Geology News

Department of Geological Sciences | University of Colorado at Boulder | 2007-2008

Spring Graduation 2008

Geology News

Contents

Letter from the Chair

Mary Kraus

I have just begun my sixth and final year as Department chair. Next year at this time you will hear from the new chair, who will be elected by the faculty this fall. The past year I have been helped considerably by Shemin Ge, associate chair for the undergraduate program, and Bob Anderson, associate chair for the graduate program. On behalf of the department, I want to thank both of them for their dedication and service.

Two new faculty started last fall - Becky Flowers, who was featured in the newsletter last year, and Brian Hynek, who has a story on p. 4 of this newsletter. In addition, Kevin Mahan, is a new instructor in the Department. Kevin and his research also were featured in the newsletter last year. Those additions bring the faculty number to 32. It is a remarkably diverse group of people with research that includes geomicrobiology, geology of Mars, petroleum reservoirs, recent and ancient climate change, and metamorphic petrology.

Our student numbers have also increased this year. Lon Abbott, our new undergraduate advisor, reports that the undergraduate number has increased from about 95 students a year ago to 115 students in spring 2008. In addition to educating our majors, the department continues to play a large role in the science education of undergraduate students at CU with approximately 4,000 undergraduate students enrolled in geology classes last year. As you know from last year's newsletter, the Department is involved in the Science Education Initiative at CU. The goal of that program is to change the way science is taught to both the non-major undergraduate students and our undergraduate majors. As part of the SEI, one additional post-doc – Leilani Arthurs - joined continuing post-docs Andrea Bair and Jennifer Stempien last fall. An article on the SEI and these 3 science teaching fellows is featured on p.14.

Graduate student numbers will also increase this fall because an unusually large new group of students – 26 – is entering our program. This will bring our total graduate population to over 90 students from the current 75 students! Several new programs will greet the students. Last fall, the graduate students initiated a mentor program for new graduate students. A continuing student, who is a volunteer, is assigned to each of the new students to help with their transition to graduate school in our department. Many of the new graduate students will be teaching assistants, and the SEI is planning a 2-day training session for them. The training will help each TA be more effective in the classroom. Another new program initiated last year by the graduate students is a lunchtime seminar series. Graduate students organize and run the seminar, and the speakers and participants are also graduate students. Funding is provided by grants from ExxonMobil and El Paso Corp. Finally, the new graduate students will participate in the 5th Annual Bill Bradley Field Trip, which will be held this year on August 23 and 24. We welcome any alumni who would like to participate – just send me an email.

The 4th Annual Bill Bradley Field Trip was held last August and was again supported by Shell Oil. The first day of the trip had technical input from Lon Abbott and Karl Mueller, graduate students Dylan Ward and Maureen Berlin, and advisory board member Gus Gustason. We focused on the geology along Lee Hill Road and 6-mile Fold. Field trip participants spent the night at the Mountain Research Station, where we

We want to thank our Advisory board members for donating their time and energy to the department

were joined by other faculty and students. Advisory board members generously provided funding for the liquid refreshments for the evening. The second day of the trip was led by Bob Anderson.

The Advisory Board met twice this year as usual. The board has several new members, including Penny Patterson of ExxonMobil, Eric Leonard from Colorado College, and Dean Miller, who is an environmental lawyer with Davis Graham & Stubbs. I thank Tim Garfield and Barb Mieras, who have rotated off the board, for their efforts on behalf of the department. Neil Fishman has continued as chair of the Board.

The last page of this newsletter lists the names of those who have donated to our program over the last calendar year. To all these individuals and corporations I express my thanks on behalf of all the faculty, students, and staff of the department. Please consider making a gift to the department so that our students can have the same quality educational experience today that you had when you were a student. This newsletter includes an envelope for sending a gift to the department and the last page has a form for identifying the fund to which you would like to donate. In addition to the Braddock and Curtis endowed funds, the Department is always in need of general gifts funding. General gifts support a number of important departmental programs including student travel to conferences, the undergraduate mentor program, and activities of the undergraduate Geology Club.

Notes from the Advisory Board

By Neil Fishman

Can you believe it has been over 10 years since the Department of Geological Sciences moved into the "new" Benson Earth Sciences Building? A 10th Anniversary Celebration, marking the passage of 10 years since completion of the building, was held in October, 2007. It was quite an event, with hundreds of people in attendance, all of whom fit comfortably into the building's beautiful and spacious atrium. Partygoers included several generations of CU geology graduates as well as past and current faculty and staff. Mary Kraus, the dynamic and inspiring Chair of the Department, did a wonderful job of creating an evening to remember, both through her organization of the celebration and through her remarks to the crowd. Bruce Benson (for whom the building is named), Bud Peterson (Chancellor, CU Boulder) and Phil DeStefano (Provost, CU Boulder), also spoke to those in attendance. Although the building is beautiful, its real importance is as the structure in which the excellent faculty and professional staff can continue to inspire students to learn earth sciences. In addition, this well-equipped building facilitates the top quality research that is being pursued by the faculty. I encourage you to visit the Department's website (http://www.cugeology.org) to learn more about what is going on in the Benson Earth Sciences Building, and to get an idea of how much of a difference a new building and a few years can be in transforming an entire department. In addition to contributing funds that were used to construct the new building, many caring and generous alums and friends continue to donate to the Department in support of one or more of its endowments. I am grateful for your contributions, as is the Department. Your support provides the foundation upon which a fundraising campaign is being built, as we work to further assist students in their struggle to afford an increasingly expensive education from CU in an environment of shrinking State funding. The Department and the Advisory Board maintains a fundraising

focus on expanding the Bruce Curtis Endowment to $1 million in order to support students through graduate student fellowships. As I'm sure you are aware, the Braddock Geology in the Field Endowment, named in memory of Bill Braddock, supports departmental and class field trips; this endowment has grown to about $240,000. Field trips supported by the Braddock Endowment are viewed as critical by the department because field geology remains an essential component of the educational process. The composition of the Advisory Board has changed since my last message to you. It is with deep regret that I bid farewell and a most sincere thanks to Tim Garfield, who recently rotated off the Board. Tim gave much to the Board and the Department, and he will be greatly missed. Also, Barb Mieras rotated off the Board this past year. I am grateful for all of Barb's contributions to the Board and to the Department and thank her so much for her work. Fortunately, there are three terrific new members to welcome to the Board. Dean Miller (B.A. 1983; M.S. 1989) joined the Board in the fall of 2007, and has been a most welcome addition. Not only does Dean bring expertise in geology to the Board, but his law degree (J.D. 1994, Southern Illinois University) provides us with a broader perspective on the role of geology in everyday life. Penny Patterson (M.S. 1981, Ph.D. 1990) and Eric Leonard (Ph.D. 1981) both joined the Board as new members and participated fully in our Spring, 2008 meeting. I look forward to working with them and I'm certain the Department will benefit from their involvement. And finally, Beth Hanson, who ran the departmental offices for many years and kept the faculty, staff, and Advisory Board well organized and informed, retired at the end of the Spring 2008 semester. We will miss Beth, but wish her well in her retirement.

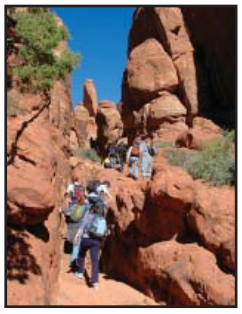
New Faculty

Brian Hynek joined the department in August 2007 as a new Assistant Professor with research interests in planetary geology. Brian grew up in Iowa and earned his Bachelor's from the University of Northern Iowa. After a brief stint teaching high school physics and chemistry he pursued his Master's and Ph.D. at Washington University in St. Louis. His thesis focused on Mars, including interpreting the ancient climate using the geologic record, physical volcanology, and geological mapping in preparation for the 2003 Mars Exploration Rovers landing. Brian came to CU as part of the Laboratory for Atmospheric and Space Physics research faculty in 2003. His research has focused

Tripod Lidar and GPS survey, West Bijou Creek, Colorado. From L to R, David Phillips (UNAVCO), Cary Kandel (CU Geography & INSTAAR), Greg Tucker (CU-Geology & CIRES), Emanuelle Feliciano (UNAVCO-RESESS and Univ. Puerto Rico Mayaguez), Anne Sheehan (CU-Geology & CIRES), Matt Pranter (CU-Geology)

on understanding the history of water on Mars and the planet's astrobiological potential. This falls into several categories: (1) Studying its ancient river valleys and erosional history to understand the amount and duration of abundant surface water. (2) Remote sensing analyses of water-altered minerals exposed on the surface coupled with laboratory experiments and geochemical modeling to better understand the alteration pathways and their potential to support microbial life. And (3) Terrestrial analog work in Nicaragua to better understand sulfur-rich volcanic systems, which were likely widespread on ancient Mars. Brian plans to continue and expand these projects in the next few years. He works closely with NASA on current and upcoming missions, including landing site selection activities for the 2009 Mars Science Laboratory. Brian is also a member of NASA's formal advisory council.

