

Crimson Tide GeoNews

The newsletter of the
Department of
Geological Sciences in
The University of Alabama's
College of Arts & Sciences
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Spring 2010

A MESSAGE FROM THE NEW CHAIR:

Ibrahim Çemen



In August 2009, after 25 years of service to the science of geology at Oklahoma State University, I became the new Chair of the Department of Geological Sciences at the University of Alabama. After four months in Tuscaloosa and a steep learning curve, I am just now beginning to settle in as the new Chair.

During the last decade, geoscience departments have experienced unprecedented growth because of two of the greatest contemporary worldwide problems: a) maintaining a healthy and clean environment; and b) providing sustained sources of energy and materials. Therefore, demand for geologists by energy and environmental industries have grown very rapidly and will probably continue to grow in the 2010s.

At the UA Department of Geological Sciences, our intention is to step up and meet this demand. We have very healthy graduate and undergraduate student enrollments and we will be hiring two new faculty in fall 2010; a seismologist and a molecular geochemist. We intend to add at least two more new faculty within the next two or three years, and reach the median Ph.D. granting department faculty size of 17 by 2012.

Alumni of geology departments nationwide are great supporters of their alma maters, and alumni of the UA Department of Geological Sciences are no exception. In fact, I find the alumni here more eager than usual to help the department. This is evidenced by the great success of the Geological Sciences Alumni Board (GSAB).

How can an alumni and/or friend of DGS help? Scholarship support for undergraduate and graduate students is always needed to help attract and keep talented students in the department. The GSAB has long recognized this need and has provided \$71,250.00 for scholarships since the initiation of the board in 2002. We also need your support to help with field trips, faculty travel and to bringing speakers to the campus for the colloquium series.

One of our pressing needs is financial support to augment stipends for our Graduate Teaching Assistantships. Our GTAs work very hard. They teach three lab sections in comparison to two lab sections in most Ph.D. granting departments. However, they are also one of the lowest paid by any Ph.D. granting geoscience department in the SEC, Big 12 or ACC. We intend to raise money to establish a series of scholarships and fellowships to supplement GTA stipends and at the same time to reduce the teaching load. Better monetary offers should help us to attract high quality, talented graduate students. The reduced teaching load would help our students spend more time on their M.S. thesis and Ph.D. dissertation projects and finish in a timelier manner to enter the industry and academia as well qualified alumni of the UA Department of Geological Sciences.

In short, I hope the GSAB members and other alumni will work together to make our department even better. When you are in Tuscaloosa or in a nearby community, please stop by and see us, we will be glad to show you the changes taking place.

**A NOTE FROM THE VICE PRESIDENT
OF RESEARCH:**

Joe Benson

Professor and VP of Research



After nine years in the Arts & Sciences Dean's Office as Associate Dean for Natural Sciences and Mathematics and then Senior Associate Dean, I was appointed Interim Vice President for Research and Vice Provost in June of 2007 and assumed the position permanently in February of this year. While much of my time in the Dean's Office was spent on accounting matters, I now spend more time on legal issues. I keep wondering which graduate courses I took prepared me for this?

I do, however, enjoy working with faculty across the university to support their research endeavors. The university in general and the Department of Geological Sciences in particular have hired some very talented young faculty members who are providing our students with exciting research opportunities throughout the world.

I do very much miss the department, the teaching, and the chance to interact with students. While the names and faces have changed through the years, the department is still a wonderful place to work and does an outstanding job in the areas of teaching, research, and service.

ERNEST A. MANCINI

Distinguished Research Professor

On December 31, 2009, Dr. Ernie Mancini will retire from the Department of Geological Sciences after a remarkable career at The University of Alabama. We will indeed miss him very much. We wish him the best of luck and great success in his endeavors in the years to come.

The following is a short career synopsis of his outstanding service to the department.



Ernest A. Mancini (B.S., Albright College, Reading, PA, 1969; M.S., Southern Illinois University, Carbondale, 1972; Ph.D., Texas A&M University, 1974) retired from The University of Alabama at the end of the Fall 2009 semester. He joined the faculty in 1976 accepting dual appointments as an Assistant Professor with the Department of Geological Sciences and as a petroleum research geologist with the Mineral Resources Institute. Prior to arriving at the University, he taught biology, physical science, and earth science at North Greene High School in Illinois (1969-71) and worked as a petroleum exploration geologist preparing for offshore lease sales off Alaska and California for Cities Service Company in Denver, Colorado (1974-76). He was appointed Associate Professor in 1980, Professor in 1984, and Distinguished Research Professor in 2005 by the Board of Trustees. He served as State Geologist and Oil & Gas Supervisor for Alabama from 1982-96 and as Interim Director of the

School of Mines and Energy Development from 1988-89. During his tenure as State Geologist, the Geological Survey of Alabama published a new geologic map for Alabama, and the State became a major producer of natural gas. He was appointed as the Regional Director for the Eastern Gulf Region of the Petroleum Technology Transfer Council in 1995 and was appointed as the founding Director for the Center for Sedimentary Basin Studies by the University in 1998. He served as Interim Chair of the Department from 2008-09.

In his 34 years of teaching, research and service at the University, he has supervised 21 M.S. and 8 Ph.D. students. He has received the following honors: American Geological Institute Ian Campbell Medal (2004), American Association of Petroleum Geologists (AAPG) Distinguished Educator Award (2000), Gulf Coast Association of Geological Societies (GCAGS) Outstanding Educator Award (1998), Geological Society of America Fellow (1995), AAPG Haas-Pratt Distinguished Lecturer (1987-88), AAPG-GCAGS Levorsen Petroleum Geology Award (1980), elected Honorary Member of the Gulf Coast Section (GCS) of SEPM (1991), Honorary Member of the American Association of State Geologists (1996), Honorary Member of the GCAGS (2003), and Honorary Member of the AAPG (2008), and awarded 5 Best Paper Awards with co-authors from GCAGS/GCS-SEPM (1980-82, 1985, and 2001).

