History of the Geosciences Department and 50th Anniversary

By: Sayo Goseki and Rosalyn Wang

Fifty years ago in 1962, Dr. Anton L. Hales arrived to head up Geosciences Division of Graduate Research Center of the Southwest (GRCSW) headquartered on SMU campus. The Geosciences department had originally started as the Institute of Geological Sciences.

In 1964 the Founders Building opened and in 1966 GRCSW changed its name to Southwest Center for Advanced Studies (SCAS).

Not only was the Institute of Geological Sciences one of the first departments, in 1967 the SCAS acquired the first ever scanning electron microscope in the US. In 1969, the Southwest Center for Advanced Studies changed its name to The University of Texas at Dallas and also Geosciences became an official department of UTD. It was one of the first two departments established along with the Space Sciences, which is now the Physics department.

In 1969, Chuck Helsley obtained Moon rocks from NASA headquarters, Houston, TX, and the very first moon rocks ever were displayed in the Founders Building, attracting more than ten thousand visitors to the campus.

In 1970 Joseph Mills, Jr., Ph.D. was the first official UTD student to register and in 1972, Jose Francisco Longoria- Trevino was the first Ph.D. student to graduate from the Geosciences Department at UTD.

Over the past fifty years the Geosciences department has changed just as much as UTD has. The department started with twelve faculty members, peaked at fourteen, and today there are ten. Originally the department was strictly a graduate studies program. In 1970, it admitted its first graduate students in a class of twenty five. In 1975, it admitted its first undergraduate class consisting of twenty six students.
In Spring 2012 there were 32 Ph.D. students and 33 M.S. students are enrolled in the graduate program. In the same year the Institute of Geological Sciences name changed its name to Programs in Geosciences. Its first home was the first floor of the Founders Building and Founders West Annex. Since then, the department has transitioned from the main campus to the new permanent home at the Research and Operations Center building (ROC), located on the northwest corner of Waterview and Drive A.

The Geosciences department has traditionally emphasized geophysics and geochemistry. Currently the main focus is on the tectonic processes of continental deformation. When asked about the future of the department, Department Head Dr. Oldow states that he would like to see the department “enhancing its relationship with the mineral and petroleum companies. We are losing track of where resources come from, including resources such as iron and copper and critical materials.”

Dr. James L Carter, Professor Emeritus and former Department Head, says that he would like to see the faculty grow with more specialists in “soft rock” studies so that the department may cover all bases of geosciences. “UTD is aiming to be a tier one university and our faculty should have at least the average number of faculty for Geoscience departments in Tier One schools.”

Geosciences is 50 years old!

The celebration of UTD Geoscience Dept. 50th anniversary was held on October 26, 2012. In preparation, Dr. Carter arranged for many maps to be put up in the downstairs hallways of the ROC building. Prof. George McMechan gave a talk titled “3D Imaging of Earth’s Energy Resources”. McMechan’s research focuses on seismology and ground-penetrating radar. In November he received the Maurice Ewing Medal from the Society of Exploration Geophysicists.

Following the lecture, the Geosciences Department hosted an open house featuring tours of and demonstrations of its facilities in the ROC center. This celebration was open to everyone on campus.
Dr. John Graham and his Historic Paleomagnetism Samples

By: Stephen Kallenberg & Jordan Claytor

Nudged in between the lairs of mad geoscientists and their minions, and in this case hidden in the basement of the Research Operations Center at UT Dallas lies antique, and very historic, paleomagnetism samples left behind by Dr. John “Jerry” Graham. The late John Graham began studying paleomagnetism in the 1940s. His equipment and samples are important to the legacy of the Department of Geosciences as Dr. Graham was at the Southwest Center for Advanced Studies (the precursor to UTD) from 1963 to 1968.

Dr. Graham was one of the first Americans to conduct research in paleomagnetism and became well-recognized for his ingenious, curiosity-driven science. His work at the Department of Terrestrial Magnetism (DTM) at the Carnegie Institute in the late 1940s and early 1950s is highly regarded and laid the foundation that led to incontrovertible evidence for the theory of continental drift. He developed laboratory methods and equipment which were replicated by his successors and modified versions of such instrumentation are still being used today.

