

# **Support the Field**

Alumni and friends have responded enthusiastically to our appeal creating the new Friends of Student Field Experiences Endowment, helping to raise \$1.2 million toward a goal of \$2.5 million. Contribute to this endowment and you can make a difference in the lives of students by ensuring a Jackson School tradition of outstanding student field experiences.

#### Ways to Give

1. Mail in the contribution form with this newsletter, checking the box for the Student Field Experiences Endowment. 2. Give or pledge via our secure online server at http://www.jsg.utexas.edu/foundation/support.html. (Be sure to designate the Student Field Experiences Endowment.)

"Much of what I learned about geology over my past three years as a student at UT was integrated into the fantastic variety of formations, outcrops, folds, faults, and geologic features that Dr. Cloos showed us. It's experiences like this that remind me how fortunate I am to be a part of an institution like UT and a community like the Jackson School."

—James Pape, undergraduate in geology who took part in a JSGfunded field trip to California led by Prof. Mark Cloos

"The Jackson School commitment to taking students to the field is a great part of what makes our undergraduate and graduate programs strong. We need to ensure that every student has multiple opportunities to gain field experience so that no bright student turns to other areas of study because they can't afford the extra fees associated with a geosciences education." *—Eric Barron, Dean, Jackson School of Geosciences* 







The Newsletter. a tradition since 1950. is published annually for friends and alumni of the Jackson School of Geosciences at The University of Texas at Austin.

EDITOR AND DIRECTOR OF PUBLIC INFORMATION: J.B. Bird ASSOCIATE EDITOR: Marc Airhart MAGAZINE DESIGN: www.whittingtonand co com

ART DIRECTOR: Christia Madacsi PHOTOGRAPHY: Sasha Haagensen, Joe Jaworski, Marsha Miller, David Stephens CONTRIBUTING WRITERS: Kathy Ellins, Kathyrn Hansen, Paul Mann

SEND ALUMNI NOTES AND **INQUIRIES TO:** Newsletter Editor Jackson School of Geosciences The University of Texas at Austin PO Box B, University Station Austin, TX 78713-8902

PHONE: 512-471-6048 FAX: 512-471-5585 E-MAIL: communications@jsg.utexas.edu WEB ADDRESS: www.jsg.utexas.edu

# 70 GEOLOGY FOUNDATION **76 ALUMNI NOTES 104 MEMORIALS**

ON THE COVER: The Caspian Sea as seen from space. The North Caspian is the region of four of the world's "new giants," oil and gas fields discovered since 2000 that have more than 500 million barrels of ultimately recoverable oil or an equivalent amount of gas: Kashagan, Kalamkas-More, Khvalynskove, and Rakushechnoye. See related article on page 42 on the map of the world's giants prepared by Paul Mann and colleagues at the Jackson School's Institute for Geophysics, in collaboration with independent consultant Mike Horn and IHS Vice President Ian Cross. IMAGE SOURCE: NASA.

# **CONTENTS**

WELCOME

BRIEFS

3

**18 SCIENTISTS** 

28 LIBRARY REPORT

30 SUMMER FIELD CAMP

#### **FEATURES**

32 Barnett Boom Ignites Hunt for **Unconventional Gas Resources** 

38 Down the Hatch: Swallowing Carbon Might Be Good for the Planet

42 Location, Location, Location: Mapping the World's Oil and Gas Giants



50 Exploration & Development: Texas Geoscience Training Helps Cultivate Brazilian Expertise, Energy Independence

55 Hemispheric Vision: Jackson School Revitalizes Ties through Latin American Forum on Energy and the Environment

58 Jackson School Inducts 16 Legends into New Hall of Distinction

62 GeoFORCE Texas: Inspiring the Next Generation of Geoscientists

66 Earth Science Education Gets Boost in Texas

68 For Geoscience Graduates, It's Still a Seller's Market



# WELCOME





Dear Alumni and Friends,

Somewhat belatedly I am pleased to send you the 2006 newsletter, which covers activities of the Jackson School in its first year as an independent college as well as my year as inaugural dean (2005-2006). From the formation of the Jackson School in 2001 through its first year as a collegelevel unit at UT, I have been honored to help nurture and guide this great institution. Your support and counsel have been invaluable, as alumni, advisers, parents, friends, mentors and employers of our graduates. A number of

you contributed to the successes chronicled in these pages, such as our Latin American Forum, GeoFORCE Texas, and the strong recruiting of our graduates. Your financial contributions continue to make our success possible, as we add new faculty and researchers like the outstanding hires profiled here, and as we seek ways to encourage and support top-notch students. Having returned full-time to teaching and passing the torch to our new dean, Eric Barron, on September 1, 2006, I look forward to maintaining a rich and rewarding association with the Jackson School, and I hope you will do the same.

Bill Fisher



Dear Alumni and Friends,

Please enjoy this copy of the Jackson School Newsletter, which I am honored to send you jointly with my predecessor Bill Fisher. The accomplishments covered in these pages reflect the 2005-2006 academic year and the culmination of Bill's outstanding leadership of the Jackson School, first as its director (2001-2005) and then its inaugural dean (2005-2006). Bill handed me an institution with outstanding programs, financial wherewithal, a great leadership team, and a growing student body. At a time when geoscience enrollment is flat or declining nationwide, we are experiencing dramatic increases, particularly at the freshmen level, which bodes well for our future. I look forward to sending you the 2007 newsletter this fall, chronicling our ongoing accomplishments as we work together to realize the vision and full potential of the Jackson School.

Bnn

Eric Barron

# BRIEFS

#### **RESEARCH HIGHLIGHTS**

#### **New Geosciences Model**

Luc Lavier, a research associate at the Institute for Geophysics, and Gianreto Manatschal, a professor at the Université Louis Pasteur in Strasbourg, France, have developed a new model to explain how continents break apart to form oceans. Their discovery, detailed in the March 16, 2006, edition of *Nature*, may improve targeting of deep-water oil and gas reserves.

"In recent years, academic and petroleum industry studies of continental margins have shown that their evolution is more complex than that predicted by earlier models," said Lavier. Energy companies have been especially interested, he said, because "the old models were not working."

The two prevailing models explaining continental break-up are known as pure shear and simple shear. Both explain features observed near the coasts of continents but fail to explain the geology of the deep oceans. Lavier and Manatschal propose a new model that can explain phenomena observed both in deep waters and at the edges of continental margins.

Industry contacts have been especially interested in their revised concept of how heat is distributed in offshore sedimentary basins. "Passive continental margins around the world are the site of important deep water petroleum resources," said Dr. William Powell of ExxonMobil Upstream Research Company. "ExxonMobil Upstream Research Company is pleased that our grant to the University of Texas Institute for Geophysics supported a portion of the research reported in the Nature paper, and we look forward to the testing of these new concepts."

A better understanding of temperature history, said Lavier, "is critical in areas such as the south Atlantic where oil exploration is taking place in deeper waters in the search for future resources."

Along with ExxonMobil Upstream Research Company, the research was supported by Groupe de Recherche des Marges, a French academic consortium co-sponsored by Total Oil Company.

#### Good to the Last Drop

The State of Texas Advanced Resource Recovery (STARR) program, active at the Bureau of Economic Geology (BEG) since 1996, has tripled in size since September 2005. The team now includes more than a dozen researchers led by Bob Loucks.

The goal of the research is to increase oil and gas production from state-owned mineral lands. Researchers work with industry partners who operate exploration or development projects on state lands. The partners share their technical data, and BEG researchers complement the companies' technical efforts by focusing on issues that reduce risk or increase recovery efficiency.



Schematic representation of the temporal and spatial evolution of the three consecutive phases of rifting leading to break-up and seafloor spreading. Figure by Luc Lavier, published accompanying "A mechanism to thin the continental lithosphere at magma-poor margins," Nature, March 16, 2006.

The nature of the research ranges from very local studies resulting in step-out, drill-deeper, or recompletion recommendations, to regional studies examining future potential of new prospect concepts covering multiple-county areas. The research also examines unconventional play potential, an increasingly important category that includes tight sands, coalbed methane, and shale gas. Gas production from such reservoirs in the onshore lower-48 states now provides over 35 percent of the domestic production rate.

Research concepts applied in STARR include new seismic technologies for direct detection of hydrocarbons, new methods for understanding stratal architecture and distribution of sandstone reservoirs, and new methods for predicting quality of deeply buried reservoirs.

#### Gas on Ice

The Exploration Geophysics Laboratory (EGL), an industrial associates research program at the Bureau of Economic Geology, has been working for several years to demonstrate the value of multicomponent seismic in exploration applications. An area of intense interest currently is the use of imaging technologies to understand and map the distribution of marine methane hydrates in the deepwater areas of the Gulf of Mexico.

It's an important subject. Estimates show that the energy content of methane hydrates stored in the world's continental margins may be double that of all conventional fossil fuels. However, the details of the physical distribution of hydrates (for example, massive versus disseminated deposits) remain unknown.

Bob Hardage and his colleagues in EGL have been interpreting 4-component oceanbottom cable seismic data acquired by industry partner WesternGeco. The data helps the team understand the near-seafloor geologic setting, including sediment type, sediment strength, and structural features such as deep expulsion chimneys.

The team has established several indirect seismic methods to map hydrate presence significant because the U.S. Minerals Management Service now requires operators to assess the potential for commercial production of methane hydrates on leases taken in deep water for conventional oil and gas exploration.



Ascanio Rincón, a Jackson School postdoctoral researcher and one of the principal scientists at the Mene de Inciarte site, shows the daughter of John Moody the cast of a saber-toothed cat, given to Moody in recognition of his discovery of the site.

#### Jackson School Nurtures Major Paleontology Discoveries in Venezuela

RIEFS

8

Since the fall of 2005, the Alfred P. Sloan Foundation and the Jackson School have helped foster development of a new fossil discovery with potential world-class significance for paleontology. The site in Western Venezuela, known as Mene de Inciarte, could be "another La Brea," said John Harris, a curator from the famous La Brea Tar Pits in Los Angeles who visited the site in September 2005 on an expedition coordinated by the Jackson School.

Harris traveled to the site with experts from the Jackson School and La Universidad del Zulia in Venezuela to assess the discovery. When they confirmed the site's scientific potential, the Jackson School joined with the Foundation for Quaternary Paleontology of Venezuela, an organization founded by UT geology alumnus David Orchard, M.A. '79, to convene a conference in Austin to explore next steps. The conference brought together 32 attendees from 16 institutions in the U.S. and Venezuela-scientists, curators, industry representatives, and agency heads who discussed forms of cooperation and priorities for scientific investigation.

The initial discovery was made in 1998 by John Moody, an industry geologist working in Venezuela. With colleagues from La Universidad del Zulia, Moody found fossil remnants of a saber-toothed cat buried near the surface of one of Western Venezuela's natural tar seeps, known locally as menes. This was the first discovery of a Pleistocene-era fossil in one of Venezuela's menes, which geologically resemble the La Brea Tar Pits in California.

In addition to identifying new Pleistocene-era species, the site-the precise location of which is not being widely publicized for security reasons-holds out the promise of reshaping the vision of North and South American flora and fauna migrations. Harris and a colleague from the Page Museum, Chris Shaw, believe the discovery "indicates a biota that is as rich and diverse as that of Rancho La Brea which, of course, is the standard bearer for documenting the past 200,000 years in North America."

Chris Bell from the Department of Geological Sciences took part in the field trip and co-convened the Austin conference. Bell has worked closely with Ascanio Rincón, one of the original Venezuelan scientists at the site, who completed a year of postdoctoral research at the Jackson School in the fall of 2006. Now a paleontologist on staff at the Instituto Venezolano de Investigaciones Scientíficas, Rincón has subsequently taken on management of a second, equally exciting major find in eastern Venezuela, the scope of which was just becoming known as this edition of the JSG Newsletter was going to print. Look for more information in the next edition.

#### Then There Were Two

The Bureau of Economic Geology continues to manage the Texas effort to win the bid for FutureGen, the \$1 billion federal initiative to build the power plant of the future. Texas is competing against Illinois for the prize. The winning site will host a prototype for the world's first near-zero emissions, fossil-fuel energy facility.

The 275-megawatt plant will produce electricity and hydrogen from coal with nearzero emissions by capturing carbon dioxide, which will be sequestered by subsurface injection.

On July 25, 2006, the FutureGen Alliance, a non-profit consortium of leading international energy companies working with the U.S. Department of Energy, announced four finalists for the bid. Texas is home to two of them-Odessa and Heart of Brazos near Jewett. Illinois is home to the other two potential sites. The alliance expects to select the final site in late 2007.

"We consider the Odessa and Jewett sites to be top contenders, and we will continue pressing the merits of both proposals with the alliance," said Scott Tinker, director of the Bureau of Economic Geology. "Now the real work begins. We have plenty of exhaustive work ahead of us as we provide the alliance with additional information. We will do all we can to bring FutureGen home to Texas."

#### Ice Pays the Price

Less than a half-century ago satellites provided the first glimpse of Earth from space. Among the surprises revealed over time were images of Greenland's rapidly melting glaciers, raising the alarm that global warming is already profoundly influencing Earth's complex climate system.

On April 16, 2006, Ginny Catania of the Institute for Geophysics (UTIG) and colleague Tom Neumann of the University of Vermont headed north of the Arctic Circle to begin a two-year campaign to understand the importance of seasonal melt water on Greenland's ice sheets. Their project examines how ice dynamics in Greenland's interior control movement at the periphery of the ice cap and may shed light on the long- and short-term causes of ice sheet variability. The results will help climate modelers predict the response of the ice sheet to a changing climate.

Catania headed south the following November to the frozen Antarctic continent, where she led a research team to continue previous UTIG efforts to understand the



Ginny Catania drives a radar sled across the ice in West Antarctica

behavior of the ice streams of the West Antarctic Ice Sheet.

Data from Catania's Antarctic research was central to two papers appearing in Science Express March 1, 2007. The papers demonstrated that a wedge of sediment, pushed up by glacial movement, may be a buffer against moderate sea-level rise, pointing to ocean temperature rise as the key factor in glacial retreat

Catania used a snowmobile-towed radar to gather data in the region where ice from the Whillans Ice Stream in West Antarctica begins to float in the Ross Sea, forming the Ross Ice Shelf. She and her colleagues, including co-author Richard Alley and first author Sridhar Anandakrishnan of Pennsylvania State University, focused much of their attention on grounding lines-where ice sheet transitions from resting on the Antarctic land mass to floating over water on the ice shelf. "In the past there has been very little information about grounding lines and how they control ice flow," says Catania. "New studies reveal that grounding lines have greater control over ice flow than previously realized."

The research may help scientists predict how Antarctic ice responds to rising ocean temperatures and contributes to rises in sea level. The geological record shows that in the past ice sheets have collapsed causing rapid sea-level rise. The researchers believe such natural variability needs to be better understood in context with increased climate warming.

#### AAPG Bulletin **Dedicated to Fisher**

Institute for Geophysics researchers Paul Mann and Alejandro Escalona edited AAPG's Special Volume for April 2006 (volume 90, number 4, 2006) on Maracaibo basin, "3-D Anatomy of a Supergiant, Maracaibo Basin, Venezuela."

The editors dedicated the volume to Bill Fisher for being "a tireless proponent of research and mentor of graduate students engaged in research on the Maracaibo basin." Mann and Escalona noted that throughout his career, Fisher "has been committed to promoting opportunities for students from outside the United States and for increasing the ethnic diversity of the graduate student population of the Department of Geological Sciences" at UT Austin.

He has also supervised more than 30 Venezuelan graduate students since 1987. Eleven of these students conducted graduate research on the Maracaibo basin. Their theses and published results "form the core of information presented in this volume," state the editors.

Eight articles authored or co-authored by Mann and Escalona cover topics in regional geology, tectonic history, petroleum systems, reservoir properties, stratigraphy, and mapping of the basin. Fisher and José Guzmán co-authored an article on "Early and middle Miocene depositional history of the Maracaibo basin, western Venezuela." The volume is available via the AAPG Web site.



vised since 1987.

#### Nicaragua's Fault

During the 20th century, earthquakes killed more than 30,000 people in Central America, which forms part of the Pacific Ring of Fire, a system of subduction zones and strike-slip faults encircling the basin of the Pacific Ocean.

Bill Fisher with Patricia Montoya, Ph.D. '06, at her graduation from the Jackson School doctoral program in May 2006. Montoya is one of the more than 30 Venezuelan graduate students Fisher has super-

In May and June 2006, with funding from the Jackson School and the Subduction Factory program of the National Science Foundation, the Institute for Geophysics' Kirk McIntosh and Paul Mann teamed up with colleagues from the university's

Department of Geological Sciences and the Department of Geography to investigate the faults responsible for volcanic-front earthquakes near Lake Managua and Lake Nicaragua.

Because lakes continually collect sediments, careful studies of the age of faulted lake sediments can provide a history of the timing and character of major earthquakes. The team used rented ferry boats, adapting them for their geophysical surveys and lake coring campaigns. Prior to the project neither lake had been thoroughly surveyed.

The fault patterns mapped challenge all previous predictions for faults beneath Lakes Nicaragua and Managua, which cover much of the country. The researchers are currently correlating the geophysical survey results with the core data. They presented their preliminary findings at the December 2006 meeting of the American Geophysical Union.

#### Probing the Arctic Seafloor

Year-round sea ice in the Arctic Ocean makes towing conventional marine seismic equipment impossible, with the result that the Arctic portion of the North America-Eurasia plate boundary is poorly understood.

More detailed information about the Arctic sea floor would improve global plate tectonic reconstructions and could settle long-standing disputes about the location of the Arctic continental shelf, a point in debates over international fishing rights, mineral rights, and national territorial issues.

In July and August 2006, researchers from the Institute for Geophysics and the Department of Geological Sciences applied new twists to tried and true methods to examine two regions in the western Arctic Ocean-the Chukchi Borderland and the Mendeleev Ridge. They used helicopters to

View of chartered vessel Mozorola at dock on Ometepe Island in the middle of Lake Nicaragua



#### **Moonguakes Revisited**

Three decades after NASA pulled the plug on a network of sensitive seismometers left on the lunar surface by Apollo astronauts, scientists have taken a second look at their old research and discovered the moon was doing a lot more shaking than they realized at the time.

Throughout the 1970s, the seismometers radioed back data to the lab of Yosio Nakamura, a geophysicist at The University of Texas at Austin. Unfortunately, Nakamura's primitive computer was insufficient to process the information. As a result, he was unable to determine the sources for more than 9,000 of the 12,500 disturbances that showed up on the seismographs. But Nakamura and his colleagues reanalyzed all the data in 2005.

The reanalysis showed that 5,885 of the mysterious seismic events were deep quakes caused by fractures running roughly halfway to the center of the moon. Nakamura and his colleagues also reported locating 250 new nests, or regions where the moon's interior seems to fracture repeatedly.

RIEFS

Discover Magazine ranked the find No. 49 among the top 100 scientific discoveries of 2005. Only by understanding the interior of the moon can scientists fully piece together the story of how the moon and Earth formed and evolved over time, said Nakamura.

Right: Stacked seismograms of newly discovered far-side deep moonquake A285 at stations 12, 14, 15 and 16. Courtesy Yosio Nakamura.



deploy hydrophones through holes in the pack ice and used a U.S. Coast Guard icebreaker to tow an airgun array.

The surveys of the Chukchi Borderland, an area where waters from the Pacific and Atlantic meet and interact, will be useful for reconstructing the Arctic continent for times in the past, helping scientists to understand how the Western Arctic Basin opened.

Rocks dredged from the Mendeleev Ridge, believed to be a hotspot volcanic feature, will be used to determine the origin of this plateau and, if they prove to be volcanic, may explain the role of volcanism in the motion and rotation of Earth's tectonic plates.

#### **Structural Diagenesis**

The cover of the April 2006 Journal of Petroleum Geology spotlighted the work of the Structural Diagenesis Initiative, a research program at the Jackson School led by Steve Laubach, a senior research scientist at the Bureau of Economic Geology, with co-PI's Peter Eichhubl, Rob Lander and Linda Bonnell (all at the Bureau), Jon Olson (Department of Petroleum & Geosystems Engineering), and Randy Marrett (Department of Geological Sciences).

The journal cover showed Jackson School graduate student Kira Diaz-Tushman's field

area in Scotland and images from student research by Meghan Ward and Leonel Gomez in Mexico and West Texas. The issue included an article by Laubach and Julia Gale on "Obtaining fracture information for lowpermeability (tight) gas sandstones from sidewall cores."

The Structural Diagenesis Intiative strives to further the understanding of how fracture and fault growth and chemical diagenetic processes interact to govern the attributes of structures in the Earth. Graduate students make significant contributions to the initiative, including Ward, Diaz-Tushman, Gomez, and Aysen Ozkan. Laubach sees great potential:



Kira Diaz-Tushman, M.S. '07 from the Jackson School, and Tim Wawrzyneic of the University of New Mexico's Department of Earth & Planetary Sciences, collect LIDAR data in northwest Scotland during a 2006 field trip organized by the Jackson School's Structural Diagenesis Initiative.

"The best science is yet to come in this area. There are many exciting research leads with important societal implications."

The initiative earned a "Best University Research" award from the U.S. Department of Energy (DOE) in 2004 and spawned a distinguished lecture tour. In November 2006, DOE's Office of Basic Energy Sciences awarded the Structural Diagenesis Initiative more than \$750,000 to continue its awardwinning research for another three years.

#### **Developing African Energy Markets**

In the fall of 2005, the Bureau of Economic Geology's Center for Energy Economics (CEE) was awarded a \$3.5 million cooperative agreement from the U.S. Agency for International Development (USAID) to continue work with the Resource Center for Energy Economics and Regulation (RCEER) in Ghana. As part of the agreement, CEE and RCEER will focus on capacity building and public education to contribute to Ghana's efforts at developing a natural gas market framework.

The scope of the current cooperative agreement extends beyond Ghana to include replication of the Ghana model in other regions in Africa and Latin America. The CEE will also extend its Smart Development Initiative through international partnerships, capacity building, and training and development of USAID personnel. Head of the CEE, Michelle Michot Foss, believes the grant opens opportunities to build stronger, more prominent linkages between the CEE and its corporate network. The CEE is currently exploring establishment of a "Global Development Alliance" to supplement activities and funding provided by this agreement, starting with the narrowly defined mission of development of a functioning natural gas market framework in Ghana.

#### **SPEAKERS & LECTURES**

#### No Snowjob

Paul Hoffman of Harvard University laid out evidence for one of modern geology's great detective stories-the theory of global glaciation, or Snowball Earth—during one of his major presentations for the Edwin Allday Endowed Lecture Series at the Jackson School of Geosciences.



Speaking to an auditorium full of students and scientists March 30, 2006, Hoffman reviewed facts that "had long been known to exist" and recent scientific results that "renew the chance to resolve controversies" in the Snowball Earth theory.

