 17 talks that focus on the future directions of sedimentary geology in the early 21st Century. He co-chairing (with Henry Pettingill) two sessions on the future deep-water exploration areas of the world at the AAPG Convention. He is also a co-convenor for the 2002 SEPM Research Conference at the March Annual AAPG/SEPM meeting to be held in Houston.

In March 2001, Paul gave the keynote address at the three day conference at The Geologic Society (London), on "Deep-water depositional systems of the world." This summer, Paul will spend one month in Australia as the Esso Australia Distinguished Lecturer. He will visit the major cities where he will lecture for two to three days each on various topics in the petroleum systems of deep-water margins Australia. He hopes to have his book "Petroleum geology of turbidite systems" (written with Roger Slatt), published by the end of this year.

Paul continues to serve as the Chair of the AAPG Distinguished Lecture Committee, helping select fourteen speakers for domestic and international tours. This was the last year of his term as Associate Editor for the AAPG Bulletin and GeoMarine Letters. He was a co-convenor (with Cesar Cainelli, Petrobras) of session "Seismic Stratigraphy of Deep-Water Environments" at the 26th IGC convention in August 2000. He gave short courses to the University of Nebraska, National University of Mexico, and Mexican Petroleum Institute.

Alex Goetz making a field spectral reflectance measurement on an outcrop of the near-vertically-dipping Pierre Shale near Morrison, CO.

David Budd, Harmut Spetzler, Joseph Smyth enjoying the Spring 2000 graduation party.

View the Newsletter Online at:
http://www.colorado.edu/geolsci/nl2001.pdf

Fund Raising for the Department

Charles Stern, Chair

The Department of Geological Sciences, and the University in general, benefit a great deal from, and to some extent depend on, funds raised by gifts and donations from alumni and the private sector. This newsletter is one of the mechanism by which we contact and raise funds from our geology alumni.

Alumni frequently ask: for what aspect of the department's program do you need money that the University does not provide? The department has three main areas of need for extra support from alumni and the private sector. They include support of our field geology program, fellowships for graduate students, and our departmental "discretionary" account that supports such activities as the publication of this newsletter, our graduation ceremonies, our Advisory Board meetings, and special teaching or research initiatives for faculty and students.

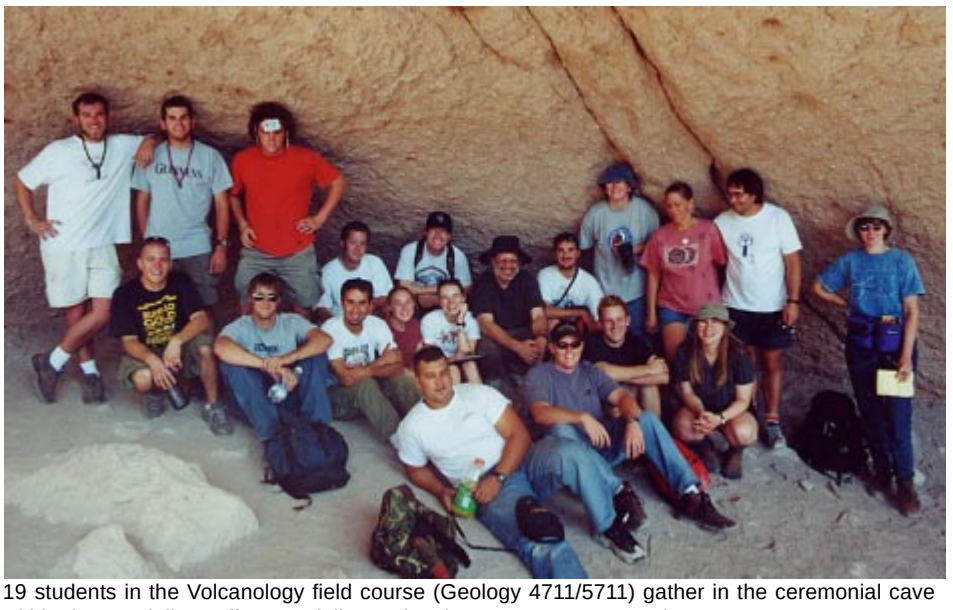
The University provides us with some support for all these areas, but not as much as we need to run the program for our faculty and students that we consider to be essential and top quality. On this page I briefly describe each of these three different areas of need, try to explain why your gifts are important to supplement the basic level of support provided by the University, and discuss how we manage these gifts.

I request that as an alumni recipient of this newsletter you consider making a gift to the department in one of these areas so that our students can have the same quality educational experience today that you had when you were a student. We provide in this newsletter an envelope for sending a gift to the department, and on this page a form for identifying which area you would like to donate to, and for making a gift with a credit card. Although the CU Foundation manages our gift money and endowed accounts, it works best for us if you send your gift directly to the geology department so we get it into the right account and acknowledge that we received it.

On the back page of this and every newsletter we list the names of those who have donated to our program over the last calendar year. To all these individuals and corporations I would like to express my thanks on behalf of all the faculty, students and staff of the department.

Geology In the Field

Field geology remains an essential element of our educational program. The faculty organize numerous field trips in order to teach students geology in the field and not just in the classroom. These trips range from short 3 hour excursions around the Boulder area for both majors and non-majors in our introductory geology courses, to one day and weekend trips in the Colorado Rocky Mountain region for our undergraduate majors and graduate students, as well as special week to ten day trips to areas of unique geologic interest and importance on the west coast, in Mexico, the Basin and Range,



19 students in the Volcanology field course (Geology 4711/5711) gather in the ceremonial cave within the Bandelier Tuff at Bandelier National monument, New Mexico.

Yellowstone Park, and on occasion Hawaii.

Many of these field trips are directly associated with the field courses for our majors. Our department has never run a summer field camp. In the past we had one four-credit field course required for all our majors, but currently we have a modular system such that each undergraduate geology major must take six credits of field geology by taking three separate two-credit field courses. One of these two-credit modules is an introduction to standard and modern field methods which teaches all our majors such things as how to measure strike and dip with a Brunton compass, as well as how to use GPS (Global Positioning System), GIS (Geographic Information System), and both air photos and high-resolution remote satellite images to construct geologic maps and cross-sections. The other more advanced field courses, which are also open to graduate students, focus on specific areas of geology such as stratigraphy, ore deposits, volcanic and metamorphic rock, structural geology, hydrogeology, geophysical field techniques, geomorphology, environmental chemistry and the regional geology and tectonic evolution of the western U.S. Thus we have increased our field geology requirements for our undergraduate majors, and provided a mechanism for them to interact with a larger number of different faculty in the field then in the past.

In general the department covers only the vehicle costs associated with ground transportation on these trips, so that students and faculty pay their own food and lodging during extended trips, and their own plane fares if a trip begins outside of Boulder, such as the trips to the west coast or Hawaii. Students pay a course "fee" ($21) to cover the transportation costs associated with these field courses. However, the money generated by this course fee covers only about one-half of our actual yearly field trip transportation budget. Also, many of the field trips the department runs are not associated directly with field courses. For instance, the major courses such as mineralogy, petrology, structure, hydrogeology, stratigraphy, geophysics, paleontology, and petroleum geology are basically lecture and laboratory courses, not field courses, and therefore do not generate money from course fees for transportation. However, these courses will typically involve one or two day or weekend field trips that are essential for demonstrating the material of the course in the field. Also many graduate courses, described as either lecture or laboratory courses or seminars, involve field trips, although students in these courses do not pay transportation fees.

In order that our faculty continue to be able take our students into the field to learn, we need to raise extra money to support field courses above and beyond that generated by field course transportation fees. The Advisory Board perceived this need a few years ago. They agreed that teaching geology in the field was a fundamental aspect of our education program and they also identified field geology as an aspect of their own education about which they had fond memories. For this reason they suggested creating an endowment from alumni gifts to support our field program. This initiative to create the "Geology in the Field Endowment" has been a major focus of our fund raising effort among our alumni over the last two years. Last year we mailed a brochure concerning this fund to each of our 2,000 alumni, and in the fall members of the advisory board telephoned alumni asking for support for this initiative.

The goal of this "In The Field" initiative is to create an endowment of $500,000 to provide support for the costs for field trips not met by student fees. Currently we have raised $70,000 for the Geology In The Field endowment, and both last year and again this year, William Hiss had provided a $25,000 challenge grant to match any donation made into this account. We certainly hope to meet this challenge in the next year on the way to our $500,000 ultimate goal.

If you remember field geology as one of the more motivational and effective aspects of your educational experience as a geology student, and would like to support this opportunity for current and future students, please consider making a gift to the Geology In The Field endowment. This endowed account will remain available to the department in perpetuity, and we will only spend the interest generated by the account each year.

Graduate Fellowships

Graduate education is a fundamental aspect of our program, and an MS degree has long been considered the entry degree into the profession. We currently have approximately 100 graduate students working towards advanced degrees in our program. Graduate students are a key element in both our research and teaching program.

To compete with other universities for top graduate students we need to be able to offer financial support packages that allow our students to concentrate on their studies and also provide funds for their research projects during the three to six years they spend obtaining either an MS or a PhD degree. We do this for some students (approximately 12 at any one time) by providing Teaching Assistantships (TA's) to students who teach laboratory sections of our introductory geology and undergraduate major courses. Faculty with research grants also recruit students by providing Research Assistantships (RA's). We also have some endowed fellowship accounts for support of graduate students, but nowhere near as many as some of the top public and private universities in the country.

One of our top fund raising goals is to increase the number of endowed graduate fellowships we have to support graduate students. It takes approximately $20,000 per year to provide a full 9-month support package, which includes both tuition costs and monthly stipend, for a graduate student. This means we need a $500,000 endowment to fully support a graduate for the academic year.

