

GEOLOGICAL SCIENCES
UNIVERSITY OF COLORADO BOULDER

Geology News

Active tectonics
in Death Valley
Inside on page 9

Editors

G. Long Farmer
Dan W. Mitchell

2012 - 2013

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Letter from the Chair

Lang Farmer

Time again for your annual update on the Department of Geological Sciences. We just finished off an eventful 2012-13 academic year with the May graduation of forty-four undergraduate geology majors. We seem to be keeping steady at about 250 majors, the highest number since the early 1980's. Students in our major seem to be interested both in conventional and unconventional energy resources, and many are expressing an interest in hard rock economic geology. That is something we haven't seen in decades. We also had about 11 M.Sc. and four Ph.D. students complete their degrees this year. Thesis topics involved a number of subdisciplines including geomorphology, petroleum geology, geobiology, igneous geochemistry and isotopic geology. These thesis topics point out the wide range of expertise currently available in the department these days and highlight the scope of modern geoscience research.

The department keeps trying to mold the geological sciences major so that it better reflects how the geosciences are evolving. This year we rejiggered our undergraduate major (again), this time combining our environmental geosciences and geology "tracks" to create a broader geology major that allows students to pick courses from a wider variety of topics. A student can now include more geomorphology, geohydrology, oceanography, and even public policy coursework in their major program. Numerous "advising" documents have been put together with the help of the Geological Sciences Alumni Advisory Board to help students steer their way through the major. These documents outline how students can choose to complete a "traditional" geology major, or craft a major with more of an emphasis on solid earth/hydrosphere/biosphere interactions. This is our first attempt at a such a flexible major, but our hope is that it will pan out and suit the department and our undergraduates for a long time to come.

Alumni events this past year included an alumni get together in the Houston area sponsored again by Penny Patterson. This was a fantastic event and we are exceptionally grateful to Penny for organizing the activity.

Faculty wise, things were reasonably quiet last year, with the important exception that we had to bid Professor Matt Pranter a fond farewell. He left CU this past May to take on professorial duties at the University of Oklahoma. We wish Matt the best in his new position and will certainly miss his many contributions to our petroleum geology program.

This year also saw the retirements of several university folks who have played a major role in departmental activities over the years. As you can read about elsewhere in the newsletter, Suzanne Larsen, the long-time Earth Sciences Head Librarian, and Marcia Kelly, the Geological Sciences Office Manager for the past five years, both retired from the university. They will be sorely missed. In addition, Robyn Fugett has left her position as the department's CU Foundation representative and is joining the Nature Conservancy here in Boulder. We wish her the best in her new role.

On the more positive side of things, Professor Alexis Templeton was successful in convincing the powers that be at CU to support a new initiative in geobiology, which will involve, in part, three new faculty hires over the next 3-4 years. The department will be right in the middle of this new initiative and I expect that future newsletters will be brimming with news regarding how the project is evolving.

One other alarming development this past year is that the department asked me to stay on for another couple of years as Chair, so there is little hope that this Chair letter will improve any time soon.

Other campus news that might be of interest is the announcement made earlier this year by Provost Russell Moore that CU Boulder will be moving forward on plans to create a College of the Environment and Sustainability. Exactly how our department will be involved in this exercise remains to be seen, but interesting times seem to be ahead of us on this front.

As a departure from the usual closing fundraising pitch, I instead point out that our newsletter cover this year would not have been possible without your donations. This airborne "Lidar" high resolution digital was made available to students for mapping projects conducted as part of an undergraduate/graduate departmental field trip run by Professor Karl Mueller, using funds supplied by the Braddock-in-the-Field Fund. Your contributions to the department are not only greatly appreciated, but also provide enrichments to our undergraduate and graduate programs that would not otherwise be possible. We not only fund field trip activities with your donations, but continue to provide graduate student research and travel grants, as well as undergraduate mentorships, as a direct result of your generosity. I hope you will consider a donation this year.

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

Notes from the Advisory Board

by Dean Miller

It has been a good year for the Geology Department Alumni Advisory Board. We are pleased that Patty Corbetta and Andres Aslan joined the Board. Patty works for BHP Billiton in Farmington, New Mexico; Andres is a geology professor at Colorado Mesa University in Grand Junction, Colorado. Their willingness to volunteer their time and effort to the Department is greatly appreciated.

One of the best parts of serving on the Board is the opportunity to interact with and act as a resource for the students in the Department. The Board once again met with graduate and undergraduate students to get their views on the Department. All of the students reported that they are very satisfied with the Department, but also made suggestions for improvement, which we passed along to the Department. Following the Spring meeting, the Department held a reception during which several graduate students presented posters describing their research. It was a great opportunity for Board members both to get to know the graduate students and to see the broad variety of the students' research topics. The quality of the graduate students' work is impressive.

Thanks to the efforts of Dawn Kaback, the Board held another career night, during which Board members shared their insights on networking strategies and job-hunting skills with undergraduate and graduate students. One thing we try to do at the career night is to stress the constantly changing nature of the geology profession and the need to have a variety of skills to be able to adapt to the invariable changes in the field. The students appreciate these insights, despite having to listen to Board members' war stories from their invariably circuitous career paths.

Last August, several Board members graciously volunteered to act as drivers for the annual Bill Bradley Field Trip, where Department faculty and some Board members introduce incoming graduate students to the local geology. The two-day field trip included a stay at the Mountain Research Station near Ward on Saturday night. Alumni always are welcome to come along on the trip. If you are interested in participating in this year's trip, please contact Lang Farmer.

If you haven't seen the Department's website recently, I recommend checking it out at <http://www.cugeology.org>, which has current information about faculty research. You will quickly see that the Department faculty is involved in incredibly diverse areas of research, many of which go beyond traditional geology. The

website also has a convenient alumni resources link where you can donate to the Department and update your contact information in the searchable online alumni database.

I can't help but make a quick pitch for fundraising. State budget cuts have had a significant impact on the Department. Even small donations (really, I'm not kidding) are important and directly help students. Please give what you can. You will feel better for it.