First advanced by Joe Kirschvink of the California Institute of Technology in 1989, the Snowball Earth theory resolves a series of geologic anomalies—primary among them the presence of synchronous glacial deposits in equatorial regions—by positing that Earth experienced several complete freezes during the Proterozoic Eon (from 2.5 billion to 535 million years ago). The most recent two glaciations, according to the theory, occurred during the Neoproterozoic about 710 and 635 million years ago. Each episode is thought to have lasted around 10 million years.

Such dramatic freezes conceivably would have wiped out all life on Earth. For this very reason, scientists initially thought the deep freezes could not possibly have taken place, since the fossil record shows that cyano-bacteria and microscopic organisms were living in the oceans before the most recent freezes. New discoveries about the ability of aquatic organisms to sustain life under cracked ice packs, however, have eased doubts stemming from the fossil record. Meanwhile, since 1992, Hoffman and Harvard colleague Dan Schrag, a geochemist, have developed and disseminated a geological case that has allowed Kirschvink's theory to snowball in credibility, causing an idea that once seemed absurd to stand on the verge of scientific orthodoxy.

Editor's Note: As the Newsletter was going to print, the Snowball Earth theory was being challenged by new data from desert outcroppings in Oman. The debate continues.

Paul F. Hoffman, Sturgis Hooper Professor of Geology, Harvard University



# **Spring 2006 Commencement Address Excerpts**

#### NASA Astronaut James Reilly, II



As earth scientists, we are fortunate to have a perspective on the world not shared with any other branch of science. For the keg physicists, I'm not talking about the ability to drink beer while attending class requirements at the outcrop... Almost everything around us has, in some way, a link to the physical world we study. Materials used in manufacturing and construc-

tion depend on the earth sciences. Life support in the form of foods, water and the air that we breathe all exist or have dependencies within the realm of our studies. Energy, which we will always need in increasing amounts, is almost uniquely the realm of our discipline, whether it is hydrocarbon, nuclear, hydro or even solar, the earth sciences are linked to it in some way. We will always need to make use of the raw

materials of the planet in our lives but this harvest must be tempered with the ideals of good stewardship where we do the least harm and preserve the largest share of the environment for future generations.

Some will proceed from here into private enterprise and some into public service. For either path you take, and I've been down both, the only real secret of success that I've ever known is "good enough is never enough." If you hope to advance personally and professionally always seek the next great challenge. Never pass up the opportunity to do more to make yourself more knowledgeable, capable, dependable, and trustworthy. Seek responsibility and work to build the tools of cooperation so your teammates on your quest for success will enjoy working with you. The most successful enterprises are built with people who go to work happy every day. Sometimes this is the happiness of ignorance. Ignorance can be your friend. As new astronauts we heard from the greybeards who built the space program where 12 US citizens have been the only visitors to another celestial body. If they had one common theme it was they were all so young and optimistic that they didn't know they couldn't do it. You will find that your optimism will be infectious and could very well change an ocean of indifference or generate the enthusiasm to do the impossible.

#### Undergraduate Valedictorian Kim Nguyen

With all the time spent with classmates and professors in the field, we build special bonds and lots of good memories that other majors can never understand. Nothing beats sitting in front of a campfire with your classmates after a long hard day in the field, while Dr. Helper grills his famous barbeque chicken for our dinner and everyone sings along to the guy with the guitar "If I had a Million Dollars." Nothing beats taking a week long field trip to Mexico to study hydrogeology with your classmates when there's no running water or electricity and everyone smells by the end of the trip. And lastly, nothing beats sitting alone in the Chihuahuan Desert to study the subsurface geology and hearing nothing but the sound of my own breathing. There's just really something special about Geology. It's a field of study that takes you to places you never knew existed and lets you experience things you otherwise would have never done. I went from the little girl who never went past her front lawn to a girl swinging like Tarzan in a Mexican cave from long hanging tree roots. I don't complain when there's no air conditioning and when I drop my food in the dirt, I just brush it off and eat it. I can hike for miles and sweat, and instead of whining about my discomfort, my brain is rolling on geology and I apply what I've learned in the classroom in the field. Geology has changed me. I hope it has changed you.

Now, a lot of you might think that geology is just a big boyscout-like camping trip, and you still wonder, okay, what are you going to do now that you've graduated? Who really hires geologists anyways? The answer is-don't worry about us. We're all covered. The demand for geologists is twice the supply, well, at least it is for now. And unfortunately, with the recent news article done by the Associated Press titled "Big Oil Makes Push in On-Campus Recruiting" that reached 74 news outlets including one in Canada, things are going to change. It was like the article revealed our little secret to the world. And with the media buzz and the Jackson School's top ten ratings, new students are pouring into the Jackson School. The count of freshman joining the school this Fall 2006 is going to double the



Left to right, from the Jackson School's Spring 2006 Commencement: Astronaut James Reilly, II, Dean Bill Fisher, Kim Nguyen, B.S. '06, Department of Geological Sciences Chair Clark Wilson

geology school's current student population. With that in mind, it kind of takes you back to when you first decided to do geology. I did it because I truly liked it. It was never about the money for me. I never thought that there was going to be such a huge market for geologists, and I can honestly say that most of the students graduating here were the same way. I faced the doubt people had for my future, the pointing and laughing. And now, there's this satisfaction in me, this really nice feeling of being in demand for a job that I love. There is no better time to graduate. The timing was just right for us. Not only do we have the honor of being the first May graduates of the Jackson School, we entered the job market at its prime.

#### **OUTREACH**

#### **GeoFORCE Texas**

In the fall of 2005, the Jackson School launched the inaugural ninth grade academy of its outreach program, GeoFORCE Texas. The first year was a great success and laid the groundwork for an effort that will reach nearly 400 South Texas high school students by 2008. See the complete article on Geo-FORCE on page 62.

#### Fort Valley & UT Austin

GeoFORCE Texas was originally modeled on the eleventh-grade Math Science and Engineering Academy (MSEA) developed by Isaac Crumbly at Fort Valley State University. The Jackson School continues to maintain strong relations with Fort Valley, one of Georgia's designated Historically Black Colleges and Universities. In 2006, for the third summer in a row, the Jackson School hosted MSEA students on The University of Texas at Austin campus. Students met with Jackson School faculty and researchers, lived on campus in Jester Dormitory, and took local field trips to Mt. Bonnell, Shoal Creek, Enchanted Rock, and Longhorn Caverns.

As part of its partnership with Fort Valley, the Jackson School recruits students from the university through the Cooperative Developmental Energy Program (CDEP). The Jackson School's first CDEP transfer students, April Duerson and Stanley Stackhouse, began coursework in the Department of Geological Sciences in the fall of 2005. Both graduated in spring of 2007 and Stackhouse accepted admission to the master's degree program at the Jackson School to continue his studies. Two other CDEP students enrolled in the Department of Petroleum Engineering at UT, Alex Tripp, Jr. and Prince Kwarteng, are on track to complete their degrees.

#### Shaping the Coasts

The Bureau of Economic Geology led its second Decision Makers Field Conference Sept. 28 and 29, 2006. The goal was to expose state decision makers to some of the scientific issues and natural resources of the Texas Gulf Coast, to put technical issues into a policy context, and to introduce some of the human resources available to decision makers. Participants included state legislators, state agency managers, and staff personnel from the legislature and major agencies.

#### Enhancing Diversity

In 2006, the Institute for Geophysics collaborated with Huston-Tillotson University, one of Texas' designated Historically Black Colleges and Universities, to teach an undergraduate geoscience course and conduct professional development workshops for minority-serving science teachers in Texas.

#### Selection of Recent Speakers

Robert Dalrymple, professor, Queen's Distinguished Lecturer

William A. Fahmy, geophysical adviser for ExxonMobil Exploration - AAPG-SEG Joint Inter-Society Distinguished

Kate Moran, director of the Marine Geoprofessor in oceanography and ocean engineering at the University of Rhode Island, and former director of the Ocea Drilling Programs, Joint Oceanographic

Roger Pielke, Sr., senior research scientist at the Cooperative Institute for Research in the Environmental Sci-Boulder - UTIG Seminar

George Postma, Director of Eurotank and Professor of Earth Sciences at the University of Utrecht - Boyd Lectureship in Petroleum Exploration

Seth Stein, professor at Northwestern University - Incorporated Research Institutions for Seismology (IRIS) and Distinguished Lecturer

The itinerary included an orientation at BEG's Houston Research Center followed by a briefing on FutureGen and Texas' bid to host it. During a bus trip to Galveston, participants heard a presentation on "Putting CO2 to Work and Reducing CO2 Emissions." A field excursion on Galveston Island followed, examining coastal processes, the effects of storms, and hurricane preparedness. A visit to Valero's oil refinery in Texas City was followed by a briefing on BEG's State Lands project and its impact on the search for Texas oil and gas.

The undergraduate course highlighted contemporary topics in the geosciences using materials developed with funding from the National Science Foundation (NSF). NSF also funded the overall effort through its Opportunities for Enhancing Diversity in the Geosciences program. Professional development for minority-serving teachers is currently underway through "The Earth Science Revolution Workshops," tied to the Revolution in Earth & Space Science Education, a national initiative to reform earth science education. Financial support comes from the Jackson School and the Texas Education Agency.

Plans are underway to seek funding to integrate the best elements of the UTIG/ Huston-Tillotson partnership into the Jackson School's GeoFORCE Texas program. The Huston-Tillotson partnership could serve as a model for launching a rigorous, earth science professional development program for science teachers in south Texas. This in turn could help teachers prepare for a new Texas high-school level earth and space science course. Complementary activities could also increase outreach to African-American populations in Texas while assisting Houston-Tillotson's development of in-house geoscience capability.

#### Explore UT

Bringing more than 40,000 visitors to campus in one day, Explore UT is the largest annual showcase for the University. As an official college at UT, the Jackson School hosted its first school-wide activities in March 2006. By all measures they were a great success. Thousands of children of all ages visited the Geology building and took part in geoscience activities meant to inform and inspire.

During Explore UT, student volunteers, like ConocoPhillips Spirit Scholar Angela Prince, bring science to life for young minds.



#### Shore Thing

Program began its ninth year in the fall of better understanding of the dune and beach dynamics on the Texas coast. Through the program, Bureau researchers h high school and middle school students and teachers, showing them how to measure topography, map vegetation lines and shorelines with Global Positioning Systems (GPS), and observe weather and wave conditions. As participants in data on their changing shoreline.

"Students are appreciative of the opportunity to take part in this program, gram with Bureau colleague Jim Gibeaut "It isn't everyday you go on a field trip to the beach." The program currently works with three schools, Ball High School, Port as High School, and Port Isabel High dents make at least three field trips to surand Hepner envision a network of coastal schools conducting scientific beach studlic using the Internet.

RIEFS

8

Hands-on activities included Not All That Glitters Is Gold (panning for pyrite), Gem Faceting, and the Texas Oil Tycoon game, which contrary to its name taught young minds how hard it can be to find oil. Visitors enjoyed the CT Lab's X-Ray Vision demonstration and the seismology exhibit-Earthquakes: Shake, Rattle and Roll.

Many visitors were captivated by the Bureau of Economic Geology's 3-D Geology presentation. And a series of short movies packed in audiences, offering dramatic perspectives on tsunamis, Mt. Saint Helens, the geologic history of Texas, and the Edwards aquifer.

The presence of 58 volunteers, mainly students, was another highlight for young visitors. As Bureau researcher Sue Hovorka observed, "Young students are very attracted by older students. And it's good for undergrads and grad students to practice being experts."



#### **Fast Times at AGU**

The three Boerne High School teachers and four students who joined the Institute for Geophysics/Swiss-led Lago Fagnano project in Tierra del Fuego, Argentina, in the summer of 2005 accompanied the Institute for Geophysics' NSF GK-12 Fellow, Ethan Perry, and GK-12 Co-Principal Investigator, Kathy Ellins, to the 2005 Fall Meeting of the American Geophysical Union (AGU) in San Francisco. All made presentations about the experience and research results. The students attended AGU's "Bright Stars" symposium for high school students—a very special honor as participation in "Bright Stars" is by invitation only.

#### **IN THE NEWS 2005-2006**

Links to complete articles, streaming radio and television files, and current In the News items can be found on the news section of the Jackson School Web site.

#### Who's got the most oil? Dallas Morning News, Jul. 21, 2006

It's a simple, important question, with a far from simple answer: the size of a nation's proven oil reserves. For decades, Saudi Arabia has held the pole position, with reserves more than double those of anyone else. Thanks to price spikes and technology break throughs, Canada and Venezuela are challenging the Saudi lead. There could be as much as 3 trillion barrels of tarlike oil in the Orinoco belt of Venezuela, said William

Fisher, dean of the Jackson School of Geosciences. "The potential there as in Canada is very great," he said.

#### **Texas Towns Compete** for Clean Coal Plant

#### Dallas Morning News, Jul. 18, 2006

The U.S. government wants to build the perfect coal-fired power plant. Supporters call it a "technology solution" to controlling carbon dioxide emissions. "That approach seems to work better than sort of a forced regulatory approach that people can't adapt to," said Scott Tinker, Texas' state geologist, coordinating the state's FutureGen site proposals.

#### Fort Worth's Noisy Neighbors: Gas Derricks

#### Los Angeles Times, Jul. 5, 2006

Although oil and gas wells have been drilled in other highly urbanized areas, the magnitude of drilling in Fort Worth sets the city apart, said Eric Potter, associate director of the Bureau of Economic Geology at the Jackson School. Elsewhere, gas wells are on "a few percent" of city land, but because the Barnett Shale is believed to be rich with gas throughout, virtually all of Fort Worth has become a drill site. "It's like shooting fish in a barrel," Potter said.

#### **Science Center** Has Policy Goals

AAPG Explorer, Jul. 2006

With political posturing over rising energy prices, the need to educate and formulate

energy policies based on science has never been greater—and another organization is stepping up to the plate. The newly established Center for International Energy and Environmental Policy at the Jackson School, directed by former USGS Director Charles Groat, was created to bring a science and engineering perspective to energy and related environmental issues.

#### **Rebuilding New Orleans Needs Science**

#### New Orleans Times-Picayune, Jun. 20, 2006

A 20-person panel of the American Geophysical Union recommended improved hurricane and storm surge forecasting and a reliance on high-quality scientific data to guide the rebuilding of New Orleans and other areas of the Gulf Coast. Charles Groat, a geology professor at the Jackson School and former director of the USGS, said the committee has been helpful in pointing out the failure of experts to communicate their individual research findings to each other. "We brought people together who we assumed were talking to each otherand they weren't," Groat said.



#### **Geoscience Training** in Full Force Geotimes. Jun. 2006

In summer 2005, Doug Ratcliff, then the assistant dean of the Jackson School, and colleagues launched GeoFORCE, a program that selects 40 new students per year from South Texas who will spend about a week every summer from ninth through 12th grade learning about careers in geology. "The goal is to try to get more students into that mathscience pipeline that the nation is really thin on," says Stephen Hammond, a USGS hydrologist who worked to recruit exhibitors.

Ice Loss Rapidly

Based on student reaction, the corporatesponsored venture appears to be a big hit.

#### Texas Must Build Plants— And Soon

Texans this week got a small glimpse of what life might be like in 2010 if power companies don't build more generation plants. Electric companies weren't ready for surging demand, causing a rolling electricity blackout across the state. If all goes as some experts predict, however, as power prices rise with demand, power companies will build more generators. "The market is very healthy. This is a good place to be. People like investing in Texas," said Michelle Michot Foss, chief energy economist for the Center for Energy Economics at the Jackson School's Bureau of Economic Geology.

#### Barrier Islands **Need Management Plan**

Biloxi Sun-Herald, Apr. 15, 2006 In the middle of an oversized conference room in the IP Hotel & Casino, 10 coastal scientists from across the country met this week to consider a strategy for managing North America's barrier islands. "You've got to talk about how much things are worth," said Jim Gibeaut, a geologist from the Jackson School's Bureau of Economic Geology. "What we are trying to get at is to recommend a strategy

# Greenland's Accelerating

#### USA Today, Washington Post, BBC News, et al., Aug. 9-14, 2006

The meltdown of Greenland's ice sheet is speeding up, satellite measurements show. Data from NASA satellites show that the melting rate has accelerated since 2004. Most of the ice is being lost from eastern Greenland, a U.S. team writes in



the journal Science. Jianli Chen of the University of Texas at Austin and colleagues, including Clark Wilson from the Department of Geological Sciences, studied monthly changes in the Earth's gravity between April 2002 and November 2005.

#### Dallas Morning News, Apr. 18, 2006

for managing barrier islands. There's a lot of development going on, like in Texas, and there's no sign of it slowing down, even with last year's storms."

#### Oil at Record High, Lawmaker Touts Gouging Bill

Environment & Energy News, Apr. 19, 2006 As oil prices continued their record-setting climb, Rep. Bob Stupak (D-Mich.) urged House Speaker Dennis Hastert (R-Ill.) to allow for a House vote as soon as possible on his price gouging bill, H.R. 3936. But at least one economist is blaming the price rise on an "extremely speculative" commodities market that at least on the oil side could be off by as much as \$20. "There's a big difference between the market fundamentals and what's



# **Big Oil Makes Big Push in Campus Recruiting**

#### As Work Force Ages, Major **Companies Hunt for Talent**

The original version of this article appeared in papers across the country via the Associated Press the week of April 11, 2006. This edited version is reprinted with permission.

AUSTIN, Texas - University of Texas senior Thuan Phan switched majors from computer science to geological sciences, figuring the field trips would make it more fun. Now his degree turns out to be lucrative, too.

"Big Oil" has been doing some big recruiting on U.S. campuses this year-as have many smaller companies in the petroleum and natural gas business. The combination of high prices, an aging work force and a tight pipeline of trained workers has the industry desperate for talent. Phan accepted an offer in Houston at Schlumberger Ltd., an oilfield services firm.

"The pay's really good, and it's just exciting," says Phan.

#### Salary Offers are Up

BRIEFS

For job-hunters, it's a good time to graduate from college. The National Association of Colleges and Employers' most recent survey found companies planning 14.5 percent more on-campus hiring this year; a recent salary survey showed offers up significantly across a range of fields.

But it's a particularly good time for petroleum engineers and geologists-fields that were so slow in recent years some university departments closed. Offers made last fall to undergraduate petroleum engineers averaged \$62,236, up more than 6 percent.





Prominent geoscience programs, including those at Texas, Massachusetts Institute of Technology and Colorado School of Mines, are reporting more companies interviewing on campus. William Fisher, dean of UT's Jackson School of Geosciences, saw something this year he'd never seen before: a student got a signing bonus—for a summer internship.

"My guess is the demand for geoscientists is roughly twice the supply," Fisher says.

#### **3 Factors at Work**

Three major factors are at work:

Prices. Oil around \$70 per barrel provides incentive and funding to look for more of it. But most of the easy-to-reach oil has already been tapped, and finding what's left requires advanced technology and expertise.

"If you go back to the old 'Beverly Hillbillies' show, you dig a hole in the ground and oil pops up. Those days are gone," says Paul Poley, vice president of human resources at Oklahoma City-based Devon Energy Corp. If Devon is going to spend \$60 million for a rig to drill through the floor of the Gulf of Mexico, it wants to hear from smart people that an oil strike is likely.

Demographics. During the oil bust of the 1980s, the industry stopped hiring. Now, workers' average age is 49. Big companies like ExxonMobil and Royal Dutch Shell PLC predict that half of their work force 10 years from now has yet to be recruited.

Too few students. Interest in the geosciences varies with the market, but takes time to adjust. Total U.S. geoscience degrees approached 10,000 annually in the early 1980s, then crashed to about one-third that

by 1991. Last year, about 2,400 undergraduate and 1,500 graduate degrees were granted.

At Texas, undergraduate enrollment was once as low as 110 students but now it's growing modestly, with about 200 in the department. Still, demand is growing faster. Good students, Fisher said, have as many job offers as interviews.

#### **Companies Growing More Flexible**

In geoscience, a master's degree is still the entry ticket for many jobs. But experts say companies are becoming more flexible about hiring and training undergraduates. They will have to.

The American Geological Institute's Christopher Keane says the industry will need up to 30,000 more experts over the next decade, but at current rates, U.S. universities will produce only half that many graduate degrees.

"Big Oil" isn't the only place to go with a geoscience degree. Kim Nguyen, a senior hydrology major at Texas, said she didn't pursue oil company jobs for ethical reasons, but found work with an environmental consulting firm.

Matt McDonald, a master's student in geophysics, said he "was kind of blown away by all the offers" from the oil industry. Still, for now at least, he turned down Shell to pursue a doctorate, which would leave open an academic career.

Nguyen said two older sisters who studied business and engineering questioned her choice of field a few years ago. But the engineer later discovered that many of the companies she was targeting were looking for geologists.

"It's kind of cool to be in demand," Nguyen said, "when everyone had doubts."

going on," said Michelle Michot Foss, chief energy economist at the Center for Energy Economics at the Jackson School's Bureau of Economic Geology.

#### **Bolivia May Inhibit** Gas Exploration Geotimes. Mar. 2006

In May 2005, Bolivia passed a hydrocarbon law that significantly "jacks up the tax for production," says Scott Tinker, director of the Jackson School's Bureau of Economic Geology. The high taxes place Bolivia at risk of losing outside investment. And "Bolivia doesn't have the capital to develop its own resources," says Tinker. Around the world, companies and countries are stepping up the search for unconventional energy resources. Countries such as Bolivia, says Tinker, mired in political debates about how to develop conventional resources, "could get left behind."

**Congress Considers** Changing the Weather Marketplace, Jan. 2, 2006

With more intense hurricane seasons forecast over the next several years, the United States Senate is considering funding research into taming nature's fury. Institute for Geophysics researcher Rob Scott warns that tinkering with climate in one area could have unintended consequences for other regions: "It's a little bit like a bicycle wheel: you go to straighten it out here by tightening one spoke and you find it becomes warped elsewhere."

#### **New Computers** Uncover Old Moonguakes Discover Magazine, Jan. 2006

Three decades after NASA pulled the plug on a network of sensitive seismometers on the moon, scientists have taken a second look at old research and discovered the moon was doing more shaking than they realized. With new computing power, Yosio Nakamura, a senior research scientist and professor emeritus at the Jackson School, has been able to reanalyze old data from the 1970s, altering our view of moon geology. Ranked No. 49 among the top 100 discoveries of 2005, according to Discovery.

#### **Fisher Sees Changes** But No Peak

#### Geotimes. Dec. 2005

Political events and natural disasters might interrupt world oil supplies, but lack of

(No. 9).

resources and production capability should not, reports William Fisher, dean of the Jackson School, in his end-of-year energy outlook. "Fossil fuels will continue to be the dominant global energy sources well into this century, but the mix will change with coal and oil steadily having less of a role and natural gas more, as the methane economy comes into full play," writes Fisher. Despite



#### Jackson School Ranks No. 9 Overall

#### U.S. News & World Report, Mar. 31, 2006

The latest graduate school rankings from U.S. News & World Report placed the Jackson School No. 9 overall among graduate programs in earth sciences, up from No. 11 in the previous rankings in ranked the Jackson School in the top 10 in three of the four earth science speseismology (No. 9), and paleontology

this shift, he dismisses concerns of imminent "Peak Oil," citing strong reserves outlooks.