Brian is excited to be part of the Department and has spent his last few years enjoying the local scenery of Colorado. He is an avid mountaineer, climber, skier, and kayaker and cannot think of a better place to combine his work and play.



We are proud of all of our active students

Faculty Activities

Mary Kraus continues to study climate change at the Paleocene-Eocene boundary. She and her students are working with colleagues from the Smithsonian Institution, Northwestern University, and the Florida State Museum. The goal is to use multiple proxies (paleosols, organic geochemistry, isotopes of mammalian fossil teeth, and paleobotany) to understand changes in precipitation associated with dramatic global warming at that time boundary. Mary served as President of SEPM (Society for Sedimentary Geology) this past year. At the end of the spring she gave a keynote address and presented a short course at the 12th Meeting of the Argentine Sedimentology Association (XII Reuniones Argentinas de Sedimentología).

Gifford Miller, Professor of Geological Sciences and INSTAAR Fellow, was elected to the Norwegian Academy of Science and Letters in March of this year as a Foreign Member. The Academy (Det Norske Videnskaps-Akademi) was founded in 1857 to "advance science and scholarship in Norway." It consists of 219 seats for Norwegian members and 183 additional seats for foreign members across all divisions of natural and social sciences and the humanities. The new members will be presented at the Annual Meeting of the Academy in Oslo in May. Miller spent a year as a visiting professor at the University of Bergen in 1979-1980, and he taught there and at UNIS, the University Center in Svalbard, for several years. He has had an active research program on Svalbard on numerous occasions, and has worked on the paleoclimate history of Norway and Europe for many years. The University of Bergen and University of Colorado have enjoyed a lively exchange of sabbatical faculty, post-docs and graduate students over the past 40 years, enriching both programs. Professor Jan Mangerud, a frequent visitor to Boulder and long-time colleague, nominated Giff.

Installing a GPS control point at the eastern end of the Vanj Valley

Grad students, postdocs, and faculty enjoy the view from the top of North Table Mountain, near Golden.

In the summer of 2007, **Peter Molnar** returned to Tajikistan for the first time in 30 years. He went to help Becky Bendick, who received her Ph.D. at CU in 2000; she heads a project to study the active geodynamics of the Pamir and adjacent Tajik Depression and South Tien Shan. The first step was to install a GPS network to measure rates of deformation.

Peter writes: The trip brought a mixture of emotions because I had spent some formative years among Russians and Tajiks in a country deservedly renowned for its hospitality, but the place where I lived for weeks to months among Soviet seismologists in the 1970s had been largely destroyed in the civil war that divided Tajikistan during the 1990s. Peace reigns now, but the landscape is littered with rusting tanks, and along some roads the occasional sign that land mines might be present and live limited our natural wanderlust to a camera with a long lens. I was plied with questions of all kinds about our current politics, September 11, and life in general. One memorable question was "Why not?" after I answered "No" to the question, "Are you a Moslem?" Fortunately, some things never change, and Tajikistan proved still to be world's leading example of hospitality. Wherever we went, we were invited to be guests and promptly served whatever was available.

Although the infrastructure of Tajikistan remains a work in progress, with our colleagues from both Tajikistan and Kyrgyzstan, we installed a GPS network, and they then carried out a first set of measurements. We anticipate determining rates of ongoing deformation across the "Roof of the World," as the Pamir is called

and into the surrounding regions, where a potpourri of tectonics processes are illustrated well: folded and faulted sedimentary rock detached from basement 10 km below on a layer of salt; deep thrust faults where arguably the best example of intracontinental subduction occurs; and within the high flat Pamir itself, which seems to be collapsing as a miniature Tibetan Plateau (or humongous piece of camembert cheese).

Professor **Anne Sheehan** spent fall 2007 on sabbatical at the Scripps Institution of Oceanography in La Jolla, California. She worked with Peter Shearer on the application of earthquake seismic techniques to detection of faults beneath Southern California. Sheehan served as Incorporated Research Institutions for Seismology/Seismological Society of America Distinguished Lecturer for 2007 and gave presentations about her Himalayan research at science museums and other public venues throughout the country. In summer 2007 Tom de la Torre and Gaspar Monsalve defended their Ph.D. theses. Tom's thesis work focused on earthquake focal mechanisms and seismic attenuation beneath the Himalaya, and Gaspar worked on seismicity, velocity tomography, and flexural modeling of the Himalaya. Tom now works for Tricon Geophysics in Denver, and Gaspar has accepted a faculty position at the National University of Colombia at Medellin. In spring 2008 undergraduate Henry Berglund presented first results from the Rio Grande Rift GPS project at the Seismological Society of America meeting in Santa Fe, New Mexico. The project involves the use of modern satellite geodesy to measure present-day tectonic motions in Colorado and New Mexico.

Greg Tucker and Nate Bradley planting radio-tagged tracer stones in the bed of Halfmoon Creek, near Leadville, May 2007. Tracking the motion of these clasts over time will reveal the pattern of dispersion and provide a test of mathematical models. The project is supported by an Innovative Research Grant from CIRES.

Prof. Anne Sheehan with Danny Brothers (CU Geol BA '04) at Scripps Pier, Scripps Institution of Oceanography, La Jolla, CA, Sept. 2007. Brothers is now a graduate student in geophysics at UC San Diego.

Paul Weimer started the fall semester with a two-week trip to Norway where he visited Spitsbergen and the Eocene deepwater outcrops, and he gave a keynote talk at the Sequence stratigraphy conference in Tromso. In the fall, he taught Sequence Stratigraphy and Basin Analysis (6330) for the fourteenth time. During the spring semester, Paul taught Geology of Colorado (1040), and Petroleum systems of deepwater settings (6060).

In October, Paul was awarded honorary membership with the Gulf Coast SEPM for his work since 1990 with the section. He continues to serve as Trustee for the Gulf Coast Section SEPM Foundation. He is serving on the program committee for their 2008 Research Conference on deepwater reservoirs and the 2010 conference on 3D seismic stratigraphic interpretation of depositional systems.

Paul is finishing co-editing a book (with Craig Shipp and Henry Posamentier) titled Mass-Transport Deposits in Deepwater Settings (SEPM Special Publication Number 93). Expected date of publication is 1st Quarter 2009. He also began a two-year stint on the Department of Energy Ultra-Deepwater Advisory Committee.

For the AAPG, Paul serves on the AAPG Education and Publications Committees. He is the Associate Technical Program Chair for the 2009 AAPG National Convention in Denver, and is organizing two technical symposia for the conference. He is working on a very special publication for 2009.

As part of his responsibilities with the 100th Anniversary committee, he is filming and conducting interviews (with Ed Dolly) with select "historic" Rocky Mountain and Houston geologists. Results will eventually be made available through the RMAG and AAPG.

ANDREWS RECOGNIZED BY GSA WITH DISTINGUISHED CAREER AWARD

At the Geological Society of America's National Meeting in Denver last Fall, the Quaternary Geology and Geomorphology Division awarded its highest honor, the Distinguished Career Award, to Professor John T. Andrews. A special separate honor was presented to his wife, Martha, who accompanied John to the Awards Ceremony. John's nomination was sponsored by three former Ph.D. students, and was applauded by a large crowd at the ceremony, a large number of whom could trace their lineage back to the Colorado Quaternary Program.