He has served as president/chair of the following professional organizations: AGI President, AASG President, GCS-SEPM President, Alabama Geological Society President, SE Section–Paleontological Society President, SE-GSA Chair, North American Commission on Stratigraphic Nomenclature Chair, and as Chair of the Mineral and Energy Resources Section for the National Association of State Universities and Land-Grant Colleges (NASULGC). He has served on the Board on Natural Resources for NASULG, the Board for the Center for Legislative Energy and Environmental Research, and on executive committees for AGI, AAPG, AASG, GCAGS, and GCS-SEPM. He was appointed by the Secretary of

Interior to the US Department of Interior Advisory Board Committee serving as chair from 1987-89 and receiving a Resolution for Outstanding Contributions in Public Policy in 1996. He is serving on the Editorial Board for the Journal of Stratigraphy, served on the Editorial Board for the Environmental Geology and Water Sciences Journal, and served as Elected Editor for AAPG. He is a Trustee for the AGI Foundation.

**A NOTE FROM THE FORMER CHAIR:
Harold Stowell**



I am fortunate to have been the department Chair from 2000 until 2008. During 2007 I realized that it was time for me to resign because I could not do what was needed for the department, and grow the research and teaching programs that I needed for my career goals. Therefore, I chose to resign during the summer of 2008. My decision was partly based on knowing that the Geological Sciences faculty would have excellent leadership with Professors Donahoe and Mancini ready and able to move the department forward. Last year we were in transition during a search for a new chairperson and now as the 2009 academic year begins, I am pleased to welcome Ibrahim Çemen as our new chairman.

Looking back on nine years of chairmanship, I am very pleased at the Department's accomplishments. The first years were difficult because they began with the departure of Professor Lyons (1999) and continued with the departures of Sridhar Anandakrishnan in 2001, Dennis Harry in 2003 and Tony Rodriguez in 2005. These departures were not failures for the Department, but excellent opportunities that our capable colleagues could not decline. Fortunately, with the aid of the Dean and University, we moved quickly to hire productive new faculty members. Andy Goodliffe, Geoff Tick, Delores Robinson and Fred Andrus were hired in 2003 and 2004, Tim Masterlark in 2005, and Amy Weislogel and Josh Schwartz in 2007. As a result of the new faculty members and increasing numbers of students at UA, we have seen remarkable shifts in the department. The young and dynamic faculty members have energized all aspects of the department by developing new teaching methods, attracting new majors, and growing new research programs. As I watch these young faculty members reach their stride and as Dr. Çemen takes the helm, I realize that the Department is in good hands.

Field Course 2009, from Harold Stowell

The University of Alabama Geology Field Course [GEO 495] was taught in Taos New Mexico during May and June of 2009. This class of 18 students was the 17th annual Bama class in northern New Mexico. Students drove University vans from Tuscaloosa to their home for the summer: the Austing Haus in the Taos Ski Valley. This base of operation is hardly the classic camping experience that some of us may remember: it includes shared rooms with private bathrooms and TV! This excellent facility provides a place where students and faculty can recuperate from long days in the hot sun and work on the written reports and maps that are important for the learning experience.



Angular unconformity separating Mesozoic strata from Quaternary pediment on the edge of the Nacimiento uplift, northern New Mexico.

The class provided numerous opportunities to see unique geology from the Pliocene basalt flows of the Servilleta Basalt in the Taos plateau of the Rio Grande rift to the Proterozoic schist and quartzite of the Sangre de Cristo Mountains. Initial class exercises taught field methods and introduced the geology of the Rio Grande Rift and Sangre de Cristo Mountains. These were followed by a series of projects that involved mapping undeformed sedimentary strata, measuring sections of Mesozoic sedimentary rocks, mapping simply deformed Mesozoic sedimentary rocks, mapping complexly folded and faulted Paleozoic sedimentary strata, and mapping complexly deformed Precambrian metamorphic rocks. In addition, there were excursions to examine Tertiary volcanic rocks in the Valles Caldera, Front Range faults of the Sangre de Cristo Mountains, massive sand dunes in the San Luis Valley, a swarm of radial dikes at Spanish Peaks, and altered volcanic rocks at Red Mountain, CO.

Many of the projects require considerable exercise and this is physically challenging. But, the beauty and wonder of the desert and the geologic exposures are truly outstanding.

In part because much of New Mexico is very dry compared to Alabama, the class was pleased to find out that several of the field exercises require working in the forested mountains where shade is available and water flows freely.

The 2009 class was a wonderful group and had many great times. Of course, some of the best moments are always near the end when the important accomplishments of the class come into sharp focus. As always, the New Mexico experience was productive and enjoyable for all!



The 2009 University of Alabama mountaineers on the highest point in New Mexico, 13121 feet above sea level, Wheeler Peak New Mexico.



The 2009 University of Alabama Field Course at the Austing Haus, Taos Ski Valley New Mexico.

FACULTY AND STAFF UPDATES

PAUL AHARON
Loper Chair Professor

News From The Darkness of Caves

The primary research effort of the year focused on acquisition of paleo-climate archives from stalagmites in DeSoto Caverns on three time slots (i) the last 700 yrs, covering the duration of the so-called “Little Ice Age”; (ii) most of the Holocene period (0-7000 yrs), and (iii) the last glaciation maximum through the deglaciation interval (32,000 to 10,000 yrs ago). W. Joe Lambert, a senior PhD student in my group, has completed a three-year monitoring (2005-2008) of rainfall, air temperature, humidity and drip-flow rates at DeSoto that serves as the yardstick for the interpretation of the paleo-data.

Using grant funds from the Alabama Office of Climatology we have assembled a pollution-free coring device that was used in August 2008 to retrieve three cores from DeSoto stalagmites (as shown in photo, next page). The cored material has been studied for mineralogy and petrography, and an accurate chronology was derived on the basis of multiple radiometric dating by Uranium-Thorium isotopes. The cores serve as study material for three MS students. Among the new findings, two can be singled out: (i) Rainfall pattern in the past 700 yrs was controlled by solar variability, and (ii) A >1000 year duration mega-drought that occurred in the Gulf Coast at the termination of the last deglaciation.

DeSoto Caverns serve both as natural research laboratory as well as a convenient teaching venue. Graduate students enrolled in the class “Karst: Geology, Hydrology and Paleoclimate”, taught in the 2009 fall semester, had the opportunity to visit the cave, observe the karst features and get insights on the complex processes involved in carbonate deposition within the cave.