#### **UTIG Researchers** Join Tsunami Investigation

Discovery Channel, Dec. 18, 2005 The deadly wave that shook the world Dec. 26, 2004, caused the deaths of more than 280,000 people. "America's Tsunami: Are We Next?" followed an international team of scientists, including the Institute for Geophysics' Jamie Austin, for 17 days as they used remotely operated vehicles to explore the raw power of the earthquake through what it left behind on the ocean floor.

#### Hovorka Explains Benefits of Carbon Sequestration

#### Marketplace, Dec. 9, 2005

Carbon sequestration is gaining new attention as a technology that might combat global warming. "CO2 is a powerful solvent," said Bureau of Economic Geology scientist Susan Hovorka, who explained how compressed CO2 can also be used to extract oil. Gary Rochelle of UT's Department of Chemical Engineering also weighed in on the costs and economic hurdles to transporting CO2.

#### Football Wasn't Only No. 1

#### Austin American-Statesman, Nov. 25, 2005

Confirming that sports teams are not the only top-ranked programs at UT Austin, the American-Statesman interviewed faculty leaders from petroleum engineering, Latin American studies, accounting, and geosciences. Clark Wilson, chairman of the Department of Geological Sciences, explained the school's strategies for maintaining the country's No.1-ranked program in sedimentology and stratigraphy.



# BBC News, Dec. 6, 2005

British and US scientists have produced a remarkable map of the underside of the West Antarctic Ice Sheet (WAIS). "These data are critically important," said Don Blankenship of the Jackson School's Institute for Geophysics. "Without them we wouldn't be able to assess the contribution of the WAIS to global sea level rise." Aircraft had to fly up and down some 50,000 miles of grid lines in the two months from December 2004. "It was a remarkable job to complete it all in the one season," said co-principal investigator Jack Holt, also from the Institute.

#### Crafting a School That Rocks Austin American-Statesman, Oct. 31, 2005

When Dallas oilman John Jackson died in 2003, he left the geology program at the University of Texas at Austin more than \$232 million-the second highest gift in the history of higher education. Now comes the hard part: using these riches to transform a good geology program into a great one. "We've got a great opportunity, but we've also got a great challenge," said William Fisher, the school's dean, whose decades-long friendship with Jackson was pivotal in securing the bequest. A dramatic expansion of the faculty is planned, and with Fisher, 73, looking to scale back his administrative duties, a search committee has been formed to find a new dean.

# 2005-2006

Awards and honors for the 2006-2007 academic year will appear in the fall 2007 newsletter.

#### Faculty & Researchers Jav Banner (DGS)

Carolyn G. and G. Moses Knebel Distinguished Teaching Award Jackson School, 2006

#### Chris Bell (DGS)

Joseph C. Walter Jr. Excellence Award Jackson School, 2006

Carolyn G. and G. Moses Knebel Distinguished Teaching Award Jackson School, 2006

#### William Carlson (DGS)

Inducted Member, UT Academy of Distinguished Teachers, with title of University Distinguished Teaching Professor The University of Texas at Austin, 2006



Peter Eichhubl (BEG) Elected Fellow, Geological Society of London, 2006

#### William Fisher (DGS/JSG)

Heritage Award, Division of Professional Affairs, American Association of Petroleum Geologists, January 2006 Dedication of AAPG Bulletin special issue on

Maracaibo Basin, American Association of Petroleum Geologists, April 2006

#### Peter Flawn (DGS)

Public Service Award, American Association of Petroleum Geologists, 2006

#### Sergey Fomel (BEG)

Top 25 Presentation at 2006 Annual Meeting, Society of Exploration Geophysicists, 2006

#### Michelle Michot Foss (BEG)

Senior Fellow Award, United States Association for Energy Economics, 2006

#### Julia Gale (BEG)

President's Certificate of Excellence for poster (co-author), Energy Minerals Division, American Association of Petroleum Geologists, April 2006

#### Sean Gulick (UTIG)

Distinguished Lecturer, Joint Oceanographic Institutions/U.S. Science Support Program for 2007-2008

#### Bob Hardage (BEG)

President's Certificate of Excellence for paper (co-author), Energy Minerals Division, American Association of Petroleum Geologists, April 2006

#### Susan Hovorka (BEG)

Award of Excellence, Association for Women in Communications, World Water Simulation, 2006

#### Martin Jackson (BEG)

Joseph C. Walter Jr. Excellence Award Jackson School, 2006

#### Charles Kerans (DGS/BEG)

Carolyn G. and G. Moses Knebel Distinguished Teaching Award for teaching undergraduates Jackson School, 2006

#### **Rob Lander (BEG)**

President's Certificate of Excellence for poster (co-author), Energy Minerals Division, American Association of Petroleum Geologists, April 2006

#### Stephen Laubach (BEG)

Best Poster Award (co-author), Energy Minerals Division, American Association of Petroleum Geologists, 2006

#### Leon Long (DGS)

Carolyn G. and G. Moses Knebel Distinguished Teaching Award for excellence with introductory-level courses Jackson School, 2006

#### Robert Loucks (BEG)

Levorsen Memorial Award for Best Oral Presentation (co-author), Southwest Section, American Association of Petroleum Geologists, 2006

#### Paul Mann (UTIG)

Joseph C. Walter Excellence Award Jackson School, 2006

#### Randy Marrett (DGS)

Best Poster Award (co-author), Energy Minerals Division, American Association of Petroleum Geologists, 2006

#### Rob Reed (BEG)

President's Certificate of Excellence for poster (co-author), Energy Minerals Division, American Association of Petroleum Geologists, April 2006

#### Stephen Ruppel (BEG)

Levorsen Memorial Award for Best Oral Presentation (co-author), Southwest Section, American Association of Petroleum Geologists, 2006

#### Amos Salvador (DGS)

Robert H. Dott Sr. Memorial Award, American Association of Petroleum Geologists, 2006

#### Diana Sava (BEG)

President's Certificate of Excellence for paper (co-author), Energy Minerals Division, American Association of Petroleum Geologists, April 2006

#### Ronald Steel (DGS)

6th-Century Chair (part time) in Sedimentary Geology, University of Aberdeen, Scotland, August 2006



Jeff Paine (BEG) and President, 2007



Jack Sharp (right) with Kim Nguyen, M.S. '06 and class speaker for the Jackson School's inaugural spring commencement. Sharp is the fourth member of the geology faculty at The University of Texas at Austin to serve as president of the Geological Society of America, following John Maxwell (1973), Peter Flawn (1978), and Sharon Mosher (2001).

#### Leadership Positions

#### William Ambrose (BEG)

President Energy Minerals Division, American Association of Petroleum Geologists, 2006-2007

#### Eric Barron (JSG)

Chairman, Consortium for Ocean Leadership, 2007-2008

#### William Fisher (DGS/JSG)

Chairman, Board of Trustees AAPG Foundation, July 2006

#### Charles Groat (DGS/JSG)

President-elect, Division of Environmental Geosciences, American Association of Petroleum Geologists, 2006

President-elect, Environmental and Engineering Geophysical Society, 2006

#### John Sharp (DGS)

Vice President, Geological Society of America, 2006-2007 and President, 2007-2008

#### Scott Tinker (BEG/DGS)

President, Association of American State Geologists, 2006-2007 President-elect, American Association of Petroleum Geologists, 2007-2008

#### Lesli Wood (BEG)

President, Gulf Coast Section, Society for Sedimentary Geology, 2006

#### Students

#### Chris Berg

Tech Sessions Best Speaker Award, Spring 2006

#### Castellanos, Hugo A.

Third Place for Best Student Poster Award, 2006 AAPG Annual Convention, for

"Sequence Stratigraphy and Structure of the Miocene Guantao and Pliocene Minghuazhen Formations, Zhao Dong Field, Bohai Bay, Eastern China"

Nysha Chaderton AAPG Grant

Wes Crawford Petrography Contest

**Gareth Cross** Norman H. Foster Memorial Grant (AAPG)

Laura Demott GSEC Student Service Award

Ryan Ewing GSEC Student Service Award

Ned Frost Richard C. Hasson Memorial Grant (AAPG)

Joshua Garber Petrography Contest

**Beatriz Garcia-Fresca** Robert K. Goldhammer Memorial Grant (AAPG)

Carolina Gomez William Dow Hamm Memorial Grant (AAPG)

James Lyons Don R. Boyd Memorial Grant (AAPG)

Thomas Macrini Tech Sessions Best Speaker Award, Fall 2005

Murat Maga Outstanding TA

Tom Lovitz

Estwing Hammer

Matthew McDonald Tech Sessions Best Speaker Award, Spring 2006

Michael Michaelides Outstanding TA



#### Student Recruiting and Placement Surge

With the close of the 2006 academic year, the Department show the increased interest in Jackson School students overa and the rise in opportunities fo hose with Bachelors degrees

After several years of flat job offers, recruiting began to take off in 2004, rising again dramatically in 2005

class who applied for entry in the fall of 2006," noted Clark Wilson. This was the first semester reflecting both the new job prospects for geoscience graduates and the Jackson School's stature as a distinct college-level unit at the University.

Whereas in year's past, less than 10 undergraduates might seek out the geosciences najor as freshmen, for the fall of 2006, about 80 enrolled out of 120 accepted. Along with an influx of 20 transfer students, total enrollment at the undergraduate level was up by 25 percent in one semester, all the more remarkable since most of the growth came from the

"We are currently planning for growth, setting targets for undergraduate admission numbers and academic standards for both freshman and transfer student admissions," said Wilson. "Our overall growth, as reported by the university administration, is the largest of any college on campus." The Department administered a survey during the summer 2006 orientation sessions to find out why students chose the Jackson School "Very traditional motives-interests in the Earth and field work-were big attractions," said Wilson.

Patricia Ganey-Curry

Geophysics

Roger Gary

Geological Sciences

Claudia Gerardo

Philip Guerrero

Angela Kille

Glvnis Morse

Sean O'Bryan

Geology Foundation.

Dennis Trombatore

School of Geosciences

Staff Excellence Award, Institute for

Staff Excellence Award, Department of

University Staff Excellence Awards, 2006

Outstanding Graduate Coordinator Award

Graduate School/University Co-op, 2006

Guion Award, Walter Geology Library

Staff Excellence Award, Dean's Office/

Guion Award, Walter Geology Library

Honorary Staff Excellence Award, Jackson

#### Anna Morisani Outstanding TA

Lorena Moscardelli AAPG Grant

Andrew Petter Tech Sessions Best Speaker Award, Fall 2005

Carla Sanchez Harold J. Funkhouser Memorial Grant (AAPG)

Samuel Scott J. Ben Carsey Sr. Memorial Grant (AAPG)

Kira Diaz Tushman Raymond D. Woods Memorial Grant (AAPG)

Best Poster Award Energy Minerals Division, American Association of Petroleum Geologists, 2006

#### Staff

Susan Doenges Staff Excellence Award, Bureau of Economic Geology



## **University Names Eric Barron Dean of Jackson School**

Effective Sept. 1, 2006, The University of Texas at Austin named Eric Barron, former dean of the College of Earth and Mineral Sciences at Pennsylvania State University, as the new dean of the Jackson School of Geosciences.

Barron replaced the Jackson School's inaugural dean, Bill Fisher, who was instrumental in securing the major bequest that created the school. Fisher, who agreed to serve as inaugural dean while the University searched for his replacement, remains on the faculty.

The torch was passed at a school-wide ceremony in Boyd Auditorium Aug. 31. Barron expressed his appreciation for Fisher's leadership and his work with school benefactor John Jackson. "I simply can't imagine that Jackson's belief would have been that strong if Bill Fisher hadn't been extraordinarily adept at describing all of our strengths, as well as our potential to be truly great," said Barron.

"The University of Texas at Austin has a celebrated tradition in the geosciences," said Barron. "I look forward to the challenge of taking the Jackson School to the next level of achievement. True to the vision of its founding benefactor, the school will strive to make a lasting impact on Texas and the world."

Barron was previously a distinguished professor at Penn State and former director of Penn State's EMS Environment Institute.

#### **Excerpts from Dean Barron's Inaugural Address**

I look at the Jackson gift and I am astounded not just with its magnitude but at the simplicity of its guidelines-to support the geosciences, both in basic and applied research, particularly in the areas of water, energy, minerals and the environment. The goal is quite simply to create a top five geosciences program.... Consider also, that our destiny is entirely in our own hands-we aren't embedded in the competing interests of a diverse college. Our future depends only on our vision and our commitment to excellence.

...To me, that means that every dollar we have must be viewed as an investment and we should relish every opportunity to compete our ideas, through proposals, presentations and papers, against anyone out there.... So, how should we invest?

Well, the first title that I would like to claim is to be the most student-centered college that this University has ever seen, and to far exceed any other earth sciences program anywhere .... The second title - I don't have a catchy phrase - but I would like to claim the title for developing star power, for enabling really gifted people to define the future of our disciplines .... When the Jackson School hires a young faculty member or scientist, I want the rest of our colleagues in other universities, government labs and industry to say "there is someone to watch," because there is recognition out there that the Jackson School chooses wisely, senses potential, and then, that we are vested in promoting their success.

... In my view, we have to begin our time together with a strategic plan, one that is visionary (as opposed to mundane goals centered on statistics and percentages). It needs to engage and excite. It needs to define the path for our investments, and it needs to be able to attract the next set of resources.

....If I close by looking back over the priorities that I have just outlined, it is clear that the true priority is people - how you attract

He has chaired an array of national research boards, including the Climate Research Committee of the National Research Council (NRC), the NRC's Board on Atmospheric Sciences, and the Science Executive Committee for NASA's Earth Observing System and NASA's Earth Science and Applications Advisory Committee (ESSAC). His research interests are in climatology, numerical modeling, and Earth history.

"Eric Barron accomplished great things at Penn State," said William Powers Jr., president of The University of Texas at Austin. "Working within a large state university, he developed a studentcentered culture that placed a premium on teaching, while advancing his college's research leadership. I am thrilled he will be leading the Jackson School."

Barron assumes leadership of the Jackson School as it aspires to become one of the world's top institutions in the geosciences. In 2002, the school received the largest gift ever made to a U.S. public university, \$237 million of a total bequest to the University of \$241 million from the estate of Jackson, a 1940 geology graduate. As a result of the gift, which carried a charge of advancing the earth sciences, the university made the Jackson School a separate academic unit at the level of a college.



them to the Jackson School, how you empower them, how you promote them, how you best celebrate their achievements, and how you develop a community that reaches back in time and extends far into the future. I will do my best as your Dean to give "people" my full attention. You have my promise that I will do my best to be an advocate, a facilitator, and a communicator. I am counting on being partners in creating the single greatest geoscience program ever. Thank you for the invitation to be a part of such a great adventure.

# SCIENTISTS

#### **Going with the Flow** DAVID MOHRIG STUDIES THE CHANGING FACE OF OUR PLANET

David Mohrig keeps a flat, palm-sized rock on his desk that he's had since he was six years old. He found it on a fossil-hunting trip with his father. Look closely at the piece of shallow marine limestone and you'll see broken bits of ancient denizens of the sea: bryozoans, brachiopods, crinoids, gastropods and trilobites.

"I was kind of hooked just hunting for fossils and exploring the streams and hill slopes," said Mohrig, who grew up in southern Minnesota. "My interest in geology started early and it stayed." Even as a child, he was curious about how sand was moving through the river in his hometown.

By the time he went to college, there was no doubt that he would study geology. "I was delighted and couldn't believe my luck that I could get a degree in geology as an undergraduate," said Mohrig. "It was almost like cheating it was so much fun."

Mohrig joined The University of Texas at Austin's Department of Geological Sciences as an associate professor of geology in the summer of 2006. Before coming to the University,

Mississippi River Delta; image taken 5/24/2001 by ASTER. Turbid waters spill out into the Gulf of Mexico where their suspended sediment is deposited to form the Mississippi River Delta. Like the webbing on a duck's foot, marshes and mudflats prevail between the shipping channels that have been cut into the delta. Image courtesy of USGS National Center for EROS and NASA Landsat Project Science Office.



he was an associate professor of geology at the Massachusetts Institute of Technology.

He is interested in how Earth's surface evolves over time and how it is affected by changes in the environment such as sea level, precipitation, and tectonics. He has studied how sediment dunes change shape as they move along a riverbed; compared land-based and underwater channel flows; pondered why underwater landslides travel as far as they do; and tried to understand what channels on Mars reveal about ancient climate on the red planet.

#### Mississippi Delta

One fertile stream of research for Mohrig is the Mississippi Delta. A combination of human impacts and natural forces (see sidebar) is wiping 25 square miles of delta wetlands off the map each year. That impacts coastal fisheries and reduces natural defenses against storm surges such as those caused by Hurricane Katrina. So there is considerable interest in delta restoration.

Before the land can be restored, Mohrig cautioned, it's important to understand how the delta was formed and how it worked before humans altered it.

"We're looking at a specific image of the surface," he said. "But we don't know if it is a representative image." The delta may have had a number of different states over the last several million years. "If the delta today is not a standard looking surface, it would be helpful to know that now before we start trying to restore it," he said.

For example, according to Mohrig, there is a debate right now about the rate at which the delta is subsiding, or sinking. How that rate might have changed over time remains unclear. "That's a basic question and it affects everything we do," he said.

Collaborations with industry may provide answers. The energy industry collects seismic data in the Gulf of Mexico to explore for new resources. This data can be used to create three-dimensional maps of now buried delta surfaces. Mohrig can use these to determine how the delta has evolved over time. He already uses some data from WesternGeco and hopes to get access to more.

#### Vanishing Wetlands

The Mississippi Delta is built up from and deposited in the Gulf of Mexico by the Mississippi River. The river dissecond, the sixth largest discharge

The Mississippi River is restless. In just the last 7,000 years, it has shifted along the coast at least four times, each time emptying into the Gulf at a new spot. The abandoned outlets comwithout the influx of sediment from the river. Mohrig says left alone, the river's main discharge to the Gulf would shift westward to one of its tributaries, the Atchafalaya Rive

brought the Mississippi to heel damming it, redirecting its course and hemming it in with 2,000 kilometers of levees and dikes. As a result, a greate fraction of the sediment carried by the river is now discharged out in the deep ocean, rather than building up wet-

lands for development and agriculture and the dredging of canals for hydrocarbon exploration and commercial and recreational boat traffic, and the humar

The problems do not end there. As Earth's oceans warm, sea level rise by subsidence, a natural compacting and sinking of the land. About 25 square miles of wetlands around the Mississippi Delta disappear each yea

big impacts on the fishing industry, the transportation industry and the survival of migrating waterfowl. It also reduces natural defenses against storm surges such as those caused by Hurricane

"We could collect this data ourselves," he said. "But it is expensive to collect and it makes sense to work with industry and not recollect data that already exists."

The work is part of a larger initiative at the National Center for Earth-surface



David Mohrig studies how fluid flow shapes and reshapes Earth's surface. His work relates to underwater landslides that trigger tsunamis, wetland loss around the Mississippi Delta, and channels on Mars.

Dynamics (NCED), a National Science Foundation Science and Technology Center where Mohrig is a principal investigator. NCED participants, who include ecologists, engineers, geologists and mathematicians, study how human land use shapes Earth's surface and how the changing surface in turn affects all life on the planet.

#### **Channel Surfing**

Mohrig often does laboratory experiments using flumes to compare how materials flow on dry land versus underwater. He was surprised to find that the way material flows through channels is different in these two environments, even though surface features produced by terrestrial and submarine flows often look similar.

On land, once a current of water and sediment gets deeper than the confining channel topography—say, after a hard rain—it just spreads out and floods nearby land. But underwater, because the flowing material is only slightly more dense than the surrounding water, the currents can be a number of times thicker than the channel that confines them.

"They'll still be guided by that channel, which goes against our intuition," Mohrig said. "You would think it would just spread laterally under its own weight with little regard for the relatively subtle bottom topography. But there is a basal, high density core that can be confined in these channels and the upper flow is guided by that and dragged along."

Numerical models of the system did not predict this phenomenon. That's because the underlying physics is often so complex that the models, to remain manageable, leave out some terms. "There are many occasions where we throw out a wrong term assuming it won't be important," Mohrig said. "The lab experiments tell us what terms we really shouldn't throw out."

#### **Underwater Landslides**

As a post-doctoral associate in the mid-'90s at the University of Minnesota, Minneapolis, Mohrig helped solve a mystery about underwater landslides. There is evidence in the geologic record that underwater landslides often run much

farther across the seafloor than similar landslides on dry land. This was enigmatic because researchers knew two effects dampened underwater landslides: 1) water resists motion more than air does, and 2) the buoyancy of rocks and sediments underwater makes them effectively lighter than they would be in air.

Mohrig and his team set up an experiment in the lab that mimicked an underwater landslide. They spent a year designing and building what they called "the fish tank," a tank 10 meters long, three meters high and one meter wide with a channel down the middle. When they opened a gate on one end, a mixture of sediment and water rushed along the channel. The researchers performed the experiment with the tank in open air and then again full of water. High speed video cameras allowed them to slow time down and carefully observe the landslides.

In the underwater case, Mohrig observed water flowing under the leading edge or "head" of the landslides and lifting them up. In the real world, this basal lubrication reduces friction allowing a landslide to skate across the seafloor much farther than it would otherwise. "It turned out that underwater, these slides and avalanches would hydroplane like your car tires," said Mohrig.

The research appeared in 1998 in the Geological Society of America Bulletin, but Mohrig's interest in landslides was more than academic.

"Submarine landslides are a great hazard," said Mohrig. "They can trigger tsunamis and

Mohrig's lab and tank at MIT showing a turbidity current moving through a submerged, sinuous channel. Dr. James Buttles provides scale for the photo. Red dye was put in the current to visualize the flow. For instance you can see the flow spilling out at the second bend. The flow itself is underwater.



damage deep ocean infrastructure such as communications cables and pipelines we use to get hydrocarbons onshore." Underwater avalanches can also bury seafloor life.

In the late 1990s Mohrig took a break from academia for several years and worked as a senior research geologist for Exxon in Houston. As part of the company's efforts to improve offshore drilling technology, he developed methods for applying sediment transport mechanics to seismic maps Exxon had made of sedimentary deposits. "I gave them quantitative methods for determining how the reservoirs were plumbed so they could more efficiently extract hydrocarbons," he said.