Citation for John T. Andrews Recipient of the 2007 QG&G Distinguished Career Award

Nominators: Gifford H. Miller, Peter U. Clark, and P. Thompson Davis

Citationist: Gifford H Miller

John T. Andrews owns at least three legacies in Quaternary geology and geomorphology. In the course of nearly 45 years of research, John Andrews has, more than any other scientist, pioneered our understanding of the dynamics and history of North American ice sheets. His pioneering studies in glacial geology and glacial isostasy across the Eastern Canadian Arctic led to his first book, for which he received the Kirk Bryan Award at the age of 36. Always looking to incorporate new tools, John integrated geophysics, AMS 14C, U-Series, and Amino Acid Racemization, always tied to rigorous primary field observations, to challenge existing paradigms and to develop a new understanding of Laurentide Ice Sheet behavior at high latitudes. He initiated the Baffin Island program when he arrived at Colorado in 1968; next year's fieldwork will mark the 40th consecutive year with an INSTAAR field presence on Baffin Is. His initial work developing a numerical model of the Laurentide Ice Sheet forms the basis upon which most subsequent models are derived, and he was one of the first glacial geologists to recognize that emerging Quaternary marine records provided the most secure overarching framework for continental ice sheet activity. John made a mid-career transition to evaluate ice sheet-ocean interactions preserved in sediment records on glaciated marine shelves, an archive largely ignored by paleoceanographers up to that point. This effort led to the recognition that Heinrich events reflect partial collapses of the Laurentide Ice Sheet. He has participated in numerous ocean-sediment coring projects around Iceland, Baffin Island, and Greenland, work that continues today. But perhaps John's most enduring legacy has been as an inspiration to a cadre of outstanding graduate students. With unerring encouragement, exceptional creativity, and a buoyant sense of humor, he has guided the dissertation research of 29 Ph.D.s, most of whom now populate our profession, and a similar number of students with M.Sc. degrees. He was an early advocate of a gender-neutral graduate program, and has mentored a large number of exceptional female graduate students. His graduate supervision and generous sharing of ideas has inspired the careers of many in the audience today, and created a community of educators and researchers who carry on his legacy. John Andrews has also served the community selflessly, chairing the QG&G Division of GSA, AMQUA, and the Dept of Geological Sciences at Colorado, as well as many national committees. He received the University Medal, awarded by the Board of Regents at the University of Colorado, he has been elected Fellow of GSA and AGU, and he holds numerous other national and international honors. John T. Andrews richly deserves the recognition of a career of distinction, and is so rewarded with the Division's Distinguished Career Award.

Congratulations John!

Gifford Miller and John Andrews at Citation Ceremony

EMARC News http://emarc.colorado.edu

Several new research projects are being started. **(1)** Phase IV of our ongoing Gulf of Mexico research consortia focuses on the petroleum systems of the Florida Escarpment area in the eastern Gulf of Mexico. About 10,000 km of PSDM (pre-stacked depth migrated) 2-D seismic data set acquired in 2005 are being interpreted by three M.S. students (Kris Schwendeman, Mike Leibovitz, Ben Herber). Eight companies are supporting this private consortium. The project started in May 2008 and will extend to fall 2009.

We are focusing on establishing the stratigraphic and structural framework, performing 1D and 2 petroleum systems modeling, and doing a new resource evaluation of the area. This project is of particular significance because this is one of the last frontier exploration areas in deepwater in the US. Last summer, the area was removed from the OCS Lease Schedule until 2024. The PSDM data allows us to image this province in ways not possible with post-stack time seismic reflection data. Our reinterpretation of the geology of this area will help reassess its resource potential. Rick Sarg (Research Professor, CSM), and Tom Ahlbrandt (ex-USGS) will be advising on this project

(2) A regional geologic study of the Piceance basin is being done as part of a large RPSEA (Research Partnership to Secure Energy for America) grant with the DOE. This integrated study will ultimately address fractures in tight-gas sandstone reservoirs. The project is coordinated by Dag Nummedal, Director of the Colorado Energy Research Institute (CERI) at CSM. $2.8 Million Federal funds were allocated to this study ($730 k to Paul Weimer and Matt Pranter). An important component of the grant is a private-sponsored consortium (i.e corporate matching to the RPSEA grant) that is being organized by Paul Weimer. Fifteen companies are sponsoring a regional stratigraphic, structural, and petroleum systems analyses of the Piceance Basin. We anticipate 6 M.S. students and two post-doc researchers to work on the first two years of this project. Project start-up is June 2008.

(3) The AVID Consortium is a project sponsored by Shell, ConocoPhillips, and ExxonMobil and run by **David Budd** and **Matt Pranter**. AVID, or the Analysis of Variability In Dolomites, started in May, 2005 and is now in its second round of funding (Phase II). In the first round of support, David, Matt, and a number of graduate and undergraduate assistants documented a hierarchy of laterally persistent periodic patterns in the porosity and permeability of Mississippian and Eocene dolomites of Wyoming and Florida, respectively. Matt then examined the affect of that variability on dolomite reservoir models and fluid flow and published the results in two papers (Pranter et al. 2005, 2006) in the AAPG Bulletin and Petroleum Geoscience.

EMARC Researchers Chunju Huang and Shu Jiang

The second phase of the consortium, which is now underway, is designed to assess the origin of the lateral periodic petrophysical properties. A working hypothesis is that they may form by self-organizing phenomena during dolomitization (Budd et al. 2006, Geology). Gina Bribiesca's M.S. thesis will be an outcrop test of whether lateral patterns are inherited from the limestone precursor or formed during dolomitization. Gina will sample across a dolomite-to-limestone reaction front in the Neogene dolomites of Curacao, Netherland Antilles. If patterns are present in both limestones and dolomites, then Gina hypothesizes that the patterns in the dolomites are inherited from the limestone. If lateral patterns are present in the dolomite but not the limestone, then formation during dolomitization is indicated. Lack of spatial patterns in either lithotype will mean either the patterns are not universal, or that they may only originate during burial diagenesis. In the second part of the AVID 2 Consortium, David Budd is working with reaction-transport models to assess the geologic factors that determine the length scale of the lateral patterns already documented in the Mississippian dolomites.

(4) During the past year, **Matt Pranter** began an additional phase, Phase IV, of the Williams Fork Consortium that addresses the stratigraphic architecture and reservoir connectivity of fluvial deposits of the Upper Cretaceous Williams Fork Formation in the Piceance

Basin. Matt has been actively conducting research in the Piceance Basin since 2003 and collaborates with Dr. Rex Cole (Mesa State College) on the research. There continues to be significant interest in this type of research because the Williams Fork is a major natural gas producer in the Piceance Basin. Well-exposed and representative outcrops of the Williams Fork Formation are present along the margins of the basin and provide analog information to improve how petroleum reservoirs are characterized and modeled. Phase IV research is sponsored by 10 industry associates that represent independent and major petroleum companies. In April 2008, a Phase IV sponsor meeting was held in Boulder with 35 representatives from industry in attendance. Graduate students and faculty made research presentations and discussed the project objectives and results to date. This research has involved field work, the use of high-resolution ground-based and aerial LiDAR (laser scans of the outcrops) and orthophoto data, and both outcrop and subsurface reservoir-modeling methods. The LiDAR, orthophotos, and land-based photomosaics are use to "map" the distribution and dimensions of fluvial deposits of the Williams Fork Formation as exposed in various canyons along the western margin of the Piceance Basin. These types of data are important inputs to 3-D models of petroleum reservoirs that produce from these types of deposits within the basin and elsewhere. Matt's former student, Nick Sommer, successfully completed his Master's research on the project in the Fall 2007 and is now a petroleum geologist with EnCana in Denver. Current M.S. student, Brandon Binford, and Ph.D. student, Adel Aboktef, are also working on aspects of the Williams Fork research. Research on reservoir-related issues of the Williams Fork Formation is also funded through a recent grant from the Research Partnership to Secure Energy for America (RPSEA). This research is in collaboration with Dr. Dag Nummedal and the Colorado Energy Research Institute.

M.S. student, Jill Haynie, is conducting a detailed core- and well-based petrophysical and modeling study of a Niagaran (Silurian) reef reservoir in the Michigan Basin and will graduate in Fall 2008. Three new graduate students will join EMARC and the Reservoir Characterization and Modeling Laboratory in Fall 2008: M.S. students, Sait Baytok (from Turkey), Alicia Hewlett (from University of Texas), and Rachel Shaak (from Penn State).

Matt continues to be active in AAPG, serves as a reviewer for the AAPG Bulletin, and co-chaired a session on reservoir characterization and modeling at the 2008 Annual AAPG Convention in San Antonio. Most recently, Matt was promoted to Associate Professor with tenure.