Helping students plan their careers

by Lon Abbott

The department, thanks to the generosity and extensive help provided by our alumni, is able to provide resources and opportunities for our students as they plan their careers. Integral to this effort is the Alumni Board's annual Career Day event. It is an evening filled with pizza and conversation about what career options students have and how to get a job in the field of their choice. This spring the panel of alums fielded numerous questions from over 40 enthusiastic students.

The department, the AAPG Student Chapter, and the undergraduate Geology Club organized van transportation for all interested students to last fall's Rocky Mountain Rendezvous job fair in Laramie.

As important as career information is, it is experience and a skill set that will land a student a job. The centerpiece of the department's effort to provide students relevant training beyond the classroom is the Mentorship Program, in which they work on real research projects under the guidance of departmental faculty. This invaluable program is made possible by the generosity of our alumni, whose donations have kept the program vibrant.

The department has grown tremendously in the last few years; about 245 undergraduates are now pursuing a major in geological sciences, up from 87 six years ago. But despite that growth, the department remains small by CU standards and, as students frequently remark, a place where student-faculty interactions possess depth. That interaction extends to the academic advising the students receive. Whereas many departments advise via group meetings, Geological Sciences relies on one-on-one meetings. Students frequently make advising appointments in order to engage Tamee Albrecht or me in conversation about their future career. There is nothing more satisfying for an advisor to discuss with students than their future plans, and these sessions provide students with yet another venue in which to consciously plan their future.

Geological Sciences Advisory Board Members

Andres Aslan
Colorado Mesa University

Ted Ball
Los Alamos National Laboratory

Patricia Corbetta
BHP Biliton

Greg Davis
Brown Caldwell

Richard Goldfarb
U.S. Geological Survey

Dawn S. Kaback
Geomatrix Consultants

Houston Kempton
Environmental Consultant

Dean Miller - Chair
Davis Graham & Stubbs, LLP

Sophie Newbury
Williams Energy

Penny Patterson
ExxonMobil Exploration Company

Alan Seeling
Petroleum Geologist

Chandler Wilhelm
Shell Exploration and Production Co.

Joe Zamudio
ITT Visual Information Solutions

Faculty Activities

Robert Anderson



Members of the Kennicott Glacier research team sledding materials into place to install GPS monuments onto the ice to track glacier motion over the melt season. Leif Anderson, Billy Armstrong and Miriam Duhnforth are shown - March 2013
photo by Bob Anderson

Rebecca Flowers

Last year a new quadrupole mass spectrometer for mineral degassing and measurement of He was installed in Becky Flowers' lab as part of a new (U-Th)/He thermochronology facility in the department. Jim Metcalf, who obtained his PhD at Stanford and has extensive noble gas experience, joined the group as a new research associate and lab manager in summer 2012 and has played a key role in getting the new lab launched. A variety of internal and external users have already obtained data in the lab, and we look forward to further expanding this user base.

We are continuing our work on projects in Canada, South Africa, and the western U.S. Alexis Ault finished her PhD last year, published several papers associated with her thesis research, was awarded a NSF postdoctoral fellowship that she is now completing at the University of Arizona, and obtained a tenure-track faculty position at Utah State University. PhD student Jessica Stanley is continuing her work on kimberlites in southern Africa, and spent over a month in South Africa and Botswana last summer. Rachel Landman published her MSc thesis research on the evolution of the northern Rio Grande Rift in Geosphere, and for her PhD research is exploring development of the conodont (U-Th)/He ther-

mochronometer. Late last year Becky Flowers was the lead author on a paper in Science that presented evidence that a substantial part of the western Grand Canyon was carved by 70 Ma, in conflict with the conventional view that the entire canyon was carved after 6 Ma.



PhD student Jessica Stanley's field assistant Warren Miller (a MSc student at Nelson Mandela Metropolitan University, South Africa) and some locals collect pieces of a kimberlite dike near the village of Mzongwana, South Africa

Kevin Mahan

Kevin Mahan's group continues to work on tectonics and deformation processes and properties of deep continental crust, with ongoing projects in western Canada and the northern Rockies of Montana and Wyoming.

Shannon Leslie (MSc), who worked on deformation mechanisms in deep crustal mylonite from northern Saskatchewan, successfully defended her thesis in May.

Cailey Condit, a 2nd year PhD student, continues her work in southwestern Montana. Her project is focused on understanding the structural and tectonic setting for exhumation of an exposed deep crustal section in the Madison Range. Cailey will be presenting her most recent results at the Rocky Mountain section GSA meeting in Gunnison in May. She is also slated to take her comprehensive exams in late April.

Lesley Butcher, MSc student working with Craig Jones and Kevin, has exciting new results from her work on the timing of late stage deep crustal hydration documented from crustal xenoliths in the Colorado Plateau. Her new Th-Pb monazite geochronology supports the interpretation that Late Cretaceous to Late Paleocene hydration of the deep crust was likely sourced from fluids derived from the subducted Farallon slab.

Two new graduate students will be joining Mahan's group in Fall 2013. Phil Orlandini will work toward his MSc degree by focusing on the origin and conditions of formation of a network of deep crustal granulite-facies pseudotachylite exposed in northern Saskatchewan. Elizabeth Sherrill will start the PhD program and work with both Mahan and Vera Schulte-Pelkum (CIRES research associate) on a joint seismological and geological study of deep

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crustal seismic anisotropy. Elizabeth's work will be supported in part by a new NSF CAREER grant funded to Mahan for work on the evolution of seismic anisotropy in crustal rocks. Finally, Julien Allaz has now worked for CU Geological Sciences as the electron microprobe manager for one year.

Allaz and Mahan submitted a proposal to NSF's Major Research Instrumentation program in February to purchase a new state-of-the-art electron microprobe that will not only serve needs for routine major/minor element work but will also have advanced capabilities for high resolution trace element analysis.



Northern Tibet

photo by Peter Molnar

Peter Molnar

In the autumn, Peter took a trip of a lifetime to northern Tibet to carry out reconnaissance geologic work aimed at determining when and how the region rose to its current 5000-m elevation. In summer, this area is a swamp, or maybe better, a mudhole as little grows. So, one must enter when the ground is frozen, in our case in late October-early November (during the election!), and therefore when it is cold. Humans do not live there, but wildlife (yaks, wild Tibetan donkeys, wild Tibetan antelopes, bears, and wolves) seem to thrive on virtually nothing (except maybe each other, in some cases).

