DOWN TO EARTH

DEPARTMENT OF GEOLOGY AND GEOPHYSICS, UNIVERSITY OF UTAH SPRING 2002

Message From the Chair

Greetings from the Chair's office!

There is good news about our faculty searches. The retirements of Bill Parry and Duke Picard resulted in openings in both Geological Engineering and Sedimentary Geology. Our search for their replacements has been successful and we are once again at full strength in our faculty. Dr. Fulvio Tonon arrived in February. Fulvio is a Civil Engineering graduate of the University of Colorado at Boulder and will strengthen the geotechnical side of Geological Engineering. Dr. Cari Johnson will join us by the first of the year after completing a post-doc. Cari is a graduate of Stanford University and her skills will round out our sedimentary geology and tectonics programs.

There are also some interesting developments for our profession at large. The legislature approved House Bill 96 a few weeks ago. This bill provides for professional licensure of geologists who practice engineering-type geology in the state of Utah. Those old folks like me will have a year to 'grandfather' in if they want a license. Younger folks will have to pass a test and obtain some on the job experience. I encourage all of you to join the Utah Council of Professional Geologists. This is the organization that will provide timely information about licensure and also provides a unified voice for the geological profession in the state. I was pleased to see HB 96 passed. I think it is good for our profession and it was also a real grass roots effort that came from geologists who recognized that their decisions have a major impact on public safety and economic issues.

By the way – our graduate students are busy planning a summer geology field trip to East Africa. This is the second major geological expedition organized by our graduate students – the first trip went to New Zealand two years ago. You will be really pleased to see how our field trip program has grown; during the last several years we have sent groups of undergraduate and graduate students traveling throughout the western US, South America, and New Zealand. Africa will continue that tradition. These trips are possible because of folks who continue to contribute to our field trip and other funds in the department. I urge all of you to think about supporting our students – consider a donation to the field trip fund, our Distinguished Lecture fund, or the Chairman's discretionary fund. Your contributions, regardless of size, have major positive impacts upon our students – both present and past.

Sincerely,

Ronald Bruhn, Chair
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DEPARTMENT DEVELOPMENT

Utah Legislature Pass Geologist Licensure Bill

Tiffani Copyak

During the final hours of the 2002 Utah Legislative session the Utah Senate passed HB 96, Licensure of Geologists. Short of Governor Leavitt's approval, the bill should become law by next July.

The act requires licensure of individuals practicing geology before the public. Before the public is defined but not limited to consultation, investigation, evaluation, planning geologic mapping, interpretation of geologic data, preparation of geologic data, preparation of geologic reports, geologic cross-sections and geologic maps, and inspection of geological work. It includes any geologic work that is relevant to public welfare or the safeguarding of life, health, property, and the environment.

The qualifications for licensure require an applicant to be of good moral character and provide evidence of a bachelor or graduate level degree in the geosciences granted through an accredited institution with a minimum of 30 semester hours (or 45 quarter hours) of course work in the geosciences. Along with these requirements, the following apply according to degree level reached:

-with a bachelor's degree, a record of five years of active professional practice in geological work of good character indicating the applicant is competent to be placed in responsibility of work.

-with a master's degree, a record of three years of active professional practice in geological work of good character indicating the applicant is competent to be placed in responsibility of work.

-with a doctorate degree, a record of one year of active professional practice in geological work of good character indicating the applicant is competant to be placed in responsibility of work.

After January 1, 2004, applicants will be required to meet the examination requirement established by the rule division in collaboration with a board that will be set up to monitor the act. The board will consist of three professional geologists, the Utah state geologist, and one member representing the general public.

Many view this act as a necessity in Utah where people are building their homes higher in the foothills in areas prone to natural hazards. Developers are required to submit hazard studies before they are allowed to build, but there is no set qualifications for the geologists completing these reports. A substandard report will not get approval and often costs the developer money to pay for another report on the same property. The Licensure of Geologists will define the standards for the geologist working on such cases.

The passing of this bill will allow Utah geologists the ability to work in other states having similar geologist licensure acts and provide for the public the ability to investigate the expertise of individuals performing geologic work.