Ongoing research programs include shallow analog studies of deepwater depositional systems from offshore Nigeria and northern Gulf of Mexico. Dr. Shu Jiang (from CNOC) is interpreting these data. Both Dr. Sverre Henricksen (our project sponsor from Statoil-Hydro) and Dr. Miki Gardosh (Geophysical Institute of Israel) will join us in August for one-year sabbaticals. We are extremely fortunate to have them share their expertise with us for one year.

The Red Wing Creek Field is a well known meteorite impact field in the Williston Basin in western North Dakota. CU-alum Roger Barton (B.S., 1969) of True Oil has provided us a 3-D seismic data set across the feature, which we are interpreting to develop a comprehensive 3-D reservoir model. Dr. Chunju Huang is interpreting the structural framework of the feature, and Dr. Sun Zhixue will develop the reservoir model.

EMARC researchers continue to help test seismic attribute software developed by Dr. Geoff Dorn and Ph.D. students (Stan Hammon and Jim Carlson). This software helps to define and characterize stratigraphic and structural boundaries. Ahn InSuk works as a ½ systems administrator for a new Linux-based network.

Don't leave Frank! Its just the 2007 CU Geology Field Trip!

University of Colorado names Bruce Benson its 22nd President

In February, the University of Colorado Board of Regents voted to appoint department alumnus, Bruce D. Benson, as the 22nd president of the university's three-campus system. Benson, a prominent corporate leader and higher education advocate succeeds Hank Brown, the former U.S. senator and fellow CU alumnus who has led Colorado's flagship university since June 2005.

President Benson earned a bachelor's degree in geology from CU-Boulder in 1964. He began graduate studies in geology but put that work on hold to drill for oil in eastern Kansas. Although he never completed his MS degree, Benson went on to build his own multi-million dollar company from scratch. For over four decades, Benson has served as a tireless volunteer on behalf of the Department of Geological Sciences and the University of Colorado. As a result of his hard work and generosity, the Department of Geological Sciences moved to the Benson Earth Sciences Building in fall 1997. Not only did he make generous contributions for the building, he also led the fundraising campaign to ensure its construction. Later Benson endowed the Benson Chair in Petroleum Geology and donated funds to renovate the old Geology Building, which is now named for emeritus faculty, Bruce Curtis. He and his wife Marcy chaired the University of Colorado's $1 Billion Comprehensive Fund-Raising Campaign from 1997 to 2003.

Among his numerous community and political activities, Benson has chaired the CCHE, the Governor's Blue Ribbon Panel on Higher Education for the 21st Century, and the Metropolitan State College of Denver Board of Trustees. He has been a Trustee of the National Endowment for the Humanities, National Park Foundation, and Smith College. He currently chairs the Denver Public Schools Foundation.

In recognition of his outstanding contributions to the University of Colorado, Benson has been awarded the University Medal (1999) and the Alumni Association's Recognition Award (2001). An Honorary Doctor of Humane Letters was conferred on Benson in 2004 to acknowledge his outstanding university and public service.

As CU president, Benson will embark on a mission to increase private and public funding for the university at a time when Colorado faces an economic downturn and CU and other Colorado colleges and universities must join forces to lobby against even deeper cuts of state funding for higher education. CU ranks 48th nationally for state funding earmarked for higher education.

President Benson's first official function was the Department's annual alumni reception – CU at the Brown. Both Bruce and his wife Marcy attended the event.

Benson Earth Sciences Building

CU President Bruce Benson

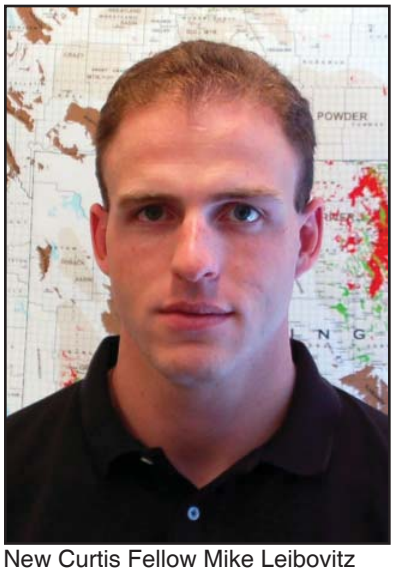
Congratulations President Benson!

Funding Updates

Bruce Curtis Graduate Fellowship

Since 2005, the Bruce Curtis Graduate Fellowship has funded 5 students. Quentin German and Greg Robertson were funded in 2005-06 and Nick Sommer was funded in 2006-07. ExxonMobil currently employs Greg and Quentin, and Nick works for EnCana. Lyndsay Ball and Brandon Binford were the Curtis Fellows in 2007-08. Lyndsay continues as a Ph.D. student working with Shemin Ge, and Brandon, who works with Matt Pranter, should graduate this summer or fall and then will go to work for Encana.

The Bruce Curtis Graduate Fellow for 2008-09 is Mike Leibovitz, working on an M.S. degree with Paul Weimer. The tentative title for Mike's thesis is *Sequence Stratigraphy of the Florida Escarpment, Offshore Eastern Gulf of Mexico*. This spring, Mike also received the Rocky Mountain Association of Geologists Veteran's Award.



New Curtis Fellow Mike Leibovitz

The Curtis Fellowship Fund is currently our major fundraising effort. The cost to support a graduate student continues to rise, and the strength of our graduate program depends on our ability to attract and fund the best graduate students. This endowment stands now at about $800K and our goal is to reach $1Million.

Bill Braddock Geology in the Field

This fund was established in 2003 with $90,000 in funds. Since then, it has grown steadily so that it now is approximately $250,000. This endowment allows the Department to fund field trip expenses that are not covered by student fees and by the university. Ph.D. student Dylan Ward organized a series of field trips for students and faculty last summer using Braddock field funds. Trips included the Roan Plateau (led by Ph.D. student Maureen Berlin), I-70/A-Basin debris flows (led by Ph.D. student Scott McCoy); the Palmer Divide / Fort Carson / Little Grand Canyon (led by Greg Tucker); Lawn Lake, Rocky Mountain National Park (led by D. Ward); and the Rampart Range (led by Ph.D. student Nate Bradley). Dylan has organized a series of trips for summer 2008. In addition to these extracurricular trips, the Braddock fund supported course-related trips this year to Hawaii (see photos on this page) and Death Valley.

The faculty and students thank alumni for their continued support of this fund. With the rising cost of fuel, this fund is increasingly important for keeping our students – both undergraduate and graduate – **in the field**.


Geology students "**In The Field**" in Hawaii

Alumni Receptions

In October 2007, the Department hosted a reception to celebrate the **10th Anniversary of the Benson Earth Sciences Building**. Two hundred faculty, alumni, and campus administrators, including Chancellor Bud Peterson, Provost Phil DiStefano, and Dean of A&S Todd Gleeson, attended the reception. Bruce and Marcy Benson were honored guests.

A brief history of Benson Earth Sciences is as follows: The Department began a major push for this building in the late 1960s. In 1969, the Colorado Commission on Higher Education declared the old Geology Building functionally obsolete. Construction of a new building for the Department was scheduled to begin in 1971; however, problems with State funding for higher education subsequently eliminated that option. A joint Geological Sciences/INSTAAR/CIRES building proposed in the 1970s came to a similar fate.

With help from the CU Foundation in the 1980s, funds were raised from the private sector to help "seed" a building fund. A major contribution by alumnus Bruce Benson and his family moved the project forward along with a gift from the Crail-Johnson Foundation through CU Geological Sciences alumnus Eric Crail Johnson.

Following a successful Capital Campaign, Chancellor James Corbridge committed campus funds toward the project, and in late 1993 the State of Colorado made a commitment for the remaining funds for the building. By early 1994, the design phase was well underway for the new building and the building was completed in 1997.

The **4th Annual CU at the Brown** Alumni Reception for the Department of Geological Sciences was held on February 21, 2008 at the Brown Palace Hotel. Anna M.R. Wells, who is a member of the Department Alumni Advisory Board, and Michael Zakroff of St Anselm Exploration Company generously sponsored this elegant event. Bruce Benson, who had just been appointed as the new President of CU, and his wife Marcy both attended as did Chancellor Peterson, Provost DiStefano and his wife Yvonne, and Deans Todd Gleeson (A&S) and Stein Sture (Graduate School).