Base camp in northern Tibet

photo by Peter Molnar



Much of the exposed rock is fresh basalt, presumably erupted in the last 10 Myr. Only it seems to have avoided deformation, either by folding and thrust faulting, or by more recent normal faulting.

We sampled basalt for dating and chemical analysis to determine depths and degrees of melting, sedimentary rock and modern stream water for stable isotopes, granitic rock for (U-Th)/He cooling ages and times of rapid exhumation, and fault gouge for dating when slip occurred on the fault. Plans include others (from the Universities of Michigan and Rochester) to return for longer field seasons and more extensive mapping and sampling this autumn and next. Maybe I will get another chance in a couple of years.



Chuck Stern

Standing in front of the church at Paricutin, Mexico, which was overrun by lava during the 1943 eruption of the volcano in the background. The church is still open for mass on Sundays, but you have to climb in through the collapsed roof. Chuck visited the site to seek divine inspiration after presenting an invited keynote address about Andean volcanism at the 2012 Cordilleran section meeting of the GSA in Queretaro.

Paul Weimer

Paul was on sabbatical for academic year 2012-13. Selected events from the year included a keynote talk at the Rocky Mountain Section AAPG meeting plus eight posters; co-sponsor of the Gulf Coast Section SEPM Research Conference in December in Houston ("New understandings in the petroleum systems of continental margins.")

He had a two-month visit to Australia where he was a visiting professor at the University of Adelaide, and worked to develop two new research programs. In April, he gave a keynote talk at an Israeli conference on recent eastern Mediterranean gas discoveries. In May, he became a trustee for the AGI Foundation. He serves as the chair of the AAPG Advisory Council and continues to serve on several professional society committees.

Instructor Activities

Lon Abbott

This year marked the release of Lon's third geology book aimed at a popular audience. ***Geology Underfoot Along Colorado's Front Range*** was co-authored with his wife, Terri Cook. The book brought Lon full circle in a way, as he grew up in Boulder and it was his love of the local mountains that caused him to pursue a career in geology. To be able to share with a broader audience the geological wonders of the Front Range was a real treat. Icing on the cake was that the book's cover art was done by his mother, a long-time local artist who passed away in 2007. The scene is of Boulder from Davidson Mesa, which she painted as a graduation present when Lon received his Ph.D.

In conjunction with the book's release, Lon has given a number of presentations on the Front Range's geological history, including talks at the CU Alumni Directors Club, the Boulder Bookstore, and the Denver Museum of Nature and Science.

In addition to the book, Lon published seven articles in Earth magazine this year and has served on the planning committee for GSA's 125th anniversary meeting, to be held in Denver this October. He is the field trip co-chair and is editing the meeting's field trip guide.

Suzanne T. Larsen Retires

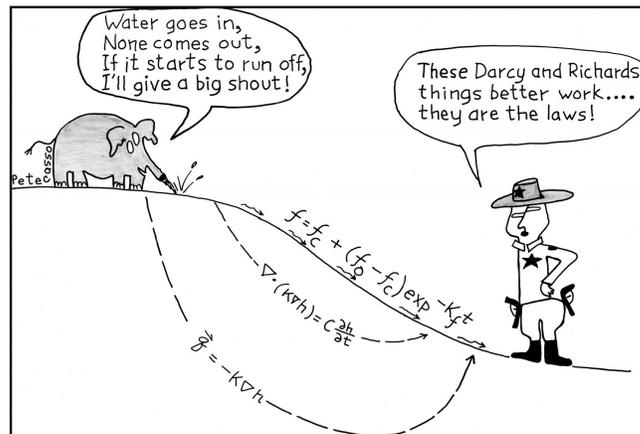
It is with mixed emotions that I am writing to announce my retirement on May 31st, 2013 after 26 years at the University and 22 years as Head of the Earth Sciences Library. I began in the Earth Sciences Library in 1988, when it was in what is now the Bruce Curtis Museum Collections Building. There have been amazing changes in the world of libraries since then. In 1988, GeoRef was a paper index. Web of Science was a very complicated, difficult to use paper index called Science Citation Index, only available in Norlin. GeoRef evolved into a cd rom product spread over 5 discs that had to be checked out and used on a single computer. But the searching capabilities were pretty amazing at the time. Now we are in a world of e-books, bibliographic databases that can be searched from Timbuktu if you are there, digital maps, full-text on-line journals, delivery of article requests to your desktop, programs that create bibliographies for you and, of course, Google.

I am very proud to have been part of the team, with Giff Miller and Lang Farmer, that oversaw the design and construction of the Benson Earth Sciences Building, which contains the Jerry Crail Johnson Earth Sciences and Map Library. The library expanded from 2,400 sq ft to almost 11,000 sq ft. and the Map Library moved from Norlin to the new space. It is hard to believe the building opened for spring semester 1998. It still looks great. I think the interaction I have had with students, both graduate and undergraduate, and faculty though the years is one of my best memories. It is always a bit disconcerting though to find that someone I knew as a grad student is now a department chair! I left the Earth Sciences and Map Library in the capable hands of Katie Lage, our Map Librarian who became the Acting Head of the Library in 2010, to become Interim Associate Dean of Libraries. The Earth Sciences and Map Library, as well as several other units, reported to me. I am proud of what Katie and the Library Staff have accomplished since I left, developing an active instruction program and continuing to make sure the collections, both paper and digital, support the teaching and research needs of the Department and our other

Emeritus Activities

Peter Birkeland

"Petecasso" has been creating some illustrations for the book "Hillslope Hydrology and Stability" by Ning Lu from the Colorado School of Mines and Jonathan W. Godt of the United States Geological Survey.



users. The Libraries just did a major survey and there were several comments regarding the high levels of service and knowledge exhibited by the folks in the Earth Sciences and Map Library.