Students examine pumice erupted from the Valles caldera on the western edge of the Rio Grande rift near Los Alamos, New Mexico.

This year, however, we have a special opportunity created by Melissa and Anthony Moores, who pledged to match any new endowments for graduate fellowships over $125,000 with tuition. This means that at the moment, and until all their matching money is used up, an endowment of only $250,000 is required to fully support a graduate student, since the income from this endowment will be matched by the Moores challenge grant with tuition. We have already received one such $250,000 endowment for a graduate student fellowship from the estate of an alumnus, Waldo Rennie, class of 1916.

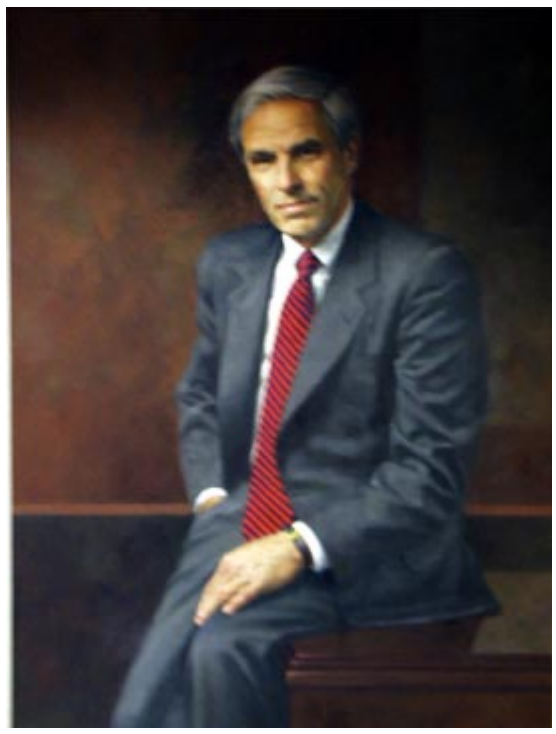
I would request that any alumni who would like to make an extremely worthy gift to support a graduate student consider making a contribution to a new or one of our existing graduate fellowship endowment accounts. A gift of either $125,000 or $250,000 will provide 50% to 100% support for a graduate student. Smaller gifts will enhance the value of our existent accounts which at the moment provide only partial, but still very valuable amounts of support, for our graduate students. These endowed fellowship accounts include the John Edwards Graduate Fellowship Endowment, the Jeffrey Deen Memorial fund, the "Graduate Fellowship in Geological Sciences" funded by a family which prefers to remain anonymous, the Zena Hunter endowment for a woman PhD student, the Warren O Thompson Fund, the Waldrop Fund, the Longley-Wahlstrom-Warner Fund, and the Bruce Curtis endowment. If you would like to send a contribution for one of these graduate fellowship endowments, but desire more information about them, let us know and we will try to answer your questions.

Departmental Discretionary Fund

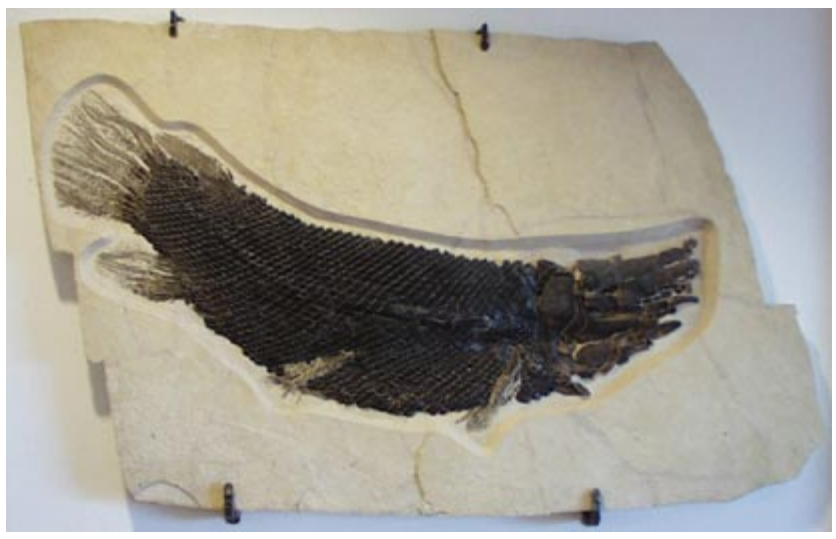
Many alumni send us gifts for our departmental discretionary account. We use this money for a number of important aspects of our program that would not exist without these gifts. One is our newsletter. The university is considering providing every department a budget line to support a newsletter, but this has not happened yet. It costs us approximately $7,000 to print and distribute our newsletter to our approximately 2,000 alumni. Our discretionary account also supports the two meetings a year of our advisory board, which has been very beneficial for both improving our educational program and for further fund raising such as the Geology In The Field initiative. We also use our discretionary account to host a small ceremony for our graduating students three times a year at the end of the fall, spring, and summer semesters, departmental get-togethers such as our annual spring awards assembly held each April to honor our most outstanding students, and the weekly colloquim series.

Finally discretionary money is important for addressing many small items and initiatives which allow us to maintain and improve our program independent of the general budgetary condition of the university. As chair of the department, the discretionary account makes my work much more effective. For all those who have donated to this account in the past – thanks.

Art in the Building



Oil-painting portrait of Bruce Benson, which Bruce's wife Marcy gave Bruce as a Christmas present this year, and which hangs in the first floor lobby of our still new Benson Earth Science Building in honor of Bruce's generosity to the department.



Fossil gar (*Lapisosteus simplex*) from the early Eocene Fossil Basin of the Green River Formation, near Kemmerer, Wyoming. This and other attractive and educational etched and polished slabs of rocks and fossils are on display in the Benson Earth Sciences Building thanks to Roy Young, owner of Natures Own in Boulder and Nederland.

Donors to the In The Field Endowment

Jeffrey T. Abbott
John T. Andrews
Margaret M. Baker
Frederick L. Barnard
Nancy K. Barnard
William C. Bradley
James A. Bush
Douglas K. Childs
Jon J. Connor
James A. Cosby
Berton W. Coxe
Anthony J. Crone, Jr.
Charles Cunningham, Jr.
Cheryl L. Cunningham
D Keith Murray & Associates Inc
Gary C. Daniels
Claire B. Davidson
David F. Davidson
Dr. Bruce A. Geller
Richard J. Goldfarb
Estate of Harry D. Goode
Gerald R. Grocock
Prf. Timothy L. Grove
Leonard W. Heiny
Marilyn F. Heiny
William L. Hiss
Ben M. Irvine
Dennis Irwin, Jr.
Marie M. Janzer
Victor J. Janzer
David R. Johnson
Prf. William R. Judd
Carl A. Jurie
Dr. Karl S. Kellogg
Dr. Nancy R. Kellogg
Eric M. Leonard
Alan P. Lester
Barbara D. MacMillan
Dr. Beverly McMahon
D. K. Murray
Ocean Energy Inc
James D. Orner
Elwin M. Peacock
Jane Breitenstein Peacock
Eric L. Pierson
Kathleen H. Pierson
Marith C. Reheis
Ann M. Reilly
Richard L. Reynolds
James G. Ritchie
Theodore A. Scambos
Donatella P. Scanniello
Mark A. Scanniello
Kenneth C. Shaver
C. G. Shearer
Eugene M. Shearer
Shell Western E & P
Matthew R. Silverman
John Small, Jr.
Hartmut Spetzler
David K. Swanson
Kathryn J. Tegtmeyer
Craig D. Thompson
Dederick C. Ward, III.
Alan Werner
Chandler T. Wilhelm
Laura V. Wilhelm
Felicie C. Williams
Gail V. Young
George C. Young, Jr.
Joseph A. Zamudio

AAPG June 2001

Denver, Colorado

CU Alumni cocktail party
Monday evening June 4

Check your AAPG registration for time and place

Reception and Open House
Benson Earth Sciences Building Open House
Tuesday evening June 5

Check our web page for further details

Gift & Deposit Information: (Select only one type per transmittal)

Check (or cash) in the amount of: _____

Credit Card Type & Number: _____

Exp: _____ Day phone: _____

Cardholder signature: _____

Securities (stock): _____
(NOTE: attach security valuation packet)

Other: _____

Please deposit this gift to:

Fund Name:	Geology In The Field	**Amt:**	$
Fund Name:	Graduate Endowed Funds	**Amt:**	$
Fund Name:	Geological Sciences General Gifts	**Amt:**	$
		Total:	$

should equal gift total

Additional Gift Information:

This gift is in memory of: _____
This gift is in honor of: _____

This gift will be matched by: _____
(Name of Employer)
Matching gift form Attached: ☐
This is a corporate matching gift for: _____

Please mail all donations to:

Department of Geological Sciences
University of Colorado at Boulder
399 UCB
Boulder, CO 80309

Library News

What's new in the Jerry Crail Johnson Earth Sciences and Map Library?

By Suzanne T. Larsen

The most obvious new development in the library is that we have changed our name. The Map Library has been a huge success since moving over to Benson Earth Sciences with the Earth Sciences Library in 1998. We have a large, diverse user base from all over the campus and the community but we hope that the name change will better identify the location of the Map Library for those who haven't found it yet. Check out the Map Library Web Page at http://www-libraries.colorado.edu/ps/map and look at the online "Web resources" section for links to great map sites on the Web. This is created and maintained by our Map Librarian, Beth Filar.