Check out the Utah Council of Professional Geologists (UCPG) website:
www.utahpg.org

The Earls Family Endowment

Jennifer Swift

On November 30th of last year the College of Mines and Earth Sciences received a gift in the amount of $20,000 from the John C. Griswold Foundation at the request of Mr. and Mrs. Christopher Earls. The gift will be used to establish a fund named the Earls Family Endowment. The fund is expected to receive additional contributions in the following years to bring it to a minimum of $50,000, and is to be used for field studies in the College of Mines and Earth Science. Authority for expenditures from the fund will be at the discretion of the Dean and Director of the College.

FACULTY

Dr. Fluvio Tonon Joins Geological Engineering Faculty

Tiffani Copyak

The department welcomes the new Geological Engineering Professor, Dr. Fulvio Tonon. Tonon completed his undergraduate work at University of Padua in Italy where he was awarded the Thesis Prize by the Italian Tunneling Society for the best thesis on Underground Excavations. His thesis was titled "Multiobjective optimization of uncertain structures: a fuzzy set approach with application to the design of tunnel lining in hard rock."

Professor Tonon then came to the United States and completed his Ph.D. at the University of Colorado at Boulder with a thesis on "Three dimensional modeling of underground excavations and estimation of boundary conditions in rock with fabric."

Tonon has worked as a Professional Engineer for SIGES completing many design projects, along with work as a Senior Tunnel Engineer for Parsons Transportation Group. He has a list of publications and design projects related to tunnels and underground excavations, foundations, rock and soil slope stabilization, hydraulic works, bridges, reinforced concrete buildings, and restorations.

Dr. Tonon's research interests are in the area of geomechanics with specialization in rock mechanics and rock engineering, numerical modeling, underground excavations, mechanized tunneling, uncertainty models, and design process and optimization to Civil Engineering.

Dr. Tonon is the newest addition to the Geological Engineering faculty and will assist in building the program to meet ABET criteria. He immediately became involved by heading a design project for the GG5320 Geological Engineering Design class.

Dr. Picard Awarded Pettijohn Medal

Tiffani Copyak

Dr. Duke Picard is the Francis J. Pettijohn Medal awardee for "Excellence in Sedimentology." The Pettijohn Medal is given in recognition of persons who have a significant reord of outstanding contributions in sedimentary geology. Dr. Picard recently retired from the deparment but continues with dedication to this department.

Bob Smith Selected for New Earthquake Research Committee

Tiffani Copyak

Professor Bob Smith has been chosen by Secretary of Interior Gale Norton to serve on the newly formed Scientific Earthquake Advisory Committee. Dr. Smith is among ten nationally recognized seismologists who will form a panel that will advise the Director of the U.S. geological Survey on matters relating to the USGS's participation in the national Earthquake Hazards Reduction Program, including guidance on research needs and achieving national goals. Included in their work will be reviewing and making recommendations for research on understanding the physics and geology of earthquakes as well as the requirements and specifications for regional and national seismograph and GPS networks. Bob also serves on the USGS review committee for the 2002 National earthquake hazard maps.

Stay tuned for information on the new Sedimentary Faculty member Cari Johnson in the fall 2002 newsletter.

Egypt Trip

Travis Crosby

Collaboration between the geology and geophysics departments of the University of Utah and Cairo University recently took Professor Jerry Schuster and graduate student Travis Crosby to Egypt's Sinai Desert. The trip's purpose was to perform several seismic tomography surveys in an attempt to identify and delineate possible zones of gold and base metal mineralization.

The geology of Sinai is strongly influenced by the rifting of the Red Sea in which the resulting faults occasionally act as a conduit for mineral enriched hydrothermal activities; and, in fact, more than 100 such mineral deposits are known to exist in Egypt's Eastern Deserts, most of which were discovered and exploited by the ancient Egyptians and the Romans. The fabled King Solomon's mine, as mentioned in the Bible and now lost, was supposedly located in the Sinai. Several lesser-known areas have recently been investigated by Dr. Hanaa Salem of Cairo University and shown to have gold and silver concentrations high enough to warrant further investigation with the University of Utah's seismic techniques. Schuster and Crosby's resulting travels took them to such remote places as Wadi El Kid, Dahab, and Sharm el Shiekh.