Thanks for the memories.
Suzanne T. Larsen

The Department Supports the RESESS Internship Program

by Val Sloan

This past summer, faculty in the Department of Geological Sciences played a significant role in mentoring undergraduates in the RESESS summer research internship program. RESESS (Research Experiences in the Solid Earth Sciences for Students) is an NSF OEDG-funded program that aims to increase diversity in the geoscience workforce through supporting students from underrepresented groups by preparing them for graduate school and getting them excited about Earth science. The program is managed by alumna Valerie Sloan at UNAVCO, a Boulder non-profit and university-governed consortium that facilitates geoscience research and education using geodesy. The interns hail from all over the country, and work with science mentors at CU, the USGS, and UNAVCO. This summer, five faculty from the Department worked with six interns to guide them on their summer research projects: Becky Flowers, Shemin Ge, Craig Jones, Jason Neff, and Anne Sheehan. In addition, Post doc Alison Duvall and several graduate students provided additional mentoring, including Kathy Kelsey, Erin Leckey, Will Levandowski, Matthew Weingarten, and Daniel Zietlow. Dan Fernandez in Professor Jason Neff's lab provided computer mentoring, as well.

Introducing the Interns to the Geology and Beauty of the Boulder Area

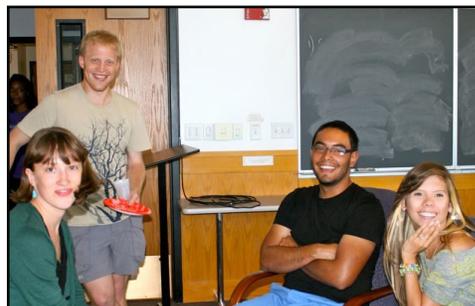
In mid-June, Professor Kevin Mahan and six graduate students led a two-day field trip to introduce the RESESS interns to the geology and beauty of the Boulder area. Starting in the PreCambrian in Eldorado Springs Canyon, Kevin and the graduate students walked the interns through the stratigraphic section. Further stops included Betasso Preserve where they looked at sapprolites, and Sugarloaf Mountain, where they discussed landscape evolution. The group ended with dinner at the CU Mountain Research Station. The next day the stops included looking at the retreat history of nick-points at Boulder Falls, and at the lookout above Flagstaff Mountain. Graduate students Cailey Condit, Rachel Landman, Abigail Langston, Shannon Leslie, Matthew Weingarten, and Andy Wickert took turns presenting different topics and did a great job asking questions of and interacting with the RESESS interns. The interns loved the trip, and were infused with excitement about the rich geology that surrounds Boulder.



The 2012 RESESS cohort on the geology field trip in Eldorado Springs Canyon.

Giving Advice on Graduate School

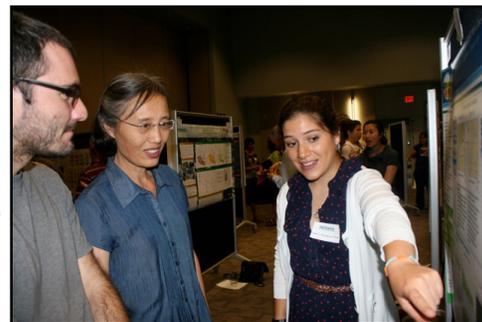
In mid-July, the RESESS interns had the good fortune to get advice from both graduate students and then faculty at a seminar on graduate school. The advice included useful bits of wisdom on what not to do when searching for a graduate school advisor, and how to choose between doing a masters degree and Ph.D. The interns said that it was one of the most useful experiences of their summer.



RESESS interns, Angel Torrens-Bonano and Ashlyann Arana Morales, right, chatting with graduate students Cailey Condit and Andy Wickert about graduate school.

Presenting their Research

The culminating event for the interns was presenting their research through talks at the RESESS colloquium and then at a poster session. Mentors and peers came and showed support at both events, and helped to give the interns the experience of participating in a professional conference-like setting. Students had to present their research to poster judges, and although there were no prizes, all interns were fielded good questions and received some good feedback. The research projects conducted by interns included a study of seismicity induced by fracking disposal injection wells, testing whether minerals usable in thermochronology could be found in sedimentary rocks from New Zealand, and comparing field measurements of biomass and so carbon storage to existing models used by the Forest Service, amongst others.



RESESS intern, Isabel Villaneda-van Vloten shows her poster to her science mentors, Professor Shemin Ge, and graduate student, Matthew Weingarten.

Val Sloan says that she is very grateful to the Department for its commitment to the program. "The science mentors and graduate student mentors provided a lot of guidance and support to the interns on their research projects throughout the summer; it was a lot of work on their part. The truth is, without the mentors, this program wouldn't exist, but thanks to their efforts, most of these interns' lives are changed forever." Of those students who have gone through the RESESS program and finished college, 70% are currently in graduate school and 15% are employed in the geoscience workforce.

Front Office News

by Marcia Kelly

The Geological Sciences department has survived another academic year but with a couple of big personnel changes.

Tiernen McConaughy left the Geology department in August 2012 to join the School of Education here at CU Boulder. In her place we have hired **Susan Pryor**.

Susan came to us with 14 years of experience working at CU. The last 6 years she's been working as a Graduate Program Assistant in the Applied Math department in the College of Engineering. Susan hit the ground running and has made the transition a painless process for the department. She does a great job managing the myriad of responsibilities for new students entering into our graduate program and advising current students and their advisors in the policies of the Graduate School. Please join us in welcoming Susan!

Joanne Brunetti continues in her position as the Accounting Tech with humor and efficiency – both strong job requirements! Joanne works hard to ensure the tracking of finances, travel and procurement. She is very much the center of Department and faculty financial activity.

Barbara Easter continues to enjoy her position as the front office receptionist and does a fine job of greeting students and visitors and handling phone calls with the utmost kindness and a smile on her face. She has many other responsibilities that she works on with an upbeat attitude.

Marcia Kelly retired as of May 31, 2013 after working for CU for 25 years. She feels fortunate and privileged to have worked in a department with such dedicated faculty, students and staff.