The debate whether continental drift happened or not embroiled the geological community during the time period Dr. Graham was an active researcher. He was not free from the dispute and much of his work at the Carnegie Institute set out to find evidence to settle the debate over whether the geomagnetic field was capable of reversing its polarity. He found rock samples that had magnetizations that were opposite in direction to that of the Earth’s present magnetic field. This led to further projects and research grants that carried him through his career at DTM. His research that followed the discovery of reverse polarity magnetizations in rocks was laden with negative results and led him to suspect the reliability of the data he had collected. He moved from DTM to the Woods Hole Oceanographic Institution in Massachusetts in 1957, where he continued research and developed new geophysical instrumentation for six years until he arranged with Dr. John Carter to work at the Southwest Center for Advanced Studies. Dr. Graham, Dr. Carter, and Dr. Charles Helsley worked together at SCAS to try and prove the theory of Continental Drift by developing sufficiently sensitive magnetometers and adequate demagnetization devices to collect data that could unequivocally prove that magnetic striping on the sea floor was due to the actual reversal of the polarity.
Dr. Graham left behind a box of cube-shaped samples that he and his colleagues collected from eight localities in Colorado, Utah, Idaho, Wyoming, Washington, and South Dakota. The box contains 36 samples he obtained from undisturbed sedimentary rocks. The ages of most of the samples range from about 10 million to 50 million years old with a few samples that were from 125 to 150 million years old. Two-thirds of the samples collected from the eight sites yielded magnetizations that pointed in the direction of an ancient geographic north pole; instead of geomagnetic north at the time. Dr. Graham’s research was published (Torreson, Murphy, and Graham, 1949, Journal of Geophysical Research, v. 54, p. 111-129). During the time of his research, the geomagnetic North Pole at eight sites was about 18 degrees east of true geographic north. Results were interpreted to be consistent with the hypothesis that the Earth’s magnetic field has remained constant in direction for the past 50 million years.

Dr. Graham played an important role in the Geosciences Department at UTD and it is only logical to include him in this newsletter highlighting the 50th anniversary of the department. His contributions to the field of paleomagnetism were highly regarded and laid the foundation for conclusive evidence proving the theory of continental drift. His tenure with the department lasted for five years but his contributions to science are well-remembered today.

May 1948. Dr. Graham is in the middle with O.W. Torreson and T. Murphy in Washington preparing for the expedition where the samples were collected.
In January, 2012, the Department of Geosciences received a $600,000 gift from Pioneer Natural Resources, with a 50 per cent match of $300,000 from the State of Texas Research Incentive Program (TRIP). The gift is being used by the department to support students in several ways. The first is to provide financial support, as semester scholarships that can be renewed for up to two and a half years, to students pursuing the Fast-Track M.S. degree option. The Fast-Track program allows students to pursue the Master’s Degree while finishing a Bachelor of Science in Geology or Geophysics. The gift is also being used to provide student access to new equipment and infrastructure for student use in field based geology courses. For example, the department used a part of the gift to purchase two new field vehicles that will be used during the two undergraduate summer field geology courses and for field based graduate courses. Other new equipment includes two heavy-duty trailers, four large weather-proof tents, heavy duty folding tables, and UHF field radios. Department Head Dr. John Oldow use funds from the gift to support the graduate level field course that took place during the fall. This course took students across a transect of the North American Cordillera, building geologic cross-sections of the orogenic system which has shaped the western United States along the way. The course also examined geologic phenomena in the Colorado Plateau and the Rio Grande rift. This course will provide students with a unique field experience and a great array of knowledge of the North American Cordillera.

This gift was given to establish an ongoing relationship between the Department of Geosciences and Pioneer Natural Resources. In fall 2010, Pioneer began reaching out to the Department by interviewing UT Dallas Geoscience students for summer internship positions. Pioneer has expressed interest in continuing to recruit students from the department as summer interns, and may even employ students during the Fall and Spring semesters. The close proximity of Pioneer’s headquarters and UT Dallas make the partnership ideal for both groups.