Prior to fieldwork, several days were spent in Cairo visiting such places as the Egyptian Museum and the Pyramids of Giza, and while in Cairo a nighttime taxi cab ride proved eventful when a barely visible exposed wire hanging from a broken dashboard meter shocked Travis not once but twice. His knee and hindquarters (where the current exited from his leg and back into the seat on which he was sitting) were reportedly feeling better after several hours.

In light of recent events, particularly America's involvement in military action in Afghanistan, crew safety while traveling abroad was initially a concern. Such apprehension proved quite unnecessary in that the Egyptian people were remarkably friendly and affable, especially towards westerners, and contributed to a very memorable trip.

GRADUATE STUDENTS

East African Geologic Systems

"To learn geology one must travel widely and observe carefully, for geology is learned through the soles of your shoes, not the seat of your pants!"
-Walter L. Manger

Following a great tradition of the entering graduate student class of 1999, the new graduate students of 2001 have formed a class with an associated field trip to a geologically significant and unique locality. This year's class will focus on the East Africa Rift Zone. The group of students, otherwise known as E.A.G.E.R. (East Africa Geologic Expedition Researchers), has begun a student led seminar class, which culminates in a two-week field trip to Kenya in August. Thanks to a successful and extensive fundraising effort, all systems are going for this ambitious project. The students have been rewarded with donations from family members, the Department of Geology and Geophysics, and the College of Mines and Earth Science. Excitingly, Rev. Marta Weeks has displayed outstanding generosity with a donation that essentially allows the E.A.G.E.R. group to embark on this exciting journey. The expedition will examine structure, geomorphology, archaeology, and volcanics of the rift valley and Mount Kenya areas of East Africa. Paleoclimate, paleogeography, and the evolution of the African continent will also be themes for the trip. The group's packed agenda includes observation and study of Kenyan wildlife and culture in addition to creating a comprehensive field guide of the geologic and cultural stops. EAGER would like to thank all the individuals who have helped make this project a reality. Look out for a slide show next fall.

Seismic Methods to Detect Dinosaur Fossils

Travis Crosby

Does anyone remember the opening scenes of the first Jurassic Park, where paleontologists were using seismic methods to detect dinosaur fossils in-situ? And with a single shot they had perfect images within seconds with no processing. Oh Hollywood, if only it were that easy! Well, last fall several University of Utah students, led by geophysics Professor Jerry Schuster and paleontologist Scott Sampson, traveled to southern Utah to attempt that very same thing, minus the movie stars.

Located in a remote region of the Kaiparowits Plateau near the Utah/Arizona border is an active dinosaur quarry currently under investigation by Sampson and other paleontologists. While their work so far has produced numerous finds they are still concerned about where to concentrate their efforts as they continue to excavate further back into the hill on which the quarry sits. So last November Travis Crosby, Paul Gettings, Derrick Hasterok, Dave Sheley, and others set up a rather complicated array of 216 geophones on the hill above and spent the next several days collecting enough data to require the use of three separate recording seismographs, one of which was graciously provided by Craig Lippus of Geometrics, Inc. The energy source, a small 5-pound mini sledgehammer struck against a 4x4 inch metal plate, was activated 540 times producing over 116,000 traces of seismic data requiring what will most likely be a several month processing effort. The team also performed a 3-D ground penetrating radar survey over the same site, as well as a high-precision differential GPS survey of each seismic shot and receiver location. The combination of methods will help reduce the uncertainty in identifying fossil deposits.

With the current data set (providing 5 to 10 meter depths and resolution on the order of 0.5 meters), researchers already have several hurdles to overcome and acknowledge that resolving individual bones may be impossible due to instrument limitations and an exceptionally small velocity contrast. Instead they are focusing on identifying larger fossil clusters, and identifying possible improvements in future surveys, such as ways to increase resolution, shorten setup and acquisition time, and simplify processing. By building upon lessons learned now, future surveys using this technique, dubbed High-Resolution 3D Tomography, might become fast enough and routine enough to enter everyday use of real-world geophysics.