Carmen Juszczyk has been hired as of June 18, 2013 as the new Assistant to the Chair. Carmen, earned her MBA, MPH from the University of California, Berkeley, and Haas School of Business. She loves spending time with her son, hiking, singing, and fiber arts. She looks forward to getting acquainted with the people of Geological Sciences and providing excellent customer service to help the academics prosper. **See the current office staff on page 19**

The staff works hard to facilitate the daily accomplishments of keeping the department running smoothly. We look forward to assisting students, alums, faculty and emeritus while helping to accomplish the mission of the department in educating the next generation of leading Earth and planetary scientists.

Please stop by and see us sometime! The Departmental office can be contacted at:

Phone: 303.492.8141

Fax: 303.492.2606

Email: geolinfo@colorado.edu



From left to right; Susan Pryor, Barbara Easter, Joanne Brunetti, Marcia Kelly



We're saying goodbye, so long, farewell and arrivederci!

On May 31, 2013 Marcia Kelly retired from the Geological Sciences department.

Marcia started her career in March of 1988 working for the University of Colorado on the Denver campus in the Department of Electrical Engineering & Computer Science. After stints in the Career Center and the Mathematical Sciences department she made the move to the Boulder campus in June 2006. She worked at INSTAAR as the executive assistant to the director but found that she missed the hustle and bustle of an academic office.

In June 2008 Marcia joined the Geological Sciences department. Marcia always enjoyed working with the students but particularly loved working with graduate students. She feels fortunate and privileged to work in a department with such dedicated faculty, students and other staff and will miss her daily interactions with everyone associated with Geology.

Marcia is looking forward to spending time with her family, doing some traveling and polishing off her golf clubs! Best wishes!!

On The Cover.....

by Karl Mueller

The Eastern California Shear Zone offers a remarkable opportunity for understanding how rapidly slipping faults and other landforms are produced during large earthquakes. Equally exciting is the availability of new, ultra high resolution digital elevation models from airborne lidar scanning that image this active landscape (see cover for a shaded relief map of active faults in the Panamint Valley, California). Students armed with this tool are thus able to map large areas at high resolution - gaining insight into active tectonics while learning to recognize and map structures in the field. This experience, gained during an extended trip over Spring Break to Death Valley and supported by the Braddock In the Field Fund, is a popular opportunity to see first hand what makes the Earth tick. Structures in the region include the easternmost strike slip faults in the Pacific-North American plate boundary and large normal fault systems that mark the edge of the Basin and Range province. Equally remarkable are actively evolving landforms preserved in a hyper-arid desert environment, free of vegetation that masks evidence for recent movements of the crust. Students are thus able to link concepts learned in the classroom with relationships visible in the field. Perhaps more importantly, this allows students to understand how to systematically predict geologic relations, rather than simply memorizing curriculum in a textbook. This is one reason why we take students into the field.



Lunch break in the shade, Redwall Canyon fault zone and alluvial fan



Students traverse Tertiary deposits in the Furnace Creek Mountains



Midnight hike to the top of the Eureka sand dunes, northern Death Valley

Field Trips

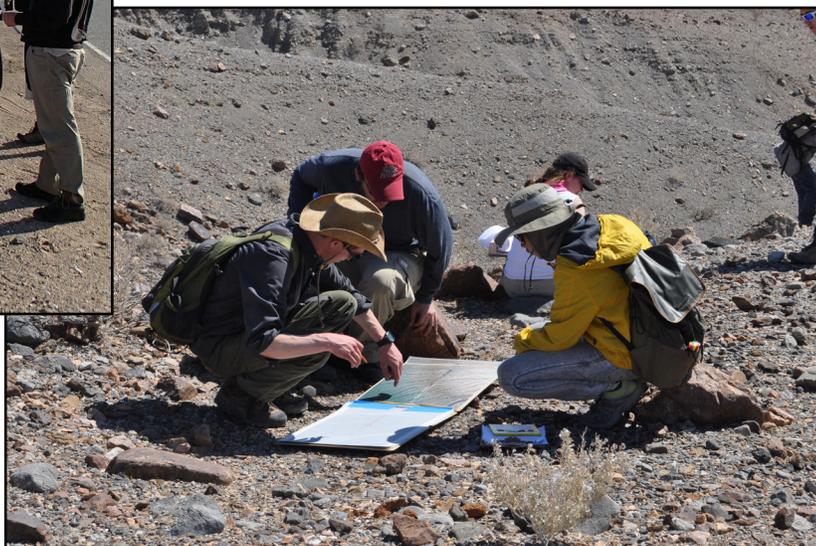


The 2012 Bill Bradley Field Trip for new incoming graduate students

Show and tell with lidar imagery examining a cinder cone split by the Owens Valley fault zone. Suburbans make great chalkboards!



Overview stop at the start of the active Tectonics Spring Break Fieldtrip. Regional Geology and strike slip restraining bends in the Confidence Hills, southern Death Valley



Tyler Kane, Curtis Magnino and Dew Nudthawud pondering the complexities of the Panamint Valley fault zone on lidar basemap, Spring 2013 Active Tectonics field trip

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Morgan Carson discussing the Grand Canyon Volcanic Field at Toroweap Point to the GEOL4717/5717 field tectonics seminar class in March 2013



GEOL44717/5717 class and some geezer (Professor or hobo? A play-at-home game) at an overlook of the Escalante river basin and the Henry Mountains



Chuck Stern being lectured by Argentine anthropologist at trench dug in Holocene sedimentary deposits in cave in southern Chile



Chuck Stern being drawn inexorably to dinner in Torres del Paine National Park in southern Chile.

2012-2013 Undergraduate Mentoring Program

Taylor Thompson worked with MSc. student **Chelsea Fenn** to conduct a subsurface characterization of the lower Mesaverde Group in the Uinta Basin, Utah. Taylor produced the foundation necessary to determine formation tops of important stratigraphic intervals and to identify/estimate discrete architectural elements associated with lower Mesaverde fluvial deposits.

Connor Simmons spent three weeks on the Kennicott Glacier in the Wrangell-St. Elias Mountains in Alaska learning about glacial morphology with PhD student **Billy Armstrong**. Connor collected data from GPS monuments already installed on the ice, as well as installing new monuments for future work.