#### Out of this World

Mohrig's work is not limited to Earth's surface. On Mars, there are large fan-shaped deposits with channels cutting across them. Some scientists point to the channels as proof that Mars was once a much warmer and wetter planet than it is today and that its surface might have been able to support life. Members of Mohrig's research group

standing of how fluids and sediments move on Earth and apply it to satellite and rover images of Mars. They determined that the channels could have been caused by asteroids or comets hitting Mars, temporarily heating up and releasing water frozen near the surface. In other words, the channels shouldn't be taken as proof that Mars was ever wet and

realized that they could take their under-

Ancient channels on Mars. warm enough— NASA. long enough—for

> life to Ev resear expan Mohr well g "I rock I got fo birthe "It's b some were s when behin and I' back a

life to get a toe hold. Even as his research portfolio expands to Mars, Mohrig remains well grounded. "I still have the

rock hammer I got for my seventh birthday," he said. "It's been a hassle sometimes. There were several times when I left it behind somewhere

and I'd have to go back and get it. I'd think, 'I don't want to go back up that mountain.' But I still have it."\*



"Most geologists deal with millions-of-year timescales," said Bayani Cardenas. "I like to see things happen in front of my eyes. That's why I study surface water/groundwater interactions."

#### Hitting Fast Forward Hydrogeologist cardenas anxious to get his feet wet

To collect data for his master's thesis, Bayani Cardenas would often go out into the middle of a river carrying a laptop computer and data loggers. He was measuring permeability of sediments—their ability to transmit fluids.

"I didn't want to drop the computer in the river, especially since it was not mine. I thought there had to be a better way," he said. So he developed a technique that was just as accurate, but didn't require any electronics.

At the time, he didn't think a graduate student could make much of an impact on his field. Yet scientists and consultants around the world are now using his technique.

He knows because he has gotten frustrated emails—some from as far away as France and Hungary. The correspondents, referring to the paper describing the technique in a 2003 issue of the journal *Ground Water*, write things like, "Your technique doesn't work!" Cardenas politely writes back that the paper has a typo. An equation is missing a bracket. Now he's publishing the first "errata," or correction, of his professional career.

For most scientists, this would be disappointing. Instead, he said, "I'm flattered by it. I didn't think anyone would read it. It was in a very applied journal. That was three years ago and now all this time later, people still say, 'Hey, it's not working.' It's a rewarding experience. It makes you want to do more and do it better."

#### Fast Forward

Cardenas joined The University of Texas at Austin's Jackson School of Geosciences as an assistant professor in the summer of 2006.

He studies how water flowing on Earth's surface in streams and rivers (surface water) interacts with water flowing below the surface (ground water). Specifically, he studies how heat and chemicals are exchanged between the two. This work has implications for how pollutants are transported through the environment.

"Most geologists deal with millions-ofyear timescales," Cardenas said. "I like to see things happen in front of my eyes. That's why I study surface water/ground water interactions. I want to study something tangible. I like to see both the process and the product."

Though a first-time faculty member, Cardenas already feels familiar with the professional academic's basic mix of duties teaching, research, and proposal writing, all of which he pursued as a doctoral student at New Mexico Institute of Mining and Technology. He does, however, look forward to having more resources and not having the pressure to finish a degree.

But mostly, he is just anxious to get started

When we spoke at the start of the fall semester, he was writing grant proposals. He planned to take in students who are interested in collaborating on his research. He was preparing for an environmental hydrogeology course he plans to teach in the spring. And he was working with a company in Minnesota to build a five-meter flume, which he describes as a cross between a sandbox and a fish tank that mimics a riverbed.

"If you go to the river, you can't cut a slice through it," said Cardenas. "The flume allows you to dig a trench down into the sediments and look at the cross section without getting wet."

He had returned from a field trip to test out a new infrared camera that will allow

*Cardenas took this infrared image of a river in September 2006 while testing a new camera.* 







*Cardenas plans to build a five-meter flume, a cross between a sandbox and a fish tank that mimics a riverbed. Photo: Flume operated by the U.S. Department of Transportation.* 

him to quickly measure temperatures across the surface of a river. It was his first original work while at the Jackson School. He and his collaborators are writing a paper about the test for publication.

And then there are the mundane aspects of a new job. Cardenas was still assembling his office furniture, deciding where his books and other belongings will live and trying to figure out the voice mail.

"I'd like to hit fast forward and see what it's like two or three years from now," he said. "Right now, it's like a diesel engine warming up. Starting off is slow, especially if you don't have students.

#### From the Philippines to Texas

Cardenas grew up in the Philippines. In the

www. hole lill er riv hole st www. st at hii U Lii of th mm

summers, he and his family would go to a cabin several hours from their home.

"My parents really liked the outdoors. And I enjoyed swimming in the river, hiking, and camping," he said. "So I thought studying the water cycle would be a good way to stay outside."

He did a lot of field work at a Nebraska field site for his master's degree at the University of Nebraska-Lincoln. Hence the fear of dropping computers in the river.

"But my Ph.D. was all modeling and it involved no field work," he said. "So now I'm hoping to get out in the field more." The problem is, he related, once colleagues and advisors discover you are good at computer modeling, they encourage you to do more of it.

Cardenas also got an early interest in the natural world from *National Geographic*. His grandparents bought his older brother a lifetime subscription to the magazine back in 1971. "Back then, it cost something like \$100. Of course, we would get them two months late in the Philippines, but that magazine made a big impression on me."

While an undergraduate at the University of the Philippines Diliman in Manila, Cardenas worked several jobs to pay for outdoor hobbies such as caving, hiking, and mountain climbing.

In one job, he helped train park rangers in "Leave No Trace Ethics." Most park rangers in the Philippines are subsistence farmers who live in the wilderness and have no formal education.

"Even though they have inherited environment-friendly lifestyles from their ancestors, some have a hard time coming to grips with modernization, like tourists flocking into their areas and asking for guides or porters," Cardenas said. He helped introduce park rangers to behavior that they should expect of tourists.

"Some guides are more than willing to take the tourists' money and just do as they are told, like take people to an ancient burial site," he said. "When they get there, they inadvertently trash the place."

In another job, he helped develop alternative livelihoods for locals. For example, he said, "if managed properly, coral reefs can provide sustained income to coastal communities if they are fished moderately and



Like tree rings, the bands indicate how climate changed over time.

promoted for tourism as well. This would be an alternative to just fishing as much as they can to make as much money as they can."

Cardenas did his Ph.D. research at the New Mexico Institute of Mining and Technology with advisor John Wilson. The goal was to represent real world hydrologic processes more accurately in computer models.

"People often look at hydrologic systems

in simplified ways out of necessity, but I use a more brute force approach," Cardenas said. "I keep adding things in to make the models more and more realistic. It's a bottom-up approach."

As a graduate student, Cardenas won numerous honors and awards. In 2002, he was the first recipient of the Frank Kottlowski Fellowship, given by the New Mexico Bureau of Geology and Mineral Resources. That fellowship, which was created as a memorial to the former director of the bureau, funded part of Cardenas's Ph.D. research.

In 2004, he received an Outstanding Student Paper award from the American Geophysical Union (AGU) for a presentation he gave on his dissertation research. In 2005, he received a Horton Research Grant, the highest award that AGU gives to hydrology graduate students.

Cardenas is married and has a fouryear-old son. He and his wife met through a mountaineering club when they were students in the Philippines. That seems appropriate for a geologist.

"I think it's great," Cardenas said, "when you can combine work and play."\*

#### **Sentinels of the Sea** CORAL REEFS HELP PREDICT SEVERITY OF GLOBAL WARMING

Quinn hopes to help by providing better

like. "So we can tell the modelers, 'Okay,

20,000 years ago, the temperature and salini-

ty of the oceans were like this, El Nino was

this active, and so on,' and that places con-

said Quinn.

straints on the inputs to the climate models,"

According to Quinn, the key is a better

understanding of uncertainties. "People say,

'How do we know what's going to happen?'"

said Quinn. "We don't for sure, but we can

think in terms of probable outcomes. It's

analogous with risk assessment and insur-

ance. When I lived in coastal Florida, I had

hurricane insurance. Now I live in Austin, I

don't have hurricane insurance. It's still pos-

sible we'll get hit by a hurricane, but not very

As the uncertainties diminish, Quinn

likely. We want to use the past behavior of

said, policy makers may feel confident

enough to start doing something about

the Earth to lower the error bars."

Terry Quinn searches for just the right kinds input for the models from his coral studies. of coral. "We look for big Volkswagen-sized corals," he said. "Branching corals and big sea Corals grow by adding new layers on the outside, like the trunk of a tree. And like fans are pretty to look at, but they aren't nectrees, they have annual growth bands that essarily good for climate records. So we look record information about what that year was for big ugly ones."

To be precise, he looks for a type of stony coral called Porites, which go by the common names of lobe or mound coral. They look like big round bales of hay covered in purple, green, or tan fuzz. To Quinn, these are also archives of Earth's past climate. They tell of a time before scientists and naturalists and explorers had the instruments to accurately measure and record the world around them.

Earth's climate is changing. Climate scientists agree on that much. But they argue about how much and how fast. Climate models that are used to predict future climate vary widely in their forecasts. For example, some predict Earth will warm by 3 degrees Fahrenheit by the end of the century, others put the number closer to 12 degrees. The models are based on fundamental physics of the oceanatmosphere system, but also require simplifications and assumptions to be made, the choices of which vary between models.

Terry Quinn studies fossil corals for clues to ancient climate and ocean conditions. This work helps improve climate models that forecast future climate.



climate change.



Researchers extract a coral core with a hydraulic drill in the North Pacific. Photo: Maris Kazmers, NOAA Paleoclimatology Program/DOE.

#### Coral Hunting

Quinn joined The University of Texas at Austin's Jackson School of Geosciences in the summer of 2006, assuming a dual appointment as a professor in the school's Department of Geological Sciences and as a senior research professor in the Institute for Geophysics (UTIG).

Before coming to the Jackson School, Quinn directed the Global Change Research Center at the University of South Florida. He's had a connection to the Institute for more than a decade through his collaboration with Fred Taylor, a senior research scientist at UTIG. "Fred is the guy I always go to when I want to know where to find corals that cover a time period and a climate problem I'm interested in."

Some of the questions Quinn is interested in include: How have the salinities and temperatures of the ocean's surface changed over time? And what about climate variability? Have the El Niño/Southern Oscillation events become more intense or long-lasting over time?

When he first began studying corals for clues about past climate about 15 years ago, Quinn went on large research ships with an array of other researchers working in different fields, state-of-the-art equipment, and technical support. In the early days, he made several field trips with the Ocean Drilling Program. But over the years, he's gotten more nimble. Now, when he goes out in the field, it's often with just two or three other

They bring back solid cylinders of limestone three and a half inches, or nine centimeters, wide. Some cores shipped back to the lab might be as long as ten feet, or three meters. Following each field trip, it takes years of lab work and analysis to interpret what the cores are saying about past climate. "People often say to me, 'You must have grown up loving scuba diving and corals," said Quinn. "No, I didn't. I'm using corals because I'm interested in specific climate questions over specific time intervals. I try to figure out what is an important scientific question that my expertise could make an impact on and then ask, okay, now what archive should I use?" For the questions he's



researchers on a small boat. He usually just rents the boat and her captain locally for a few weeks.

The researchers spend entire days in wet suits, drilling into underwater corals, often eight or ten meters down. "We go to remote places," usually on or near tropical islands, he said. "So we need simple and robust tools. There are no Home Depots in places like the Solomon Islands or New Guinea."

Quinn uses a hydraulic coring device designed by Fred Taylor. It runs on power from the boat delivered through an umbilical cord. "Most of the people who drill modern corals use the UT drill. It's evolved and improved over the years of course," Quinn said.

asking about climate change, the archive happens to be coral.

Quinn studies other repositories of climate information, including foraminifera-singlecelled marine organisms with carbonate shells-in sediments in the Gulf of Mexico.

Quinn is sometimes asked about the damage that drilling can do to corals, which are in decline in much of the world. He said, "We fill the holes in with marine cement. The living animals around it will grow over it. Like a scab, it heals itself. You go back three years later and you can't tell where you drilled."

#### Cutting Up

Back in the lab, a coral core is cut in half down the middle. A thin slab is cut off of one of the halves. Then the slab goes to the dentist. It gets x-rayed to reveal light and dark density bands. Darker, denser bands indicate periods of slow growth. Lighter bands indicate faster growth.

Next, the slab is secured on a bench and a computer-guided dental drill runs along its length, grinding a small trench in it. This produces a fine powder which is sampled 12 times for each year of the core (as determined by the location of the bands). Thousands of tiny vials are loaded up with the powder. Then each sample is analyzed to determine the oxygen and carbon isotopic ratios of the sample. A subset of the sample

Quinn (left) used to participate in large ocean drilling projects involving research vessels. Now, when he goes into the field, he's much more nimble



"We look for big ugly ones," said Quinn. Porites coral colonies, such as this one in Ofu lagoon, American Samoa, hold a key to understanding Earth's past climate. Photo courtesy of Christina Kellogg, USGS.

is then analyzed for the elemental ratio of strontium to calcium. After many careful calculations, a month-by-month history of sea surface temperature and salinity is produced, often spanning centuries.

Quinn is especially proud of research he and his colleagues published in the journal Paleoceanography in August 1998. His collaborators included Fred Taylor (UTIG), Thomas Crowley (Texas A&M University), Pascal Joannot (Aquarium de Noumea), and Christian Henin and Yvon Join (Institut Français de Recherche Scientifique pour le Développement en Coopération).

They reconstructed a history of ocean conditions at New Caledonia—a French island east of Australia-back to the year 1657. French scientists have collected daily measurements of sea surface temperatures and salinities at that same spot continuously since 1967. That allowed Quinn and his team to precisely match part of his record to actual observations to verify and calibrate his results.

The record showed seasonal cycles and El Nino/Southern Oscillation (ENSO) cycles

Working at the JSG, "It's as if you had the chance to buy Microsoft stock when it got started. The intellectual expansion will be staggering."

that were familiar. But it also revealed longer, previously unknown cycles that unfolded over 16, 32 and 60 years.

"We still don't know the causes of these decadal changes," Quinn said. He and a student are looking at other corals at nearby sites to paint an even more detailed picture of what happened.

Much of Quinn's work focuses on the tropics. That's because the temperatures in the tropical oceans play an important role in the climate of the entire planet. "If the tropics are warm, you get convection and monsoons," Quinn said. "But if you cool the tropics, you get droughts."

Corals attest to this connection. For example, the monsoons in India failed in 1877 and 1878. "We see records of that in coral in the Indian Ocean. In 1982 and 1983, there was a big ENSO event. Coral records reflect that event too," said Quinn.

In the fall of 2005, Quinn was part of a team that drilled cores in reefs off the shore of Tahiti to look at the history of tropical sea level and surface temperatures from 25,000 to 10,000 years ago—a time that covers Earth's last major glaciation. The team is still evaluating the samples.

The Tahiti work was part of the Integrated Ocean Drilling Program (IODP). The IODP is an international effort that grew out of two earlier projects: the Ocean Drilling Program and the Deep Sea Drilling Project. Scientists from around the world submit proposals to use one of several ocean

#### How do corals record past climate and ocean conditions?

A colony of stony coral is made up of thousands of colorful little animals clone of all the others, builds a hard cup-shaped scaffold of calcium carbon ate. It absorbs the calcium it needs rom the surrounding seawater. Quinn on top." Slowly, layer by layer, a hard coral head" forms beneath. All the ng coral is on the outer surface

As the seasons change, sea temeratures rise and fall, as does the ount of sunlight filtering through the time, a coral head develops growth bands similar to those in the trunk of a tree. These appear as light and dark bands in x-ray images.

One colony of coral can grow for several hundred years. By carefully ocean conditions at time scales ranging from seasons to multiple centuries These "climate windows" provide valu climate system operated in the most recent past, but also in the geologic

research vessels with deep sea drilling capabilities to explore the history and structure of Earth as recorded in seafloor sediments and rocks. Quinn is just finishing a three year term on the Science Planning Committee for the IODP, ranking and recommending which proposals will be drilled.

Quinn says the opportunities in his new professional home at the recently formed Jackson School of Geosciences will be groundbreaking: "It's as if you had the chance to buy Microsoft stock back when it was just getting started. I'm not talking about monetary expansion-although there is certainly money. It's the intellectual expansion that will be staggering."★

#### Ginny Catania

Ginny Catania joined the Institute for Geophysics as a research associate in September 2005.

She focuses her research on understand ing ice dynamics and glacier processes in



Greenland and Antarctica through remote sensing, field work, and model observa-

tions. She hopes her work will lead to bet-

ter predictions of how ice sheets will change in the future and how those changes might impact global sea level.

Catania completed her first field season on a multi-year project in Greenland in spring 2006. Her goal is to study the importance of short-term ice velocity changes due to increased summer surface melt to the stability of the ice sheet interior near a site called Swiss Camp.

She is also studying ice streams in West Antarctica to try to understand what causes ice stream variability. In work published in the summer of 2006, Catania discovered that parts of Kamb Ice Stream may have shut down in as little as 10 years, much faster than glaciologists previously thought possible. Whillans Ice Stream is now slowing down and Catania hopes to better predict the future flow of Whillans based on her understanding of what happened to Kamb Ice Stream.

Catania is not only dedicated to research She has tried to get more young women excited about a career in science. "We need all sorts of perspectives in science, from a broad range of women," she said. She was a presenter for the Expanding Your Horizons science conference for middle school girls in Austin in March 2006. At the University of Washington, Catania mentored young women from low-income families to encourage them to enroll in college.

Now, she's shifting her focus to women already in graduate school. She believes women studying science often don't feel fully appreciated by their colleagues and suffer from a lack of female role models. "I think the most significant thing I can do for women in science is to be present doing good science," she said.

#### Tim Doolev

Tim Dooley came to the Bureau of Economic Geology's Applied Geodynamics Laboratory (AGL) as a postdoctoral fellow in 2003 and then became a research scientist in late 2005. He received his doctorate at Royal Holloway, University of London, in 1994.

His research focuses on gravity-driven salt tectonics, including both the ductile behavior of mobile salt layers and associated brittle structures in cover sediments. This also includes topics such as salt-sheet advance and the influence of strike-slip motion on salt-body reactivation.

improved the visualization techniques. He uses high resolution digital cameras and a surface laser scanner to make animations and 3D visualizations of the model runs. "Physical modeling is a highly graphic way to demonstrate geologic processes," he said. "With our current dependence on the hydrocarbon industry, any research tool that enhances our understanding of the geological evolution of a particular hydrocarbon field is of great importance."

Dooley has also improved the laboratories by adding three new deformation rigs and a new sectioning device to slice models at intervals of 5 millimeters (0.2 inches) or less. These allow him to monitor not only surface deformation but also the 3D structure of the brittle overburden and flow regimes within the viscous salt bodies. "In the long run," he said, "my primary goals are to generate

Catania received her PhD. in geophysics from the University of Washington. Before coming to the Jackson School, she was a post-doctoral researcher at the University of California, Santa Cruz.

In addition to field studies, remote sensing, and seismic data, Dooley uses scaled analog modeling, a laboratory technique for reproducing (on a small scale) real world



systems. In practice, these are essentially large boxes containing materials such as salt, sand, clay, and water. Researchers at the AGL

had long done this type of modeling, but Dooley introduced new modeling methodologies and technologies which have

comprehensive suites of models that are of use to industry and academia and maintain the reputation of the labs as being a center of excellence for modeling salt tectonics."

Dooley came to the AGL in 2003 to head up the modeling laboratories and work on salt-related modeling with Martin Jackson and Mike Hudec. He said there were multiple reasons for coming, but "the reputation of the AGL as a highly respected salt tectonics study group in the academic community and oil industry was key."

#### Peter Eichhubl

Peter Eichhubl joined the Bureau of Economic Geology in the University of Texas at Austin's Jackson School of Geosciences as a research scientist in January 2006.

Eichhubl's research addresses the formation of faults and fractures, their effect on flow of water and hydrocarbons in the subsurface, and the chemical interaction of these fluids with rock and minerals. His research is of applied interest to groundwater management and the exploration and production of oil and gas. Fundamental aspects of the research have implications for the seismic and non-seismic deformation of the Earth's upper crust and for the interaction of subsurface fluids with the atmosphere and biosphere.

"I hope to make UT Austin an internationally recognized center for research on coupled structural and diagenetic processes, from the grain or pore scale to the regional or reservoir scale," said Eichhubl.

Eichhubl received his master's degree from the University of Vienna in Austria and his doctor's degree in geology from the



University of California. Santa Barbara. Prior to joining the Bureau, he was a postdoctoral fellow at the Monterey Bay Aquarium Research

Institute, a staff scientist at Stanford University, and an assistant professor at Texas A&M University-Corpus Christi.

He became a scientist because of his interest in interactions: "I am interested in understanding how natural systems interact—such as various geologic systems with each other and with life-and also in the interaction of humanity with nature.

For example, how do humans respond to geologic processes, or how do we analyze and comprehend natural systems given our intellectual and observational capabilities?"

Eichhubl's appointment to the Bureau was made possible by a Jackson School Initiative titled, "Fracture Opening Processes: Chemical/Mechanical Evolution of Fracture Systems." The initiative is funded by the U.S. Department of Energy with matching funds from the Jackson School.

#### Matthew Hornbach

Matthew Hornbach came to the Institute for Geophysics as a post-doctoral fellow in 2005 and then became a research scientist in June 2006. He received his Ph.D. from the University of Wyoming in 2004.

He uses high-resolution 2D/3D seismic data in conjunction with other geophysical indicators to image, model, and ultimately link shallow geological structure with sedi-



S C I E N T I S T S

rent scientific problems involving methane hydrates (icy substances containing methane at or under the seafloor) submarine landslides, and life at hydrothermal vents on the seafloor.

Methane hydrates might one day be mined as fuel. But they also have a dark side. If the methane they contain were ever released to the air, greenhouse warming would increase. One of the largest known methane hydrate reservoirs in the world is at Blake Ridge, about 300 km east of Charleston, South Carolina. Hornbach is trying to determine just how much methane hydrate is trapped there and what impacts it might have on climate if it were released to the air. Hornbach wonders, "What are the key potential gas-release triggers, and are any of these triggers causing gas to release right now?"

Submarine landslides can trigger deadly tsunamis. What causes the landslides, though, is unclear. Working with colleagues at the U.S. Geological Survey, Hornbach recently collected high resolution seismic images of the Cape Fear slide complex. This slide, located about 300 km east of

Jackson School of Geosciences

26

Cape Fear, North Carolina, is thought to have been the largest submarine landslide off the east coast. The goals of this project are to reconstruct the history of this slide, estimate the potential tsunami it generated, and from this, estimate the potential risk of future events. Hornbach is also collaborating with the Institute's Luc Lavier on this work.

Hydrothermal vents on the seafloor spew chemicals and heat that support exotic biological communities in an otherwise dark, cold, nutrient-poor environment. "We don't have a clear understanding of the basic plumbing system vital for sustaining these biological communities," Hornbach said. One of the goals of his research is to use 3D/4D seismic imaging techniques combined with fluid models to characterize the flow regime at methane seeps. Hornbach said, "My hope is that we may be able to use our results to predict where other sea floor chemosynthetic communities exist."