Tracking Dinosaurs in Central Utah

Rose Difely

Rose Difley and her advisor, Tony Ekdale, recently submitted for publication a manuscript on dinosaur track beds in the latest Cretaceous North Horn Formation in Emery, Sanpete and Carbon Counties, Utah. The paper, which resulted from Rose's graduate studies, showed that large dinosaurs existed close to the KT boundary in central Utah.

Rose had worked in the Wasatch Plateau for several years before she realized that the strange, irregular sandstones were actually tracks of dinosaurs exposed in vertical cross section. She tallied about 100 track beds all in about one mile square at the North Horn type locality. Moreover, she found that track beds were widespread for miles surrounding the type locality. Besides the type locality, she found additional North Horn dinosaur tracks in several other localities in the Wasatch Plateau, and spread over a distance of about 50 miles. Tracks at one of these localities was the first evidence of dinosaurs on the western side of the Wasatch Plateau, according to the U. S. Forest Service.

UNDERGRADUATE STUDENTS

Cook Inlet Undergraduate Research

Dan Neuffer

In July of 2001, Professor Ron Bruhn and a group of young geologists flew to Alaska to research the geology of the Cook Inlet Basin in south-central Alaska. Dan and Courtney Neuffer, both undergraduates in the department, and Ann Altstatt, an intern at the Denver office of the U.S. Geological Survey, joined Dr. Bruhn in characterizing various properties of Cook Inlet rocks. The first few days of the trip were spent in the Alaska Geologic Materials Center core lab in Eagle River, Alaska. At the core lab, Dr. Bruhn and the students made measurements of magnetic susceptibility and permeability on cores of sedimentary rocks from Cook Inlet. The group also used a portable spectrometer to determine the mineralogy of the samples. During this time, Professor Bruhn, Ann, Courtney, and Dan also traveled to several creeks outside of Palmer to measure the magnetic susceptibility of stream boulders washed down from rock formations in the Talkeetna Mountains.

After finishing up work in the Eagle River-Palmer area, the group headed down to the Kenai Peninsula. Dr. Bruhn and the students spent the first afternoon at the Exit Glacier near Seward, analyzing rocks and admiring the beautiful white-blue ice of the glacier. The group spent the remaining several days of the trip on the Kenai Peninsula, camping near the beaches and collecting mineralogic and magnetic data on Tertiary sedimentary rocks exposed in sea cliffs along the Cook Inlet. Professor Bruhn and the students worked along the coast at Clam Gulch, Ninilchik, Homer, and Seldovia, always keeping an eye on the wildly fluctuating tides of the Cook Inlet. The goal of the Cook Inlet research was to correlate field measurements of magnetic susceptibility and mineralogy with aeromagnetic maps of the Cook Inlet region to gain an understanding of the rock units and minerals responsible for magnetic anomalies.

AEG Student Night

Tiffani Copyak

The Associaton of Engineering Geologist Wasatch Front Student Chapter hosted the monthly AEG meeting in January. AEG Student night, held a month earlier than normal due to the Olympics, drew students out to present projects they had been working on over the past year. Jody Gisseman and Heather Mickelson provided a presentation on an engineering field camp they attended in South Dakota over the past summer. The projects were followed by a slideshow of pictures taken on the trip to and from South Dakota. Tiffani Copyak presented on the Salt Lake County Natural Hazards Maps compiled during the Spring of 2001 while participating in a internship through the University of Utah. Jason Nielson provided the results of a project completed in GG 5540 Geological Engineering Design where they analayzed a TMDL project in Little Cottonwood Canyon and designed mitigation to reduce zinc levels in the surface flow that is killing fish populations. Courtney Neuffer finished off the student presentations with a presentation on Lake Tahoe. The tile of the talk was “Lake Tahoe: A lake born of fire and ice” The talk was given to get the AEG folks hyped up about the annual AEG conference that will be held in Reno, Nevada this coming September. The student chapter raised $210.00 with which they will use towards a spring conference trip.

Undergraduate Research Opportunities

Jennifer Swift

Undergraduate Research is a great opportunity to set yourself (obviously assuming you are an undergraduate) apart from all the other undergrads in the Geology and Geophysics Department. Interested? Good, let's begin.