Pictures of both events are included on these pages.

Chancellor Bud Peterson, Michael Zakroff, and Advisory Board Member Anna Wells

Fred Baker, Ha
ate School Stei

Bill and Mary Lou Smith

Lon Abbott and Kei

Doug Callier, Yvonne DiStefano, and Provost Phil DiStefano

Joanne Brunetti and
daughter of Melissa
Alan Lester

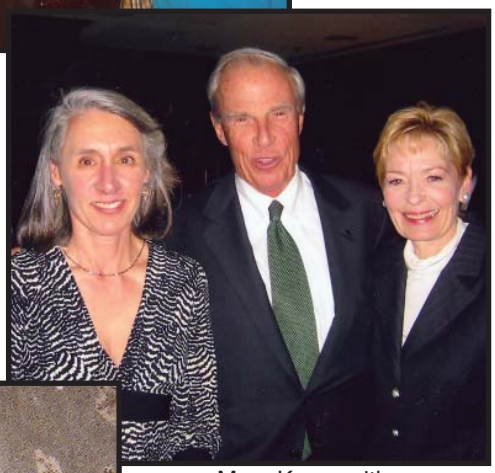
nnah Pavlik, Dean of the Gradu-
n Sture, and Pete Birkeland

Bob Munger and Aliene Saunders

Dave Kunovic and Steve Marks

Tim Farnham and Ad-
visory Board Member
Stephanie Gaswirth

Kris White and
Lang Farmer



Mary Kraus with
Bruce and Marcy Benson

John and Barbara Harms

th Murray

Advisory Board Member
Dawn Kaback

l Ting,
and

Jill Pursley, Advisory Board Member
Ben Lowry & Valerie Bakeman

Update on the Science Education Initiative

With careful coordination by David Budd, the Department is now finishing its second year of collaborating with the campus' Science Education Initiative (SEI) to reform the way science is taught to majors and non-majors alike. Individual faculty members interested in enhancing their students' learning are central to the effort. On a course by course basis, these faculty partner with one of the three post-doctoral Science Teaching Fellows (STFs) hired by the Department.

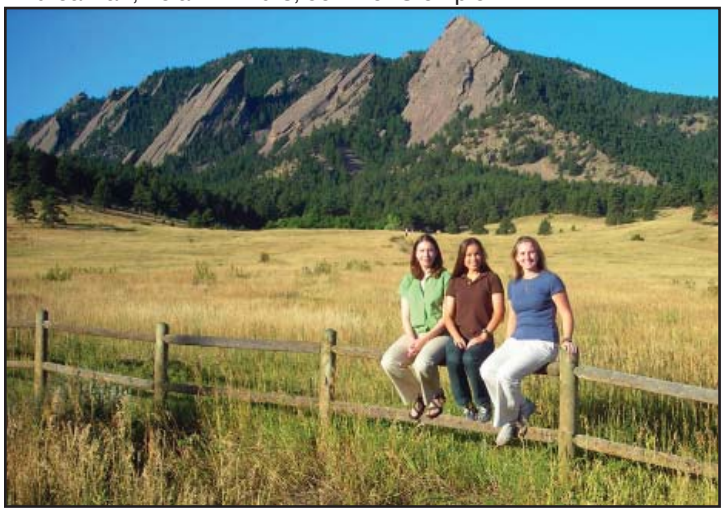
The STFs are Jennifer Stempien, Andrea Bair, and Leilani Arthurs who received their Ph.D.s from Virginia Tech, Nebraska, and Notre Dame, respectively. Each has a geological background (Jen and Andrea are paleontologists, Leilani is an aqueous geochemist) and a passion for excellent teaching. Over the past two years, Andrea worked with professors of our largest introductory course, Physical Geology (Geol 1010). Jen assisted professors teaching the introductory Earth History (Geol 1020) and Global Change (Geol 1060) courses, and developed a survey tool for measuring students' attitudes toward learning geosciences. Leilani, who joined the Department a year ago, has been working on Environmental Geology (Geol 2100) and Oceanography (Geol 3070). Reform of an individual course typically involves three components – defining what the students should learn, evaluating what they are being taught, and assessing what they are actually learning. To address the first component, faculty members must define specific learning goals for their course. Learning goals state what the students should know, what they should be able to do, and the cognate level of learning that they should achieve. Articulating learning goals at the start of the course, unit, or lecture is helpful on three counts. First, they aid in developing a course structure that facilitates their attainment. Second, sharing learning goals with students is an effective way of communicating the faculty members' expectations of their students. Third, knowing what students should be learning aids in assessing what they actually learned.

The second component of the initiative is aligning what is taught with the course learning goals and implementing strategies that foster enhanced learning. This may require just the simplifying of jargon or rephrasing of PowerPoint slides, or a major restructuring of the course. The STFs are vital to this effort as they can both suggest approaches and techniques that other education researchers have shown to work, as well as develop interactive methods of classroom engagement and hands-on in-class activities.

The third component of the initiative is assessment of what students are actually learning. Traditionally, two or three exams per semester serve as the key assessment tools for a course; however, faculty collaborations with the SEI avail them to a greater variety of options. For example, faculty members and STFs might design a variety of in-class questions and exercises, concept-based homework, and pre-/post-instruction concept surveys that assess which concepts students struggle with and which ones they have grasped. The STFs also make classroom observations and interview students to determine what students are thinking regarding specific concepts and what issues pose barriers to their effective learning. This real-time feedback to the instructor allows them to adjust the pace of the class and insure that specific learning goals are being achieved before moving on to new ones.

To date, most of the SEI's efforts in the Department have focused on the four introductory courses that generate ~70% of all the student credit hours taught annually by the Department. These are Physical Geology (Geol 1010 taught by nine different professors), Earth History (Geol 1020 taught by five different professors), Global Change (Geol 1060, particularly the section taught by Scott Lehman), and Environmental Geology (Geol 2100 taught by Alexis Templeton). Some of the key accomplishments of Departmental efforts thus far include: (1) Summer workshops in which all faculty who taught in the two most popular introductory courses (Physical Geology and Earth History) spent 3 days defining consensus, overarching learning goals for those classes. (2) Developing and analyzing new types of concept-based homework and in-class activities for all four introductory courses. (3) Identifying misconceptions that students bring to introductory courses and detecting the geologic concepts that they consistently have trouble learning. (4) Restructuring the Earth History course so that it progresses backward through time from what is most familiar to students (i.e. the present) to what is less familiar to them (i.e. the distant past), and employs a problem-orientated case-study approach that teaches

Andrea Bair, Lelani Arthurs, Jennifer Stempien



students concepts and tools needed to solve geological problems. (5) Development of pre- and post-instruction concept surveys for Physical Geology, Earth History, and Environmental Geology that measure overall student learning. The initial results suggest, on average, a near doubling of the amount of learning and retention when the components of the initiative are implemented!

A survey tool that measures students' attitudes and self-efficacy towards learning geosciences was also created and administered in nine introductory sections during 2007. It establishes a baseline view of student attitudes when they enter an introductory course and a comparison when they complete the course. The survey results also identify attitudinal characteristics of the students that professors may find helpful for interactions with students. Of particular interest, the survey showed that introductory non-major students view the geosciences as less scientifically rigorous than sciences like physics and chemistry because of the perceived lack of experimentation and the descriptive nature of geological research.

On a more favorable note, students say that the geosciences are of greater general interest to them than other sciences. These findings present both challenges and opportunities for the Departmental faculty and the SEI. The STFs summarized their efforts to date in two short documents titled "Conceptual Learning in Geology Courses" and "The Importance of Considering Student Attitudes," which were distributed to the faculty in January 2008. The STFs also made five presentations at the Geological Society of America national meeting and they have been invited to speak at professional meetings and teacher training workshops.

The SEI is funded for three more years. During the 2008-2009 academic year, the faculty and STFs will move from a focus on introductory courses to a focus on upper division major-track courses. Our plans call for focused efforts in Mineralogy, Structural Geology, Environmental Geology, Sedimentology & Stratigraphy, and Oceanography. By the time the SEI project ends, the creators of the SEI hope to see an overall transformation in the science teaching culture on the CU Boulder campus. Successful education reform within our Department will contribute to this overarching vision. Stay tuned for future updates on the changing face of science education reform!