Given the goal of helping the Department continue to produce well trained geoscientists, Pioneer’s gift will allow the department to offer students more opportunities to gain sound field geologic experience. The dialogue established between Pioneer and the Department of Geosciences will allow students more opportunity to enter the oil and gas industry. In return for their generosity, Pioneer will have an advantage in recruiting well trained geoscience graduates from UT Dallas.
Grinding to a Halt

By: Mike Martin and Brian Bailey

On the north end of UTD’s campus, in a large, unassuming, pre-fabricated steel building lurks a longstanding staple of the institution. His office is not adorned with framed degrees or publications; there are none of the typical prizes one might expect of a 14-year veteran of higher education. Instead, there are schematics and drafting drawings scattered about, some in neat piles, but all are covered in handwritten notes that narrate the span of a career. This is the office of the UT Dallas Staff Machinist, Mr. Richard Beavers.

Richard Beavers, affectionately referred to as “Jerry”, has been with the School of Natural Sciences and Mathematics since January, 1999. Jerry has known since he was a teenager that he wanted to be a machinist, and has always spent time in machine shops learning and honing techniques and design. After serving in the United States Navy, he went to work for Texas Instruments here in Dallas. Mr. Beavers spent 18 ½ years with a major oil company as a machinist and technician. When a good friend of his recommended him to UT Dallas Geosciences Professor Emeritus, Dr. Dean Presnall, Jerry got his start with the University. The school had only been a four year undergraduate university for a few years and had a total enrollment of about 10,000 students.

During these early years, the nature of Jerry’s work was support for NS&M, and specifically the Geosciences department. Once Dr. Presnall retired, however, his workload expanded significantly and grew to encompass almost anything that was thrown his way. There was a steep learning curve, but nothing Jerry couldn’t handle. He simply kept his nose to the grindstone, worked long days, and mastered his craft. Examples of Mr. Beavers’ work are plentiful in our department, as he has designed numerous pieces for the LiDAR scanning instruments employed by Dr. John Oldow and Dr. Carlos Aiken in their research. Jerry’s handywork has even been to space, as he produced pieces for Dr. John Hoffman’s mass spectrometer onboard the 2007 Mars Rover mission.

Sadly, it appears that Jerry’s tenure here at UT Dallas is coming to an end, as he will retire at the end of this year. However, don’t feel sorry for him, as he says he has enjoyed the time he has had at UT Dallas. There are aspects he will miss, “Mostly the people, especially the students. I enjoy getting new students in here and learning about them.” With such a significant change coming in his life, we asked Jerry what he plans to do with his time. To which he replied, “Hopefully travel… and sleep in!”

Most likely, the machine shop will retire along with Mr. Beavers, as the workload has decreased to a point that a state university can no longer justify continuing the machine shop. Most departments already purchase custom and one-off equipment through outside sources and the facility is very much a relic of a time when components were designed and produced in-house out of necessity. This time has passed, but one cannot help but feel as though we are losing an asset that will be greatly missed.

Most of you may have never known the purpose of the large shop attached to what we call the “Rock Barn”, but now that you do, perhaps you should consider dropping in to the machine shop before it disappears! There you will find a smiling and welcoming Jerry, who will no doubt chat you up, just to see what “materials” you’re made of.

P.S. May 2013: Jerry is working for UTD McDermott School of Engineering.
The Melting Third Pole

By: Heather Aley and Morgan Hampton

Dr. Alexander Braun is an Associate Professor in the Geosciences Department. One project he has been working on for the past two years concerns the behavior of a glacier on the Tibetan Plateau that is only accessible via satellite because it is one of the most remote areas in the world. The Tibetan Plateau is considered the world's water tower or the third pole for its enormous resources in fresh water. The loss of these glaciers will affect millions of lives.