Connor Simmons with an ice drill ready to install a GPS monument on the Kennicott Glacier in southeastern Alaska's Wrangell Mountains

In conjunction with Professor **Steve Mojzsis**, **Jennika Greer** conducted zircon U-Pb age determinations on some of Earth's older rocks found in northern Quebec. She will be presenting her results at the Goldschmidt Conference in Florence, Italy, later this summer.

Andrew Adams and **Robert Kowalsky**, along with Professor **Anne Sheehan** and PhD student **Danny Feucht**, both worked on field studies associated with a project entitled "Study of the deep electrical structure of the Rio Grande Rift to constrain extent and mechanisms of rifting."

Steve Chase conducted X-ray diffraction laboratory experiments with MSc. student **Sarah Hirner** on the mineral majorite. This silicate mineral is found deep in Earth's mantle and Steve is con-



Andy Adams in the field in New Mexico. Doing magnetotellurics field work

cerned with how the physical properties of this mineral are affected by differing degrees of hydration.

Steeledan Cortes and Professor **Chuck Stern** conducted field and electron microprobe analyses of cerite and other rare earth element minerals found in Precambrian rocks at Jamestown, just west of Boulder.

Phil Orlandini worked with Professor **Kevin Mahan** to use paleomagnetic information to assess the origin of pseudotachylytes found in the Athabasca granulite terrane in northern Saskatchewan.

Phil Orlandini hard at work in northern Saskatchewan



GEOLOGY NEWS

News and Awards

Undergraduate Awards for Spring 2013

AWARD	RECIPIENTS
Bruce Curtis Outstanding Junior	Brian Shreve Tyler Kane
Johnston Memorial Scholarship	Chris Newton
Kolber Award	Brenda Kessenich Jennika Greer
RMAG Outstanding Senior Award	Devon Theune
T. Keith Marks Scholarship	Allison Schaiberger Karalee Brugman

Graduate Awards for Spring 2013

AWARD	RECIPIENTS
Longley, Wahlstrom, Warner Award	Derek Weller
Johnston Award	Tristan Betzner
Spetzler Award for Research	Ulyana Hordyskyj
W. O. Thompson Award	Lesley Butcher
Waldrop Memorial Scholarship	Michelle Hopkins

Shell Exploration & Production Graduate Research Awards



Shell provided funding that is helping graduate students complete research projects for their degrees.

Leif Anderson
Rachel Landman
Francis Rengers

We wish to
congratulate all of our
graduates and
award winners.



The 2012 Bill Bradley Field Trip for new incoming graduate students

Photo by Mohammed Alqattan

The Department of Geological Sciences
undergraduate mentor program is funded
solely from gifts like yours!

Degrees Awarded (Fall 2012 - Spring 2013)

B.A. Geology Majors

Ahmed Abdullah Al Khatem
 Faisal Alhulisi
 Ross Michael Apodaca
 Benjamin Barishman
 Kelsey Jean Bartling
 Gina Basse
 Laura Beach
 Laurel Rochelle Beougher
 Tyler Bernier
 Scott Douglas Campbell
 Morgan Brittany Carson
 Tyler Weston Conquest
 Steeledan Cortes
 Anthony Joseph Cronin
 William Curtiss
 Elisa L. Dahlberg
 Robert M. Davis
 Briana Filice Dodson

Julia Elizabeth Dziennik
 Sam Ecenia
 Derek Stephen Goff
 Clayton Haskins
 Lainey Elise Heyl
 Dew Nudthawud Homtong
 Chad Warren Horwitz
 John H. Kinney
 Michael Henry Larsen
 Ryan Lenberg
 Sterling Loetz
 Patrick D. McConnell
 Joel I. Mendez
 Brooke Molson-Moran
 Chris Newton
 A. Rae Ann Orkild-Norton
 Reed Driscoll Pellicore
 Tyson A. Rasmussen
 Peter Rody

Alex Romansky
 Jason Sauer
 Allison Schaiberger
 Anna Schroeder
 Joshua Scott
 Tyler MacPherson Sears
 Drake Moore Singleton
 Hunter Max Snyder
 Brian Lee Spitzmiller
 Eric John Sundstrom
 Chase Taylor
 Lauren Ray Terry
 Devon Cynthia Theune
 Taylor Thompson
 Taylor Lee Weber
 Kevin Wentzel
 William Westerfield
 Tristan Ashley Wolff
 Amanda Setsuko Yoshino

M.S. Candidates Graduating with Degrees

	Advisor	Thesis Title
Rachel Acks	Mary Kraus	Sedimentary and Climatic Response to the Second Eocene Thermal Maximum in the McCullough Peaks Area, Bighorn Basin, Wyoming, U.S.A.
Tevis Brandon Blom	Eric Tilton	Rock Weathering Effects on Bedrock Channel Erosion Determined via Abrasion Mill Experiments
Celene Louise Christensen	Gifford Miller	Multi-proxy Responses of Icelandic Lakes to Holocene Tephra Perturbations
Sarah Grace Evans	Eric Tilton	Sensing Vegetation Growth and Senescence with Reflected GPS Signals: Active Microwave Detection of Western North America Phenology
Amanda L. Howard	Lang Farmer	Hafium Isotope Evidence on the Provenance of ~1.1 Ga Detrital Zircons from Western North America
Shahen A. Huda	Eric Tilton	Modeling the Effects of Bed Topography on Fluvial Erosion by Saltating Bed Load
Robert Jaecks	Matthew Pranter	Spatial Geostatistics, Lateral Variability, and Scale Invariance of Variogram Properties within Dolomites
Gabriela I. Keeton	Matthew Pranter	Sedimentological and Stratigraphic Characteristics of Fluvial Sandstones Based on Outcrop Spectral-Gamma-Ray Data and Borehole Images, Williams Fork Formation, Piceance Basin, Colorado
Nadine Ginsberg Reitman	Shemin Ge	Groundwater Flow and Its Effect on Salt Dissolution in Gypsum Canyon Watershed, Paradox Basin, Southeast Utah
Nathan Rogers	Paul Weimer	Sequence Stratigraphy of the Upper Cretaceous Mancos Group and Related Units, Piceance Basin, Northwestern Colorado
Christopher M. Rybowskiak	Matthew Pranter	Evaluation of Measured and Facies-Based Effective Permeability and the Significance for Reservoir Mapping and Connectivity