We now have access to over 4000 full-text online journals system wide, and over 80 journals in the Earth Sciences. For the most part these mirror our print collection but there is a growing list of journals that exist only online. These online journals can be accessed from any campus IP address, meaning we can provide desktop access for our students and faculty. This has really created a library with outwalls for the researcher, and has been especially helpful in interdisciplinary areas, like geophysics and geochemistry, where important journals often physically reside in other branch libraries. Most of the online journals are displayed through Adobe Acrobat, a graphic interface that allows the article to display and print out just like the print-set hardcopy version. Some even include live hyperlinks to other resources or data. All of this desktop access has not driven people away from the library, but rather to it in order to learn to access the resources we provide more thoroughly and efficiently.

On a less encouraging note, this fall the University Libraries, including the Earth Sciences Library, was compelled to do what most of the major universities across the country have been doing for a number of years – cut our serials budget. Rising journal prices, inflation, and inadequate budget increases over a number of years forced a cut of 10% to the serial budget across the board. This is the first cut we have had to make in recent memory but it may not be the last. Journal titles that were cut were reviewed with geology faculty to minimize the impact on teaching and research. The possibility of cutting printed copies of journals in favor of online versions is not of any help in budgetary issues since retaining the online version without the print is as expensive or more expensive than keeping the hard copy.

Please feel free to drop by and say hello if you are in the area. If you have any library- related questions I can be reached at Suzanne.Larsen@colorado.edu or 303-492-4611.

COPIES OF THESES AVAILABLE !!!

If you completed a master's or Ph.D. thesis at CU in the Department of Geological Sciences, a copy of your thesis may be available to you. For many years it was required that a "Departmental" copy be turned in as well as one for the graduate school (which became the library copy) and an archival copy. We do not have the space to house the extra departmental theses any longer and are offering them to the authors for $25, which covers postage and handling. All those offered have been checked against our library collection to make sure that we have a circulating copy and an archival copy. Not all theses are available.

Departmental copies did not exist for all and the departmental copy was used to fill in for any missing circulating copy. In some cases maps in the departmental copy will be incomplete because they have been taken to relace lost maps in the circulating copy.

This offer is good until December 31, 2001. Until that date we will only supply the thesis to the author or a family member of the author. If you would like to request a thesis that is not your own, the remaining theses will be available to anyone after the deadline. You may submit your request for one of these in advance if you wish.

View the list of theses and order form at: http://www.colorado.edu/GeolSci/ then click on News on the left hand side. If you have any questions contact Suzanne Larsen at 303-492-4611 or Suzanne.Larsen@colorado.edu.

News from the Geological Section of the Museum

Peter Robinson

Perhaps some of you are wondering what has happened to the old Geology Building. It is currently being renovated for use by the museum as a collections building and all of the Geological collections currently stored in Hunter Building will be moved there later this year. There will be much more modern collection/research space and also classroom space for collection oriented instruction. There will be three faculty offices for geologists, one to occupied by Dena Smith, our new invertebrate paleontologist, one to be occupied by Peter Robinson (until he retires in September 2002) and one for another paleontologist. There will be library, research, processing and preparation space for faculty and students.

During the past year we finished a major collections improvement grant from NSF which allowed us to catch up on much needed curation and to make more material available for research. This grant and the preparations for the move have occupied much of Robinson's time for the past year.

Robinson is continuing his research on the Eocene faunas of Wyoming and Colorado.

EMARC

In spite of the volatile changes in the petroleum industry during the past two years, EMARC remains strong, and continues to grow and build many significant additions to its existing infrastructure.

1. Six companies recruited this past fall. Students received both summer intern and permanent offers. Continued efforts are being made to increase the number of companies recruiting. To place this in perspective, five companies who recruited here during the past three years no longer exist (Amoco, Arco, Mobil, Texaco, Vastar).

2. The new core facility in the basement is being finished during spring 2001. This 1200 square foot room will be used as both a teaching and research facility. The room is designed to store both lithified rock cores and unlithified sediments. It consists of two long examination tables, and many storage shelves. Donations of core for teaching and research are being solicited. In addition, a cool storage unit (<40 degrees F) is included to store cores of unlithified sediments from the deep Gulf of Mexico reservoirs. The room will be dedicated in June associated with the AAPG Convention.

3. The bp Center for Visualization is being established this year, from a $10.5 million donation resulting from the bp buyout of Arco. The center will eventually be run by Geoff Dorn, formerly a senior research scientist at Arco's Research Lab in Plano, TX, and the designer of the CAVE. Geoff gave a one hour presentation at the January Gulf of Mexico consortium meeting. We are now discussing ways of mutual research between the existing research programs and Geoff's new center.

4. A new professorial position in reservoir geosciences is being recruited for this winter. Hopefully, the department will have a successful candidate hired by this coming fall to expand upon our existing programs.

5. On December 7th, Andy Pulham ran a one-day consortium meeting in Houston, immediately following the GCSSEPM Research Conference. This meeting reflects the final results of a four year- marginal-marine reservoir consortium. On January 10 and 11, the first meeting was held in Boulder associated with the new Gulf of Mexico research consortium. The meeting had 60 attendees, representing 23 companies. The meeting included 15 presentations by students and research scientists. Bruce Trudgill, now a lecturer at Imperial College, flew from London to present the results of his portion for the first year research. Research results were distributed in a pdf format on CD-ROM's. This allows for the supporting companies to place the results on their internet sites so that all employees can access the research results.

6. A new major research project is being started to study the Lower Pennsylvanian turbidite outcrops of western Ireland. These outcrops are used by several companies as a primary training ground for deep-water short-courses. The goals of the project are to collect shallow cores (<100 m) behind the outcrops and wireline logs. The information will then be used to address reservoir issues, such as continuity and upscaling for reservoir models and simulation. The project is being done between CU, Andy Pulham (Memorial University), Trevor Elliott (University of Liverpool), and Peter Haughton (University of Dublin).

7. There have been several ongoing changes in personnel in the center. David Knapp, the systems administrator for seven years, took a job at NCAR as a systems administrator. This was a wonderful career move for David—we are most grateful that he stayed for seven years and kept the center running smoothly. John Roesink, who is completing his MS in geology, took over in July as the new systems administrator. In his first official act, John immediately rearranged all of the computers and furniture in the lab, creating the illusion of progress, while ensuring his job stability because no one could find anything and they were immediately reliant on him.

Renaud Bouroullec joined us as post-doc in structural geology. Renaud, born and raised in Brittany and a PhD from Imperial College, is working on the GOM consortium. In April, Olivier Serrano will join us working in sequence stratigraphy in the deep GOM. He received his PhD from the University of Rennes. We are currently hiring a post-doc researcher in petroleum systems modeling. Colleen Velie continues as the center's administrative assistant. She is now in her twelfth year at the Center.

Finally, with great sadness, we report of the departure of Andy Pulham, who accepted a professorial position at Memorial Unviersity in St John's, Newfoundland. Andy has done a superlative job running the reservoir research program since October 1995. He has distinguished himself in his research, culminating in being chosen an AAPG Distinguished Lecturer in 2000-2001. We will continue to collaborate with Andy on a number of projects, specifically the Ireland coring/logging project. Andy's new position has tremendous upside potential; as the major offshore Canadian fields are being brought on line, there is now major captial investment into the local University system. We wish Andy the very best in his future efforts in Canada.

EMARC Group (left to right) John Roesink, Renaud Bouroullec, John Martin, Chris Morton, Colleen Velie, David Pyles, Hector Gonzalez

ASTROBIOLOGY AT CU

The interdepartmental program in astrobiology entered its third year of NASA support this past year, out of an initial five-year grant. This year, we hired a new faculty member in astrobiology in Geological Sciences—Steve Mojzsis, who works on the ancient terrestrial environment and implications for the earliest life on Earth. We also added a co-investigator in the area of the biochemistry of metabolism, Prof. Shelley Coply from Molecular Biology; this brings us to a total of nine investigators supported through the astrobiology grant, spanning the physical and biological sciences and reaching into the humanities.

The astrobiology group this year supported a public symposium on the nature of intelligence and the potential for intelligent life elsewhere. Over five hundred people attended. In addition, a workshop was convened that brought together all of the faculty and students here at CU who have an interest in astrobiology; about 75 attended.

The CU astrobiology group is one of eleven groups nationally, funded through the NASA Astrobiology Institute program. Our goal is to provide broad, interdisciplinary training in the field of astrobiology, while also giving students the in-depth training in their home discipline that will allow them to make substantial progress in understanding the potential for life elsewhere. Faculty and students involved in the program come from the Departments of Geological Sciences, Astrophysal and Planetary Sciences, Atmospheric and Ocean Sciences, Molecular, Cellular, and Developmental Biology, Environmental, Population, and Organismic Biology, and Philosophy. The effort is led by Prof. Bruce Jakosky of Geological Sciences.

Undergraduates Use GPS and GIS Technologies

by Henrietta Laustsen

The curriculum of Geology 3050, 'Computer Assisted Geological Techniques", has undergone big changes in the past two years. Course fee money has allowed us to purchase eleven Global Positioning System (GPS) receivers. Students are each given a receiver at the start of the semester, and use it for various projects throughout the semester. Students are also encouraged to "play" with the receivers on their own. GPS data are downloaded from the receivers to the computers in our computer lab, and incorporated into Geographic Information System (GIS) databases.

Students work with the GIS software ArcView throughout the semester, gaining proficiency in making and manipulating spatial databases and their associated maps. GIS is a powerful technological tool for visualizing spatial data, and familiarity with ArcView is increasingly requested of job applicants in Earth sciences.

The focus on GPS/GIS technologies in 3050 has been so popular that a second course in GIS, Geology 4700 "Topics in GIS", has been added to the department's courses. This course focuses on extensions to the ArcView software that we do not have time to cover in 3050. The extensions on which we concentrate in 4700 are ArcView Spatial Analyst and ArcView 3-D Analyst. These make available complex three-dimensional analytical tools, as well as 3-D maps of database features.