#### Angela McDonnell

Angela McDonnell joined the Bureau of Economic Geology as a research associate in March 2005.

Her principal interests include seismic interpretation, sequence stratigraphy and seismic facies analysis. Since joining the Bureau, her research has focused largely on the Gulf of Mexico and its deep (>15,000 ft) gas play potential with particular focus on Texas' state waters.

She is also involved with state lands studies including interpretation of the East Texas Field and seismic analysis of the



collapse structures as observed on seismic data and their comparison to outcrop examples. These structures pose hazards for gas well drilling and production.

McDonnell received her Ph.D. from University College Dublin, Ireland. Her research focused on the sequence stratigraphic development of passive margin depositional systems, deep water contourite deposits, and deep water, sub-photic carbonate mound growth.

She worked as a consultant geophysicist for Fugro Robertson for three-and-a-half years prior to joining the Bureau in early 2005. While at Fugro she gained experience on numerous basins worldwide (offshore Ireland and Norway, North Africa, Gulf of Oman, Persian Gulf, East Coast U.S. basins and offshore Brazil) integrating seismic interpretation, sequence stratigraphy, sedimentology, and structural analysis. She also designed and taught short courses on topics that include workstation techniques, attribute analysis, seismic sequence stratigraphy, prospect analy-

What does she love most about her work? "I love the constant variety in day to day work and the interaction with other researchers here at the Bureau and with industry partners," she said.

sis, and basic seismic interpretation.

#### Timothy (Tip) Meckel

Timothy (Tip) Meckel joined the Bureau of Economic Geology as a research associate in July 2006.

His research aims to discover what happens when fluids are injected into the subsurface. He works within the Gulf Coast Car-



monitoring subsurface fluid movement. This work adds to the Bureau's growing expertise in large-scale greenhouse gas sequestration, also called carbon capture and storage.

As global population increases, so does demand for energy. "If we as a society are committed to making a significant impact in reducing atmospheric emissions of greenhouse gasses associated with our energy needs, the potential of subsurface, long-term geologic storage needs to be fully investigated," said Meckel. "This technology could provide an economically and environmentally sound way to approach this issue."

Meckel said carbon sequestration is also a matter of civic and ethical responsibility. "We don't litter anymore," he said. "Why is CO2 emission any different, except for the fact that it is invisible?"

Meckel is a native Texan, born in Houston. After completing a master's degree in geology at the University of Montana in Missoula, he entered the The University of Texas at Austin's doctoral program in geological sciences, earning his Ph.D. in 2003. His dissertation focused on understanding the tectonic evolution of the southernmost Australian-Pacific plate boundary south of New Zealand.

After completing his Ph.D., Meckel taught undergraduate geology for one year at Colby College in Waterville, Maine, before receiving a Mendenhall post-doctoral research fellowship investigating subsidence issues in Louisiana with the U.S. Geological Survey. Meckel has also been to sea aboard the R/V Maurice Ewing offshore western Nicaragua and briefly worked for ExxonMobil as an exploration geologist in New Orleans.

#### Wayne Wright

Wayne Wright came to the Bureau of Economic Geology as a consultant geologist in 2005 and became a research associate in January 2006.

Wright is currently conducting regional sedimentological and stratigraphic studies on the greater Permian and Fort Worth Basins. He also conducted geological evaluations of potential FutureGen sites for Phase 1 and Phase 2. His focus in the Greater Per-



mian Basin is the Pennsylvanian succession and the overall tectonic and structural evolution. Within the Greater Fort Worth

Basin, he focuses on the Mississippian Barnett Formation and the overlying Pennsylvanian successions.

One of his other key interests is linking diagenetic studies in carbonates to sequence stratigraphic models at the reservoir and basin-scale. The upscaling of pore-scale reservoir properties is vital in establishing the best methods for recovering reserves in a reservoir, as well as having a regionally accurate exploration model. To that end, Wright is trying to develop new methods for quantifying pore geometries and shapes in 3D using image analysis techniques and microscopy.

In general, mud-rock depositional systems such as the Barnett Formation are not nearly as well understood as other siliciclastic and carbonate systems. Currently, the Barnett Formation shale-gas play in the Fort Worth Basin produces 2 percent of U.S. domestic gas. Therefore, understanding this play type is vital to the overall economics of the U.S. and to decreasing dependence on foreign oil and gas. By defining the stratigraphic evolution of the Forth Worth Basin from the Ordovician underpinnings through the Mississippian Barnett Formation and ultimately the overlying Pennsylvanian successions, an improved exploration model for the Barnett Formation can be created. This study is defining the facies types present in the basin and their distribution using wireline logs, core and outcrop data, geochronologic and biostratigraphic data, and seismic. Overall, this research is extremely important for understanding mud-rock "shale" gas systems worldwide and creating a template which can be exported to other undeveloped areas. Further, this work is helping to define the structural and tectonic development of both the greater Fort Worth and Permian Basins. Wright is also trying to assess the significance of the boundary placement between the Mississippian and Pennsylvanian

Systems in this area, because historically sedimentation patterns have been modeled

100 200 300

400

500

600

asserting a regional unconformity at this level. The Mississippian to Pennsylvanian interval in earth history is extremely interesting because it also spans the transition from greenhouse to icehouse climatic conditions which also affect sedimentation patterns and reservoir properties.

Wayne has previous reservoir experience in the Middle East, India, Pakistan, South America, North Africa, North America, and Ireland. His skills and experience include integrated reservoir studies, sedimentology, sequence stratigraphy, biostratigraphy, seismic interpretation, geochemical analysis and modeling, basin evaluation, play fairway mapping, and economics. He has also performed petrographic and geochemical studies to delineate fluid flow vectors and sites of mineral deposition, as well as predictive and retrospective metallurgy using petrographic and geochemical techniques.

As a teacher, Wright specialized in techniques and applications of fluid inclusion analysis in petroleum systems, as well as techniques and applications of cathodoluminescence, carbonate petrography, dolomitization, carbonate geochemistry, fluid flow modeling, and carbonate core logging. Before coming to the Bureau, he worked as a sedimentologist for Fugro/Robertson Research International Ltd. He received a Ph.D. in geology from University College Dublin, Ireland in 2001.



# LIBRARY REPORT

#### **Gifts from Alumni and Friends Expand Offerings**

#### **By Dennis Trombatore**

We open this year's report with exciting news. Carlotta Chernoff (B.S. '92, M.A. '95) and members of her family have established the Chernoff Family Library Fund for Geophysics and Earth System Sensing to honor Carlotta's father, Charlie N. Chernoff, former chief geophysicist at Chevron Geosciences. Earnings from this fund will allow the library to increase the depth and breadth of its holdings in geophysics and related areas, an important growth area in research. Our initial goal for this fund is \$100,000, and we are actively seeking donors to help us put it over the top. I would like to extend my deep appreciation to the members of the Chernoff family for their generous vote of confidence in our collections.

In addition, AAPG has reported that online access to AAPG Datapages at UT

Austin will henceforth be free thanks to the generosity of Daniel L. Smith, B.Sc. '58, who has established an endowment in the AAPG Foundation to cover the annual cost of this database to campus users in perpetuity. UT Austin is one of the heaviest users of AAPG Datapages, and this endowment in effect gives us new money every year to acquire additional information for the collections.

Another big development is the purchase of a UT Austin license for the Earth Sciences package of the Elsevier/ Science Direct backfiles online for about \$30,000, funded by the Walter Fund. This includes more than 1,300 volume/years of Elsevier journal archives to add to the 1997-present license that we have had for some time. Users indicated the great advantage of being able to access and use these materials from their desktops, and the response has been enthusiastic. Now we need to find the resources to purchase

"Progress Map 1889." From the First Annual Report of the Geological Survey of Texas (1889), available online through the Walter Geology Library's Virtual Landscapes of Texas.



Dan Barker Chris Bell Robert Blodgett Jon Brandt Pat Dickerson Kara Dotter Karl Follmi Wilfred D. Francis Robert Ginsburg Anatoly Kaplan Peter Larsen

go with them!

via the internet.

Walter Geology Library

An Hoadley Leis Bill Mixon E.F. McBride Kitty Milliken Ann Molineux R. Larell Nielson Amos Salvador Bridget Scanlon John M. Sharp Jim Sprinkle Bill St. Johr Univ. Di Napo Franco Urban James Lee Wilsor Louis Zachos

Despite what some people may think

based on press releases, even with a great deal

of money spent on paid licenses, less than 5

percent of the materials in the Walter Library

are available online to our users- major sci-

entific journals since the late 1990s, the Else-

vier backfiles, and a thousand or so mono-

graphs, if you include the USGS materials.

The Google-Books project will only be able

to reveal digital content for materials pub-

leaves a huge slice of content on the shelves

for users. Good content has value, and we are

committed to acquiring, organizing, preserv-

ing, and providing that content in whatever

format is available, whether it is on paper or

Here I must again pause to thank the

Walter and Barrow families and all our other

foresight in setting up the endowments that

advance the collections in such notable ways.

We continue to receive gifts of both money and materials from many sources, for

which we are grateful. Since the early 1980s,

the Walter Geology Library collection has

almost doubled in size, with large increases

in the areas of hydrology, geophysics, and

enable us to improve these services and to

loyal supporters for their generosity and

lished prior to the early 1920s, which still



soils and environmental subjects. In particular, the hydrology and related areas have made significant increases proportionally, and this is one area we still hope to support by establishing separate endowments, since the issues surrounding water will continue to grow in the coming years. With the help of Chris Bell in particular, we are also growing the paleontology collection, and the resources of the Whitney Fund help support those acquisitions.

In other news, this year with the assistance of a GRA funded by the Jackson School, we have been able to complete the reclassification of the on-site Dewey Decimal materials. The 18,000 or so Dewey items that remain are all in storage where they have been for some years, so the entire on-site collection is now in one call number sequence. Thanks to Sean O'Bryan and Angela Kille (this year's Guion Award winners) for completing this project. Angela has also been busy adding author and title records for items in the USGS Professional Papers, BEG Bulletins, and several other series of importance to users. She has also added links to those items available digitally from the USGS Publications Warehouse, thus further improving the transparency of the catalog.

This year we will also complete the integration of unique items from the ARCO

add publications at a faster rate in the coming year. You can view items at http://www.lib.utexas.edu/books/landscapes/. The Walter Library website now has a weekly listing of new books, journals, and maps for those who want to see what we are adding but cannot come to the library every week: http://www.lib.utexas.edu/geo/ (click on "New Books"). Thanks to Vickie Drake and Alice Dewberry for this development. The UT Libraries has contracted to purchase an integrated library system - one platform to run all of our computer operations. A great deal of work will be going into this

Library that was donated to us several years ago. We have added thousands of publications from this collection over the past several years, including huge selections of USGS Open File Reports, other technical reports, and theses from other institutions.

Our Virtual Landscapes of Texas Web site continues to grow, again with the assistance of Jackson School funding for digitization. During this calendar year we will add many new documents, including the USGS Folio Atlases for Texas, Jules Marcou's Geology of North America, Tom Taylor's 50 Years on the 40 Acres, and a number of out of print Bureau of Economic Geology publications. We are shifting to a PDF process to streamline the work for most items, and we hope to

transition over the next two years, and it will mean many operational changes in systems and procedures, so we will all have something new to learn, but there will eventually be many benefits in efficiencies and ease of use.

In Staff news, Melissa Van Ostran got her 25 year service award. Dennis Trombatore got a 20 year service award in May, and an Honorary Staff Excellence Award from the Jackson School. Dennis continues to serve on the GeoRef Advisory Committee (currently as chair) and on the GeoScience World Advisory Committee.

"Signal Mount—Howard County. A Cretaceous Butte." From the First Annual Report of the Geological Survey of Texas (1889), available online through the Walter Geology Library's Virtual Landscapes of Texas.



# SUMMER FIELD CAMP





# GEO 660 Summer Field Camp 2006

Top left: The view looking west from the top of Signal Mountain, Grand Teton National Park. From this vantage point, students hear an intro-ductory lecture on, and view aspects of, the neotectonic and glacial history of the Teton Mountains (background) and Jackson Hole. Professor Marrett is assisted by T.A. Miriam Barquero-Molina. Photo: Mark Helper. Bottom left: Students (Brandon Johnson left, Abena Temeng right) sketch stratigraphic relation ships among Jurassic rock units at Ghost Ranch, near Abiquiu, New Mexico. Photo: Miriam Barquero-Molina.

Bottom right: Examining the Todilto Formation with Professor Kocurek. Photo: Miriam Barquero Molina.

Top right center: Horned Toad hiking on Mark Helper's Pantalones, Goose Egg Dome, Greybull, Wyoming.

Top right: Professor Marrett with students on the west flank of Sheep Mountain on the first day of a mapping project, where students examine and describe the rock units they will later map. Here students are working their way down through the stratigraphic section, and are within the Jurassic Sundance Formation. Photo: Mark Helper.

Center: Students completing their first mapping project after dark at the Green Oasis campground. Left to right: Rebecca Comeaux, James Charmichael, Brian Cornette (mostly hidden) and Christopher Kautz. Photo: Christian George.





# BornettBoom IGNITES HUNT FOR UNCONVENTIONAL GAS RESOURCES

By Marc Airhart The global hunt for unconventional gas reserves recently turned to an unlikely spot—a patch of north central Texas that already seemed tapped out after 50 years of intense oil and gas drilling.

Technology, economics and one man's persistence transformed the Barnett Shale formation of the Fort Worth Basin into a booming new frontier.

NEW MEXICO

TEXAS

As conventional petroleum reserves dwindle in the U.S., public

pressure mounts to reduce the country's dependence on foreign energy, and the price of oil and gas rises, energy companies are setting their sights on "unconventional" domestic sources. These include oil sands, coal beds, and shales.

In less than a decade, the Barnett Shale play has become the largest natural gas play in the state of Texas and, as new wells sprout like bluebonnets across the Fort Worth region, it might soon become the largest in the nation.

"This play already covers parts of 15 or more counties," says Eric Potter, associate director of the Bureau of Economic Geology at The University of Texas at Austin. "It compares favorably with the biggest of the old oil booms of the early 20th century."

Barnett Shale & equivalent "Mississippian carbonate" Section missing ILLUSTRATION: USGS

Of course this boom is different. The concrete-like shale gives up its gas grudgingly. So individual wells tend to be smaller and more expensive to operate.

"The East Texas gushers would win out hands down," says Potter. "But there are so many [Barnett] wells that even though they are modest, the total output is going to be huge."

This play is also different because much of the untapped gas lies under the highly populated Fort Worth metropolitan area. Oil and gas companies are finding new challenges drilling in an urban setting.

Now, some experts are wondering if the boom can go global. The search is on for similar shale formations around the world, including the Fayetteville Shale in Arkansas.

#### Going to the Source

The fact that there is a Barnett boom at all reflects a tectonic shift



in thinking. In the past, drillers bypassed the source rock that generated the oil and gas and focused on the reservoir rock, where the resources were easier to extract. Typically, oil or gas exits from the source rock and migrates to places where it is trapped. And those trapsconventional fields-typically do not cover a large area.

> "There would be a field here and then a lot of blank space and then a few miles over there would be another field," says Potter. "But this kind of play, it just covers county after county. You're look-

ing at thousands and thousands of wells covering the land."

With new technologies for coaxing gas out of shales, drillers see the Barnett as both source and reservoir. One such technology is artificial fracturing—in which operators pump water and sand down a well to create fractures that liberate more gas from the rock.

Potter and his colleagues at the Bureau are analyzing the properties of shales across the state. Ultimately, they hope to apply their work to similar rock formations anywhere in the world.

According to Potter, the 5,500 wells currently pumping gas in the Barnett Shale play will ultimately generate on the order of \$35 billion for their owners. As those companies pay taxes and wages, and as their employees and contractors in turn spend their money, there is an economic ripple effect, creating an overall value of about \$100 billion to the Texas economy.

"Now any kind of mudrock or shale that's black, organic rich, reasonably thick, and reasonably deep we're interested in," says Potter. "The question is, all shales are not alike, so what makes a shale prospective as opposed to one that is not prospective? We don't really know that yet."

#### Wise Investment

Before he died in 2003, oilman and philanthropist John Jackson donated to The University of Texas at Austin royalty interests in roughly a thousand wells in the Fort Worth Basin, part of the bequest that led to the formation of the Jackson School of Geosciences. These wells were producing oil and gas from the younger Bend Conglomerate formation just above the Barnett.

The Bend Conglomerate was formed during the Pennsylvanian age, meaning it was laid down about 290 to 320 million years ago. The Barnett Shale, a marine



"The short answer is that we think that most of that acreage has quite good potential

in the Barnett," says Potter. "Eight of the top ten Jackson School royalty wells are producing from the Barnett Shale. We are forecasting that most of these holdings will produce from the Barnett."

The University receives on average about two percent of the gross revenue from wells it holds royalty interests on. That money is being used to build one of the world's premier geoscience programs at the new Jackson School. Because the money goes into general funds, it supports all of the activities of the school, including dean Eric Barron's priorities: to create the world's most student-centered earth science program, to attract and retain the best research talent, to increase

the breadth and depth of the faculty and research community and to establish the "fabric of a great school."

Researchers at the Bureau are providing technical analysis to help stimulate additional drilling and production in Wise County, where most of the University's royalty interests are located. Emphasis so far has been on mapping the basic stratigraphic and struc-



tural framework, tracking successful drilling in the less developed southern part of the play, mapping similar conditions in Wise County, and remapping the thermal maturity of the formation. The maturity seems to relate directly to the gas to oil ratio, one of the key factors controlling gas flow rates.

According to Potter, the 5,500 wells currently pumping gas in the Barnett Shale play will ultimately generate on the order of \$35 billion for their owners. As those companies pay taxes and wages, and as their employees and contractors in turn spend their money, there is an

economic ripple effect, creating an overall value of about



Royalty interests on about a thousand wells donated by John Jackson, mostly in Wise County, help build one of the world's premier geoscience programs at the Jackson School.

always there. The question is can you get it out or not."

So far, operators have extracted 2 trillion cubic feet of gas from the Barnett Shale play. At about 1.5 billion cubic feet a day, that's about 2 percent of the daily natural gas consumption of the U.S.

can not drill a

well without hit-

ting the Barnett,

and the gas is

"When you can go from nothing to the second largest producing gas field in the country in a matter of just a few years, that makes a statement," says Rich Pollastro, a geologist with the U.S. Geological Survey in Lakewood, Colorado. "That's huge. And it could potentially become the largest producing field in the country. That was a real awakening for the country and now because of its success, industry and nations are looking at it worldwide."

#### The Next Barnett?

In the summer of 2004, Southwestern Energy announced that the Fayetteville Shale formation in the Arkoma Basin had many of the same characteristics that made the Barnett Shale formation so desirable for gas production. Before the announcement, the company had quietly acquired mineral leases on nearly a half million acres of land.

The announcement set off another gas boom. Oil and gas operators familiar with the Barnett Shale rushed to Arkansas to get in on the action.

"The analog would be like a 19th century gold rush," says Ed Ratchford, geology supervisor for the Arkansas Geological Commission in Little Rock. "Everyone stakes a claim. You don't say this place is going to be better than this place. You don't have time. People were leasing thousands of acres a day."

Ratchford and his team maintain a well log library, a collection of well cuttings and cores from oil and gas wells across Arkansas. They used these to conduct geochemical tests on samples from the Fayetteville Shale and produce a regional picture of where good gas prospects were likely to be.

"We had companies all over us waiting for us to get this stuff done," says Ratchford. "They were sitting out in the parking lot before we opened up. We were the only ones that had this information. It was critical for helping the operators know where to lease."

#### The Father of the Barnett

A unique set of factors converged to kick off the Barnett boom. New technologies such as artificial fracturing and horizontal drilling made it possible to extract large amounts of gas from shales. The relatively high price of gas in recent years made it economically viable



Yet according to Eric Potter, neither of these would have mattered without one critical element: "It wasn't high tech. It was persistence and experimentation on

the part of one company that got this boom going.'

Mitchell Energy had produced gas from a shallower formation, the same formation that John Jackson had discovered in the 1950s. That production was waning.

"They began looking around for what could be done in the same area," says Potter. "They had always noticed that when you drilled through the Barnett, you would get a gas show. But everyone thought you wouldn't get much gas.'

Even though shale may have a lot of pores with the ability to store gas, it is not very permeable. In other words, it does not have many connections between the pores and so trapped oil and gas can not flow easily.

"Mitchell Energy sunk a lot of money over a long period into learning how to stimulate the rock so it would flow," says Potter. Their first attempts were expensive "massive hydraulic frac jobs." They would pump a very large volume of fluid and sand down a well bore to crack the rock and give it more permeability. At first, they got



In the excitement, many companies took a gamble on mineral leases.

"We had a lot of companies that had leased before the report came out," says Ratchford. "Then they had a big golf ball in their throats saying, 'I wish I hadn't leased here.' That's the risk you run when you lease big tracts of land in a boom without having the luxury of doing the science first."

the gas flowing, but the methods and materials were expensive. So they wondered if they could pump less fluid and get the same effect.

"They arrived at something called a light sand frac," says Potter. "Suddenly it was economical and at the same time-in the mid-1990s-the price of gas was rising. By the late 1990s, they had perfected the technique in vertical wells and started applying it to several hundred wells. That's when it came to the attention of industry.

Potter first heard about these early successes from a Mitchell employee in 1996.

"I didn't think it would have the kind of impact it did," he says. "I wasn't the only one. Most people in industry were surprised and had difficulty adjusting to the notion that shale could produce in commercial amounts over such a wide area. There were only a few companies that appreciated the value of hydraulic fracture technology applied on such a large scale."

When thermally-mature organic-rich mudstone is drilled into, the pressure drops and gas is released by a process called desorption. Early estimates of how much gas would be given up by the Barnett Shale turned out to be far too low. The experiments were run again and it was realized that this shale would give up much more gas than was previously thought.

"Then it was realized, oh, if you scale that up to the whole area and then to the whole county and up to the whole Basin, the amounts of gas are really quite prodigious," says Potter. "People became aware of that in 2002 and 2003 and that really got the ball rolling.'

Mitchell Energy already had critical infrastructure in place to process and transport gas. So they could quickly and economically take advantage of the discovery.

"It took George Mitchell 18 years to make it work," notes Larry Brogdon, partner and chief geologist for Four Sevens Oil Company. "He is the father of the Barnett Shale. He was tenacious. He started in 1981 and it really didn't take off until 1999. And even then, it took a long time to develop it."

PHOTO BY LANDRY BROGDON



"Some of those companies are going to make a lot of money," notes Ratchford, "some are going to be doing tax write offs. That's the nature of exploration. In a situation like this, where there's a frenzy, there are going to be winners and losers."

It's too early to tell how much gas will ultimately be recoverable from the Fayetteville Shale. Southwestern Energy, still the largest lease holder in the play, estimates that they will recover 17 trillion cubic feet of gas.