Coring a stalagmite in August 2008 using a newly designed corer.



Graduate students during a field trip to DeSoto Cave in November 2009.

www.geo.ua.edu/faculty/aharon.php

C. FRED T. ANDRUS
Assistant Professor



My students and I are enjoying a busy time now. I am entering my second year as Undergraduate Program Director and am teaching Historical Geology, Paleoclimatology, and Quaternary Environments, plus a specialized class or two for graduate students, as they need. Speaking of students, Miguel Etayo was awarded an MS in May hopes to defend his dissertation later this school year, and Christie Jones hopes to defend her thesis soon as well. Both are working on using the geochemistry of mollusk shells to track past marine upwelling changes along the coast of Peru as may be related to El Niño and the formation of early Andean civilizations. Jestina Hansen is picking up on this thread with her MS research into how nitrogen isotopes may vary in mollusk shells as a function of productivity tied to upwelling. Kelley Rich traveled to Belize to begin a new project in which she is trying to establish a novel precipitation proxy that will shed light on the role of drought to the Maya. My newest student, Robin Cobb (also the Department's first Marine Science Masters student), is using geochemistry to assess growth in deep ocean corals. This is following up on her undergraduate McNair research into the geochemistry of estuarine clamshells. I am working with several undergraduates right now on projects ranging from isotope fractionation in fish otoliths to public opinions on evolution.

While much of my research is in collaboration with my students, I keep a few projects to myself, with several focused on El Niño, some coral geochemistry in the Cayman Islands, and archaeological shell midden analysis on the Gulf and Atlantic US coasts. That said, I traveled a bit less this summer than usual, but did take a trip to China with Deans Han and Olin to help build educational and research ties to three Chinese Universities. This year I am back to a busier travel schedule with trips to meetings in Oregon, St. Louis, Mobile, and Mainz, Germany, where I was invited to give a keynote talk at the 2nd International Sclerochronology conference. This summer I hope to accompany Kelley to Belize to collect freshwater mollusks and Robin to the North Atlantic to collect some deep water corals via submarine.

www.geo.ua.edu/faculty/andrus.php

IBRAHIM ÇEMEN
Professor and Chair



I have recently joined to the faculty of the DGS at the University of Alabama after 25 years of service at Oklahoma State University where my research program was primarily geared towards petroleum structural geology.

In 1983, I received my Ph.D. degree in Geology from the Pennsylvania State University and joined Oklahoma State University in 1984 as an Assistant Professor. I was awarded early tenure and promotion to Associate Professor in

1987 and become a full professor in 1993. I also served as the Department Head at Oklahoma State University Boone Pickens School of Geology from 2001 to 2005.

My major research interests are a) oil and gas exploration in sedimentary basins; and b) structural styles formed in contractional, extensional and strike-slip terranes. Since 1986, my research involved in determining oil and gas potential of sedimentary sin Oklahoma and in Turkey. At OSU my graduate students and I worked on several projects related to petroleum exploration. These projects were mostly located in the Arkoma Foreland Basin of southern Oklahoma and sedimentary basins in southeastern and central Turkey. In the Arkoma Basin our work involved determining a) structural geometry and evolution of thrust faulting through construction of balanced structural cross-sections; and b) the role of thrust faults in gas accumulation in the Pennsylvanian reservoir rocks of the Arkoma Basin.



Çemen in the Arkoma Basin, during a field trip. The overturned fold in the central of the photo is located within the lower Atokan Formation.

My structure group used surface geological maps, different types e-logs, and seismic reflection profiles as tools to determine the geometry of the structural features in the two regions. Our main goal was to provide a better understanding of the structural

geometry and evolution of the Pennsylvanian structural features in southern Oklahoma to help oil and gas industry to locate structural traps. In Turkey, I have worked in determining structural evolution and oil and gas potential of Foreland basins associated with the Zagros fold-thrust belt and Central Anatolia rift basins.

With my colleagues in Turkey, I have also been conducting research in extensional tectonics in Anatolia, Turkey. We are comparing extensional structures in the Death Valley region of southwestern USA and western Anatolia Turkey, two highly extended terrains in the world. The two terrains give us an opportunity to better understand the processes of continental extensional tectonics. We use detailed geological mapping, geophysical surveys and geochemical analysis as tools and are working on developing a unifying theory of continental extension in the two regions.



Çemen in the field in western Anatolia, Turkey. The detachment surface in the background separates the highly deformed metamorphic rocks in the footwall from the mildly deformed sedimentary rocks on the hanging wall. The detachment was formed in Early Miocene as part of the Aegean Regional Extension

I have published 47 archival referred articles; edited 2 books, wrote 19 technical reports and delivered 163 presentations (57 invited). My work has been cited over 500 times in geological journals

scanned by the Science Citation Index. My research has been supported by various grants and contracts totaling to over \$5,000,000 from major oil and gas companies, and federal and state funding agencies including the National Science Foundation of the United States (NSF). I taught three summer courses in Turkey supported by three United Nations Development Program grants.

My hobbies include walking, playing basketball and playing bridge. I am married to Pamala Çemen for 26 years. We have a 21-year-old son studying political science and economy at Ohio University.

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RONA J. DONAHOE **Professor**

Rona and Jim are nearing the completion of 26 years of service at the University of Alabama. Although they have avidly followed Crimson Tide football during their time at UA, they are attending the home games in person this season for the first time. Except for the drunk, obnoxious guy who sits on the row behind them, they are enjoying the game day experience.

There are currently five Ph.D. students and one M.S. student working in the geochemistry lab. Ziming Yue and Hari Neupane are working on research related to arsenic-contaminated soils; Sid Bhattacharyya is working on methods to immobilize trace elements associated with coal fly ash; Tom Creech is studying the impact of land use and climate on water quality in Lake Tuscaloosa; John Pugh will model geologic sequestration of carbon dioxide while working full-time for Southern Company Services; Erika Rentschler has not yet selected her thesis topic, but it will likely deal with historical trace element concentrations in a South Carolina stream, as recorded by stream sediments and mussel shells.