Students gathering GPS data

Future plans include real-time field observations using ArcPad GIS running on a handheld computer. A wireless internet connection will allow remote data acquisition via ArcIMS, the Internet GIS. Students will be able to view GIS-based maps of their location, and their position on those maps in real-time as measured by a GPS receiver. The combination of GPS, GIS and wireless communication is at the forefront of evolving field techniques, and it will be really exciting to expose our students to it!


Geology 3050

Staff list and e-mail addresses

Faculty

John Andrews
andrewsj@colorado.edu

Gregory Asner
gregory.asner@colorado.edu

Bill Atkinson
atkinson@colorado.edu

Roger Bilham
roger.bilham@colorado.edu

David Budd
david.budd@colorado.edu

Lang Farmer
farmer@terra.colorado.edu

Raymond Fletcher
fletcherr@colorado.edu

Shemin Ge
shemin.ge@colorado.edu

Alexander Goetz
goetz@CSES.colorado.edu

Bruce Jakosky
jakosky@argyre.colorado.edu

Craig Jones
cjones@CIRES.colorado.edu

Mary Kraus
mary.kraus@colorado.edu

Gifford Miller
gmiller@colorado.edu

Stephen Mojzsis
mojzsis@colorado.edu

Peter Molnar
molnar@terra.colorado.edu

Karl Mueller
muellek@colorado.edu

Kathryn Nagy
kathryn.nagy@colorado.edu

Peter Robinson
robinsp@colorado.edu

Anne Sheehan
afs@terra.colorado.edu

Dena Smith
dena.smith@colorado.edu

Joseph Smyth
joseph.smyth@colorado.edu

Hartmut Spetzler
hartmut.spetzler@colorado.edu

Charles Stern
sternc@colorado.edu

James Syvitski
syvitski@colorado.edu

Paul Weimer
paul@emarc.colorado.edu

James White
jwhite@colorado.edu

Attendant Rank Faculty

John Drexler
john.drexler@colorado.edu

Emeritus Faculty

Peter Birkeland
peter.birkeland@colorado.edu

William Braddock
william.braddock@colorado.edu

William Bradley

Bruce Curtis

Don Eicher
don.eicher@colorado.edu

Carl Kisslinger
kissling@CIRES.colorado.edu

Edward Larson
elarson@worldnet.att.net

Mark Meier
mark.meier@colorado.edu

Jim Munoz

Don Runnells

Ted Walker

Adjunct & Adjoint Faculty

Philip Choquette
choquette@colorado.edu

Fred Kruse

John Edwards

Anne Jennings
anne.jennings@colorado.edu

Roy Kligfield
72752.3303@compuserve.com

Lawrence James
jamesgeoa@cs.com

Kirk Nordstrom
dkn@usgs.gov

Douglas Robertson

Professional Research Assistants

Briana Constance
constanb@colorado.edu

Dan Mitchell
mitchedw@colorado.edu

John Roesink
john.roesink@colorado.edu

Colleen Velie
colleen@emarc.colorado.edu

Emily Verplanck
emily@cires.colorado.edu

Research Associates

Barry Bickmore
bickmore@colorado.edu

Bruce Boher
bboher@aol.com

Pierre Dick

Susanna Gross
susanna.gross@colorado.edu

Sharon Hall
shall@colorado.edu

Kathy Heidebrecht
kathy@CSES.colorado.edu

Fred Luiszer
fred.luiszer@colorado.edu

Michael Schlegel
schlegem@colorado.edu

Alexandra Skewes
skewes@colorado.edu

Teaching Associates

Lisa Barlow
lisa.barlow@colorado.edu

Emmett Evanoff
emmett.evanoff@colorado.edu

Alan Lester
lester@colorado.edu

Henrietta Laustsen
henrietta.laustsen@colorado.edu

Staff

Marge Atkinson
atkinsm@colorado.edu

Paul Boni
bonip@colorado.edu

John Drexler
john.drexler@colorado.edu

Beth Hanson
hansonb@colorado.edu

Lisa Massengill
lisa.massengill@colorado.edu

Ya-Wen Zhang
ya-wen.zhang@colorado.edu

Visit the Department of Geological Sciences Web Site at: http://www.colorado.edu/geolsci/

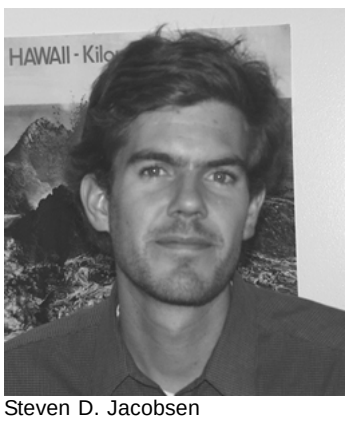
Outstanding Student Award

The AGU All-Union committee for Mineral and Rock Physics (M&RP) presented their 2000 Outstanding Student Award to Steven D. Jacobsen during the M&RP and Nonlinear Geophysics Reception. The reception was held during the AGU 2000 Fall Meeting in San Francisco. Steven Jacobsen expects to receive his Ph.D. in 2001 from the Geophysics Program at the University of Colorado Department of Geological Sciences under the supervision of Hartmut Spetzler.

He received a B.A. (1995) and a M.Sc. (1998) at the University of Colorado, under the supervision of Joseph Smyth.

Jacobsen is being honored for his measurements of structure and elasticity of $(Mg_1Fe)O$ at ambient and high pressures carried out in Boulder and at the Bayerisches Geoinstitute in Bayreuth, Germany. His work is an important contribution to our understanding of the Earth's lower mantle.

Currently , Jacobsen is a graduate research fellow at the Cooperative Institute for the Research in Environmental Sciences (CIRES), and the Department of Geological Sciences in Boulder.



Steven D. Jacobsen


One of the many high fiord walls along northeastern Baffin Island

Degrees awarded

B.A. Geology Majors

Spring 2000

Jeremy Todd DeBolt	Wendy Janine Hooten	Elizabeth Ann Ramsey
Jane Elizabeth Folger	Dierck Dietrich Kersten	Adam Harris Soldinger
John Marvin Garrett Jr.	Angela Catherine Myers	Michael James Tanner
Jordan Micah Holtz	Nicholas Reed Pietsch	Sean Sundermann

Summer 2000

Brett A. Bardsley	Peter Thomas Foister

Fall 2000

Matthew Brabeck	Steve Lawless	Jessica Rossi
Jacob Cinnamon	Martina Litasi	Cynthia Preller-
Matthew Ensminger	Rebecca Moore	Schlenker
David Larimer	Eric Roach	John Yerton

M.S. Candidates Graduating with Degrees

Spring 2000

Julia Caldaro-Baird	Weimer	Stratigraphic Analysis and Reservoir Characterization of theStagecoach Draw Feild, Upper Cretaceous, Southwestern Wyoming
Wendy Freeman	Andrews	Use of Lake Ice Records to Detect Climate Variability in the Eastern Canadian Arctic by using Observational Data and a Lake Ice Model
Sarah (Sunny) Klaber	Andrews	The Geologic History of the Southern Wrangell Mountains and the Kennicott Valley: A Visual Journey
John Marler	Ge	The Impact of the Elkhorn Fault on the Hydrogeology of the South Park Region, Park County, Colorado
Eric Nelson	Weimer	The Modeling, Sensitivity analysis, and Kinetics of Source Rock Maturation along a Megaregional Restoration in the Northern Gulf of Mexico Basin
Stephanie Schoolfield	Andrews	Late Pleistocene Sedimentation in the Denmark Strait Region
Amanda Warner	Goetz	Quantifying Fractional Ground Cover on the Climate Sensitive High Plains Using AVIRIS and Landsat TM Data

Summer 2000

Molly Zorba Bentley	Birkeland	Sackung and Sackungen Development and Distribution Chabenec, Slovakia and Encampadana, Andorra
Alex Machado	Pfeffer	Spatial and Temporal Variability of Meltwater Pathways in a Continental Subalpine Site
Alex Robertson	Miller/Peck	Simulated and Observed Climate Variability of the Last 500 Years

Fall 2000

Josh Cohn	Pfeffer	Columbia Glacier Dynamics or The SurfaceStrain Rate Field at the Columbia Glacier Calving Margin
Dan Costello	Pfeffer	
Kevin Dumont	Budd	The initiation of hypogene caves in fractured limestone by rising thernal water: A numerical modeling study with implications for caves of the Black Hills, South Dakota
Sean Pack	Miller	Drought in the Northwest Australian Outback: Isotopic Records of Ecologic Change From Lake Gregory, WA
Jake Wegmann	Pfeffer	A Modeling Approach to the Investigation of Ice Falls on the Worthington Glacier, Alaska

Ph.D. Candidates Graduating with Degrees

Spring 2000

Rebecca Bendick	Bilham	Dynamics of the Himalayan Tensile Arc (Geophysics Program Degree)
Gordon McCurry	Ge	Modeling the Effects of Climate Change on the Hydrology and Water Rights of a Semi-Arid Irrigated Watershed.