GEOLOGY NEWS

Ph.D. Candidates Graduating with Degrees

	Advisor	Thesis Title
Janice Lynne Brahney	Jason Neff	The Influence of Anthropogenic Dust Emissions on Precipitation Chemistry and Lake Biogeochemistry
Kristin H. Jacob	Lang Farmer	A Geochemical, Isotopic, and Geochronologic Study of Oligocene Magmatism, Never Summer Mountains, North-central Colorado
Emily J. Knowles	Alexis Templeton	A Geochemical Characterization of Putative Biosignatures in Subseafloor Basalts
Marcia Glaze Wyatt	Peter Molnar	A Multidecadal Climate Signal Propagating Across the Northern Hemisphere through Indices of a Synchronized Network



Fall 2012 graduation



Spring 2013 Graduate students

Spring 2013 graduation



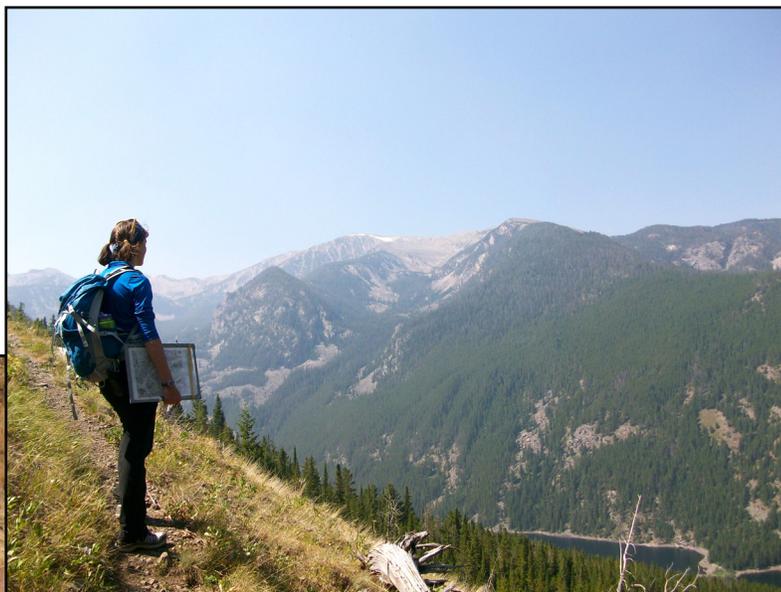
Students “in the field”



Graduate Student Daniel Zietlow aboard the R/V Oceanus during an abandon ship drill. This sailing of the Oceanus was one of many during the 2012 Field Season for the Cascadia Initiative, an onshore/offshore seismic and geodetic experiment investigating the tectonic nature of the Juan de Fuca and Gorda plates off the coast of the Pacific Northwest



Amanda Howard collecting Pikes Peak granite for a study of zircon Hf isotopic compositions in Mesoproterozoic granites



Cailey Condit enjoys the view overlooking Lava Lake while mapping metamorphic rocks in the Madison Range, SW Montana, August 2012 - Photo courtesy of Josh Johnson



PhD student Jess Stanley meets some of the locals while looking for a kimberlite pipe near Qacha's Nek, Lesotho

GEOLOGY NEWS



Gabriela Keeton collecting spectral-gamma-ray data on the Williams Fork Formation (Plateau Creek Canyon, Colorado)



Graduate student Kristen Jacobs in her field area in Never Summer Mountains, Colorado

Graduate students work in the Wind River Range "Studying Dust in the Wind (Rivers)" Left to Right: Tyler Conquest, Janice Brahney, Gregory Farlow, Cletus Blum, Ben Thompson

Advisory Board Bio's

Ted Ball

Ted completed a Ph.D. in 1992 as one of Dr. Farmer's advisees. For his dissertation project he worked on a neodymium provenance study of proterozoic supracrustal rocks in the western United States and got to spend a couple of great summers in the Snowy Range of southern Wyoming.

From 1991 until 1999 he worked as a geochemist and project manager at Tetra Tech in Denver, CO on a variety of environmental characterization and cleanup projects in the western U.S. In 1999 he and his wife and family moved to Los Alamos, NM to work at Los Alamos National Laboratory. He is currently a project manager in the environmental restoration program working on the installation of a site-wide groundwater monitoring well network at the Laboratory. In the past 14 years the project has installed nearly 70 deep groundwater monitoring wells in the Pajarito Plateau.

He enjoys keeping up with current student's interests and with the progress in the geology department.

Sophie Newbury

Sophie graduated with a masters in Geology from CU Boulder in 2010. Her master's research focused on the sedimentology of the early Eocene Willwood Formation in the Bighorn Basin, Wyoming. Right after graduation she went to work in the oil and gas industry for Williams, now called WPX Energy. She currently works as a geologist in the exploration group at WPX. Sophie has really enjoyed being on the advisory board and especially enjoys the opportunity to talk with students about their research. She likes to share experiences from her recent job search and early career as much as possible in the hopes that it helps students find enjoyable jobs.

Penny Patterson

The Department of Geological Sciences Advisory Board is a somewhat eclectic group of alumni that encompasses recent graduates to alumni that have graduated several decades ago and includes alumni that work in a variety of realms, including academic universities, petroleum and minerals industries and environmental consulting businesses. Within that spectrum, I represent those alumni working 20+ years in the oil and gas industry. I obtained three degrees from the Department of Geological Sciences, including a B.A. (1976), M.S. (1981) and a Ph.D. (1990). So, what did I do after graduation? Certainly not what I was expecting as a career path! In 1990, I began working at Exxon Production Research Company as a Research Geologist and have progressed through the technical ladder to Senior Technical Advisor with ExxonMobil Exploration Company. Over the course of my 22 years with ExxonMobil, I have conducted field work and developed exploration opportunities around the globe from Sub-Saharan Africa to the South Caspian Sea of Azerbaijan, working closely with in-country geoscientists. As a member of the Advisory Board, I have had the opportunity to meet with undergraduate and graduate students and learn of their challenges in achieving their educational objectives as well as defining their career goals. Thus, my involvement on the Board has focused on providing guidance for improvement of the course curriculum to ensure that the graduates have the skills, knowledge, and creativity to succeed in their career. Another

aspect that I have been involved with is the formation of a geoscience network for geology alumni in the Houston area. With the assistance of Houston-area alumni, we have held three successful social gatherings that have provided a network platform for alumni of all stages of their careers.