Rona was honored to be selected as a College of A&S Distinguished Teaching Faculty Fellowship for 2009-2012. She received the

Outstanding Commitment to Teaching Award from the National Alumni Association in 2003 and was given the Outstanding Educator Award by the Gulf Coast Association of Geological Societies in 2007. Teaching continues to be the most enjoyable part of her work at the University.

Rona served as Interim Department Chair during Spring 2005, and has served as Acting Department Chair nearly every summer, beginning in 2002. This last summer was particularly busy. After Carl Stock's retirement in 2008, and despite her youthful age and appearance (LOL), she is now the senior faculty member working in the Department. This means that she is Chair of the departmental Tenure & Promotion Committee. Her goal is to help the Department's junior faculty achieve success in the retention, tenure and promotion application process.



Dr. Donahoe, second from left, and UA doctoral students and staff display a Geoprobe, a drilling instrument.

It has been 15 years since Rona last took a sabbatical leave, and she has only taken two sabbaticals during the last 26 years. She has applied for a sabbatical during the spring 2010 semester with goals of developing a new 100-level course on Geologic Hazards, writing a laboratory manual for GEO 105 (Sustainable Earth, which

has replaced GEO 202), beginning work on a new DOE-funded project with Amy Weislogel studying the effect of CO₂ injection on reservoir fluid chemistry and reservoir diagenesis, graduating two of her Ph.D. students and helping them shepherd manuscripts through the publication process, and (most importantly) CLEANING UP HER OFFICE (if you haven't seen it recently, it's the worst it has ever been....seriously). If you would like to volunteer for office clean-up duty, or have a large box of matches, please let her know.

www.geo.ua.edu/faculty/rdonahoe.php

ANDREW M. GOODLIFFE **Associate Professor**

Andrew Goodliffe currently has four students. Milo Cameron, who is working on his Ph.D., is studying the tectonics of Papua New Guinea with particular emphasis on plate reconstructions and the role of core complexes in active continental rifting. Jorden Hayes is currently finishing up her M.S. degree. She is studying the initiation of seafloor spreading in Papua New Guinea and the role of low-angle faults. Goodliffe's work in Papua New Guinea is supported by a National Science Foundation Grant. Two new M.S. students have joined Goodliffe's group this fall. Meghan Alesce will be working on the Gulf Coast, primarily using CHIRP and Boomer seismic reflection data to examine sand budgets along the coastline, with particular emphasis on Dauphin Island. Emeka Nwafor's work will be focused on the Eastern Gulf of Mexico, where we hope to re-process industry seismic reflection data with the goal of better understanding this resource rich, yet underexploited area. Goodliffe, together with Peter Clark and Eric Carlson (Department of Biological and Chemical Engineering) and Jack Pashin (Geological Survey of Alabama) has recently received a large grant for site characterization

of promising geologic formations in the Black Warrior Basin of Alabama for CO₂ storage. Goodliffe will be responsible for the acquisition, processing, and interpretation of 2-D seismic reflection data as well as downhole geophysics for the 4000 foot+ well that will be drilled. In addition to the numerous research projects discussed above, Goodliffe is an active member of the National Science Foundation (NSF) MARGINS Education Advisory Committee (MARGINS is a research program that focuses on the world continental margins, the host to the majority of our Natural Resources).



This committee is currently charged with determining the form of the MARGINS education programs for the next ten years. As part of this, Goodliffe was a convener of a workshop in New York in July 2009, and is a convener of upcoming workshops in Minnesota in October 2009 and Texas in February 2010. Goodliffe was also recently appointed to a three-year term as a

member of the International Ocean Drilling Program Site Survey Panel.

This panel is responsible for evaluating proposals to the International Ocean Drilling Program and the suitability of the data available to locating deep ocean drill sites. At the university level, Goodliffe is currently in his second year as chair of the College of Arts and Sciences Diversity Committee.

www.geo.ua.edu/AMG/index.htm

TIMOTHY MASTERLARK **Assistant Professor**

My 2008-2009 academic year both started and ended in Iceland. I attended the IAVCEI General Assembly 2008 in Reykjavik, which included a presentation by grad student Haylee Dickinson. The conference was followed by a week-long excursion through Iceland's Northern Volcanic Zone. The excursion was well-led by Freysteinn Sigmundsson (University of Iceland), collaborator and author of *Iceland Geodynamics*. I returned to Iceland for the end of summer in 2009 to work with Rikke Pedersen (University of Iceland) on designing numerical models of volcano deformation. Although I spent most of this trip with a computer in a Nordvulk office in Reykjavik, I had an opportunity to visit Hekla Volcano. My work with Icelandic volcanoes is part of an ongoing collaboration with the University of Iceland and the University of Wisconsin.

The 2004 M9 Sumatra-Andaman Earthquake (SAE) is another ongoing target of my research group. Grad student Kristin Hughes and I designed and constructed deformation models of the earthquake that predict the evolution of deformation, stress, and fluid pressure in the region. Kristin's work suggests that postseismic recovery of pore fluid pressure accounts for delayed coupling among the recent earthquakes in the region. I began a collaboration with Stephan Grilli (University of Rhode Island) to combine

tsunami-genesis and wave propagation models with seafloor deformation models of the 2004 SAE. I was a part of Stephan's Science Team on a research cruise in 2005 that surveyed the seafloor near the epicenter of the SAE and our collaboration grew out of our discussions during the post-cruise retreat at the *Fondation des Treilles* (Les Treilles, France), a place for "...mathematicians whose calculations would take the form of poems..."



Lava tube near Krafla, Iceland, August 2008

Okmok volcano, Alaska, one of the most active volcanoes of the Aleutian Islands, continues to be another subject of my research. Matthew Haney (Boise State University) and I combined seismic tomography, InSAR imagery, and numerical deformation models to reveal the internal structure and magmatic plumbing system of the volcano. We are expanding the project by combining these numerical models with new InSAR, contributed by Kurt Feigl (University of Wisconsin), and GPS data that span the entire 1997-2008 eruption cycle in an effort to quantify the systematic magmatic migration and storage cycles of this active volcano.