Summer 2000

Abbas Sharaky	Atkinson	Genetic Relationship Between Porphyry and Epithermal Deposits at Jamestown, Colorado
Kristie Tiampo	Rundle	Pattern Dynamics in Southern California Seismicity

Fall 2000

Donny Barber	Andrews	Laurentide Ice Sheet Dynamics 35-7 ka: Sr-Nd-Pb Isotopic Provenance of NW North Atlantic Margin sediments.
Mike Kerwin	Overpeck/ Miller	Quantifying and Modeling Holocene Climate Variability based on Modern and Fossil Pollin Records from the Eastern Canadian Arctic and Subarctic.
Sarah Martinez	Goetz	Study of the Infrared Spectra of Phyllosilicates Through Direct Measurements, Quantum Mechanical Modeling, and Analysis of AVIRIS Imaging Spectrometer

Nicholas Pietsch

Elizabeth Ramsey

Graduate Awards for Spring 2000

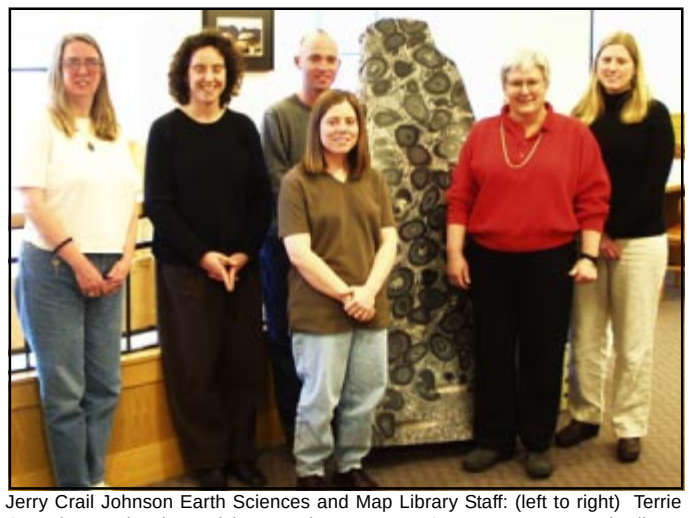
AWARD	RECIPIENTS
Association of Women Geoscientists (AWG)	Robin Martin Mikie Smith
Bruce Curtis Fund	Peter Morris John Roesink Sean O'Connor
Jefrey Deen Award	Worth Cotton
Longley, Wahlstrom, Warner Memorial Scholarship	Steve Jacobson Tanya Unger Lorna Jaramillo
W. O. Thompson Award	Steve Schultz Erich Heydweiller Stephanie Tomusiak
Waldrop Memorial Scholarship	Jason Briner Stephanie Gaswirth Jacob Waples Melissa Lester Vickie Rystrom Alex Tate
American Federation of Mineralogical Societies Grad Fellowship	Seth Mueller Eric Anderson
American Geological Institute Minority Geoscience Scholarship	Lorna Jaramillo

Undergraduate Awards for Spring 2000

AWARD	RECIPIENTS
AWG	Angela Catherine Myers
Estwing	Doc Richardson
T. Keith Marks Scholarship	Beth Van Vurst Carlos Perez
RMAG pick	Julianne Macie
Johnston Memorial Scholarship	Joe Eichenauer Jordan Holtz Erica Manteuffel Jessica Rossi
RMAG Fellowship	Tim Farnham

William L. Hiss Creativity Awards for 2000

Peter Birkeland	Lynda Lastowka
Oliver Boyd	Karen Lewis
Isla Castaneda	David Mixon
Gita Dunhill	Chris Morton
Tim Farnham	Sarah Principato
Otina Fox	David Pyles
Stephanie Gaswirth	Mikie Smith
Hersh Gilbert	Cheree Stover
Stephen Jacobsen	Ryan Vachon



Jerry Crail Johnson Earth Sciences and Map Library Staff: (left to right) Terrie O'Neal, Naomi Heiser, Rick West, Ilene Raynes, Suzanne Larsen, Beth Filar

Department of Geological Sciences Office Staff: (left to right) Beth Hanson, Marge Atkinson, Lisa Massengill, Ya Wen Zhang

DEPARTMENT NEWS

Journal of Sedimentology

Nearly a year ago David Budd and Mary Kraus began an elected four-year term as Co-Editors of the Journal of Sedimentary Research (JSR). As a result, that journal's editorial office is now housed in the Department. JSR is the oldest earth science journal dedicated to the field of sedimentology. Now in its 71st year, JSR continues its long tradition of publishing papers that become benchmark contributions to sedimentary geology. The journal is published by the Society for Sedimentary Geology, which is also know by the acronym SEPM. JSR is broad and international in scope and publishes papers that further the fundamental understanding of sedimentary processes, the origin of sedimentary deposits, the workings of sedimentary systems, and the records of earth history contained within sedimentary rocks.

The journal contains about100 articles a year, most of which are original research papers, although papers on new research methods are also included. The editorial office receives over 200 new manuscripts a year, from which ~100 are eventually accepted and published. Choosing which 100 manuscripts make it into the Journal is the primary task of Mary and David, and they use a number of Associate Editors and reviewers from around the world to advise them through the peer review process. Communicating with reviewers, authors, and associate editors, as well as processing and tracking all those manuscripts (and their revised versions) can be a daunting task, but David and Mary have the very capable help of editorial assistant Tina Brachle, a 1998 graduate of Colorado College. Once the papers are accepted, Melissa Lester takes over and guides each manuscript through the production and publishing phase. Melissa has a BS from CU, and is working on her MS degree under Peter Robinson's supervision. Both Melissa and Tina are housed in JSR's editorial office on the 3rd floor of the Benson building.

David and Mary agreed to be Editors on the assumption that the opportunity to see so much good science long before it was actually published would be intellectually stimulating. After one year on the job they claim the job has lived up to their expectations, although they already anticipate the day when their mailboxes are not filled twice a day to the brim.

Having any international journal housed in the Department certainly draws attention to our programs and faculty and is considered to be a positive contribution to the larger scientific community. In this regard, David and Mary follow in the footsteps of emeritus professor Jim Munoz who edited the Journal of Metamorphic Petrology from an office in the old Geology building for many years in the 1980s.

Anyone interested in more information on the Journal can check our website at:
http://spot.colorado.edu/~jsedr/

ADMINISTRATIVE OFFICE NEWS

By Beth Hanson

The staff in the administrative office WELCOME the opportunity to assist the faculty and students of Geological Sciences and will endeavor to do so in a timely, friendly and efficient manner. Alumni, Friends and others seeking departmental information are welcome to stop by the office and our staff will be happy to help you, or give you the information needed to obtain assistance.

The CU campus continues to be traumatized by the advent of the new PeopleSoft Human Resources/Payroll/ Benefits system activated on July 1, 2000. The use of the PeopleSoft financial system that we have been using since July 1, 1999 and the new HR system both require a great deal more time from all staff whose positions require their use. We are adjusting in this department by shifting some work, working some longer hours and the augmentation of our front desk position from a one-half-time position to full time as of 01/01/01

Unlike last year, several of our staff have recently moved on to other departments. Joyce Bograd has moved to MCDB and Kathleen Freeman has moved to the Museum Field Studies Program. Our student assistant, Amy Snee, opted not to work the Spring Semester as she is planning to carry extra hours so she can graduate in May. Consequently, we have all new faces in our front office.

Lisa Massengill came to Geological Sciences on 01/03/01, from Comparative Literature and Humanities to fill our Administrative Assistant II vacancy. This position handles reception, answers phones, greets and assists students and visitors to the department, schedules transportation, inputs the departmental academic scheduling for the Schedule of Courses, plus a myriad of other duties necessary for the smooth operation of the department. Lisa fulfills the demands of her position with great enthusiasm, attention to detail, eagerness to learn, accuracy and a wonderful sense of humor as she navigates through the ins and outs of her new position.

Marge Atkinson, who is filling the Graduate Program Assistant Position, (Administrative Assistant III), came to our Department from the Colorado Department of Transportation, and prior to that, the School of Music here on campus. Marge joined the departmental staff on 11/13/00. Marge is rapidly learning the ins and outs during one of the busiest times of the year for her position, graduate student admissions for Fall 2001. Marge is becoming familiar with the Graduate Program rules for both the department and the Graduate School. She is rapidly learning to assist the grad students with information, paper work, and the continual update of records to be sure students are on track from application to graduation. Marge approaches her position with a quiet enthusiasm, attention to detail, patience and contagious congeniality.

Fortunately for us, Ya-Wen Zhang continues as our Accounting Technician III. Ya-Wen carries out her departmental accounting responsibilities of reimbursements, account reconciliation, ordering equipment, teaching and technical supplies, along with grant account management in a quiet efficient manner, tempered with good humor and a desire to continue learning and improving her skills. She is a great asset to the department.

Our new student assistant, Karen Man Ying Cheung began work in the Department on 1/15/01. She is already demonstrating exceptional skills with attention to detail and accuracy as she acquaints herself with the Department. Karen Man Ying is a pleasant and welcome addition to the front office staff. Her diligence makes all of our jobs easier and ensures filing and other such duties are taken care of in a timely manner.

As lead Departmental Administrative Officer I wish to welcome our new staff and to thank ALL of the staff for their wonderful team spirit. This cohesiveness makes managing a smooth and efficient front office operation a pleasure as we work together to accomplish the multitude of large and small tasks essential to the Department's operation.