Chandler Wilhelm

Chandler Wilhelm (M.S. 1983), and wife Laura Wilhelm (M.S. 1982) live in Houston, as they have for the past 29 years. Chandler continues to work in the oil and gas industry, where he serves as Vice President for Unconventional Exploration for Shell Upstream Americas. He enjoys the technical and business challenges of developing unconventional oil and gas resources across a diverse and dynamic business environment from Canada to Argentina. Chandler and Laura have 3 grown children (all living in Texas and largely gainfully employed), and when not working enjoy their friends, their pets, and their frequent trips to Rome to study art, history, and great food. Chandler considers his service on the Advisory Board to be a privilege, and a way of helping the department to prepare students for the opportunities and challenges that will lie ahead in the field of petroleum geology.

Joe Zamudio

I received my M.S. degree in Geology in 1986. My emphasis was Economic Geology. I received my Ph.D. degree in Geology in 1992 with an emphasis on remote sensing. Directly after that I started working at the Department of Energy's Remote Sensing Lab in Las Vegas where I was principle investigator for a DOE-funded project to evaluate hyperspectral remote sensing systems and their utility for environmental applications. I enjoyed that work but jumped at the opportunity to return to Colorado to work as a senior staff geologist for Golden Star Resources in Denver, CO. While there I was responsible for remote sensing applications for several mineral exploration projects in South America. In 1997 I also became partner in AIG, a local firm focused on hyperspectral data analysis, mainly for mineral exploration and environmental projects. I worked full time for AIG in 1999 after the bottom fell out of the mineral exploration industry for junior companies. After AIG I moved on to work for a firm collecting hyperspectral data, then started working as an independent consultant. Currently, I work for Exelis Visual Information Solutions, teaching researchers how to use ENVI, a remote sensing data analysis program started by colleagues at CU. I also still work on some independent consulting projects, focused primarily on hyperspectral data analysis for mineral exploration. I've been on the Geological Sciences Alumni Advisory Board at CU for a few years now. I enjoy keeping up with the geology department and it is rewarding to help students make the most of their CU experience.

Submit your alumni news @
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click on "Alumni / Donations"
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Obituaries



John W. Rold passed away peacefully on September 10, 2012. He was born in 1927 in Kirkman, Iowa and moved to Colorado in 1932. He attended CU Boulder, where he received a BA and MS in geology. He worked for Chevron for 20 years and started the Colorado Geological Survey in 1969. He retired from the Survey in 1992 and did private consulting work for 18 years. He received many awards throughout his life

and served as president of many geological organizations. An avid outdoorsman, he loved hunting and fishing. He belonged to the "Old Goats" and the Colorado Wildlife Federation. He is survived by his wife of 57 years, Phyllis, and his children Marc (Allison), Becky (Jay Kittleson), Cindy, and Greg (Robin) and 7 grandchildren, Dane, Aaron, Jonny, Brian, Meghan, Stephanie and Kylie. A celebration of his life was held at St. James Presbyterian Church at 3601 W. Belleview Ave. on September 15, 2012 at 10:30am. Donations can be made in his name to the Colorado Wildlife Federation or the Alzheimer's Association .

Published in www.denverpost.com from September 12 to September 13, 2012



Dr. Timothy Gubbels was born on September 14, 1961 in Albuquerque, New Mexico to Matt and Pauline Gubbels and, until recently, resided in Arlington, VA. He passed from this life on May 12, 2012 in Lynnwood, WA, taken unexpectedly from his friends and family.

He is survived by his parents, Matt and Pauline Gubbels of Edmonds, WA; brother, David Gubbels; sister, Monica Firestone (husband, Merrick); sister, Cecilia White; sister, Michaela Zwinakis

(husband, Peter); and brother, Sam Gubbels (wife, Ann Curtis). Uncle Tim was also proud of his nine nieces and two nephews!

Dr. Timothy Gubbels was a Senior Scientist with WorldTech International and a Chief Scientist with Science Space Corporation. He received his Ph.D. in Geological Sciences from Cornell University, a MS in Geology from University of Wyoming and a BA in Geology from University of Colorado. Through his life Tim received numerous honors and awards, was a Board Member at Cornell, and published many articles that were well reviewed.

In lieu of flowers, contributions in Tim's honor can be made to the Timothy Louis Gubbels Memorial Fund at Cornell University: Attn: Ms. Judy Starr, Dept of Earth and Atmospheric Sciences, 2122 Snee Hall, Cornell University, Ithaca, NY 14853. **Please designate contributions to be used for Timothy Louis Gubbels Memorial Fund. Through this fund we honor Tim's memory, his love of the earth, and specifically his enthusiasm for the Andes Field Program. A Funeral Service was held on Saturday, May 19, 2012 at 10:30 a.m.

An online memorial album can be accessed at www.becksfuneralhome.com.

Tim was a beloved son and 'big brother' to his siblings, a doting Uncle, a great friend and a well respected scientist. His passing leaves a big hole in many people's lives and he will be missed.

Published in www.edmondsbeacon.com on May 17, 2012



The current 2013 Front Office Staff: From left to right: Joanne Brunetti, Carmen Juszczuk, Barbara Easter and Susan Pryor.

**We would like to thank ALL of our faithful and generous donors.
Words can hardly express our gratitude for your continued
support and encouragement to the Department of Geological Sciences.
We would not be the first class program that we are without your support.**

**Our Sincerest Thanks
From the Faculty, Staff and Students**

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