Two new graduate students joined my research group this fall. Jonathan Stone will draw on his background in mathematics to combine numerical models with non-linear inverse methods that optimize the characteristics of magmatic intrusion. Sarah Needy will combine her petrology background with numerical models of deformation mechanics to simulate the interplay of tectonic stresses and magmatic intrusion for rift segments and central volcano complexes in Iceland's Northern Volcanic Zone.

www.geo.ua.edu/faculty/TMweb/Masterlark.html.

ALBERTO PEREZ-HUERTA
Assistant Professor



Field work in Spain, 2008

Recently hired to replace Professor Carl Stock, I am originally from Spain where I obtained my B.Sc. in Geological Sciences (University of Oviedo) in 2000. After this, I moved to University

of Oregon to conduct my Ph.D. studies on Pennsylvanian brachiopod paleoecology (Great Basin) under the supervision of Prof. Norman M. Savage, completing my degree in 2004.

Despite my earlier research on fossil brachiopods and Late Paleozoic paleoclimate and paleoenvironmental reconstructions, my current research is highly multidisciplinary, ranging from biogeochemistry to materials science, in collaboration with colleagues in more than 15 different countries. Active fieldwork studies are conducted in the Great Basin (USA), Venezuela, NW Spain and Thailand, and I hope to start projects in Alabama soon! In terms of teaching, I am currently involved in Geology 101 and I will teach Invertebrate Paleontology in Spring Semester 2010. On a different tone, I would like to take this opportunity to thank everybody in the department for their help, and patience with me, to facilitate my adaptation. Finally, I would like to stress that I am very happy with my appointment to this department and looking forward to very productive years to come!

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DELORES M. ROBINSON
Assistant Professor

My main research area is understanding how mountains are built and how the continents are rifted apart. I use a variety of tools and techniques to study the mountain building and destruction process -- field mapping, geochronology, isotope geochemistry, seismic analysis, and computer modeling.

In the past couple of years, I have had active projects in Montana, Alabama, the Eastern Gulf of Mexico, Tibet, Nepal, Bhutan, and India. In April and May 2009, I worked in northwest India for 6 weeks studying the Himalayan Mountains. I have 4 new students who are working in the Eastern Gulf of Mexico, India and Nepal. In the past couple of years, I taught Structural Geology, the Dynamic Earth, Global Tectonics, Comparative

Structural Geology and helped teach the summer field course.



NW India, Sutlej Valley

www.geo.ua.edu/faculty/robinson.php

JOSHUA SCHWARTZ
Assistant Professor

Since coming to UA in 2007, my students and I have worked together to better understand mechanisms and timescales of magmatic growth at mid-ocean ridges and island arc systems, both modern and ancient. My research utilizes geochemical and isotopic tools, particularly U-Pb geochronology, in combination with structural and petrologic observations to understand the age and origin of oceanic rocks

and the processes that have affected them. I currently have 2 graduate students and 7 undergraduate students working with me in research areas ranging from mid-ocean ridge rocks exposed on Macquarie Island (Southern Ocean) to ancient volcanic island arc rocks in the Blue Mountains of northeastern Oregon, to even older magmatic rock in the Eastern Blue Ridge of Alabama. The field areas give us the opportunity to explore magmatic systems from a variety of unique perspectives!



At the University, I also teach a variety of undergraduate and graduate courses ranging from Physical Geology to Volcanology. One of my favorite aspects of teaching involves the inclusion of undergraduate students in research projects where they have the opportunity to collect original data using analytical facilities housed in the DGS (e.g., x-ray fluorescence detector, inductively-coupled plasma mass-spectrometer) and in the Central Analytical Facility (e.g., electron microprobe). These research opportunities engage students in the excitement of learning, data collection and interpretation, and helps bring to life otherwise mundane diagrams in their textbooks!

www.geo.ua.edu/faculty/schwartz.php

HAROLD STOWELL **Professor**

New Zealand to Alaska (and a bit of China)

I began my second career as professor during the 2008 – 2009 academic year. The Fall semester was not unusual: I taught mineralogy for the 24th time and continued to assist graduate students with their work. However, during the Spring semester I suddenly had numerous new opportunities because I was no longer busy as the chairperson of the department! I made good use of the newly available time by initiating new research in New Zealand and giving lectures in Southeastern Alaska!

My teaching activities for the year included:

Mineralogy [GEO210]

Summer Field Course [GEO 495]

Supervision of one Ph.D. [Gatewood]

Supervision of two M.S. students [Holler & Parker]

Invited lectures at Louisiana State University, Peking University, China University of Geosciences, and the China Academy of Geological Sciences, and for Lindblad Expeditions/National Geographic on the M.V. Sea Bird in Alaska

My research activities for the past year are in three general categories. The first two projects are funded by the U.S. National Science Foundation and the third has been partly supported by GNS Science [New Zealand] and the Royal Society of New Zealand. In addition, I am starting a new project, with Josh Schwartz, on understanding the collisional tectonic history of the Blue Mountains, Oregon. We received NSF funding for this work in August of this year.

1. Tectonic and metamorphic history of mid- to lower-crustal rocks of the North Cascades, Washington. This project focuses on using geochronology and metamorphic P-T estimates to constrain the history of intramontane basin development and subsequent metamorphism. Two graduate students -- Matt Gatewood [Ph.D.] and Rob

Holler [M.S.] -- are working on this research. During the year, we made 3 trips to the University of Arizona Laser Chron lab to obtain new U-Pb zircon ages for North Cascades samples.

2. Developing a practical and quantitative method for measurement of metamorphic porphyroblast crystallization kinetics and strain rate. Matt Gatewood is also working on this recently funded research, which focuses on samples from southwestern Vermont. During August, Matt and I traveled to Vermont in order to collect new garnet samples for the study.

3. Timing and conditions of partial melting in the Cretaceous lower crust of Fiordland, New Zealand. During March and April, Karen Parker, Matt Gatewood, and I began the second phase of this project to better understand lower crustal processes. The three of us made use of an inflatable boat to explore and sample in the wilderness of Doubtful Sound in Fiordland National Park. This involved surviving amazing rainstorms, braving substantial waves where the Sound meets the rough water of the Tasman Sea, and enjoying the luxuries of the 'Gut Hut' on Secretary Island.



Karen Parker [M.S. student] and Matt Gatewood [Ph.D. student] working late hours in the Gut Hut on Secretary Island.