The future looks good for the Fayetteville play. Ratchford expects the number of wells producing in the area to rise from the current 80

to a couple hundred and that gas will be extracted for at least 15 or 20 years.

He also notes that oilfield services provider Schlumberger has recently built a 30,000 square foot facility in Conway, Arkansas and will employ approximately 100 employees at that facility. "They would not do this if they didn't believe this would be a long term venture," says Ratchford.

Other areas that have generated interest for possible large shale gas plays are the Caney and Woodford formations in Oklahoma, the Floyd formation in the Black Warrior Basin of northwest Alabama, and the Barnett and Woodford formations in the Permian Basin of Texas.

It remains to be seen if the rising star of the Barnett Shale play will be eclipsed by other gas plays.

"The Barnett might be as good as it gets," says Pollastro. "No one knows for sure."

He produced the U.S. Geological Survey's assessment of the Fort Worth Barnett shale play in 2003. At the time, he estimated that it held a remaining volume of 26 trillion cubic feet of recoverable unconventional gas. Now he's evaluating the Barnett and Woodford formations in the Permian Basin, where drillers have experienced mixed results.

"It's a different animal," he says. "The Barnett in the Delaware Basin part of the Permian Basin is deeper and is more clay rich, so at present it's not working like everybody thought it would. It's not as rich in organic material as the Fort Worth Basin. I think there's good potential, but I think there will be a steep learning curve."\*

#### A Super-sized Thirst

To coax gas out of the concrete-like Barnett Shale, opera tors pump large amounts of ture the rock. One horizontal well uses about 3 million gallons of water. Most of the water for these so-called "frac jobs" comes from groundwater.

According to the Texas Railroad Commission, in 2005, about 2.6 billion gallons (or 8,000 acre-feet) of water were used for frac jobs in the



Barnett Shale. That represents 1.6 percent of the water pumped from the Trinity Aquifer for all human uses

That might not seem like a large percentage. It is an average, though. In some areas, gas drilling might represent 10 or 20 percent of the local usage.

"On average for the aguifer, this is not a big deal," says Jean-Philipe Nicot, a geological engineer at the Bureau of Economic Geology. "But for some heavily drilled areas like Denton County, it may be an issue. If that drilling expands elsewhere in the area it may become significant."

If drillers have one vertical well every 40 acres, and if each corresponds to one water well nearby, water use is well distributed across the landscape. In the Barnett Shale, though, it's typical to use horizontal drilling with multiple wells originating in a much smaller area. Pipelines are also used to deliver water from one spot to many wells.

"If you have one location heavily pumping water to hundreds of

In January 2007, Nicot and Potter released a report for the Texas Water Development Board estimating the water use for frac jobs in the Trinity Aquifer from 2007 through 2025. They noted uncertainties due to potential changes in the price of gas which might dampen or accel erate drilling and uncertainties due to new technologies or recycling echniques that might lower the amount of water used in each individual well. Under a mid-range scenario, the team projected a total groundwater use in that time period of 183,000 acre-feet (or 59.6 bilon gallons or 226 million cubic meters).

About 80 new wells are drilled in the area each month. As the rush to capture more gas from the Barnett play intensifies, the amount of water used for frac jobs will likely rise. At some point, it could compete with water for drinking and farming. Neighbors with shallow water wells might see their supplies drop.

To complicate matters, the region has experienced a severe drought since the beginning of 2005. According to John Nielson-Gammon, Texas State Climatologist, this drought is one of the most severe the region has felt in the past century. "There's been a shortage of hay and grass for cattle to graze, crop failures, and reduced yields," he says.

"We're expecting a wetter than normal winter because of El Niño," says Nielson Gammon. "But it's going to take a lot more rain to make up for the deficits. I wouldn't be surprised to see droughts continue next summer.'

The oil and gas industry might eventually be forced to use less water in artificial fracturing. Researchers at Texas A&M University are studying techniques for recycling used frac water.

Of course, concerns over water use would evaporate if the price of natural gas dropped to a point that made drilling uneconomical.

#### Won't You Be My Neighbor?



Montana and all over Texas and some in the Middle East," says Jackson School alumnus Larry Brogdon, partner and chief geologist for Four Sevens Oil Company. "I never dreamed that the best gas play I'd get into was here in Fort Worth, right under my feet.

To get the gas, operators are rushing to find suitable surface locations for drilling rigs, or "pad sites." Thanks to horizontal drilling, pad sites can be almost anywhere including undeveloped areas near creeks, floodplains surrounding rivers, pastures,

industrial corridors, and railroad and utility rights of way. From these spots, operators can drill horizontally underneath otherwise impractical areas such as subdivisions and business parks.

Brogdon, who graduated from The University of Texas at Austin in 1974 with a bachelor's degree in geosciences, has had to become something of a diplomat.

"In this play, in the urban part, one of the most important things is the political aspect of what you're doing," he says. "I spent untold hours meeting with city councils and home owner associations, educating them about what we were doing and how we did it. Because most people had no clue. They were amazed how we could drill horizontal wells and what we could do. The more understanding they are of what we are doing, the easier they are to work with."

Brogdon says it's important to tell the land owners the truth:

"You say that no one is going to get rich. It is a commodity and the price goes up and down. We tell them that there's going to be a well, but we don't know how good the well is going to be. We tell them it's like getting an annuity-money that's coming to their mailbox that they never expected.'

Some residents, according to Brogdon, get \$50 a month in the mail, while others get hundreds. He says overall, about 95 percent of the landowners he approaches eventually sign on to lease their mineral rights.

"Once you start getting an income stream for citizens, you turn adversaries into advocates," says Brogdon.

Of course, that only benefits those homeowners who actually own their mineral rights. Many in the Fort Worth area do not.

Despite the diplomatic efforts of Brogdon and others, some local residents are not happy about all the urban drilling. They complain about the noise and appearance of drilling machinery, the possible homes, schools, and businesses

According to Brogdon, energy companies are using new technologies to make drilling quieter and they are landscaping around some drilling sites.

"All of this is something that operators are not used to and are learning to do," says Brogdon. "They're wiling to do it because the gas is there. If you're willing to do it, you get the prize by getting the gas."

"I've worked in Mississippi and



"I've worked in Mississippi and Montana and all over Texas and some in the Middle East," says Larry Brogdon, partner and chief geologist for Four Sevens Oil Company."I never dreamed that the best gas play I'd get into was here in Fort Worth, right under my feet."

# Down the Hatch SWALLOWING CARBON MIGHT BE GOOD FOR THE PLANET — BY MARC AIRHART —

ach year in the U.S., we burn enough fossil fuels to blanket the country a foot (30 centimeters) deep in carbon dioxide. That's according to Sue Hovorka, a senior research scientist at the Bureau of Economic Geology at The University of Texas at Austin's Jackson School of Geosciences.

Fortunately for us, CO<sub>2</sub> isn't heavy enough to settle to the bottom of our atmosphere. "Otherwise, we'd have choked on our own emissions many years ago," said Hovorka. Still, carbon dioxide is a powerful greenhouse gas. We may not be choking on it, but the consensus of the world's geoscientists is that we are baking in it.

Hovorka is the lead scientist for the Frio 2 Brine Test, an experiment to test the viability of carbon sequestrationstoring  $CO_2$  in the ground to reduce the level of emissions in the atmosphere. For a week starting Sept. 25, 2006, she and her team pumped nearly 500 metric tons of  $CO_2$  a mile below ground in east Texas. Over the following year, she and other scientists will monitor how the CO<sub>2</sub> moves through the subsurface.

Hovorka's team predicted that it would only take several days for the plume of CO<sub>2</sub> to stop expanding through the brine and porous sandstone in the subsurface. Early indications show this is just what happened.

If the CO<sub>2</sub> continues to remain in place over the coming year, it will bolster scientists' confidence that carbon sequestration works in this particular geological setting. It also means they understand the physics of the subsurface well enough to predict how much CO<sub>2</sub> other areas can store.

Perhaps most importantly, the test has demonstrated the effectiveness of new tools and techniques for monitoring CO<sub>2</sub> underground. These tools could become critical to companies wishing to buy or sell carbon credits in the future (see sidebar).

According to Ian Duncan, associate director of the Bureau of Economic Geology, many experts in the U.S. power industry believe that some form of carbon cap and trade system will eventually be enacted by the federal government. In fact, as states such as California begin to regulate carbon emissions, some industry insiders are calling for feder-

al regulations so they can have a consis-

tent set of guidelines to operate by. "If a CO<sub>2</sub> sequestration market is going to develop, then you have to have monitoring to make sure the  $CO_2$  is going to stay there," Duncan said.

#### The Frio **Brine Tests**

The Frio 2 Brine Test, funded by the National Energy Technology Laboratory of the U.S. Department of Energy, is the second in a series conducted by the Bureau of Economic Geology to determine the long-term feasibility of carbon sequestration. The original test, conducted in 2004, was the first such test ever carried out in the U.S.

Hovorka emphasizes the collaborative nature of the Frio tests. She is the lead scientist and the Bureau is the lead institution, but considerable work is also being done by Lawrence Berkeley National Laboratory, Oak Ridge National Laboratory, the U.S. Geological Survey, and others.

The test site is in the South Liberty oil field near Dayton, Texas, 40 miles northeast of Houston. The spot sits above the Frio Formation, which stretches along the Gulf Coast from Alabama to Mexico and contains porous sandstone and brine.

Several times a day during injection, trucks hauling 20-ton tanks of cold liquified CO<sub>2</sub> arrive at the test site, where it is transferred to two 70-ton storage tanks. The CO<sub>2</sub>, which comes from a natural reservoir near a Mississippi salt dome, is transported most of the way by train.



During injection, the liquid CO<sub>2</sub> is pumped through a heat exchanger, which warms it up to 21 degrees C (70 degrees F), converting it to a gas. Then it is pumped through the injection well head and a mile down the well. The CO<sub>2</sub> enters the porous sandstone and brine through perforations in the well casing and spreads out in a plume. For the scientists, knowing just what's going on a mile below their

feet is part art, part science.

#### Tick. Tock

Tom Daley is a geophysicist from Lawrence Berkeley National Laboratory. He developed a novel seismic source that fits down in the injection well between the injection pipe and the well casing. There is about an inch-and-a-half of doughnut-shaped space between the two pipes in which to place what he calls the "tubing conveyed seismic source."

Without this unique approach, researchers would have to stop the injection, remove equipment, and replace it with the seismic source each time they wanted to take measurements. Instead, the researchers get a precise, continuous chronology of how the CO<sub>2</sub> moves without disturbing the injection.

At an observation well about 100 feet (30 meters) away, an array of 24 seismic sensors situated at regular intervals down the well act like tiny microphones, picking up the regular ticking of the seismic source over in the injection well.

As the ticking sound travels through the ground, it travels at a certain speed. But once the spreading CO<sub>2</sub> begins to cross between the source and a particular

"If you were an ant down where the  $CO_2$  is being injected, this is what you would see," said Sue Hovorka. She uses a jar of glass beads, water, and oil (red) to show how residual saturation works. She turns the jar upside down and as the oil rises, some gets trapped between the beads.



Carbon produced by burning fossil fuels might someday be stored underground. It is one of the key technologies being considered for FutureGen, a zero emissions coal plant of the future.

seismic sensor in the observation well, the tick arrives a little later. That's because sound travels slower in CO<sub>2</sub> than it does in rock or water. Daley collects the data in a small trailer on site. He tracks the advancing plume of CO<sub>2</sub> by noting when the travel time changes for each sensor in the array. Unlike most seismic images, it doesn't provide an image of the plume, but it gives a very good sense of how fast it's spreading as the CO<sub>2</sub> crosses the "trip wire" ray paths.

As predicted, he observed the plume spread across the space between the wells in just a few days.

#### **Residual Saturation**

A second line of research looks at how saturated the brine and sandstone become with CO<sub>2</sub>. In other words, how sticky are the materials? One way to measure that is to use a "wire line log"—a device that is lowered into each well to measure chloride. CO<sub>2</sub> pushes saltwater away during injection, resulting in falling chloride levels,

allowing the wire log to indirectly measure how much  $CO_2$  is present. Another method looks for a series of tracers in the observation well, chemicals that travel along with the CO<sub>2</sub> to track how much of the gas is dissolving into the brine.

"It's like a person with a red shirt in a race, you can see how the group is traveling by looking at the person in red," Hovorka said.

Before the first tests, the scientists had predicted that an effect called residual saturation,

caused by capillary forces, would cause the brine-filled pores in the stone to trap and hold about 20 percent CO<sub>2</sub>. The other 80 percent moves on to the next set of pores, and as it moves, it's continuously diminished. In other words, the plume smears out. Hovorka said the effect is intuitive.

"It's the same reason you can't get grease off the stove," she said. "You can't wash it loose with water, you have to use soap."

The 2004 test confirmed this prediction and now initial results from the 2006 test seem to reconfirm it. "It means we got the physics right," said Hovorka. It also means she and her colleagues can predict the CO<sub>2</sub>-trapping ability of other sites before injection begins, a powerful and necessary tool for carbon sequestration to become a common practice.

#### **Tasting the Soup**

A third line of research involves directly sampling gasses and fluids from the observation well to detect how the chemistry changes down below.

Samples are brought up using a U-shaped tube with an opening at the bottom. High pressure nitrogen is pumped in to one side of the so-called U-Tube, forcing gasses and fluids from the bottom up and out the other side. Researchers from Oak Ridge National Laboratory and Lawrence Berkeley National Laboratory conduct chemical analyses on the gasses using a gas chromatograph and other tools. Researchers from the U.S. Geological Survey (USGS) analyze the fluids for acidity and salinity and the presence of metals, organic compounds, and other substances.

Following the first Frio test, the USGS team announced that CO<sub>2</sub> injected at the Frio site causes the brine at depth to become acidic. The acidic brine in turn dissolves some of the rock and minerals it comes into contact with, adding iron and other metals to the salty water. It can also allow the brine and CO<sub>2</sub> mixture to open new paths through the rock.

When those results were published last July in the journal Geology, there were concerned media reports about the potential for the escape of salty brine and contamination of shallow water supplies.

Tom Daley from Lawrence Berkeley National Laboratory in the "dog house," analyzing seismic data from the observation well.





This observation well in east Texas allows researchers to sample gasses and fluids and measure seismic effects as a plume of  $CO_2$  injected 100 feet away migrates underground.

"Above the Frio formation, you have several hundred feet of shale," said Yousif Kharaka, head of the USGS team. "That's a barrier. The  $CO_2$  might dissolve a little carbonate and create a path. But when you have several hundred feet of shale, it can't escape. The Frio was and still is a good place to put a lot of  $CO_2$ .

Also, the leaching of iron and other metals might not be as severe as originally thought. Some of the metals contaminating the samples appear to come from the well casing, and not the brine.

Hovorka does not think acidification and mineral leaching will turn out to be a deal breaker. She is actually more concerned about displacement of salty water. As the CO<sub>2</sub> is pumped in at high pressure, some of the salty water is displaced, potentially contaminating fresher water above which might be used for drinking. Or it might alter overlying ecosystems. This side effect might limit how much or how long carbon sequestration can be safely done in an area.

#### **More Work Ahead**

There appears to be no shortage of places to store the world's excess carbon. By some estimates, the sediments below the North Sea could store all the CO<sub>2</sub> emitted by Europe's power plants during the next 600 years. Researchers at the Massachusetts Institute of Technology, Harvard University and Columbia University estimate that the U.S. coast has enough storage capacity for thousands of years of anticipated CO<sub>2</sub> emissions from the U.S.

"There appear to be no showstoppers," said Howard Herzog, research engineer and expert in carbon sequestration at the Massachusetts Institute of Technology. "But there are many questions and

uncertainties that need to be addressed. Projects like the Frio Brine will help us address those issues."

> Hovorka said so far, the Frio 2 test results are very promising. But there will be several more months of monitoring and analysis before definitive results will be published. Even after that, there will still be much more work to do.

"Science is based

Sound from a seismic source travels from the injection well (left) to an arrav of 24 seismic sensors in the observation well (right). When CO<sub>2</sub> crosses between the source and a sensor, the sound slows down. Scientists use this to track the spread of the CO<sub>2</sub> plume. Illustration by Jonathan Ajo-Franklin.

on duplication of results, changing the experimental conditions, testing different rock fluid systems," she said. "The Frio results

answer a few questions, but mostly they let us design better tests to ultimately reach durable conclusions.'

Hovorka is discussing with colleagues the possibility of more tests at the Frio site, as well as the Mississippi salt basin and other sites along the Gulf Coast. She is also participating in tests to evaluate CO<sub>2</sub> storage at a site in the Permian Basin near Snyder, Texas, with a long history of Enhanced Oil Recovery-the practice of pumping CO2 into the ground to increase oil or gas production.

"To establish carbon sequestration as a viable CO<sub>2</sub> mitigation option," said Herzog, "we need both pilot projects, like Frio Brine, and large scale projects, about million-ton-per-year injections, to help resolve the uncertainties. The Frio Brine project is important because

## **A Market for Sequestration**

Global carbon trading was worth more than \$10 billion last year, according to a May 2006 report by the World Bank and the International Emissions Trading Association. Some experts predict the carbon market might soon grow to as much as \$30 billion annually. Most of the world's carbon trading happens in Europe. But in the absence of federal regulations on carbon emissions in the U.S., the Chicago Climate Exchange has already been trading voluntary carbon reductions (called offsets) since 2003. Participants attempt to cut their greenhouse gas emissions by 6 percent from an average of their 1998 to 2001 levels by 2010. Over 200 companies, including AEP, Motorola, Dupont, Dow Corning and Ford, as well as universities and local and state governments, currently participate. If a participant exceeds its targets, it can sell its offsets to participants who fall short.

Carbon reductions come from a wide range of projects including planting trees, capturing methane from dumps for use as fuel, and replacing stoves in China and India with more efficient models. So far, carbon sequestration doesn't make up a large proportion of traded reductions in carbon emissions.



that might make the practice feasible.

Many of the scientists involved with the Frio tests said they feel it is their ethical responsibility to try to find solutions to humaninduced greenhouse warming.

"Carbon sequestration is not a silver bullet," said Herzog, "but it has the potential to play a major role in controlling greenhouse gas emissions."

Kharaka said we'll continue to use fossil fuels for several more decades. "And to me, carbon sequestration is probably the answer and I think we could do it right so that we don't lose too much of it or contaminate shallow water that we use for drinking or other purposes," he said. "I think it can be done, I just think we need to be careful."\*



In the short term, Ian Duncan, associate director of the Bureau of Economic Geology, believes a technique called Enhanced Oil Recovery (EOR) might instead lay the groundwork for more widespread carbon sequestration in Texas. EOR is an oil industry technique whereby carbon dioxide is pumped underground to force more oil or gas out of the

ground. EOR is typically done using natural CO<sub>2</sub> from the ground, missing out on the advantages of reducing emissions of manmade CO2. "We're investigating the feasibility and economics of building a

network of pipelines in the Gulf Coast region to link carbon sources to EOR sites," he said. "That infrastructure could later be used for carbon sequestration."

Duncan envisions the Texas state government providing low interest loans and tax incentives to private companies to encourage them to build the infrastructure. "The state could actually make money because oil production in Texas is declining," he said. "You could slow it through increased EOR."

it is one of the first steps on this road to commercialization."

Carbon sequestration tests are being conducted around the world, including one in the Norwegian North Sea and another in Canada. Since the Frio tests began in 2004, seven regional carbon sequestration partnerships have been created across the U.S. with funding from the Department of Energy. These partnerships are beginning to evaluate possible locations for carbon storage, as well as the technologies and public policies

# Location, Loca MAPPING THE WORLD'S OIL & GAS GIANTS

#### BY PAUL MANN & MARC AIRHART

Want to find the next giant oil or gas field? Then look at the map produced by Paul Mann and his colleagues.

Mann—senior research scientist at the Institute for Geophysics at The University of Texas at Austin—says it provides some important

clues. The map of the world's giants prepared in collaboration with consultant Mike Horn of Tulsa, and Ian Cross, a vice-president for IHS, an energy information company headquartered in Houston, indicates the location and tectonic setting of all known giant fields, those with over 500 million barrels of ultimately recoverable oil or an equivalent amount of gas.

Spend a little time with the map and you see that giants understand the old real estate adage: location, location, location. They prefer to hang out in about 25 upscale neighborhoods or clusters. These clusters are very unevenly distributed around the planet. The combined cluster areas cover less than a third of the Earth's surface.

The Persian Gulf is the largest cluster with over 200 of the 932 giants the group has identified so far. The Persian Gulf is a long lived passive margin of the former Tethyan ocean that collided with Eurasia in the Cenozoic. Its long lived history means the rock layering has superimposed or "stacked" intervals of both high quality source and reservoir rocks. If the oil misses one reservoir on its migration upward there is an overlying reservoir to sop it up. Evaporites provide seals or "caulking" that prevent the hydrocarbons from escaping to the surface.

The second densest cluster of giants are the 93 giants of the Western Siberian basin, a huge, largely on-land rifted area formed during the Permo-Triassic as Asia tried to split apart. I hisSiberia's Irkutsk region. Proceeds from hydrocarbons produced in the<br/>Western Siberian basin are helping to power the revived Russian<br/>economy and make it one of the key oil and gas exporters to eastern<br/>and western Europe.

#### HIGHLIGHTS

- Giant fields have over 500 million barrels of oil or equivalent amount of gas
- 932 known giant oil and gas fields
- Giants cluster in 25 areas covering less than a third of Earth's surface
- Largest cluster is the Persian Gulf
- Second largest cluster is Western Siberian basin
- Best tectonic settings for giants: passive margins along continents, continental rifts and overlying sag or "steer's head" basins
- Worst settings for giants: strike slip margins and subduction zones
- This decade set to be third best for discovery of giants
- Predicted number of new giants discovered in next three years: 33
- Potential new giant cluster areas: deepwater area of the Bay of Bengal (both eastern India and Myanmar), the Ordos and Tarim basins of western China, the Mekong delta of Viet Nam, the Sudan rift of Africa and the deepwater area of northern Australia

"We also like to compile on the global map the top five biggest oil and gas discoveries of each year and each decade," says Mann. "That helps people see at a glance where the hot areas are, how they change year by year, and what their tectonic settings are."

In fact, as this issue was going to press, an obscure Russian independ-

ent operator announced the discovery of a giant gas field in eastern

### AND THE WINNER IS ...

"One of our main conclusions was that the best tectonic setting for giants was passive margins along continents like West Africa or Brazil." A close runner-up would be continental rifts and overlying sag or "steer's head" basins.

The more restricted the rift during its early lacustrine or submarine history the better for forming large areas of high quality, black, smelly, organic-rich source rocks needed to create large volumes of oil and gas. For example, failed rifts that crack the edge of a continent but don't succeed in full ocean opening are prime real estate for concentrating the high quality source rocks needed for a giant cluster. Examples are the North Sea, the Western Siberian basin and Bass Strait separating Tasmania and Australia.