Colloquium speakers, 2000

Tom Ahlbrandt, USGS
Future Oil and Gas Resources of the World: Unresolved Issues

John Andrews, University of Colorado
Changes in the Hydrography and Land/Ocean Interactions on the Iceland Margin: Results from High-Resolution Marine Cores

Scott Bair, Ohio State University
Groundwater Contamination at Woburn, Mass.: What The Experts Said at Trial,What We Know Now

Karen Chin, Stanford University
New Facts From Old Feces: Tapping the Information Available in Lithified Coprolites

Geoffrey Dorn, University of Colorado, Visualization Center
The Role of Visualization in Modern 3-D Interpretation

James Farquhar, University of California - San Diego
New Insights Into Atmosphere-Surface Interactions and Planetary Atmospheric Evolution Through Analysis of Multiple Stable Isotopes of Oxygen and Sulfur

Chris Fedo, George Washington University
Sedimentary Petrogenesis of the Paleoproterozoic Serpens Formation (Huronian Supergroup) Using an Integrated Provenance and Paleoclimatic Approach

Dr. Carol Finn, USGS
Collapse-prone hydrothermally altered zones at Mt. Rainier, Washington revealed by aerogeophysical measurements

Dr. Eric Gaidos, California Institute of Technology
Astrophysical Origins, Geophysical Conditions and Biological Consequences

Alex Goetz, University of Colorado
Remote Sensing of the Earth; from Holocene Dunes to Swelling Clays

Richard Goldfarb, USGS
Lode Gold and Crustal Evolution - Patterns Through Space and Time

Jan Paul Heller, University of Wyoming
Dissecting the Visible Basin

Marika Holland, National Center for Atmospheric Research
The Role of Arctic Sea Ice in Climate Change and Variability

Liz Holt, University of Colorado
The Anatomy of a Fossil Fumarole: Active Volcanism and Water-Interaction in the Valley of Ten Thousand Smokes, Alaska

Gregory Hoppa, University of Arizona
Tidal Tectonic Process on Europa

Alan Lester, University of Colorado
The Roots of Historical Science - It's About Time

David Mao, Carnegie DTM
High Pressure - A New Dimension in Studies of Earth and Planetary Interiors

Dr. Stephen Mojzsis, UCLA
Vestiges of a Beginning: Oceans, Impacts, and Life On The Early Earth

Peter Molnar, University of Colorado
Late Cenozoic Closing of the Indonesian Seaway as the Missing Link Between Pacific and East African Climates (and Ice Ages too)

Gary Olhoeft, Colorado School of Mines
Searching for Subsurface Water on Mars

Jim Rustad, Pacific Northwest National Laboratory
Molecular Simulation of Chemistry at Complex Mineral-Water Interfaces

Anne Sheehan and Lang Farmer, University of Colorado
Probing the Depths of Continental Tectonics Beneath the Rocky Mountains: The Continental Dynamics of the Rocky Mountains (CDROM) Experiment

Robert Smith, University of Utah
Hotspots, Earthquakes and Evolution of Yellowstone and Grand Teton National Parks

Leslie Sonder, Dartmouth
Driving Forces for Deformation in the Western U.S.

James White, University of Colorado
New Developments in Carbon Cycling and Climate Change

Dr. Shuhai Xiao, Harvard University
Precambrian Paleobiology and Paleoenvironment On Our Planet: Astrobiological implications

The Departmental Office can be contacted at:

Phone: 303-492-8141
FAX: 303-492-2606
EMAIL: geolinfo@Colorado.Edu

Visit Us Online at:
http://www.colorado.edu/geolsci

UNDERGRADUATE STUDENT NEWS

With about 65 undergraduate courses listed (although not taught every semester), and three different tracks leading to a Bachelor's degree in Geology, our geology majors have a lot of choices to make. The Environmental Geosciences track has a focus on surficial processes; the Geology track is the most popular and broad-based; and the Geophysics track requires a substantial retinue of math and physics courses. Alan Lester, in his role as Undergraduate Advisor, helps our students to navigate through appropriate course choices for meeting degree requirements and matching eventual career and/or graduate school goals. Students get information from Alan through appointments, walk-in conferences, e-mail, and via group meetings.

With Hartmut Spetzler, Vice-Chair for Undergraduate Affairs and Honors Department Liaison, a number of meetings have been organized to dispense information about jobs, professional organizations, graduation with honors, graduate school, and research opportunities. At one of these meetings last spring, several Advisory Board members shared their professional experiences in industry, government, and private-sector consulting. Additionally, the Department of Geological Sciences has worked with CU's Undergraduate Research Opportunities Program (UROP) to offer a large number of research grants for our majors. This means that interested and motivated students can obtain a variety of experiences that bring them out of the classroom and into the world of professional geologists and research scientists.

Like all sciences, the Earth sciences are in a continuous state of flux. New technologies are being used in the lab, in classrooms, and in the field. Hand-held GPS receivers augment map and compass in the field; e-mail and internet communications are used alongside textbooks, overheads, and slides as teaching aids. While the faculty are leading and encouraging the use of modern techniques, they learn the rapidly changing technology along with the students and often from them. Courses in remote sensing, image analysis, and GIS facilitate the entry into computer based aspects of geology and make the students competitive in the job market.

Field geology, still a cornerstone of our discipline, involves a mandatory sophomore-level course and then the selection of two advanced field modules. There are presently eight advanced field courses, with Field Geophysics, Structural Field Geology, Field Mapping of Mineral Deposits, Environmental Field Geochemistry, and Igneous/Metamorphic Field Geology being taught regularly.

Other News

Jasper Hammond, 23, a CU, senior geology major, was seriously injured in a head-on collision on Tuesday night, January 2, 2001.

He was returning home from work when the driver of a stolen car who was traveling the wrong direction in Jasper's lane of traffic hit his car.

Jasper is now at home in his apartment and as of the last report we received, is able to get around on crutches/wheelchair. Jasper has had a number of surgeries and will require a minimum of 6 months rehabilitation before he is able to resume his studies in the Department of Geological Sciences where he was scheduled to graduate in May 2001.

Jasper is in need of a computer to continue working on his degree from home.

Contributions for living, medical and rehab expenses may be sent to the

Jasper Fund at Wells Fargo Bank
P. O. Box 660
Pagosa Springs, CO 81147.

2000-2001 undergraduate mentoring program

MENTOR	MENTOREE	PROPOSAL TITLE
Greg Asner	Valerie Morris	Solubility and Bioavailability of DOC, DIC, DON, DIN and its relation to land cover change.
Bill Atkinson	Stephanie Campbell	Petrochemistry and trace element chemistry from Moctezuma, Sonora, Mexico
Bruce Bohor	Julianne Macie	Sample preparation for radiometric analysis of altered volcanic ashes from southwestern Wyoming
Jason Briner	Jay Austin	Laurentide Ice sheet dynamics: Glacial Style and Chronology on Northeastern Baffin Island, Arctic Canada
Gita Dunhill	Vanessa Graves	Interpretation of high latitude marine records in terms of paleoclimate and depositional processes, Denmark strait between eastern Greenland and Iceland.
Tim Farnham	Adam Soldinger	Sedimentological and geochemical analysis of a paleosol in the Denver Basin
Shemin Ge	Joe Eichenauer	A Study of Hydrogeologic Response to Earthquakes
Mike Kaplan	Dierck Kersten	Construction of a high precision chronology of glacial deposits that have been difficult or impossible to date The work involves rock crushing, sieving of needed particle sizes, using non-toxic heavy liquids, acid digestion, cation ion exchange columns, perchloric acid, and ICP analyses to be carried out in the Cosmogenic Isotope Lab in the Benson Earth Sciences Building.
Karl Mueller	Maxwell Thompson and Matt Brabeck	Trishear modeling of the Uemachi Fault, a concealed active fault in Osaka, Japan
Kathy Nagy	Amy Gray	Testing of MgAl hydrotalcit and mesoporous silicate as cementing or grouting agents in constructing containment barriers in the subsurface with a goal of identifying and quantifying primary mineral dissolution and secondary phase precipitation reactions that could alter porosity and permeability and affect fluid flow paths.
Paul Murphey	Krystyna Kowalska	Detailed study of the stratigraphy and geologic map of the middle Eocene Bridger Formation of southwestern Wyoming in order to conduct meaningful evolutionary studies on its scientifically important fossil fauna.
Sarah Principato	Ryan Thomas	Resolution of the late Quaternary glacial history of part of NW Iceland, and to correlate the terrestrial record with the marine record of West Hunafloi, N. Iceland.
Peter Robinson	Carrie Tyler	Tracing of evolutionary change in a lineage of early Tertiary mammals. (The lineage of Arctodontomys - Microsyops, closedly related to primates).
Anne Sheehan	Joe Eichenaur	CDROM seismic experiment
Alex Tate	Grant Kier	Surface deformation in the 181 1/12 new Madrid earthquake sequence as inferred by folded sediments and past water levels across Reelfoot Lake, Tennessee.

GRADUATE STUDENT NEWS

Jason Briner began a research project on Baffin Island with Gifford Miller this year that aims to reconstruct the dynamics and chronology of Laurentide ice sheet fluctuations during the last glacial cycle. Field research was conducted last summer for three weeks near Clyde River, Nunavut, with geology major Jay Austin (a UROP/SURF awardee). They mapped glacier deposits and collected organic matter for radiocarbon dating and rock samples for cosmogenic exposure dating (which are currently being processed in the Benson Earth Sciences Cosmogenic Isotope Laboratory (room 335) with help from Jay and geology major Dan Goldstein). Not only was the summer successful scientifically, but Jay and Jason learned about some of the Inuit ways of life. They watched some new friends hunt seals and whales, inched their way through dense sea-ice packs in a small fiberglass boat, nibbled raw narwhal, and learned to relax (a bit) in polar bear country. Jason is currently planning his next adventure for late summer, 2001.

Jason Hainu (of Clyde River) and Jason Briner holding Narwhal tusk.

Debra Mickelson, a graduate student of Mary Kraus's, and researchers from Dartmouth College, and Indiana University have engaged in a cooperative study on public and private land in northern Wyoming of the 167 milllion year old Sundance Formation dinosaur tracks and the deposits that contain them. Debra's research is to reconstruct Jurassic landscapes, interpret the stratigraphic record using physical, biological, and chemical traces. Now these same researchers report the presence of an even older more extensive dinosaur track-bearing horizon. The new discovery occurs in a one-meter thick interval of rock in the Gypsum Spring Formation. Estimated to be 170 million years old, this newly discovered layer preserves evidence that dinosaurs that inhabited this part of Wyoming may have also been swimmers. The original 1997 discovery in the Sundance Formation of north-central Wyoming has resulted in the establishment of the Red Gulch Dinosaur Tracksite. This site, on public lands administered by the Department of the Interior, Bureau of Land Management (BLM), is a 40-acre area currently being developed by the BLM to become a dinosaur educational site accessible to the public.