Karen Parker wrestling with perennially wet vegetation of the Fiordland rain forest.



Matt Gatewood takes the UA field party to Secretary Island, Doubtful Sound New Zealand.

Quality research and teaching programs in the geological sciences require significant infrastructure. Unfortunately, much of the equipment and several labs in the department are aging and inadequate. Therefore, I devoted a significant amount of time toward initiating equipment replacements and upgrades and lab renovation. My efforts focused on upgrading the electron probe microanalyzer [EPMA] in the Central Analytical Facility and renovating the rock dissolution labs in order to provide clean workspace for my isotope group and to accommodate Josh Schwartz and his students.

1. The JEOL 8600 EPMA was purchased in 1990 and had not been significantly updated for over 10 years. In the last year, I was able to use NSF funding, augmented by UA money, to completely replace the

automation and computer systems, and install a new state-of-the-art energy dispersive system for rapid high quality analytical work.

2. The Bevill Chemical Petrology lab is used for preparing trace element and isotope samples. This involves dissolving rocks and minerals and separating and concentrating elements from rocks and minerals. These techniques require elaborate safety equipment including fume hoods and ultraclean preparation facilities. I spent a considerable amount of time installing new laminar flow hoods and fabricating new evaporation boxes.

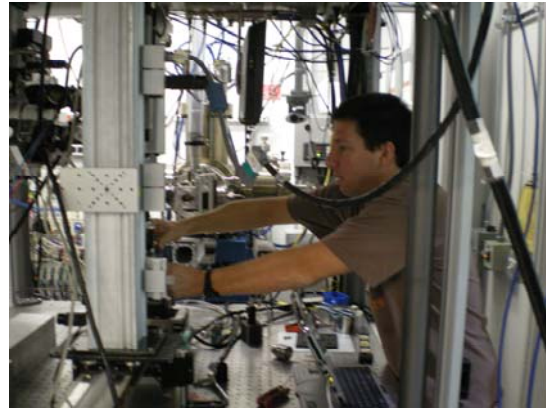
www.geo.ua.edu/faculty/stowell.php

GEOFFREY R. TICK
Associate Professor

It's been a busy and productive year in the hydrogeology realm! I have been continuing my research interests in many different areas including 1) investigating oil recovery processes at the pore scale; 2) conducting regional scale studies of saltwater intrusion, nitrate fate and transport, and groundwater flow dynamics of the aquifer system of southern Baldwin County, Alabama; 3) investigating field-scale innovative techniques to characterize small-scale preferential flow paths in highly heterogeneous aquifers: Columbus Air Force Base, Mississippi; and 4) investigating the processes controlling the dissolution and removal of multi-component immiscible liquids at different scales. In 2009, two peer-reviewed articles were published in high outlet journals (*Water Resources Research* and *Water, Air, and Soil Pollution*) and two are currently under review (*Water Resources Research* and *Ground Water*).

I currently have five graduate students working on research projects under my direction; three M.S. students (David Slavic, Jason Harvell, and Will Burke) and two Ph.D. students (Dorina Murgulet and Jay Ghosh). In fact, as of this December 12, 2009, Dorina Murgulet will have

officially graduated with her doctorate degree. She will continue to work at the Geological Survey of Alabama as a hydrogeologist.



Pore-Scale Research: Quantifying oil recovery processes during surfactant flooding; Advanced Photon Source Synchrotron Facility, Argonne National Laboratory



Field-Scale Research: Characterizing small-scale preferential flow paths in a highly heterogeneous aquifer, Columbus Air Force Base, Mississippi.

I am excited about teaching a new set of eager students in my Geology 306 "Hydrogeology" and Geology 101 "The Dynamic Earth" courses this semester and look forward to teaching Geology 410/510 "Soil and Groundwater Restoration" next semester (Spring 2010). This year I have seen some of the largest enrollment increases in my courses, which provide me the rewarding opportunity to inspire these students to become future hydrogeologists!!

www.geo.ua.edu/faculty/tick.php

AMY WEISLOGEL
Assistant Professor



I'm wrapping up my 3rd year with the department and it's hard to believe how time has flown! In the past year I've been work on several projects with my graduate students: provenance of Jurassic sediments in the eastern Gulf of Mexico with M.S. student Tommy Lovell ('10) as part of a project on the greater evolution of the eastern Gulf for the Center of Sedimentary Basin Studies with Delores Robinson and her students, paleodrainage evolution of the Missouri headwaters region with M.S. student Jenny Rothfuss ('10), and salt-sediment interaction outcrop modeling in La Popa basin, Mexico with Constantin Platon ('10). Each of these students along with Delores and I will all have presentations at the AAPG meeting in New Orleans next April- if you'll be at the meeting it would be great to have you stop by to check out our work! Delores and I will also be co-chairing a session on evolution of the Atlantic and Gulf coast margins at the NE/SE Geological Society of America Section meeting in Baltimore, MD next March and would love to see any alums there as well. I've also become involved with chasing down Permian-Triassic boundary successions in South Africa and China to address paleoenvironmental and paleoclimatic change associated with the big P-T extinction event.

Along with teaching courses for introductory geology, sedimentology/stratigraphy, sedimentary petrology and depositional systems, there's never a dull moment!

www.geo.ua.edu/faculty/weislogel.php

CHUNMIAO ZHENG
Professor

I spent most of 2009 as the Birdsall-Dreiss Distinguished Lecturer visiting 70 universities and research institutions around the world (see a personal reflection of my lecture tour after this article). The Birdsall-Dreiss lectureship, sponsored by the Hydrogeology Division of the Geological Society of America, is awarded annually to a groundwater scientist based on two criteria. The nominee must be a renowned scientist whose publication record and research have had national and international impact in the field of hydrogeology and the nominee must be an outstanding speaker.

In 2009, our group welcomed two new students, Jessa Moser came from the University of Cincinnati to do a MS degree. Li Huang started her Ph.D. program after completing a MS at Moscow State University. Three Ph.D. students are continuing with their research projects, including: Marco Bianchi studying effects of preferential flow paths on solute transport, Guoliang Cao studying groundwater storage depletion in the North China Plain, and Song Chen studying risks of CO₂ sequestration in fractured rock formations. Dr. Rui Ma, who came to us from China University of Geosciences-Wuhan as a post-doctoral research fellow, is playing an active role in the DOE project studying the fate and transport of uranium contaminants at the Hanford site in Washington State (see a related story (<http://research.ua.edu/2009/03/forecasting-solutions/>)).