AAPG Student Chapter News

The CU AAPG Student Chapter had a great year: the chapter had a very successful petroleum-company recruiting season, hosted several excellent professional speakers, conducted a field trip to observe onshore drilling operations, and participated in the AAPG's Imperial Barrel Contest.

The fall 2007 job-recruiting season was very positive and several members of the student chapter and Department accepted internships and full-time positions with companies. There continue to be numerous career opportunities for students in the petroleum industry, including positions in Denver.

The guest speaker were excellent this year and included topics on thrust fault complexes in Colombia, stratigraphy of the Williams Fork Formation, 4-D seismic in offshore environments, and fluvial reservoir connectivity. Graduate-student members of the chapter also made presentations on their current research and aspects of petroleum geology.

Once again, EnCana sponsored a field trip to an active drilling rig in the Denver Basin just outside of Boulder. Students were able to observe directional drilling tools and operations on the rig.

This year, for the first time, CU competed in the AAPG Imperial Barrel Contest. The Imperial Barrel Contest is a competition in which graduate students from various universities compete in a "real world" petroleum exploration assessment exercise. The project involves weeks of geological/geophysical analyses of a particular resource play and culminates with formal group presentations by the students to a panel of industry and academic experts. The team consisted of Jason Adams, Gina Bribiesca, Renee Foster, Mike Leibovitz, and Kris Schwendeman. The team placed second in the regional competition; however the competition was very close, and the team was awarded $3000. The funds were used to support an AAPG Student Chapter field trip to the Moab, Utah area.

This year, Danny Burns was the recipient of the L. Austin Weeks Undergraduate Grant. The grant is awarded each year to active AAPG student chapters to assist undergraduate geoscience students with educational expenses. Officers for 2008-2009 include: Mike Leibovitz (President), Analisa Maier (Vice President), Travis Kelsay (Secretary), and Gina Bribiesca (Treasurer).

We thank Shell Oil Company for its financial support of our chapter.

AAPG Student Chapter members enjoying a field trip to Utah. Lunch at Canyonlands.

FRONT OFFICE NEWS

The front office underwent a major personnel change at the end of the academic year. **Beth Hanson** retired at the end of May and the training of a new Office Manager, **Marcia Kelly**, began on June 4, 2008.

Please welcome Marcia into the Department. She comes to us from INSTAAR, where she was assistant to the director and prior to that was a Program Assistant in the Math Department at CU Denver for several years. She comes well prepared to step into the position and do a terrific job. Be sure to stop in and say hello.

Carrie Simon continues to handle her position as Graduate Program Assistant with good humor and dedication to getting the incoming graduate students into the program, assisting continuing and graduating students with all the details to keep them and their advisors on track. **Barbara Amaral** enjoys her position as the Administrative Assistant, front desk position where she fields phone calls, greets folks who come into the office and handles the academic scheduling plus a myriad of other duties Barb accomplishes this with a happy face and helping attitude. **Joanne Brunetti** continues to fill the Accounting Tech position with a great deal of good humor, (which is frequently needed), she works with purchasing, travel and a large number of accounts to keep the department accounting on track. All three manage their positions with aplomb and great attitudes while doing an excellent job.

We have a staff dedicated to meeting the administrative needs of Geological Sciences Faculty and Students in an efficient, friendly, and timely manner.

The front office staff looks forward to, and welcomes, assisting Alumni and Friends of Geological Sciences in finding answers to appropriate questions they have regarding the Department, faculty, former faculty, students, and staff.

The front office maintains its position of being the meeting and greeting place or the ”nerve center” in the Department.

Pictured left to right: Carrie Simon, Marcia Kelly, Beth Hanson, Barbara Amaral, Joanne Brunetti.

The Departmental Office can be contacted by:
Phone: 303-492-8141
FAX: 303-492-2606
EMAIL: geolinfo@Colorado.Edu

Student News

Janice Brahney has been awarded a National Science and Engineering Research Council of Canada Post-Graduate Scholarship D for her dissertation research titled “History and impact of dust deposition on alpine aquatic ecosystems”

Corey Lawrence works in the field

Corey Lawrence, a Ph.D. candidate in the Neff Laboratory, was recently awarded a National Science Foundation Doctoral Dissertation Improvement Grant (NSF-DDIG) to support his research of dust deposition and accumulation in the soils of the San Juan Mountains. The NSF-DDIG awards are funded through the NSF Directorate of Biological Sciences and are intended to support research that will improve the overall quality of a student’s dissertation.

The goal of Corey’s dissertation research is to characterize and quantify the role of dust in the biogeochemical cycling of elements essential for plant and microbial productivity. The San Juan Mountains in southwestern Colorado currently receive substantial inputs of dust each year, likely originating from wind erosion of soils in the arid and semi-arid regions of the Colorado Plateau and Mojave Desert. A recent study by the Neff Laboratory has shown that the amount of dust deposited in the San Juan Mountains has increased by a factor of 5 over the past 200 years. This increase in dust is evident in the chemistry of alpine lake sediments, however it is unclear if these increases have resulted in the accumulation of dust in soils of these mountain ecosystems.

The NSF-DDIG funding will provide support for Corey to measure several geochemical characteristics of soils in order to evaluate the contribution of dust. Specifically, Corey will utilize the difference between the strontium isotope chemistry of dust and local bedrock as a tool to distinguish between

the contributions of each of these materials to elemental pools. This research is in collaboration with Department of Geological Science's Radiogenic Isotope Laboratory and the Laboratory for Environmental and Geological Studies. In addition to supporting this aspect of Corey's dissertation research, the NSF-DDIG award also provides funding for Corey to serve as a mentor for undergraduate student research projects in the San Juan Mountains.

Laura Pommer was the first recipient of the newly-established Rex Monahan Geological Scholarship Award, sponsored by the Colorado Section of the American Institute of Professional Geologists

2007-2008 Undergraduate Mentoring Program

Junior **Michael Beach** (GEOL/ASTR) has been working with Dr. Brian Hynek for two years, helping to remap the ancient river valleys across the martian surface. This new global dataset is providing better constraints on the timing of their formation and how much water was involved. Much like on Earth, they are using the rock record to assess the climate history of our neighbor. It appears that Mars had an Earth-like hydrologic cycle for up to half a billion years. These results can help assess the potential that life ever arose on the Red Planet. Michael's work was recently presented in a conference paper at the 39th annual Lunar and Planetary Science Conference.

Junior **Henry Berglund** is working with Prof Anne Sheehan on a GPS (Global Positioning System) experiment to determine whether the Rocky Mountains and the Rio Grande Rift are still tectonically active. Here is a photo of Henry servicing a GPS station in New Mexico.

In the summer of 2007, **Devin Girtin** accompanied Ph.D. student Kurt Refsnider to Baffin Island in the eastern Canadian Arctic. Devin was able to gain valuable experience doing field geology while assisting Kurt with his Ph.D. research on the glacial history of the island over the past 2.5 million years. Together, Devin and Kurt also developed a smaller research

Devin Girtin puzzling over 9 m terrace seds.

project for Devin to tackle for his senior thesis research investigating a series of marine shorelines formed during periods of higher relative sea level over the past 10,000 years. While in the field, Devin surveyed these shorelines in a few different areas and collected samples of organic material from each shoreline for radiocarbon dating to construct a record of local relative sea level change.

Emily Gregonis and **Marc Serravezza**, working with Professor Becky Flowers, learned the basics of the (U-Th)/He thermochronometry technique and the first-order geological problems that can be addressed with this tool. Both Emily and Marc carried out microscopy work that involved careful hand-picking of high-quality apatites from Canadian shield mineral separates for apatite (U-Th)/He analysis. Ph.D. student Alexis Ault handled their training and other detailed logistics. Emily also obtained a University Research funds that will support her continued work on this same project through the summer.

In the summer of 2007, Junior **Willis Blakeslee** worked with graduate student Jason Adams on a sedimentology project in northern Wyoming. Willis did field work on sedimentary rocks with the goal of understanding how precipitation changed 55 million years ago in response to a dramatic episode of global warming.