When asked about how he does his research offsite Dr. Braun said, “Satellites do not discriminate where you work.” Dr. Braun uses several methods for his research such as ICESat laser altimetry, which measures ice sheet mass balance, cloud and aerosol heights, as well as land topography and vegetation characteristics; GRACE satellite gravimetry, which involves a set of twin satellites that orbit the Earth 15 times a day making very detailed measurements of the Earth’s gravity field; and SRTM digital elevation models with the Chinese Glacier Inventory to collect his data from across the world. Research data is limited because of cuts in the research budget of NASA. The problem with the reduction in satellite missions is the gaps in the timeline. These gaps make it almost impossible to tell what is happening continuously in the Tibetan plateau. According to Dr. Braun, “The most critical thing for this research is not necessarily more accurate data but continuous data.” So far, Dr. Braun has discovered that the Lhagu glacier, measuring 40km long and 5 km wide, is currently losing 1 meter of ice every year. The difficult part of this project is that the Tibetan Plateau is uplifting, but measuring this is extremely difficult because of the complexities of the tectonics of that region combined with the ice melt. With the satellites, we see the elevation is rising but
that does not mean it is gaining ice. Uplift is caused by the delamination of the lithosphere and the reduction in the ice mass. In reality, the glacier loses ice and uplifts, which mean it is most likely losing more ice than we think it does. There are not many processes on the planet where we have meter level elevation change within a year. As of now, it is not possible to give a timeline as to when the glacier will be completely gone due to limited available data. This research has huge implications economically and agriculturally for South and Southeast Asia as they depend on this melt water. The Tibetan Plateau is a non-sustainable resource that has a dry climate with very little precipitation that does not replenish what is melted. Once these glaciers melt, they are gone and there will be no more melt water for this region.

**Summer Field Geology Courses**

By: Karolanne Toby and Karlynda Johnson

For undergraduate students in the Geosciences Department, Field Geology I and Field Geology II are requirements that are both exciting and challenging. We recently took both field geology courses and wish to relay some of our experiences, to both future Geoscience students and Department graduates, who may be amused by our perspectives! Although some classes prepare you for field based studies, there are still many questions left unanswered. These include: What should you expect when you are actually in the field? What items to bring? Also, most importantly, how much do the field courses cost? To better prepare the students about to embark on their field camps, we, as recent students in field geology, have compiled a list of the most important things you need to know to get the most out of your field camp experience.

Both Field Geology courses at UT Dallas are three weeks long, and depart the day following spring graduation. In addition to the tuition for a three hour course, students have an associated field course fee of $1,500. Field Camp I (Field Geology I, GEOS 3300) is instructed by John Geissman and takes place in New Mexico and Colorado. Field Camp II (Field Geology II, GEOS 4300) is instructed by John Oldow and will take place in western Nevada in 2012. Inquiries regarding prerequisites and registration should be directed to the geosciences academic advisor, Ms. Meaghan Doughtery (972-883-2500).

Travel to, from, and during field camp is provided by the Geosciences Department. Rental vans seating seven or eight people are used, and drivers attending field camp are always needed. The cost of overnight stops at campsites is included in the field trip fee. Food while traveling between campsites is not included in the field trip fee. Restaurants and fast food are stops to be expected.

While in the field, students are given two simple options: sleep in a tent or on the ground. Make sure your tent is of high quality, as wind is a major consideration. There is a possibility of tents being destroyed, so this should be taken into account. Despite the quality of your tent, tent stakes are important to deflect the wind, but heavy rocks are a useful tool as well. There is a possibility that you will be rooming in a hotel 1-3 nights during the trip, which may or may not be included in the field trip fee.
Although you may have given no previous thought to the issue of restroom facilities, do not let this matter sneak up on you. There are no toilets in the field. When you are not in camp, you are expected to function in the wild (the only safe place left). Field camp I has field locations where there are no restrooms, but not to worry, shovels are provided. Field Camp II has port-a-potties and porcelain in the local saloon, but in the field the same rules apply. Be prepared, you will be required to go several days without showering. Baby wipes are a nice option, according to some.