Last summer, **Sarah Principato** completed her first field season in North Iceland, funded primarily by National Geographic. The focus of Sarah's project is to determine the Late Quaternary history of the Hunafloi region, N. Iceland, using terrestrial and marine evidence.

She completed a preliminary glacial geologic map of this region that includes moraines, striations, erosive glacial features, raised beaches, the Saksunarvatn Tephra, and more. In addition to the terrestrial fieldwork, Sarah is also studying marine cores near this region in order to link the terrestrial and marine environments.


Debra Mickelson demonstrates latexing techniques used for documenting footprints


A view south of Hunafloi, N. Iceland, Sarah Principato collecting a sample for cosmogenic exposure dating.

NEWS OF ALUMNI

Robert H. Butcher
(BA '60, MS '62)

Robert retired from the U.S. Office of Personnel Management on March 1, 2000. Bob worked in the petroleum industry from 1962 to 1986, and served as President for Queen City Exploration, Inc. He and his wife, Cynthia Clarke, live in Alexandria, Virginia. They have a son, Jim, and a daughter, Linda, and three grandchildren.

Wayne Cavender
(BA '49, MS '51, PhD '63)

Wayne was recently awarded the Ben F. Dickerson trophy by the Society for Mining, Metallurgy and Exploration, presented at the 2000 annual convention. The award recognizes Wayne's contributions to the mining industry, and his participation in the development of heap leaching technology for processing of low-grade gold ores. Ores containing as little as 0.2 gm/tonne of gold can be treated economically with this technology. Today, over half of the world's mined gold production is yielded with this technology. Wayne is now retired, and living with his wife, Ann, in Rogue River, Oregon.

Mark W. Davis
(BA '69, MSCE '82)

Mark sends us his update from the Land Board, where he has been working for nine years managing mineral activity on state lands in Colorado, the royalty from which goes to support K-12 schools. He currently holds the position of Minerals Director for the Colorado State Board of Land Commissioners. Previously, Mark was the Chief of the Minerals and Mineral Fuels Section of the Colorado Geological Survey. He has a son Jack, and a daughter Sarah.

James Ritchie
(BA '80, MS '85)

James writes to us from San Carlos, California. James married in May 2000 (first wife deceased), he has an 8-year-old daughter and has been with SECOR for 10 years since co-founding the San Francisco Bay area offices in 1990. He is looking forward to his annual visit to Boulder, CO in the fall.

Marcia R. Shapiro
(PhD '77)

Marcia is working on her last assignment before retiring in early 2002. She will be traveling around the world migrating Mobil map-based data into the merged system. Marcia reports, "the paleontologist has gone from geophysics to GIS expert!" She will be moving to Corvallis, Oregon for retirement.

Quaternary alumni

Our Quaternary alumni continue to do stellar duty for the Geological Society of America. **Steve Colman** is a newly elected councilor. The officers of the Division of Quaternary Geology and Geomorphology include **Scott Burns, Peter Clark, Debbie Harden, and Alan Nelson**. Scott, being treasurer, puts on such great parties that the division is one of the most active ones in the GSA.

If you lost track of **Rick Hoblitt** or **Dan Miller**, fret no more. They are written up extensively in a recent book, Volcano Cowboys (St. Martin's Press, NY), which details the history of the USGS volcano hazards program.

OBITUARIES

Harry D. Goode
(BS '51, PhD '59)

Harry D. Goode passed away on April 1, 2000 in Salt Lake City. Before his graduation Harry served in Northern Ireland, England and France during World War II as part of the 818th Signal Port Service Co. He was transferred to Long Lines Control in Paris in September 1944, where he served until March 1946 as Captain. He returned home in March of 1946, and in April '46 married Dorothy Rice. He was geologist for the Ground Water Branch of USGS in Utah until 1962, when he was appointed Associate Professor of Geology with the University of Utah. He taught general geology, ground water, field geology, geomorphology, and interpretation of aerial photographs. In addition to reconnaissance studies of springs and ground water, he was a consultant for government and local agencies in the fields of ground water and geologic hazards. Most of his studies were published by the U.S.G.S. or by the Utah Geological Survey. Harry is survived by his sister, M. Clare Goode, and by many friends. Contributions in his memory may be sent to the Development Office of the University of Utah for geology scholarships and fellowships which he established.

Taylor F. Kittredge
(MS '67)

Taylor F. Kittredge passed away in October of 1998. He is survived by Alice (Missy) Kittredge, who is living in the Republic of Panama. Taylor received his MS degree from CU in structural geology in 1967.

Harold E. Koerner
(BA, '29; MA, '30)

Harold E. Koerner passed away on August 14, 2000, at the age of 95. After Harold graduated magna cum laude from CU and received the D.W. Brunton Prize for Excellence in Geology, he received his master's degree a year later, and his Ph.D. in geology from Yale in 1939. Harold was a faculty member at Lafayette College in Easton, Pennsylvania, from 1930 to 1947. He then moved back to Boulder and began teaching geology and vertebrate paleontology at CU. He served as assistant head of the Geology Department from 1949 to 1970 and as associate chair from 1970-71. After his retirement in '71 he continued his field work in vertebrate paleontology. Harold is survived by Margaret Smith Koerner of Boulder; three daughters, six grandchildren, three great-grandchildren, a niece, and a nephew; and long-time companion, Dorothy J. Stauber.

Charles D. Masters
(MS '57, PhD '65)

Charles D. Masters passed away on August 19, 2000. He had retired in 1995 from the U.S.G.S., where he was Chief of the World Energy Resources Program in Washington, D.C.

Felix E. Mutschler
(PhD '68)

Felix E. Mutschler passed away on May 9, 2000, in Cheney, Washington. Felix was actively engaged in scientific research until a few weeks before his death. His research included the genesis and petrochemistry of Mo-Sn-W-U porphyry-ore deposits, and petrology of igneous rocks and their relation to tectonics. In 1970 he was a participant in the NASA-Boston College Surtsey-Heckla (Iceland) expedition. Felix also taught at the University of New Mexico, Hunter College of the City of New York, and the University of Colorado. He served two terms as Geology Department Chair at Eastern Washington University. He is survived by his wife, "Bunny", and sons, Charles and John.

EMERITUS ACTIVITIES

Pete Birkeland still gives a few talks. The latest was on soils at Williams College, after which he and Sue visited/hiked the best of the northeast. Alum **Don Rodbell** (see his Peru cover photo, Quaternary Research, v. 54, no. 3) had them to the family cabin on a quiet lake in southern New Hampshire. Later, alum **Tom Davis** had them to his refurbished house near Franconia Notch (polished rock floors and counters) and then took them on a killer eastern hike.

Bill and Louise Bradley spent 10 days on the English narrowboat canals in May. Getting through the locks was tough, and made the pubs all the more worthwhile. Bill and Suzanne Larsen are completing a photo-map educational exhibit on the Lake Missoula floods, Vic Baker's Ph.D. topic. Stop in and see it in the Earth Sciences Library.

Don Eicher has been active on the sports scene. He has been cross-country skiing, and when he biked with **Ted Walker** in June, Ted had already logged 2700 miles! Don is reading up on the geology of South Africa, as he and alum **Dale Johnson**, with wives, have a grandiose plan to fly Dale's plane across the Atlantic Ocean to England then, if all goes well, turn south for South Africa.

Carl Kisslinger is a part-time regular in CIRES. He continues to work on earthquakes in the Aleutians, and edited the International Handbook of Seismology and Earthquake Engineering (for the centennial of the founding of the International Association of Seismology and Physics of the Earth's Interior). He was elected vice president/president-elect of the Retired Faculty Association on campus, and works with the graduate school and CU Foundation on graduate student related matters. He and Penny travel, including a trip to Europe.

Ed Larson is into serious running these days. Soon he heads to Rome to run a marathon, after which he will visit Italian volcanoes. Ed is accompanied by alums **Tom Prather** and **Eric Miller**; Tom to run and Eric to offer some Italian red at the half way point.