One of the worst places to find giants is a strike slip margin where complex and ongoing structural history can disrupt reservoirs. Another poor setting for giants are subduction zones where reservoir sandstones are choked with clay minerals and therefore have limited reservoir potential for holding large oil and gas deposits.

# tion, Location

"You can count giants in subduction settings on one hand," says Mann.

"If you're looking for a giant," says Mann, "go to those tectonic environments that are associated with the densest clusters of known giants. Avoid tectonic environments with poor track records. It's a major level of risk that can be avoided at the outset of the search."

Mann's analysis shows that collisional settings are less important in forming giant fields than researchers previously thought.

#### **BEHIND THE MAP**

Assigning tectonic settings to all 932 known giants is challenging since individual basins typically undergo many different tectonic phases often separated by tens to hundreds of millions of years. However, subsurface data are improving and scientists now have a much better idea of what these phases were and what their relative importance was on hydrocarbons.

Most basins have an unequivocal "main event" that shapes their structure, stratigraphy and their associated giant fields. Mann also uses software developed by Larry Lawver and Lisa Gahagan of the Institute for Geophysics' PLATES project to show how moving plates have affected the history and location of giants (see PLATES sidebar).

The team's work follows closely the earlier efforts of legendary oil finder Michel Halbouty, who tracked trends in giant discoveries from the 1960s to his death at age 95 in 2004. In Halbouty's fourth and last edited volume on the topic, "Giant Oil and Gas Fields of the Decade,



Paul Mann conducting field work in Nicaragua, May 2007.

1990-1999," Mann and his colleagues were invited to contribute a paper on their work on the tectonic setting of giant fields.

"Once we pulled the database together for this paper, it has become less of a chore to update it each year," he says. Fifty seven giant oil and gas fields were discovered in the period from 2000 to 2005.

Computer technology makes it easier to track the locations and main characteristics of the many giants.

#### GIANT AMONG GIANTS

One of the areas Mann and his team have studied the most is the Maracaibo basin in Venezuela. This relatively small basin is the home of 14 giants and has produced over 30 billion barrels of oil since the basin was first developed in the early part of the 20th century.

Working with UT postdoctoral researcher, Alejandro Escalona and UT Ph.D. student Veronica Castillo, Mann has used 2D and 3D seismic data to "slice and dice" the Maracaibo basin on a computer workstation to fully appreciate the close relationship between its tectonic history and its hydrocarbon maturation and migration. This work was published as a special issue of the April 2006, *Bulletin of the American Association of Petroleum Geologists* and has culminated a study of this basin that began in 1989 and included a total of seven UT master's theses and four UT doctor's theses—including the doctor's degrees completed by Castillo and Escalona.

"We are now starting another AAPG special issue on giant fields in eastern Venezuela and Trinidad that will be the companion volume to the Maracaibo issue and capture the results of the current cadre of UT graduate students," he says.

Mann and Escalona are currently funded by a consortium of 13 oil companies for a three year study of the subsurface geology of northern South America and have supervised five graduate students. Venezuela currently has the fifth largest hydrocarbon reserves in the world and together with neighboring Colombia and Trinidad and Tobago forms one of the primary giant clusters of the western hemisphere.



Paul Mann (left) with co-investigator Kirk McIntosh conducting field work in Nicaragua, May 2007.

"We can click on any giant field on our map and pull up a spreadsheet of its main characteristics," says Mann. "We plot the basin locations on geologic maps to gain understanding of their tectonic settings. We mine the published literature for seismic and well data to construct a database for each giant field. We can sort fields which share particular characteristics including production figures or geologic characteristics like reservoir types."

The value of such a compilation is to show how common patterns start to emerge in basins that share common tectonic environments: even though those environments are separated by thousands of kilometers or tens of millions of years. What appears initially as a hopelessly tangled geologic history starts to become simpler and more understandable once you fully mine the regional geologic databases and reconstruct the basin at the time of the giants' formation.

There appears to be a lot of interest among energy industry experts in the map. "The AAPG Memoir in which this first appeared [in 2003] has sold out," says Horn. "You can't get it anymore. That's rare for an AAPG Memoir to run out of press—and that was just three years ago."

#### **RUNNING ON EMPTY?**

Discoveries of giants, which make up roughly half the world's oil and gas reserves, have declined since the 1970s. No one argues about that, says Mann. The decline has led some experts to predict that oil and gas will run out in the next few decades.

Mann says his team's mapping and tabulation of fields helps to show how these trends are evolving decade by decade and how improving technologies like 3D seismic data are impacting the hunt. "There are 932 giants on our giants map at the moment," he says. "Working with Ian Cross, our collaborator at the Global Petroleum Information department of IHS, we are always adding new ones and classifying their tectonic settings. We greatly appreciate Ian's collaboration since he keeps us up to date with the latest discovery information from the industry."

In return, says Cross, the collaboration has increased the credibility of IHS within the energy industry: "Because of Paul's good reputation in the industry, his use of the data elevates our image." Cross also says that Mann helped them refine their data.

Both agree it has been a fruitful academic-industry partnership.

"At such a global scale," says Mann, "we can identify regional trends that may not be obvious to petroleum geologists working at much more local scales within well known giant cluster areas like the Gulf of Mexico, Persian Gulf or Western Siberian basin."

Of particular interest in their compilation are the new giants that are discovered in areas with no previous track record of giants. These are the potential cluster areas of the future since favorably large source and reservoir potential exists. Some examples of these new emerging clusters are the deepwater area of the Bay of Bengal (both eastern India and Myanmar), the Ordos and Tarim basins of western China, the Mekong delta of Viet Nam, the Sudan rift of Africa, and the deepwater area of northern Australia. In all of these areas, geoscientists are working feverishly to define the size and limits of the cluster. The larger the cluster area, the better the outlook.

The first part of this decade has seen an uptick in the number of giant discoveries, despite the overall decline in discoveries since the 1970s. This is a reflection of the tremendous increase in deepwater exploration of the passive margin and rift environments along continental margins.

#### TRAINING A NEW GENERATION

Mann and Horn taught a two day short course in 2005 to train oil industry geologists on what the characteristics are of known giants and how to identify potential giants in frontier areas.

Mann also includes this material for graduate level classes in tectonics and petroleum geology that he contributes to in the Department of Geological Sciences at the Jackson School. Most of the graduate students from the Department go on to exploration careers in the oil and gas industry.

Some past graduate students Mann has supervised include:

- Corrigan, J.D., 1986, Geology of the Burica Peninsula, Panama-Costa Rica: Neotectonic Implications for the Southern Middle America Convergent Margin, unpubl. M.A. thesis, Univ. Texas at Austin, 152 p. Jeff, was here recently and might be someone to ask about the giants study: corrigan.jeff@gmail.com (now at Zetaware, Inc.)
- de Zoeten, R., 1988, Structure and Stratigraphy of the Central Cordillera Septentrional, Dominican Republic, unpubl. M.A. thesis, Univ. Texas at Austin, 168 p., (Vols. 1 and 2) (now with Chevron, Houston, Texas).
- Heubeck, C., 1988, Geology of the Southeastern Termination of the Cordillera Central, South-central Hispaniola, Greater Antilles, unpubl. M.A. thesis, Univ. Texas at Austin, 251 p., (Vols. 1 and 2) (now geology professor, University of Berlin).
- Lamar, M.E., 1990, Structure and Stratigraphy of Pliocene Evaporites, Enriquillo Valley, Dominican Republic, unpubl. M.A. thesis, Univ. Texas at Austin, 181 p. (now a medical doctor, Waco, Texas).
- Tyburski, S. A., 1992, Deformational Mechanisms along Active Strike-slip Faults: SeaMARC II and Seismic Data from the North America-Caribbean Plate Boundary, unpubl. M.A. thesis, Univ. Texas at Austin, 194 p. (now living in Calgary, Canada).
- Kolarsky, R. A., 1992, Late Cretaceous-Cenozoic Tectonics and Sedimentation in Southern Central America (Costa Rica and Panama): unpubl. M.A. thesis, Univ. Texas at Austin, 351 p. (now at Watson Energy, Mandeville, Louisiana).
- Phinney, E., 1997, Sequence Stratigraphy, Structure and Tectonics of the Southern Ontong Java Plateau and Malaita Accretionary Prism, Solomon Islands: unpubl. M.A. thesis, Univ. of Texas at Austin, 128 p. (now at BP, Cairo, Egypt).

- Cowley, S., 1998, Oligocene to Recent Stratigraphic and Tectonic History of the Central Solomon Intra-arc Basin As Determined from Marine Seismic Data and Onshore Geology: unpubl. M.A. thesis, Univ. of Texas at Austin, 103 p. (now at BP, Cairo, Egypt).
- Castillo, V., 2001, Structural analysis of Cenozoic fault systems using 3D seismic data in the southern Maracaibo basin, Venezuela, unpubl. Ph.D. dissertation, Univ. of Texas at Austin, 188 p. (now at Eni Dacion, B.V., and lecturer at Simon Bolivar University, Caracas, Venezuela).
- Iaimes Carvajal, M., 2003, Paleogene to recent tectonic and paleogeographic evolution of the Cariaco basin, Venezuela, unpubl. M.S. thesis, Univ. of Texas at Austin, 94 p. (now at PDVSA, Caracas, Venezuela).
- Rogers, R., 2003, Jurassic-recent tectonic and stratigraphic history of the Chortis block of Honduras and Nicaragua (northern Central America), unpubl. Ph.D. dissertation, Univ. of Texas at Austin, 264 p (now assistant professor at Cal State Sanislaus).
- Escalona, A., 2003, Regional tectonics, sequence stratigraphy, and reservoir properties of Eocene clastic sedimentation, Maracaibo basin, Venezuela, unpubl. Ph.D. dissertation, Univ. of Texas at Austin, 222 p (now post-doctoral student at UTIG; will become professor at Univ of Stavanger, Norway).
- Aitken, T., 2005, Cenozoic stratigraphic and tectonic history of the Grenada and Tobago basins as determined from marine seismic data, wells, and onland geology, unpubl. M.S. thesis, Univ. of Texas at Austin, 89 p. (now at Devon Energy, Houston, Texas).
- Gorney, D., 2005, Chronology of Cenozoic tectonic events in western Venezuela and the Dutch Antilles Islands based on integration of offshore seismic reflection data and onland geology, unpubl. M.S. thesis, Univ. of Texas at Austin, 103 p. (now at Marathon, Houston, Texas).
- Soto, D., Interpretation of 3D seismic data across the major fault of the Caribbean-South America plate boundary in Trinidad, M.S. candidate (will graduate fall, 2006, and work for Marathon).
- Garciacaro, E., Tectonic controls on sedimentation in the Columbus basin, eastern offshore Trinidad (graduated spring, 2006, now at Apache Corp.).
- Hanzlik, M., Late Quaternary seismic stratigraphy and structure of the western insular shelf margin of Puerto Rico, M.S. candidate (graduated, spring, 2006, now at ExxonMobil).

This kind of exploration is extremely expensive.

"To pay for it," says Mann, "these companies really have to find giants to make it worthwhile. They have to make big discoveries. If they find a small field, they can't develop it because it isn't economical to create the infrastructure needed to move the oil or gas from the offshore area to a refinery."

This decade is poised to become the third most prolific in history for the discovery of giants. And that has Horn feeling optimistic about the future of oil and gas. "I see a turn around," says Horn. "There was a burst of activity in the 1960s and 70s with the advent of digital seismic. We had a major new tool. That was followed by a rapid decline in the 1980s and 90s. Now we're seeing a turn around."

Based on trends in the numbers of annual discoveries, Mann and colleagues predict that 33 more oil and gas giants will be discovered before the end of this decade, as reported in their talk at the April 2007 AAPG annual meeting in Long Beach, California.

These big picture, "trendology" type talks are important for the oil industry since it helps them decide which new areas to look at and where new data needs to be collected. In short: location, location, location! \*

#### PLATES

PLATES is a global geologic and plate reconstruction project. The project is an industry-supported program dedicated to developing software that models past and present tectonic plate movements and geologic environments.

PLATES reconstructions are built around a comprehensive database of finite-difference poles of rotation, derived both from extensive plate motion research at the Jackson School's Institute for Geophysics and from published studies. The project's software allows investigators to group together continents and, in conjunction with user-specified geoscientific data, move them over the globe with geometric precision. In addition, the software can produce animations of the major plates for the last 600 million years, yielding time-varying tectonic scenarios that enable analyses of evolutionary Earth processes.

Plate tectonics is a powerful tool for reconstructing (i.e. "predicting") geological environments through geologic history, particularly if the underlying plate motion model is accurate and detailed. PLATES tools are especially useful to groups engaged in exploration for hydrocarbons or minerals on global and regional scales. PLATES reconstructions provide a solid framework on which to build detailed geological models, such as basin response to regional crustal motion, likely sequences of depositional paleoenvironment, or probable geothermal consequences of plate position or movement.

lan Dalziel and Lawrence Lawver are the project's principal investigators. Lawver's research focuses on the tectonics of the Arctic, Antarctic, and East Asian regions. Much of Dalziel's research aims to determine the previous configurations of the southern continents (Africa, South America, Australia, and Antarctica) which, together with India, were assembled into a single continent known as Gondwana.

Lisa Gahagan manages the PLATES software and maintains its database.

To see reconstructions and animations from the PLATES program, visit http://www.ig.utexas.edu/research/projects/plates/

Ian Dalziel completes the installation of a GPS station in East Antarctica as part of the WAGN network of stations. Data from the stations will be used to measure crustal motions of the bedrock underlying and surrounding the West Antarctic Ice Sheet.





750 Ma Late Proterozoic



600 Ma Late Proterozoic



450 Ma Caradocian (Late Ordovician)



300 Ma Kasimovian (Pennsylvanian)



150 Ma Volgian (Late Jurassic)





# **LOCATIONS OF GIANTS**

Left: Location of Giants map by Paul Mann (Jackson School of Geosciences, University of Texas at Austin), Mike Horn (M.K. Horn & Associates), and Ian Cross (IHS Energy). Topographic map: Smith and Sandwell (1997).



#### 18 A. North America B. South America 16 C. Western Europe D. Eastern Europe 14 and former USSR E. Middle East F. Africa 12 G. Asia and Oceania 10 OIL GAS 8 TOTAL 6 4 2 0 В С D Е F G А

#### Location 57 Giants (2000-2005)

#### 910 Giants Sorted by Discovery Year



# **LOCATIONS OF GIANTS**

Left: Location of Giants map by Paul Mann (Jackson School of Geosciences, University of Texas at Austin), Mike Horn (M.K. Horn & Associates), and Ian Cross (IHS Energy). Topographic map: Smith and Sandwell (1997).



#### 18 A. North America B. South America 16 C. Western Europe D. Eastern Europe 14 and former USSR E. Middle East F. Africa 12 G. Asia and Oceania 10 OIL GAS 8 TOTAL 6 4 2 0 В С D Е F G А

#### Location 57 Giants (2000-2005)

#### 910 Giants Sorted by Discovery Year



# Exploration Development

#### TEXAS GEOSCIENCE TRAINING HELPS CULTIVATE BRAZILIAN EXPERTISE, ENERGY INDEPENDENCE

By J.B. Bird When Brazil achieved energy independence in April 2006, analysts credited the country's abundance of petroleum resources, deregulation of the national oil industry, and a forward-thinking approach to sugar cane ethanol.

One contributing factor was largely overlooked, but not by the country's geoscientists: The University of Texas at Austin

From 1968-2003, The University of Texas at Austin educated 58 geoscientists and worked on collaborative projects with dozens more from Petrobras, Brazil's national oil company. The amazing run, which is starting up again today (see sidebar, "Petrobras and UT Austin Renew Partnership"), included 14 master's degree graduates, 12 Ph.D.s., and scores of professionals in short-term programs-the largest contribution of any foreign university to Brazil's bumper crop of geologists, who surely deserve as much credit as sugar cane for Brazil's emergence as a self-sufficient energy producer.

Today, Brazil relies on oil and gas for about 48 percent of its energy consumption. With proven reserves estimated at 11.2 billion barrels of oil equivalent in 2005 (according to the U.S. Energy Information Administration), Brazil ranks 16th for national oil reserves, between Algeria and Kazakhstan, up from 25th in 1982.

In 2006, the milestone that caught the world's attention was Brazil's transition from net importer to net exporter of overall energy resources. Ethanol played a major role in the shift. Mandatory as an option in the country's flex-fuel cars, it has replaced about 40 percent of Brazil's gasoline consumption, according to Cambridge Energy Research Associates, freeing up more hydrocarbons for export.

But Brazil's energy equilibrium also resulted from explosive growth in petroleum exploration and production, particularly the development of heavy oil from deep and ultra-deep waters. These successes relied on strategic investments in education made decades earlier. To hear Brazil's leading geoscientists tell the story, The University of Texas at Austin was pivotal in spurring the growth.

Like many of his colleagues, Guilherme de Oliveira Estrella, managing director for exploration and production at Petrobras, does not just credit the University but singles out one of its leaders in particular: "Bill Fisher represents a turning point in the exploration history of Petrobras," said Estrella.

#### In the Beginning

How could one university—even one as substantial as The University of Texas at Austin—and more specifically one academic leader sway a national industry in the world's fifth largest country?

The story begins in 1968, when Petrobras sent Raul Mosmann to The University of Texas at Austin, allotting him nine months to complete a master's degree in geology. Years later Mosmann would become director of exploration and production at Petrobras. Today he is the regulatory affairs and geology manager for Exxon-Mobil-Brazil. In 1968 he was one of the first young geologists Petrobras sent abroad for a degree.

Mosmann came to Austin to work with Bob Folk on sedimentary petrology, but he was interested in the new discipline of depositional systems that Fisher and Frank Brown were teaching. "It was highly recommendedmany wanted to attend because it was a new idea in stratigraphy," said Mosmann. When he reeled out of the first class to confer with two fellow Latin American students, they were in shock from the pace of the scienceand their inability to understand Fisher's English. "The three of us were saying we didn't understand anything this professor said," recalled Mosmann.

Despite the language barrier, Mosmann persisted. When he returned to Brazil, he told his supervisor, the famed Carlos Walter Marinho Campos, director of Petrobras' new exploration and production unit, that he took an interesting course in depositional systems from one of the professors. He thought Petrobras should expose its people to this professor's ideas.





#### PETROBRAS AND UT AUSTIN **RENEW PARTNERSHIP**

Culminating efforts started in 2005 to reinvigorate the Jackson School's relationship with Petrobras, in February 2007 The University of Texas at Austin signed a multi-year agreement with the company to educate geoscientists and work on collaborative projects. The agreement will provide up to \$7.5 million in research, education, and training over the next five years. A major portion will focus on large research projects that provide hands-on training with real world data for Petrobras engineers and geologists working with the Bureau of Economic Geology. The work will begin with projects to study the carbonate reservoirs of Brazil.

The agreement includes hosting some of the brightest Petrobras scientists at the Jackson School while they pursue master's and doctoral degrees in geology, geophysics, and the Jackson School's graduate program in Energy & Earth Resources (EER). The EER curriculum offers a model for training across disciplines. By May 2007, several classes of Petrobras managers had been to Austin working with faculty from EER and the McCombs School of Business, completing short courses that integrated business, regulatory, environmental, geoscience, and engineering practices.

Sylvia Couto Anjos, a petroleum systems manager for Petrobras who helped negotiate the deal, called it a reinvigoration of Petrobras' longterm relationship with UT Austin. The once-strong ties had lapsed during the 1980s and 1990s, "but now it's a new generation, new people," said Couto. "We expect great results."

#### PETROBRAS ALUMNI AND **FRIENDS HONOR FISHER**

The 2006 Latin American Forum in Rio de Janeiro concluded with a celebration honoring Bill and Marilee Fisher for their contributions to Petrobras scientists who worked with The University of Texas at Austin. Drawing a crowd of more than 100 distinguished guests in Rio, the Jackson School event caught the Fishers by surprise. Alumni came from other Latin American countries and Europe to celebrate the event. Raul Mosmann presented commemorative gifts to both Marilee and Bill, including a plaque for Bill signed by 45 former students and colleagues from Petrobras, inscribed, "To Professor William Fisher, in recognition for his enormous contribution to the education of Petrobras geoscientists, from his Brazilian friends and former students."

Raul Mosmann presents Bill Fisher with a plaque from 45 former students and colleagues at Petrobras, in recognition of his contributions to the company.



#### "Bill Fisher did not teach us only technical points. Bill Fisher taught us to be intellectually honest. To face challenges." —Guilherme de Oliveira Estrella, Petrobras



Left: Sylvia Couto Anjos, petroleum systems manager at Petrobras, with Juan M. Sanchez, vice president for research at The University of Texas at Austin, during the February 2007 signing of the new agreement between the University and

"What's his name?" Carlos Walter asked. "Bill Fisher," Mosmann replied. And then, in a statement that Mosmann said became famous at Petrobras, he told Carlos Walter, "There is a problem-to understand what he's saying."

Carlos Walter brought Fisher down for a course, which started a relationship led by Fisher on one side of the equator, Carlos Walter on the other. By the early 1970s, Fisher was regularly traveling to Brazil lecturing, and Petrobras sent two geoscientists to Austin to work on stratigraphy. Several projects ensued with help from Fisher and the Bureau of Economic Geology. Carlos Walter liked the results. After sending a few geologists, he began to send geophysicists, first for master's degrees, and later Ph.D.s.

At a critical early juncture, Carlos Walter tried to get Petrobras to allow longer study times for students, enough to complete their degrees, which could not be accomplished in nine months. There was internal division at Petrobras, and Carlos Walter decided to take the matter to the board. He asked Fisher for data showing how many graduate geoscientists other oil companies had.

"Fisher sent data," said Mosmann, "and then Carlos Walter said, 'Okay, two days from now there's a board meeting and I want you there to support me." Fisher came down on two days' notice and helped Carlos Walter get approval of a major program in training. "It changed the pattern of training. It was a turning point in Petrobras," said Mosmann. "After that, Petrobras started to develop its own expertise."

#### Teacher Appreciation

Petrobras' expertise was very much in evidence July 9-11, 2006, in Rio de Janeiro, when dozens of representatives of Brazil's energy sectorgeoscientists, regulators, and business leaders-joined leaders from 13 other countries attending the Jackson School's second Latin American Forum on Energy and the Environment. In presentation after presentation, managers from the array of companies working in Brazil's now-deregulated energy sector started their presentations with compliments to Fisher and former mentors from The University of Texas at Austin.

Wagner Peres, exploration manager for the Southern Atlantic Team of Devon Energy Corporation, complemented Fisher for having

Petrobras. Right, left to right: Guilherme de Oliveira Estrella, Bill Fisher, and Francisco Nepomuceno.

"a major effect on our professional careers at Petrobras. I'm very clear that the development in the field of seismic stratigraphy in Brazil was sponsored mainly by Dr. Bill Fisher and Frank Brown," said Peres.