Groceries are purchased as a group, and are included in the field trip fee. Utensils and dinnerware are not provided. Breakfast is a do-it-yourself buffet of cereal, bagels, fruit, granola bars, etc. If you’re lucky, you’ll be introduced to the Sadie’s salsa and bagel sandwich. Lunch is packed during breakfast to be eaten in the field. You are responsible for this—if you don’t make the time to pack a lunch, you will not eat. You must bring a Tupperware type container for your lunch, which is essentially a sack lunch. Also, water is essential in the field, so at least four nalgene should be with you in the field at all times. Dinner is family style. You and your field camp mates will cook, eat, and clean together. Dinner is by far the best meal of the trip, and varies depending on the food available. Vegetarian options are always available.

In addition to the supply lists that will be given to you, the following are essentials that can easily be overlooked while packing: Eating utensils (plate, bowl, cup, fork, knife, spork), Extra Blanket (or 2), Sleeping Pad, Pillow (you’ll miss it after about 2 days), Clothes (comfort is key, you want a change of clothes after being in the field. Laundry will be done on the trip, but having extra clean clothes in the field is worth its weight in gold), Spare pair of shoes (your feet will thank you as hiking boots do not breathe very well), camp chair, headlamp, shower shoes, baby wipes, sunscreen (and Aloe Vera, for when the sun screen fails), and towels.

Students always have many questions about what to expect in field geology courses. To put it bluntly, you won’t be in north Texas in the summer anymore (thankfully). Your new environment includes mountains, brush, loose rocks, steep inclines, clean air, wide open spaces, and peace and quiet. You will be required to gather data for your mapping exercises by getting to and studying many outcrops, which are not always along clear cut paths. Walking and climbing consume a good part of each day, but the exercise will be greatly appreciated when it is time for bed. As “treacherous” as all this may sound, your time out in the field will be one of your greatest memories. Your previous classroom experiences will instantly click while being immersed in the geology of your new environment. Field Camp will become one of the fondest memories of your undergraduate career. You’ll not only come home with some exciting stories, a tan, and less weight, but you’ll have renewed your love for geology.
The UTD GeoClub

By: Kit Harpr and Dani Gies

After another year, the Geosciences department is thriving as members of the department settle into a new and vastly improved home, the Research and Operations Center (ROC) located on the west side of Waterview Dr., just north of Drive A. The undergraduate GeoClub has seen many bright new faces at its meetings, which are now taking place in the ROC. With classes now held in both the high tech classroom and the new computer lab on the second floor of the ROC, it is beginning to feel like home to both students and faculty.

The GeoClub has been involved in many activities over the past year. For the second year in a row, the GeoClub bulletin board, located in the lower level of the Student Union, won the “Pimp my board” competition held by the Student Organization Forum. We were excited to receive the $100 in catering from any on-campus vendor, given how much it was enjoyed last year. Students and faculty alike never turn down an opportunity to eat and mingle, especially on UTD’s dime!

Considering one of our faculty members is President of the Geological Society of America, it was only natural for students to be thrilled to adventure to Minneapolis, Minnesota, to attend the 2011 GSA Annual Meeting. Due to high demand, the GeoClub was able to provide free transportation, thereby making attendance possible for many students who otherwise would not have been able to make the trip. While at the meeting, many students served as student volunteers, and everyone attended many talks and poster presentations. As with any GeoClub outing, a good time was had by all, and there were many stories to be told at the next GeoClub meeting.

This spring, the GeoClub kicked off the semester with a back-to-school bake sale fundraiser held in the UTD Student Union. Bake sales have been a long standing tradition in the Geosciences department, and student involvement was the best we have seen in years providing ample amounts of sweet treats. GeoClub raised about $150 through their efforts and the faculty and staff were excited to take part in disposing of any leftover baked goods.

Several GeoClub members participated in the annual end-of-the-year camping trip in late March. Students traveled to Beavers Bend, OK, and took part in activities such as kayaking, hiking and late night campfires. The occasional spider, however, was not a part of the trip students enjoyed, but provided entertainment in later stories.