Reflections on the 2009 Birdsall-Dreiss Lecture Tour

I was very honored by the selection as the 2009 Birdsall-Dreiss Distinguished Lecturer. Although the lecture tour has been time-consuming and at times physically draining due to constant traveling, it has given me the experience of a lifetime. I kicked off the tour with the first lecture at the University of Alabama in January 2009. I will conclude the tour with the 70th lecture at CSIRO Land and Water in Perth, Australia in November 2009. The 70 lectures cover eight countries in four continents and 25 states in the United States.

I prepared two lectures for my tour. The first lecture is entitled “Understanding Solute Transport in Extremely Heterogeneous Porous Media: Lessons Learned from 25 Years of Research at the MADE Site.” It summarizes all the field-based research at a well-known tracer experiment site and provides a long-term perspective on the challenges of modeling and predicting plume-scale solute transport in heterogeneous aquifers. The second lecture is entitled “Will China Run out of Water?” It examines China’s water scarcity and environmental problems amid the country’s

unprecedented economic growth. Of the two, the lecture on Chinese water issues has been requested more often because of its appeal to general audiences. But on a number of occasions, I gave both lectures: one to a general audience and the other to a smaller research group.

The year 2009 is certainly not ideal to do a lecture tour. Everywhere I went, I was greeted by the grim news of more budget cuts and staff layoff as a fallout of the global financial crisis. Still, there is undeniable excitement and enthusiasm for hydrogeological research and education at every level. A clear trend I have seen from my visits is that more and more hydrogeologists are working with natural and social scientists from other disciplines to tackle difficult problems that are intrinsically complex and multidisciplinary in nature, such as global changes, sustainable development, and eco-hydrology. New breakthroughs in measurement and observing technologies are opening new doors for resolving old challenges in traditional hydrogeological research fields such as aquifer characterization, contaminant transport, environmental restoration, geofluid migration, and groundwater management. The hydrogeology profession is well and alive!

I wish to take this opportunity to acknowledge the Geological Society of America Hydrogeology Division for giving me the opportunity of a lifetime. I also thank the University of Alabama for granting me a release from teaching and providing additional travel support. I am deeply indebted to the numerous faculty and students for taking the time to share their research ideas and experiences with me. Finally, I am grateful to all my local hosts whose hospitality, thoughtfulness and friendship has made my lecture tour a truly unforgettable journey.

<http://hydro.geo.ua.edu/zheng.html>

FROM OUR EMERITI

RICHARD GROSHONG Professor Emeritus

What Rick Groshong has been doing lately

A paper on faults and fluid flow in the Black Warrior Basin has just appeared in a special issue of the *Journal of Structural Geology* (v. 31, p. 874-886, 2009). Also just finished and accepted is a paper on the extensional tectonics of Black Warrior Basin for a Geological Society of America volume on Appalachians. This paper is a synthesis of work by a number of former graduate students.



Rick with Jean-Luc Epard, one of his former post-docs, overlooking the Valais in Switzerland, October 2009. Jean-Luc is the Professor of Structural Geology at the University of Lausanne.

Kathy and Rick spend July through September in their house in Grand Lake, Colorado, the town at the western entrance to Rocky Mountain National Park. Much of the rest of the year is spent teaching continuing education courses, *Structural Styles in Petroleum Exploration*, and *Mapping Subsurface Structures*, for the oil & gas industry through Petro Skills. In the past year Rick's teaching venues have ranged from Calgary,

Houston, and Buenos Aires on the west side of the Atlantic, to Dubai, Sinaia (Romania), Geneva, and London on the east side. Kathy continues to paint and to run the Renaissance Art Gallery in Historic Downtown Northport.



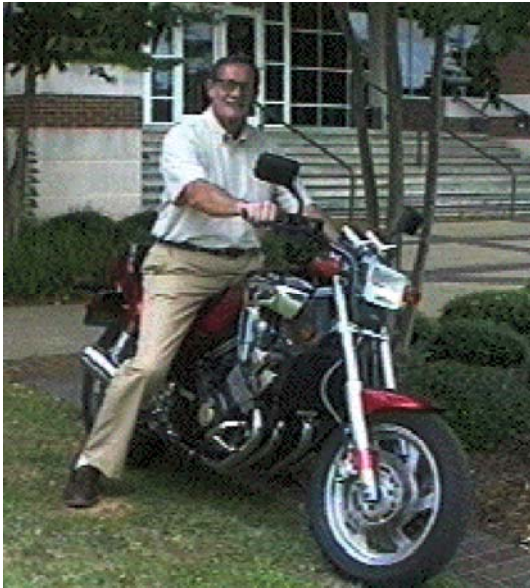
Rick Groshong and Dick Nickelsen at dinner following the special session of GSA in Rick's honor.

September Issue of *Journal of Structural Geology* Dedicated to Professor Emeritus Rick Groshong (The Nick-Rick special Issue).

In 2006 a special session in honor of Rick was held at the Geological Society of America annual meeting in Philadelphia, the topic of which was low-temperature deformation of sedimentary rocks. The primary organizer was Dr. David Ferrill, one of Rick's former Ph. D. students, now at the Southwest research Institute in San Antonio. After the session it was decided to collect papers on the topic for a special issue of the *Journal of Structural Geology* in honor of both Rick and his undergraduate structural geology teacher from Bucknell University, Richard Nickelsen (Nick). Nick is well known for his work on deformation mechanisms and introduced Rick to the subject. Among the contributors to the special issue are Rick's former students David Ferrill, Guohai Jin, Hongwei Yin, and Marcella McIntyre, former Alabama faculty member Bill Thomas, and Alabama Geological Survey member Jack Pashin, as well as Rick and Nick themselves.

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GARY W. HOOKS
Professor Emeritus



Since retirement in 1994 Gary Hooks has stayed busy part time teaching Geology 101 in the Fall, Spring, and sometimes Geology 101 and 102 in the Summer.