Jeremy Ring, working with Kevin Mahan, helped prepare sample thin sections and qualitatively describe the microstructure of rocks from a major crustal-scale fault zone (the Cheyenne Belt) in the Medicine Bow Mountains of southern Wyoming. The goal of this study is to quantify the structural and mineralogical characteristics of fault rocks that lead to development of seismic velocity anisotropy, a phenomenon that geophysicists hope to use to remotely image deep-crustal fault zones. Jeremy helped identify a qualitative record of progressive metamorphism and deformation that resulted in the development of fabric–induced anisotropy in quartzite defined by aligned mica grains.

News and Awards

Undergraduate Awards for Spring 2008

AWARD	RECIPIENTS
AWG Outstanding Seniors	Jennifer Wilson
Bruce Curtis Outstanding Junior	Emily Gregonis
Johnston Memorial Scholarship	Ben Haugen
RMAG Outstanding Senior Award	Ben Haugen
T. Keith Marks Scholarship	Cori Holmes

Shell Petroleum Graduate Research Awards

Shell provided funding that is helping 4 graduate students complete research projects for their degrees. The students and their projects are listed below.

Nate Bradley
Sean Bryan
Erin Leckey
Kurt Refsnider

Shell Petroleum Student Travel Grants

Shell provided funding that allowed eight graduate students to attend national meetings and present the results of their research:

Andrea Bair
Sarah Castle
Ethan Gutmann
Chris Harig
Erin Leckey
Laure Montandon
Ursula Quillman
Brian Yanites

Submit your alumni news @ www.cugeology.org click on the "alumni web" link

Graduate Awards for Spring 2008

AWARD	RECIPIENTS
Association of Women Geoscientists (AWG)	Pilar Rojas-Linero Katherine Dayem
Bruce Curtis Fellowship	Mike Leibovitz
Jack Edwards Fellowship	Gina Bribiesca
Longley, Wahlstrom, Warner	Treasure Bailley
Spetzler Award for Research	Alexis Ault
RMAG Bolyard Award	Treasure Bailley
RMAG Veterans Memorial Scholarship	Mike Leibovitz
W. O. Thompson Award	Chris Harig
Waldrop Memorial Scholarship	Lisa Mayhew Dylan Ward
Zena Hunter Andrews Research Award	Mary Ellen Benson

American Association of Petroleum Geologists (AAPG) Student Research Grants

Brandon Binford
Eugenia Bribiesca
Jill Haynie

Degrees Awarded
(Fall 2007 - Spring 2008)

B.A. Geology Majors

Henry Berglund
Allison Cech
Ryan Dearth
Jade Everett
John Patrick Gartland
Kathleen Gettig
Eric Grant
Ben Haugen
David Lesser
Emery Mueller
Christopher Perez
Laura Pommer
David Thul
Kyle Turley
Jennifer Wilson

M.S. Candidates Graduating with Degrees

	Advisor	Thesis Title
Sarah Castle	Jason Neff	Plant nutrient use across geological and geochemical gradients in the Southern San Juan Mountains, Colorado, USA
Phillip Jacobson	Eric Tilton	Final Examination
Ken MacClune	Jim White	Trends in the Methane Source for Three Zonal Regions 1999 to 2006: Results of a 5-Box Model of Methane Mixing Ratio and Isotopic Data
Rachelle Richmond	Mike Ritzwoller	Ambient noise surface wave tomography across Europe: Rayleigh and phase speed measurements
Nick Sommer	Matthew Pranter	Sandstone-Body Connectivity in a Meandering-Fluvial System: an Example from the Williams Fork Formation, Piceance Basin, Colorado

Ph.D. Candidates Graduating with Degrees

Gregory Bensen	Mike Ritzwoller	Broad-band ambient noise surface wave tomography: technique development and application across the United States
Ethan Gutmann	Eric Tilton	The Determination of Soil Hydraulic Properties in Land Surface Models from Remotely Sensed Surface Temperature
Gaspar Monsalve	Anne Sheehan	Deformation and seismic structure of the upper lithosphere beneath the Himalayan collision

Obituaries

John D. (Jack) Edwards

The geologic professions lost one its leaders in 21st Century Energy Predictions when Dr. Jack Edwards passed away on December 24th, 2007, a few weeks after suffering a stroke. In his sixty years as a geologist, Jack served our profession and society quite admirably.

Jack's life was one of near-constant motion. He was an avid skier, hiker, water skier and dancer (with an unforgettable and inimitable style), played soccer at Cornell, and floated the Grand Canyon seven times. He was born on June 17, 1925 in Nyack, New York. He served in the US Navy in WWII. He received his B.S. and M.S. degrees from Cornell University, and his Ph.D. at Columbia University. Jack was married to Joan Fessenden for fifty years, and they had five children, and 19 grandchildren. He married Donna Hohmann Ewy in August 1998, and continued to live life to the fullest, trekking to numerous countries and several continents.

Jack's career had two main phases: as a geologist at Shell Oil Company for 37 years, and as an adjunct professor at Ft. Lewis College and at the University of Colorado. At Shell, Jack worked in 27 different offices from 1949 to 1987, working in many capacities, including Chief Geologist, and head of geologic training. In his last position, he served as Exploration Manager for South America, and participated in a major discovery in the Santos Basin.

At the University of Colorado, Jack taught classes, served on 25 student thesis committees, and did extensive work in global energy forecasts of the 21st Century. He taught an undergraduate class titled, "Mineral Resources, World Affairs and the Environment" for 12 years. As part of the class materials, Jack compiled and summarized the world's energy trends and made an effort to predict the future trends, based on current and past rates of consumption and demands. The results of this major work were included initially in the July 1997 AAPG Bulletin, and were updated in the 2001 AAPG Memoir 74. The work is particularly significant because: (1) it was a public document, (2) it was a thorough piece of work done independent of any government or private-based research, and (3) it was initially published at a time when many others were predicting that "peak oil" was in the near future.

For future energy scenarios, Jack's prediction for peak oil is among the most optimistic amongst workers. Similar to Bill Fisher's work, he correctly points out the enormous impact that improving technology does in reserve growth within fields, offset exploration, and non-traditional fossil fuels. Jack also correctly points out the impact that deepwater oil has had, and will have, in future supply considerations, an important point missed by many peak oil advocates who consider these offshore resources as unconventional but which present the most significant opportunities for future oil and gas discoveries (as estimated by USGS).

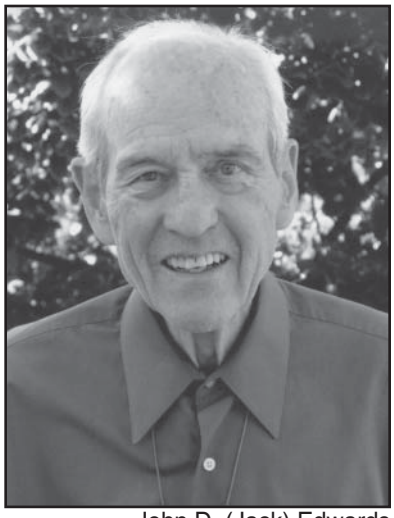
In refining his work, Jack interacted with a number of people who work in future energy predictions including Tom Ahlbrandt (when he was the project chief of USGS global basin resource analysis), Colin Campbell, Al Bartlett and others. These interactions were fruitful and educational for all. Jack continued to modify and update his predictions with new information, and, most importantly, pointed out the real hard choices that all countries have to make in the future regarding the potential use of different resources.

Through this work, Jack did important service for our profession and society. The work was accomplished because of his passion for educating the public about the future. He made many presentations at local, regional, and international venues. Jack's graphs are commonly cited in articles in the popular literature (even though there usually is inadequate explanation). Most notably, all of his work and publications were done voluntarily, and nearly all of it was done after he turned 70 in 1995. The significance of Jack's work is manifested by the inclusion of his figures in several recent AAPG Presidential addresses.

Jack also did several other things for AAPG. He was a co-editor of 1988 AAPG Memoir 48 on divergent margins, and later served as a Distinguished Lecturer (1988-1989) based on that volume. He served on the Future of Earth Scientists committee, and as Treasurer of the AAPG Foundation. For the RMAG, he served on the Executive Board and in the House of Delegates representing the RMAG. He served on the Board of Directors for five Offshore Technology Conferences (OTCs). With AAPG, Jack presented his work on Twenty-First Century Energy to members of the US Senate in Washington D.C. in 2002.