One activity of the GeoClub that has been a huge success this year is the use of Facebook. Students, alumni and faculty are able to communicate through this
Social media format and it seems to be the fastest and most effective way to reach students. Common postings include interesting scientific articles, job/internship opportunities, seminar information and pictures of GeoClub gatherings. The best thing about Facebook is that it is easy to use. One of our own faculty members, Dr. Stern, created the Facebook page back in 2006 as a way for interested students and faculty members to communicate and interact, but it has not seemed to catch on until this year. We talked to Dr. Stern about his views on GeoClub's use of Facebook. Dr. Stern typically uses the GeoClub Facebook page to post employment and internship opportunities, as well as any interesting geologic articles. When asked about his view on the utility of Facebook, he responded, "Websites make you feel bad. They are hard to change and difficult to navigate. Facebook is easy. Even I can do it!". With over 196 current members on the page, the students and alumni obviously agree. Dr. Stern also commented on the demographic bias of Facebook towards younger users as an explanation to why more faculty members are not regular contributors to the page. Dr. Stern believes that many older people find Facebook annoying with all the meaningless status updates and pointless posts. He feels that how one uses Facebook is a personal choice, and that it is not only for social media—"You use Facebook, don't let it use you." So far, Facebook is proving to be a very valuable resource for GeoClub and the department in general. Dr. Stern is gratified that there has been quite a bit of acceptance within the group. "If groups don't do anything, it comes to a natural death" said Dr. Stern. We don't see that happening any time soon with the GeoClub page. As with any student organization, involvement is the key. With all the new faces seen in GeoClub this year, we have no doubt that GeoClub will continue to be a venue for students and faculty coming together to have a good time. GeoClub has always been a place where strong friendships are formed and we see no changes happening in the near future.
Campus Developments Keep UTD at the Forefront of Texas Public Education

By: Brooke Scott and Jeff Binder

The 2011-2012 school year has certainly been eventful when it comes to continued campus developments and renovations. Former faculty and alumni who have not visited nor seen the university in several years will surely be surprised at the tremendous facelift the UTD campus has undergone in the past few years. Even for current students, the evolution at UTD has been fast and furious as the start of every new semester brings with it the excitement of new classrooms, laboratories, and student amenities.

One of the most notable changes on campus is the recent completion of the UTD Mall that runs north-south between the McDermott Library and the Student Union, and connects to the main south entrance to campus. Completed in 2011 and reminiscent of the National Mall in Washington, D.C., the UTD Mall features multiple reflecting pools surrounded by beautiful magnolias and headed by a misting tower which is sure to keep students cool during the hot summer months. The mall is just one aspect of the ongoing landscaping and beautification projects that are transforming the university from a relatively generic concrete jungle into one that is not only environmentally friendly, but aesthetically pleasing.

Landscaping is certainly just the beginning when it comes to student amenities at the university. Recently completed, a 400 seat dining hall adjacent to the student union is now providing multiple food choices for hungry students as they go about their day. The 150,000 square foot Residence Hall Phase III located near the corner of Synergy Parkway and Waterview Parkway will be

Approximately 14,000 square feet of Chinese granite was hand-placed in the linear pools.
ready to house 400 new freshman students for the 2012 Fall semester. Scheduled for completion in 2014 is Residence Hall Phase IV which will house 600 students, include a 800 seat dining hall, but most importantly, include a new 250,000 square foot parking garage, the first for the school since its humble beginnings in the 1960’s. According to the Facilities Management department, the garage will have five levels and provide parking for around 750 vehicles, which is sure to be a welcome addition to a booming student population.

The new home of the Arts and Technology Facility (ATEC) is under construction and is located west of the reflecting ponds in the center of campus. Ready for student use in summer, 2013, the new state of the art ATEC building will provide 3D art studios, photography and print making labs, computer, motion capture, acoustic and research labs along with a 1200 seat auditorium.

Although improvements to parking and food services are always welcomed by students and faculty alike, the main goal of the University of Texas at Dallas has always been and will continue to be to provide a quality education to all students.