I have maintained my office in Smith Hall (the Museum) along with the other fossils and dead things.

I have served as an advisor in geomorphic projects such as the impact of strip mining on a local stream, possible urban impact on the University Arboretum, and a proposed urban development on a local lake.

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CARL STOCK
Professor Emeritus

As many of you may know, I officially retired on 1 August 2008, as did my wife, Judy; however, I did teach Invertebrate Paleontology one last (33rd) time in spring 2009, as the Department was not allowed to recruit my successor until the 08-09 academic year. Both Judy and I will continue our research. In 2005 we bought a house in Conifer, Colorado, southwest of Denver in the Front

Range, and have lived there part-time since. We hope to sell our Northport home next year, and live in Colorado full-time.

As for research, I am one of three authors on a monograph in *Palaeontographica Canadiana* that describes the Upper Ordovician-Lower Silurian stromatoporoids from Anticosti Island, Quebec. Anticosti is the best location in North America for an almost uninterrupted sequence of stromatoporoids for that time. It should be published late this year or early next year. At least three manuscripts for the revision of the stromatoporoid part of the *Treatise on Invertebrate Paleontology* have been accepted for publication in 2010—this project began in 1988! Work is in progress on three more journal articles: 1) a description of the lowermost Devonian species of the stromatoporoid *Habrostroma* throughout North America; 2) the paleobiogeographic implications of *Habrostroma*'s distribution; and 3) the paleobiogeographic significance of three species of stromatoporoids from the uppermost Lower Devonian and lowermost Middle Devonian of Nevada.



I still have two graduate students. Sandy Ebersole is doing a dissertation on the Upper Cretaceous (upper Campanian) of the entire Mississippi Embayment. This includes lithostratigraphy, biostratigraphy, paleoecology, and paleobiogeography. Master's student, Jeff Aul, former kicker on the UA football team, is studying lower Upper Devonian stromatoporoids from southeastern Nevada. This includes those from the Alamo Breccia, a bolide impact deposit.

Both are working full-time, Sandy with the Geological Survey of Alabama, and Jeff with the UA Athletic Department. They should graduate by next spring.

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Our Staff

ADMINISTRATIVE STAFF

DARLENE CAPPS

Office Associate II

I moved to Tuscaloosa 8 years ago and love living here. I began working in the Geology Department 3 years ago and enjoy working with the Faculty and Staff. I especially enjoy helping all of our students with registration or academic problems that may arise.

The Department of Geological Sciences is a wonderful department to work for and our students are the best!

BETTY FAGEN

Office Associate Senior



I have been on the staff of the Geological Sciences Department at The University of Alabama (Roll Tide) for approximately 7 years, formerly living in South Florida 25 years. I get great pleasure working with the staff, professors, and especially the students. We have students from all over the world and I admire them

immensely because of the dedication and hard work that they bring. These young people ARE the future!

DEBBIE L. FRANK

Administrative Specialist

Debbie Frank has been with the UA Department of Geological Sciences since October 1991. She is senior member of the DGS Departmental Staff and has been promoted to Administrative Specialist in 2009. She received "The Vergil Parks McKinley, Sr. Employee Award" in March 2009. The award recognizes enterprising employees, who by action or idea, contribute to The University of Alabama Mission of teaching, research and service. She enjoys working with faculty and students in the department.

TECNINICAL STAFF

JAMES DONAHOE

Research Specialist



Jim Donahoe showing the proper use of a rock hammer in addressing server issues

After nearly 26 years in the Department of Geological Sciences (formerly, the Geology Department), I've been asked to write a little blurb about myself and what I do. What can I say, I've been lucky to have worked in the Department this long. Not just lucky from the standpoint that we have a great group of professors and staff, but lucky from the fact that no one has figured out my lack of qualification.

My duties include use and maintenance of the Bruker D8 X-ray Diffractometer, to a small part the Philips (now Panalytical) PW2400 X-ray Spectrometer, rock preparation facilities, the departmental mail and web servers, and the departmental computers and printers. One great thing about this job is it never gets boring.

ELIZABETH Y. (BETSY) GRAHAM
Manager Geochemistry Research Lab



A UA alumna, I've been in Tuscaloosa most of the past 41 years. I've been with the Department over nineteen years. The laboratory has grown over the years, with different instruments and more students. I've been fortunate to experience many things and places doing various types of research.

JOE LAMBERT
Environmental Isotopes Specialist



"UA students after coring stalagmites in DeSoto Caverns, AL". (Joe is in the middle).

In 2009 my lab provided isotope compositions for almost 7000 samples from local study sites within Alabama as well as various parts of the world. Although our primary focus is on DGS student and faculty research, we were also able to accommodate external projects thanks in part to newly acquired state-of-the-art equipment. As a service to the scientific community, we have been collecting local rainfall since 2005 in order to provide the first published water isotope data for the state. The findings over the first three years of this work have recently been published in the leading geochemistry journal, *Geochimica et Cosmochimica Acta*. Within the department, heavy users of the lab include Paul Aharon and Fred Andrus as well as their undergraduate and graduate students. Professor Aharon, who initiated the creation of the Alabama Stable Isotope Laboratory, is currently leading multiple studies aimed at deriving high-resolution paleoclimate records for the Southeast. Professor Andrus' major focus involves using isotopes as proxies for marine upwelling along the coast of Peru during El Niño events. We look to expand our facilities in 2010 to better facilitate the increasing number of isotope-based research

projects within the DGS. On a more personal note, my wife (Bailee) and I welcomed our first child to the world during the holiday break in December, 2009.

www.geo.ua.edu/asil/

DIANE (NORRIS) THROWER
Drafting Technician



I have worked in the Geological Sciences Department about 15 years. I have had the opportunity to create and assist others with all things visual, especially pertaining to recruiting. My projects include, posters, brochures, flyers, newsletters, web pages, promotional giveaways, banners and a variety of jobs that do not fit into any particular category. The most interesting part of my job has been with people from other cultures, whether faculty or students we have some very interesting conversations. I am happy I have been able to use some of my creative ideas at work. I am surrounded by a great group of people, most likely one of the best departments on campus.

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