1. To participate in undergraduate research (UROP) you must be seeking an undergraduate degree and attending the University of Utah as a full-time student (at least 12 credit hours) during the semester in which you will be participating in your project. For summer 2002, students must have been full-time in spring 2002 or be full-time summer 2002.
2. Consult with a faculty member willing to sponsor research or creative work. Applicants must be eligible for University employment and must report their earnings when applying for other sources of financial aid. UROP Assistantship funding is limited to one student per faculty during any one semester.
3. **How to apply (complete and detailed steps found on UROP website:** www.ugs.utah.edu/student/UROP.htm**).** At this link you will complete an application which requires 4 items. 1. The completed two-page application form. 2. A written proposal with you and your faculty sponsor's signature. (Specific requirements to proposals found on the UROP website.) 3. Two letters of recommendation. Details can be found on the above UROP website. 4. Letter of recommendation waiver. Return **two copies** and the originals of the two-page application form, your proposal and the letter of recommendation waiver to Jill Baeder, Undergraduate Research Opportunities Program (UROP), Sill Center. Letters of recommendation should be mailed or delivered to the same place.
4. **Budget and Academic Credit**
   For each semester of research, a student will receive hourly wages at $7.00 per hour to a maximum of $1050. In addition, a student may request up to $150 for incidental expenses (that would normally come out of the student's pocket) if no other source of funds are available. **These funds are only for a student generated project.** Students **must** also register for at least one credit hour of UGS 4800 (Undergraduate Research). For the class, an abstract of your research project will be due the last class day of the semester (the date will be specified in the acceptance letter). Abstracts should have a title, identify the semester you worked, your name, class standing, major and the name of your faculty sponsor by rank and department. The abstract must include information regarding the significance of the topic, the investigative strategy and the nature of the conclusions. For examples of outstanding student abstracts see: **University of Utah Undergraduate Research Abstracts Journal, Spring 2001** at: http://lib.utah.edu/epubs/undergrad/.
5. **Application Schedule**
   Summer 2002; the deadline is April 12, 2002. Awards will be announced on or before May 10, 2002.
   Fall 2002; the deadline is July 26, 2002. Awards will be announced on or before August 23, 2002.
   Spring 2003; the deadline is November 22, 2002. Awards will be announced on or before January 06, 2003.
   Application deadlines are before 4:30 p.m Submit applications to:
   Jill Baeder
   Project Coordinator, UROP
   Office of Undergraduate Studies
   Sill Center
   581-8070 Fax 585-3581

This is a great opportunity for undergraduates to increase their education, as well as enhance both their skills and resumes. Students who are interested can download the application forms and access further information about the UROP program at www.ugs.utah.edu/student/UROP.htm. Information is also available at the Sill Center.

MISCELLANEOUS NEWS

Meet the Cub Reporter/Editor

Tiffani Copyak
Jennifer Swift has been selected as the Down To Earth cub reporter/editor, taking over for the fall 2002 newsletter. Jennifer was born and raised in Sandy, Utah, and first attended Brigham Young University as a psychology major. Jen became interested in geology after being dragged to geology classes with her fiancé. Before jumping into the major, she took a few years off to get married and start a family. Jen has fresh ideas for the newsletter and is looking forward to bring her touch to the newsletter. She will takeover the newsletter and head the fall 2002 publication. If you would like to contact her, please email swiftjen@hotmail.com.

Staff Shuffle

Tiffani Copyak
The department staff has been rearranged to account for the loss of Deanna Johnson. She has left the department to work in Campus Design and Construction. The department will miss Deanna and wish her luck with her new position.

* Donna Thomas will handle grants and contracts, capital equipment, and any duties she previously maintained.
* Jennifer Brown will continue as the Chair's assistant, payroll, tuition waivers, scholarships, and help keep the department web page up to date.
* Maria McCandless will handle travel, purchasing, keys, supplies and recharge accounts.
* Kim Atwater will continue with academic affairs and as staff coordinator to assist with any other problems.
* Heather Whitesides is the new office assistant. She will help with mail and many other miscellaneous items. Don't forget to welcome her if you haven't already.

The department staff is a wonderful collaboration of talented individuals. As their work load has increased, they continue to provide excellence service. Thank you!