In recognition of Jack Edwards' lifetime of work in exploring for and influencing public policy discussion on future energy needs, and his many important contributions to AAPG, he was recognized posthumously with the Distinguished Service Award at the April 2008 San Antonio Annual Convention.

Jack's last words were "I have had a damn good life." That cogently summarizes his life. Jack, you will be missed.



John D. (Jack) Edwards

by Paul Weimer, Boulder, CO

Department Spotlight

Beth Hanson Retires After 12 years with the Department

Beth Hanson has a relatively long history with the University of Colorado, commencing after seven years with Colorado State University where she worked in the Veterinary Teaching hospital for a period of four years, then spent three years working for the Colorado State Forest service in Left Hand Canyon before moving into a position in the Institute of Behavioral Science on the CU Boulder campus. She worked for Richard Jessor in the Institute and moved up in the system. After four years with the Institute she moved into an Office Manager position with the Department of Athletics. After only a few months in that Department she moved into the position of Assistant to the Dean in the Department of Geological Sciences. Beth spent thirteen years in the Department of Geological Sciences and served with three chairs, Gifford Miller, Charles Stern and the current chair, Mary Kraus. Three chairs with very different personalities and approaches to their work which she found to be both intriguing and challenging.

Beth found her time in the Department to be a great adventure into the periphery world of Geology which she very much enjoyed. Time spent with the faculty, students and staff will always be fondly remembered.

Beth had the "privilege" of spending many hours in preparation for the move from the "Old Geology Building" into the beautiful new and functional home Geological Sciences now occupies. It has been encouraging to watch the Department move upwards in its National Rankings as a result of the move into the new building, the consolidation of our faculty from several buildings and the hiring of many new and highly motivated young faculty .

Beth conveys much appreciation and thanks to all of the professors, post docs, students and staff in the Department and special thanks to Giff, Chuck and Mary for their continual support of her management of the front office over the years. She also conveys special thanks to Hartmut Spetzler, John Andrews, Shemin Ge, John Drexler and Peter Birkeland for their friendship extended over the years.

Beth extends her congratulations to Marcia Kelly, who will fill her position, and hopes Marcia's time in the Department will be as rewarding as that experienced by herself.

Gifford Miller, Bruce Hanson, Beth Hanson, Chuck Stern & Mary Kraus

Alumni News

Patrick J. Barosh - Now mapping in the Kunlun Mountains of northern Tibet in cooperation with the China Geological Survey; my third survey after the USGS and the Turkish Survey, MTA. The Tibet studies are on the earthquake hazard facing the new Golmud-Lhasa Railway and structural control for the deep INDEPTH-IV seismic survey. I also have been finishing up 35 years of work on several USGS quadrangle maps for the Mass. State Geol. Survey from my home in RI. These maps follow the collision zone responsible for the Appalachian Orogeny. I'll be back in Tibet in May for my 51st field season and should finish when I am 110.

Janet Bronken Jakobsson - After many years at the Statoil Research Centre and the Norwegian University of Science and Technology, my Lupus disease has forced me into an early retirement this year. Life now revolves around family (husband Sune, and children Ingrid, 18, and Erik, 14) and my newfound hobbies of gardening, knitting and genealogy, as well as occasionally lecturing or serving on exam committees at the university.

Clay Kimmi - After graduating in 1993, I went to Colorado State University and got a B.S. in Watershed Science. I spent several years designing flood-warning systems around the country. I also designed a monitoring network that measured stage, water quality, and meteorological parameters for the Yanacocha gold mine in Peru. The work in Peru was great. I was reminded a lot about the classes and field trips I took with Professor Bill Atkinson. In 2006, I sat for the EIT and PE tests. Happy to say that I passed both on the first attempt. I now work for the Colorado Division of Water Resources as a professional engineer

Jill Pursley - I started nursing school full time at Regis in spring 2008. The first two weeks were very stressful, not because of the course work, but because of learning how to get readjusted to being in school full time and have class everyday. This last week has been much better and I finally feel like I am in a groove and am starting "to get it." The classes that I am taking for this first five weeks are Health Assessment, Professional Nursing Roles, and Pharmacology. The next five weeks will be primarily the

same classes only I don't have Health Assessment and I begin Foundations of Nursing. Health Assessment has been a great class and I love my teacher, in fact I really enjoy all of my teachers thus far. Pharmacology is going to be a little bit more difficult just because of all the memorization that comes along with it. I have met some really great people in my program and have begun to create some great friendships. With the start of school I moved in with my old roommate from college, Nicole. We would love to have any of you come and stop by or stay for a meal! Just let us know.

Jesse Jones Richter - Hello! Since 2004, I have been occupying myself primarily as a teacher. I have taught in several content areas including mathematics, earth science, life science, English and business. As an instructor, I have worked in schools in Alaska, California, Montana and Prague, Czech Republic. I currently teach at the Inner Mongolia University of Science & Technology in Baotou, China. I have also completed my M.Ed. from Montana State University, as well as my executive MBA from Colorado Technical University. I hold teaching credentials in the states of Montana and California. I intend to pursue a doctorate program in the near future. The field of geology continues to fascinate me, and I continue to study within this field as a personal hobby. My geology studies at CU have turned me into an obsessed rock collector!

Ann Felicia Rosen - a Geology alumna of University of Colorado at Boulder and Thomas Murray Ferrier were married January 13, 2007 at the San Diego Wild Animal Park in California next to a lagoon simulating the wilds of Africa. Lydia Cappelli, a good friend of the bride and groom who lives in London, Ontario, Canada, officiated at this wonderful Ceremony. A reception followed with a three-tiered cake with giraffe spots, zebra stripes and leopard spots.

The bride is the daughter of Jack Rosen, Esq. of Highland Park and Lova Andros of Glenview. She received a bachelor's degree in geology from the University of Colorado and a master's degree in business administration from Thunderbird School of Global Management. She works as a business development executive at the Canadian Consulate General in Chicago and has traveled to over 50 countries in her career. In her spare time, she rides her horse competitively as a hunter jumper equestrian.

The groom is the son of the late Dr. and Mrs. Paul A. Ferrier of La Canada Flintridge, California. He received a BA in chemistry, an MBA and an MS in Materials Science. He is director of marketing at James R. Hughes Insurance & Financial and is a competitive sailor in the Star Class.

The couple honeymooned in Cabo San Lucas and La Paz, Mexico.

Jesse Starr - Lots to share since leaving CU! I went off to Washington State University to do a M.S. studying skarn deposits with Larry Meinert and did my thesis work on a zinc skarn in northern Mexico. After spending a summer internship with Newmont Gold Company I realized that I didn't see myself in a career in mineral extraction, and decided to go out on a limb and see if my hard rock/high temperature skills could be applied to environmental geology. I moved to Portland in 2003 happily found employment with a large environmental consulting company. These days I do mostly hydrogeology and contaminant chemistry. I still spend a lot of my free time cooking and eating (!) and manage to get out for a ski trip or two every year (turns out the snow in the Pacific NW is disappointing after spending a few years skiing Colorado powder). Miss you guys!

Robert Steinbach - I left the Geology field in 1959 and in the 45 odd years I have remembered Dr. T, the 2006-07 issue of Geology News contains the first reference I have seen to the W. O. Thompson Fund. Thanks for the news and congratulations to Laura Wilson and Scott McCoy. I have struggled against the passive voice ever since Dr. T had me rewrite a chapter of my thesis without using the verb "to be" or any form of it

Mike Tanner - is in law school at Lewis and Clark in Portland.

Harvey Thorleifson - was elected as a Trustee of the GSA Foundation in late 2007 and he also was granted an Honorary Doctor of Science by the University of Winnipeg, his undergraduate Alma Mater. After spending 17 years at the Geological Survey of Canada after his departure from Boulder, Harvey was appointed Director of the Minnesota Geological Survey, State Geologist of Minnesota, and Professor in the Department of Geology and Geophysics at the University of Minnesota in 2003. Also this past year, Harvey retired as Past President of the Canadian Federation of Earth Sciences, having previously being Geological Association of Canada President in 2003/2004. Presently, Harvey is Statistician and Geologic Mapping Committee Chair of the Association of American State Geologists, while also serving on the organizing committee for One-Geology, a global initiative to accelerate geologic map web accessibility.

Ann Felicia Rosen and Thomas Murray Ferrier were married January 13, 2007 at the San Diego Wild Animal Park in California

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