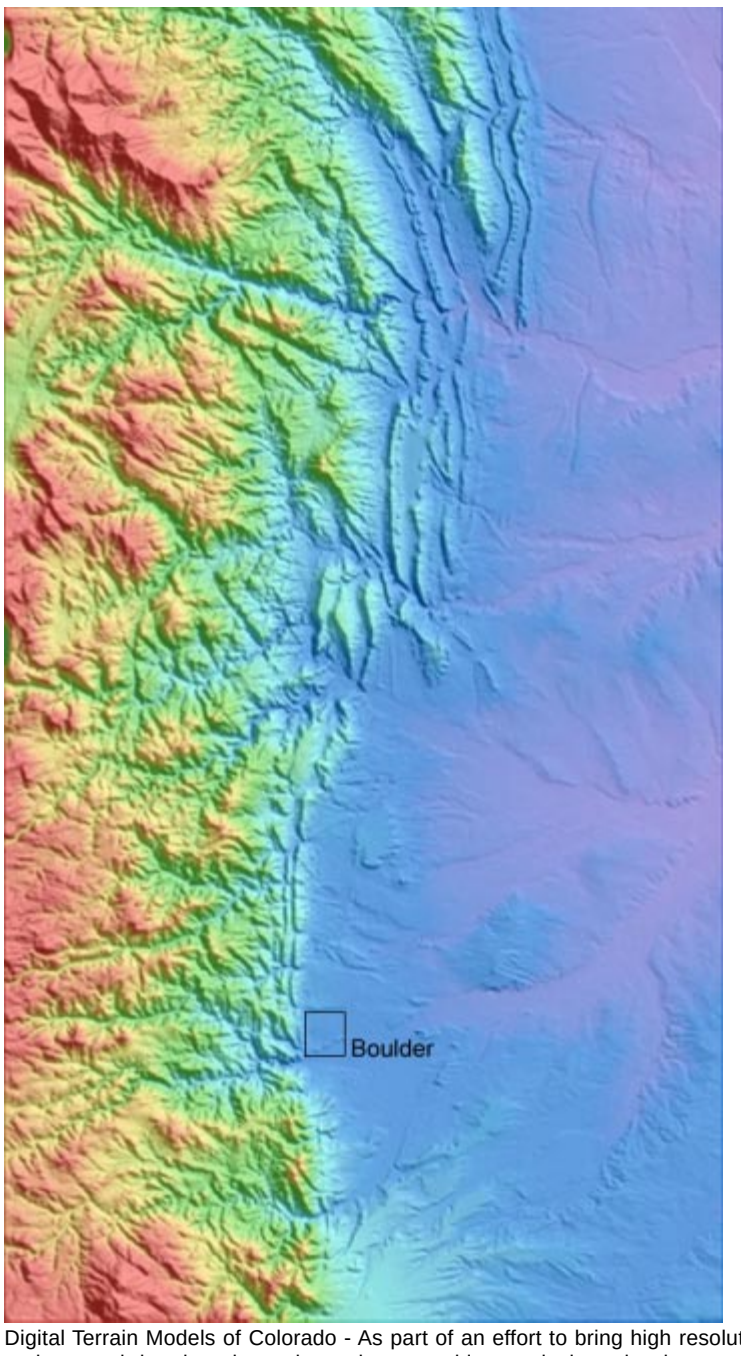
Don Runnells works half time at Shephard Miller as a geochemist. He retired from management. He has worked on gold mines around the USA (Washington, Idaho, South Carolina, and Cripple Creek) and southern Pacific Ocean (Papua New Guinea, Indonesia). He was a member of the National Research Council/National Academy of Sciences committee that made recommendations for mining on federal lands. He continues to be on the Nuclear Waste Technical Review Board that overseas the scientific work at Yucca Mountain for congress. Don and Erika continue to travel: across Canada on a train; from Paris to the Czech border with stops in a few mines and the Oberammergau Passion Play; and to a few CU football games in Boulder. Has he figured out that CSU wins the local matchup?

Ted Walker downhill skis locally (Eldora) and bikes globally (Switzerland with Barbara). They put more miles on their bikes than on their car!

Bruce Curtis tells us to expect most of our readers to be astonished when they learn he's still around, instead of hammering on that great outcrop in the sky. His apparent disappearance only means he's become tectonically inactive. He has gotten swept up in a lot of doings outside of the world of earth sciences, and has found that kind of life not too bad. He is caught up in the activities of his retirement community and finding that the world of academic politics has taught him a lot about surviving amongst prima donnas.

Bruce's current interests are principally mathematics, western history, railroad history, music history – and trying to stay afloat financially in the world of Alan Greenspan. However, he enjoys seeing his geological colleagues fairly frequently, and hearing what's new and exciting in the sciences. He finds a lot of pleasure too in reading selected geological literature, especially some that explores unfamiliar directions (such as Pete Birkeland's absorbing new Soils and Geomorphology book). It's special fun, Bruce says, "to find new studies that uncover some of those old errors I used to teach. Sometimes it seems the old errors are just getting replaced by new (and one hopes lesser) ones – but that, after all, is how we advance in science."

Pete Birkeland received the Distinguished Career Award of the Division of Quaternary Geology and Geomorphology at the fall GSA meeting in Reno. Pete (right) is receiving the golden shovel, appropriate for his soil career, from citationist Don Easterbrook, a fellow undergraduate at the University of Washington. Many of Pete's former students were there for the party. His talk was highlighted by slides of people who influenced him, and he started by honoring their WWII service. One slide was of Bill Bradley, a private in the U.S. Army, just out of high school. Bill is a former recipient of the same award.



Digital Terrain Models of Colorado - As part of an effort to bring high resolution topographic and spectral data into the undergraduate teaching curriculum, the department has sponsored a year-long effort to digitize over 50 7.5 minute quadrangles along the Front Range. Over the course of the last year the structure and active tectonics group, headed by Alex Tate, has produced a 30 meter digital terrain model stretching from the Continental Divide to the High Plains (see image above). The Center for the Study of Earth from Space (CSES) has supplied Thematic Mapper images, which are draped over the topography producing new views and perspectives of structures and landforms along the Front Range. Our aim is to provide a digital teaching database for structural geology, geomorphology, field geology and glaciology courses in the department. Use of special glasses allows the terrain to be viewed in three dimensions, much like a pair of stereo photos with only a single poster-size sheet of paper. If this weren't enough, newer commercial data is emerging for the Front Range using airborne laser scanning technology that clearly images individual houses and trees. Although presently very expensive to acquire, this data points the way to the future, where cities like Boulder incorporate high resolution topography into GIS models, allowing better characterization of natural hazards and their impact on society.

Donor Honor Roll, 2000

(Donors to the In the Field Endowment listed on page 9)

Christina A. Alexander
George W. Aubrey
Roland L. Baldwin
Bank One NA
Frederick L. Barnard
Nancy K. Barnard
Dr. Patrick J. Barosh
Roger J. Barton
Bruce D. Benson
Willard E. Bissell
BP Amoco Foundation Inc
John W. Bradbury
Paul L. Brenckle
David A. Bright
Maurice R. Brock
Lorraine B. Burgin
Chevron Corporation
Robert M. Cochrane, Jr.
Anita M. Cody
Dr. Robert D. Cody
Conoco Inc
Lynn B. Davis
Nicholas F. Davis
Mary A. Dodson
Walter C. Duke
Miriam M. Dumville
Robert G. Dumville
John L. Dwyer
John R. Dyni
John D. Edwards
Betsey A. Eggler
David H. Eggler
Exxon/Mobil
Richard A. Felling
Lori G. Gibson
Lou B. Gilliam
Michael L. Glaze
Alexander Goetz
August Goldstein, Jr.
Timothy W. Gorham
David G. Griggs
Philip L. Grubaugh
Robert D. Hall
Bud Hampton
Deborah R. Harden
Dr. Richard L. Harlan
Barbara B. Harms
John C. Harms
Wendy S. Hawkins
Leonard W. Heiny
Jo Ann T. Hemple
William G. Hemple
Richard C. Hepworth
Virginia D. Hepworth
Vernon I. Hill, Jr.
William L. Hiss
Mary S. Hubbard
Daniel L. Hudson
Marian K. Hudson
Carl A. Jurie
Donna J. Kilgore
John E. Kilgore
Ross L. Kinnaman
Harold W. Knudsen
Ronald A. Labrecque
Dennis J. LaPoint
Collis J. Lee, Jr.
Gloria V. Lee
R. J. Leithead
Kathy J. Lindsey
Colleen M. Lippert
Michael K. Madan
Caroline E. Malde
Harold E. Malde
Anson Mark
Peter A. Matter
Paul M. Merifield
Harold F. Miller
Jenifer Miller
Forrest D. Molsberry
E. J. Monheiser
William J. Monheiser
Estate of B. Moore
Dr. Frederick N. Murray
Dennis I. Netoff
Darrell K. Nordstrom
Karen G. Nordstrom
Jeannie O'Neill
Michael G. O'Neill
Sean K. O'Reilly
Richard T. Osmun
Elwin M. Peacock
Jane Breitenstein Peacock
Dayne T. Penney
Frank A. Penney
H. W. Praetorius
P. Praetorius
Karl W. Ratzlaff
Omer B. Raup
Phyllis H. Raup
Philip A. Reed
Barbara L. Rees
R. W. Rees
Henry E. Repp, Jr.
Barbara S. Richardson
Edwin H. Ross
Collier B. Sainsbury
Robert J. Schrock
Charles L. Schroll
Daniel F. Sedenquist
Shell Oil Company
Janet W. Shulman
Todd Shulman
Andrew B. Stein
Robert C. Steinbach
Virginia Steinbach
Ronald B. Stokes
Craig D. Thompson
John V. Thrailkill
Jean M. Tillema
John A. Tillema, Jr.
USX Foundation Inc
L. J. Wanek
Patricia A. Wanek
Robert R. Willhour
Lee C. Wilson
James C. Yount

. . . all the news

Thanks to all those who sent us your news. We love to hear from all of you. We prepare our annual Geology News in the beginning of January, and would like to include any significant professional or personal information you may wish to share with us. Please send your news to:

Geology News Editor
Department of Geological Sciences
University of Colorado at Boulder
Boulder, CO 80309-0399

Co-editors
Dan Mitchell
and Shemin Ge

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 _____

Address _____

Degree(s) (years and institutions) _____

Current Position/Employer _____

_____

News About Yourself/Family/Friends _____

_____

_____

_____

_____

Comments _____

_____

_____

_____

Mail to: Geology News, Department of Geological Sciences, 399 UCB, University of Colorado, Boulder, CO 80309-0399.

I/we wish to contribute to (check one or more)
o the fellowships,
o the mentoring program,
o IN THE FIELD initiative, or
o the unrestricted fund,

which will benefit the teaching and research programs of the Department of Geological Sciences. Enclosed is a check for $_____ .

Name(s): _____

Year(s) and Degree(s): _____

Address: _____

_____

Please make check payable to: The Department of Geological Sciences, University of Colorado at Boulder, and mail it with this form. An envelope is enclosed for your convenience.