"In 30 years that I've been working, I never worked so hard as those years at UT, but I don't regret it at all," said Jorge Camargo, president of Statoil Brazil and a former member of the Petrobras board. "People like Bill Fisher, Milo Backus, Frank Brown, Clark Wilson, Paul Stoffa, many others played a very important part in the professional and academic development for many geoscientists from Brazil and Petrobras," said Camargo.

"We went to the University of Texas not only to try to take the master's and Ph.D. degrees but also to do common projects, exploratory projects in the continental margin of Brazil with the supervision of Bill Fisher," said Petrobras' Estrella. "But Bill Fisher did not teach us only technical points. Bill Fisher taught us to be intellectually honest. To face challenges. To be creative and to be very honest in our professional proposals in terms of exploration and production."

As the University's relationship with Petrobras deepened in the 1970s, a range of professors and researchers developed working ties with Brazilian counterparts. Many traveled to Brazil, "guys in geophysics, Milo Backus gave a lot of support to Petrobras, later on Paul Stoffa," noted Mosmann. "Bob Folk was important, he taught me sedimentary petrology," Mosmann said, then added with a smile, "but he doesn't like oil."

#### Critical Support

Throughout the relationship, Fisher and his wife Marilee cultivated a supportive environment in Austin that was instrumental for many of the visiting Brazilians. "Many of us were bringing families and having to study hard," said Mosmann. "Bill and Marilee were very helpful to foreign students, always with a lot of support for people, not only as students but as people."

Alumni recalled Marilee seeking out Portugese-speaking doctors, dentists, and babysitters, and helping new arrivals feel at ease in Austin's new culture.

Victor Dauzacker benefitted greatly from the Fishers' support. Through five years pursuing his Ph.D., Dauzacker found himself in occasional clashes with a member of his dissertation committee.







#### Education x Proven Oil Reserves



Francisco Nepomuceno of Petrobras used these four charts to illustrate the correlation between Petrobras' investment in education and training at The University of Texas at Austin and the return on investment in exploration and subsequently proved oil reserves. "He suffered a lot," recalled Mosmann. Fisher, his dissertation supervisor, encouraged him and helped him persist, ultimately recommending "Basin Analyses of Evaporitic and Post-evaporitic Depositional Systems, Espirito Santo Basin, Brazil, South America" for the university's best dissertation award in 1981.

Dauzacker went on to Australia, where he was the first person to suggest the turbidite model in the Otway Basin. Ironically, said Mosmann, "he worked with the guy he'd been fighting with at Texas—and they made a lot of money together."

By the 1980s, students like Dauzacker were riding the crest of a wave of collaboration with The University of Texas at Austin. The wave was about to crash, with the number of scientists enrolled peaking at eight in 1982 and dropping to an average of about one per year in the intervening decades.

Francisco Nepomuceno, executive manger of exploration and production for Petrobras, makes a compelling case for the value of the historical relationship—and how useful its renewal could be as Brazil moves into yet another phase in its search for hydrocarbons. In a series of slides shown at the first Latin American Forum in Austin, in September 2005, Nepomuceno tracked the close correlation between the number of Petrobras students working at The University of Texas at Austin and the number of wells the company drilled. Both numbers peaked in 1982 (when Petobras drilled 353 onshore, shallow water, and deep water wells). The expansion of Brazil's proved oil reserves followed the same general slope, but with about 20 years' lag behind education and exploration.

Nepomuceno's conclusion? Investing in education and research programs at The University of Texas at Austin was a brilliant longterm move for Petrobras and Brazil.

#### Deep Future

Working in today's de-regulated Brazilian energy sector, with revitalized competition and high prices, Petrobras is in a very different position than the mid- to late-1980s, when reserves were expanding and prices were dropping.

With strong production in place for its national needs, Brazil faces the combined geological and engineering problems of developing its abundant heavy oil resources. Much of the heavy oil resides in Campos and Espirito Santo basins, where Brazil expects to see significant production capacity added by 2008. Led by Petrobras, which still maintains by far the dominant stake in the country's hydrocarbon sector, Brazil anticipates major investments in exploration nationally. Petrobras alone plans to spend \$34.1 billion on worldwide E&P from 2006-2010, \$28 billion of that being designated for Brazil, as reported by Veronica Murillo in Rigzone.

"Oil prices are high, and the cost of finding oil has increased enormously," José Jorge de Moraes, general manager of E&P Brazil new ventures for Petrobras, told the Latin American Forum attendees in Rio. "Ultra deepwater is our present reality. We have enormous technological challenges to solve if we want to have success from now on."

To rise to those challenges, said Moraes, academia and industry have to join efforts, combining the best of human skills with the best of technology while balancing environmental concerns.

With one of the strongest sedimentology/stratigraphy programs in the world, an expanding focus on the nexus between energy and the environment, and a tradition of educating Brazil's best and brightest geoscientists, the Jackson School and The University of Texas Austin are poised to help propel the next expansion. **\*** 

## HEMISPHERIC VISION JACKSON SCHOOL REVITALIZES TIES THROUGH LATIN AMERICAN FORUM ON ENERGY AND THE ENVIRONMENT

**By J.B. Bird** Like oil and water, energy and environment do not always mix, at least not in public, where advocates for the two issues often hunker down into entrenched political camps. In an effort to bridge the divide—and unite two regions that have their own share of political history—the Jackson School launched the Latin American Forum on Energy and the Environment.

The initiative, led by inaugural Jackson School Dean Bill Fisher and Assistant Dean Doug Ratcliff, was designed to revitalize The University of Texas at Austin's ties to the energy and geoscience sectors of Latin America while creating a space for stakeholders to explore balanced stewardship of energy and environmental resources.

"Energy and the environment are issues that are essential to the future well-being of citizens of all countries," Fisher told attendees to the first forum in Austin, "and they form the core of most academic and research programs in the geosciences." As a result of that connection—and because the Jackson School has historically worked closely with many of Latin America's leading geoscientists—Fisher thought the school was ideally situated to bring together decision-makers for discussion and development of new projects.

Charles Groat, a professor of energy and mineral resources at the Jackson School, where he directs both the Center for International Energy and Environmental Policy and the Energy and Earth Resources Graduate Program, sees the value of organizations like the forum that can bring together diverse players.

"Energy and mineral producers commonly play up the economic value of a commodity and downplay environmental concerns, and as a result their credibility with the public is not always strong," noted Groat. "Environmental groups emphasize negative landscape impacts," he added, "and tend to downplay economic benefits." In between, Groat said, there need to be organizations perceived as honest brokers.

Few academic institutions can unite as many Latin American geoscience leaders as the Jackson School. Within an 11-month span the school hosted two meetings, in Austin (Sept. 18-20, 2005) and Rio de Janeiro (July 9-11, 2006), convening government ministers, energy executives, and international funding representatives from 14 countries. Guests included 22 ministers and directors of national energy and environmental agencies. Already one major joint project has resulted—a commitment of \$7.5 million from Brazil's national oil company, Petrobras, to pursue collaborative education and research projects with the University. Additional projects in Venezuela and Ecuador are under consideration.

#### Seeking Advice

At the Rio meeting, co-hosted with the Brazilian Institute of Oil, Gas, and Biofuels, the need to balance energy and environmental concerns was very much on the mind of John Briceño (U.T. BBA '85), Belize's deputy prime minister and minister of natural resources and the environment.

"I want advice—that's why I'm here," Briceño told the assembly. After five decades of failed oil and gas exploration in Belize, oil was finally discovered there in 2005 at a site called Spanish Lookout. The size of the discovery—10 million barrels of high quality light crude was modest by most countries' standards. But for a nation of less than 300,000 inhabitants, 30 percent of whom live below the poverty line, it was a windfall. The discovery prompted national celebrations, and also, said Briceño, major questions: "What are the impacts? Who will



José Chávez, CEO of Perupetro S.A., talks with Peter Flawn, former president of The University of Texas at Austin, at the inaugural Latin American Forum in Austin.

benefit? How will we manage the industry and ensure profits benefit as many Belizeans as possible?"

Complicating matters, Belize relies heavily on eco-tourism for revenue. The country is home to the world's first national jaguar preserve and second longest barrier reef. "So much of what we have here is fragile, so this is why we take the concerns of our friends in the environmental sector very seriously," said Briceño. "At the same time, in our context, leaving such a valuable commodity in the ground is not an option."

#### Neutral Parties

Each of the first two forum meetings included a mix of joint presentation sessions followed by breakout groups dedicated to energy and environment. Ample time was reserved for networking. The school invited forum members to bring partners and spouses, to give the event a personal touch and cultivate trust across national boundaries.

Presenters at the first forum included Armando Zamora, director of the National Hydrocarbons Agency of Colombia, discussing new models for expanding foreign investment in Columbia's hydrocarbon

sector, Allan Flores Moya, vice minister of energy and environment for Costa Rica, discussing Costa Rica's alternative energy programs, and Gordon Weynand, energy team leader of the U.S. Agency for International Development (USAID), talking about USAID's priorities in Latin America. Leaders from the Jackson School highlighted areas of potential collaboration with the region.

Given the range of energy economies represented at the forumfrom deregulated to nationalized and all trends in between-attendees found interesting subjects for comparison. Energy regulations emerged as one hot topic, with representatives curious to share best practices. Marilda Rosado de Sá Ribeiro, director of legal affairs for Brazil's National Petroleum, Natural Gas, and Biofuels Agency (ANP), began to assemble a matrix of energy sector regulations across Latin America and North America. Working with Scott Tinker, director of the Bureau of Economic Geology, she carried the work into the second forum in Rio, where regulatory practices became a major topic.

#### Southern Model

Part of the Rio meeting highlighted Brazil's success in exploration and production over the past three decades, a period when the country's proved oil reserves moved from 25th world-wide in 1982 to 16th in 2005. The recent celebration of Brazil's energy independence-when the country became a net exporter of energy-lent an air of triumphalism to the proceedings.

Sylvia Couto Anjos, a petroleum systems manager for Petrobras, analyzed Brazil's exploration history in the Petrobras era as a series of cycles of discovery, from onshore (1954-1967) to shallow water (1968-1983), deep water (1984-2001), and now deep and ultra deep water (2002-present). "In each new cycle, volumes discovered increased substantially," said Couto. "Only when we entered in the world of the deep-waters with its giant oilfields was self-sufficiency foreseen as possible." She believes Brazil's current phase of discovery may be its most important ever.

Representatives of Devon Energy Corporation, ExxonMobil, and Statoil ASA (joint sponsors, with Petrobras, of the Rio forum)

Participants in the 2006 Latin American Forum in Rio de Janeiro July 9-11, with members of the local organizing committee. For a complete list of those pictured visit the Latin American Forum Web site at www.jsg.utexas.edu/laforum.





Marina Stadthagen, director of the National Office for Clean Development (ONDL) in Nicaragua's Ministry of the Environment, talks to Roberto Urquizo (standing, right), undersecretary of environmental auality of Ecuador's Ministry of Environment, and Richard Kyle (center), professor at the Jackson School of Geosciences, during the inaugural Latin American Forum in Austin.

extolled the history of Brazilian exploration and their faith in a future fated to go deeper and farther offshore."We still believe that there are elephants to be found out there, and that's why we are here," said Wagner Peres, Devon's exploration manager for Brazil and the Southern Atlantic Basins.

Hydrocarbons are not, of course, Brazil's only source of energy elephants. Following the 1973 international energy crisis, Brazil began a series of policies to incentivize production and consumption of sugar-based ethanol. While the program experienced dramatic ups and downs, and nearly crashed with the low price of oil and high price of sugar in the late 1980s, today it is viewed as a major economic and environmental success. Biofuels and other renewable sources classed as biomass account for 29 percent of Brazil's energy consumption. Maria Antoniêta de Souza of ANP offered forum participants an overview of the biofuels program, of particular relevance to countries like Mexico interested in expanding ethanol production. Ethanol works in Brazil because of the low cost of domestic sugar, government policies requiring its use, and most recently, the automobile industry's embrace of flex-fuel passenger vehicles. Flex-fuel cars are far and away the most popular passenger vehicles in Brazil. In contrast, Antoniêta de Souza explained, trucks have until recently run on 100 percent hydrocarbon-based fuel. As a next step in its biofuels program, Brazil is phasing in a mandatory level of five percent biodiesel (a diesel derivative made from biomass) for the country's diesel fuel mix. Strong partnerships with universities are critical to the plan.

#### Double Vision

Even Brazil's much vaunted biofuels program draws fire from environmentalists who criticize farming practices and the use of land for fuel instead of food. From Belize to Brazil, all countries seek to obtain maximum benefits from their natural resources, but development of energy resources, noted Groat, is often perceived to conflict with stewardship of environmental resources that have their own economic value, such as habitat, tourism and health, as well as socio-cultural qualities. Can countries have it both ways? "Yes, but it isn't easy," said Groat In his presentation on "Resource Development and Environmental

Integrity: The Quest for Balanced Policies," Groat offered examples of win-win situations where industry adopted environmental practices that had economic benefits. In one case, Texas Utilities reclaimed land in advance of regulations, to increase the value as real estate. In another, depleted quarries were reshaped for houses, commercial structures, and recreation.

Groat described the potential for fostering such situations but cautioned that education and public discourse need to look more deeply at energy and environmental issues. "We do not present in education or outreach a balanced view," said Groat. "It tends to be an all-resource perspective from the companies or all-environment in the popular view. Companies' primary interest is in the value of the resource. Environmental groups sometimes leap to an 'It's evil' point of view and in extreme cases minimize resource value. Our education system needs to give a balanced view."

#### Common Thread

While policy discussions were lively, improving geoscience education was a dominant theme at both forums. Participants in the energy breakout in Austin highlighted as "far and away the biggest issue" the need for highly-trained talent that returns to work in Latin American countries, "so that Latin America can employ all of the energy understanding in the world today," reported session moderator Tinker. Energy participants concluded that a sustained university-based program in research-particularly in unconventional resources-should be the centerpiece for graduate education and professional training.

Participants in the environmental session identified one of their greatest university-related needs as training at all levels (policy, law, geosciences), in addition to help with developing sound regulatory practices and the creation of forums for sharing best practices.

The University of Texas at Austin has long been a top destination for Latin American geoscientists, whether they are seeking degrees or working with the Bureau of Economic Geology and other units on collaborative research programs. With Groat's new center focusing on energy and environmental issues, plus a confluence of strengths in regulatory law, energy management, and policy, the University is well positioned to offer a full-spectrum of education for Latin American energy and environmental specialists.

Now with the Latin American Forum, the Jackson School has a new leadership role—and perhaps a new way to help Belize keeps its pristine beaches while developing its oil wealth.\*

Participants in the 2005 Latin American Forum in Austin. For a complete list of those pictured visit the Latin American Forum Web site at www.jsg.utexas.edu/laforum.



#### = JACKSON SCHOOL INDUCTS 16 LEGENDS INTO NEW =

istinction

At the formation of the Jackson School of Geosciences on Sept. 1, 2005, it was decided that the new school should establish a tradition similar to that of other great institutions, a hall of distinction to honor individuals who are or were strongly affiliated with the school and who achieved exceptional distinction and standing in industry, government, or academia.

On March 23, 2006, the Jackson School inducted 16 geoscience legends into its new Hall of Distinction. The group of scientists, pioneers, and business leaders includes 10 former presidents, CEOs, and chairmen of major geoscience firms, among them the former

CEO of Conoco, the former president of Shell Oil, the former chairman of Humble Oil, and the current chairman of Freeport-McMoRan Copper & Gold Inc. Three academic geoscience leaders also entered the hall. Family members and friends joined eight of the inductees in Austin for a recognition ceremony in March. The other eight members, all deceased, were inducted posthumously.

All 16 of the inaugural members were previously elected Distinguished Graduates of the Department of Geological Sciences or members of the Hall of Honor in the College of Natural Sciences, of which the Jackson School was a part until Sept. 1, 2005.

#### = HALL OF DISTINCTION MEMBERS =

Laura Thomson Barrow received her bachelor's degree in geology from UT Austin in 1923. In 1989, she established the Laura Thomson Barrow Graduate Fellowship. Her wish was to support graduate students specializing in the area of natural resources with the added desire to attract women to graduate study in geology, as well as to recognize the importance of field-oriented studies. In 1952, she and her husband Leonidas T. Barrow helped organize, and donated to, the Geology Foundation. The foundation provides loans for needy students, travel funds for teachers, scholarship and fellowship funds, library funds, and endowments establishing named professorships and chairs in geological sciences. Along with her husband, she was honored with a Joint Distinguished Graduate Award in 1972 by the Geology Foundation. She and her husband were the founders of the Wallace E. Pratt Publication fund of the American Association of Petroleum Geologists. She died on May 28, 1996.

Leonidas T. Barrow and his wife Laura helped found, and donated to, the Geology Foundation in 1952. He served on the Foundation Advisory Council from 1957 to 1963 and was elected a lifetime honorary member in 1964. Barrow received his bachelor's degree in geology from The University of Texas at Austin in 1921. During his undergraduate days, he played on the Longhorn football and basketball teams, where he earned the nickname "Slim." His studies were briefly interrupted by the first World War, in which he served in the Signal Corps of the U.S. Army. He received his master's degree in 1923 and served as instructor in geology at the University of Texas from 1921 to 1924. Working for Humble Oil and Refining Company in the 1920s, he recognized the igneous origin of the material that makes up the pay section of the Lytton Springs oilfield in Caldwell County. He worked his way up in the company from field geologist to chairman of the board by 1948. He retired from Humble in 1955. He died on March 4, 1978.

Thomas D. Barrow is the former vice chairman of the Standard Oil Company (Ohio). Earlier in his career, as a geologist for Exxon, Barrow helped extend offshore exploration and production to deeper waters throughout the world. A prominent spokesman

for the protection of the marine environment and the efficient development of ocean resources, he was one of the founders in the early 1970s of the National Ocean Industries Association (NOIA), which grew into the leading trade association of the offshore petroleum industry. Among many duties at Sohio, he was responsible for oil and natural gas exploration and production activities and for Sohio's worldwide minerals business Kennecott, of which he had been chairman and CEO prior to its purchase in 1978. Barrow earned his B.S. in petroleum engineering (1945) and his M.A. in geology (1948) from UT Austin, and his Ph.D. in geology from Stanford University. He is an honorary life member of UT's Geology Foundation Advisory Council.

John F. Bookout, Jr., former president and CEO of Shell Oil (U.S.) and Shell Canada, began as a geologist and was a pioneer in Thomas Barrow (left) and John Bookout (right).





understanding the potential of oil and gas reserves, particularly in the Gulf of Mexico. In 1967 as exploration manager for Shell, he aggressively led their acquisition of a leading position in offshore leases, which proved fortuitous. Later, as president, he provided the direction to develop the geologic and mechanical technology required to lead the industry into oil and natural gas exploration and development in waters deeper than 1,000 feet. He is a recipient of the American Petroleum Institute's Gold Medal for Distinguished Achievement. He has received various medals of honor for his service in the Army Air Force during World War II. He has served and continues to serve on numerous boards for arts, health, education, and scientific organizations. Bookout earned his bachelor's (1949) and master's (1950) degrees in geology from UT Austin.

Don R. Boyd was the consummate Gulf Coast geologist. He held many offices and won numerous awards given by the professional societies in which he was active, including the Corpus Christi Geological Society, the Houston Geological Society, the Gulf Coast Association of Geological Societies, and the American Association of Petroleum Geologists (AAPG). He joined Pan American Petroleum in 1959 in Corpus Christi, a city that was to be his base of operations for his entire career. Later, he served as president of Gulf Coast Exploration Company. In 1989, he received honorary membership in AAPG and his good friend Dr. Bill Fisher of The University of Texas at Austin wrote in his citation: "Don Boyd is one of those unique and uncommon people who has excelled in a number of areas. He is a fundamental, published scientist, a successful finder of oil and gas, a respected businessman, and a working rancher. His broad success and effectiveness stem from a perceptive and discerning mind, a substantial volume of energy willingly spent, and, I think foremost, a consummate dedication to the institutions about him-family, church, business, profession, community, and the universities that trained him." Boyd received a bachelor's degree in geology from UT Austin (1958) and a master's in geology from Louisiana State University. Boyd died on December 20, 2000.

**Robert E. Boyer** first joined the Department of Geological Sciences as an instructor in 1957 after completing his Ph.D. at the University of Michigan. At UT Austin, he was promoted to associate professor, and then full professor in 1967. Throughout the 1970s, Boyer served as chairman of the department and director of the Geology Foundation. He is an honorary life member of the Geology Foundation Advisory Council. In 1980, he was asked to serve as dean of the College of Natural Sciences. He accepted and served 14 years, a period of remarkable growth and accomplishment in the college. Boyer now holds the Peter T. Flawn Centennial Chair Emeritus in Geological Sciences.

J. Ben Carsey was a 1956 graduate of the University of Texas with a bachelor of science degree in geology. He worked as a consulting geologist and was a member of the AAPG and the Houston Geological Society. Carsey, a longtime geologist for Humble Oil (later Exxon), was responsible for numerous discoveries and exploration concepts in Texas, Louisiana, California, and Alaska. When he retired from Exxon in 1961 he became a consultant in the Houston area with his son, J. Ben Carsey Jr. He served as president of the AAPG in 1967 and 1968. In 1985, he received the AAPG's highest honor, the Sidney Powers Memorial Award, in recognition of distinguished and outstanding contributions to petroleum geology. The AAPG has also honored him by naming a distinguished lectureship and a memorial grant after him. Carsey died March 30, 1998.

Stephen E. Clabaugh is the Fred M. Bullard Professor Emeritus in Geological Sciences and a long-time leader in UT Austin's Department of Geological Sciences. He earned his bachelor's (1940) and master's (1941) degrees in geology at UT Austin. He received his Ph.D. from Harvard University in 1950. After serving as a geologist with the U.S. Geological Survey from 1942 to 1946, he began his teaching career at UT Austin in 1947. Clabaugh taught physical geology, mineralogy and petrology, metamorphic petrology, and an elementary field geology course, among others. He received the UT Student's Association Award for teaching excellence in 1957. In 1958, he received the Minnie Stevens Piper Award for "outstanding

William Muehlberger (left) and Stephen Clabaugh (right).





Decker Dawson (left) and Toby Carleton (right).

academic, scientific, and scholarly achievement and for dedication to the teaching profession." He served as Department chair from 1962 to 1966. In 1974 and again in 1978, he received UT's Carolyn G. and G. Moses Knebel Distinguished Teaching Award. Through the years, he supervised an impressive 11 Ph.D. students and 33 master's students. He has been a member of the Geological Society of America for more than 50 years.

Morgan J. Davis was a member of the Suite 8F Group, named for the room in the Lamar Hotel in Houston where they held their meetings. Members of the group included Lyndon B. Johnson, George and Herman Brown (of Brown & Root), Texas governors William Hobby and John Connally, as well as several other prominent businessmen and politicians. Davis studied geology at The University of Texas at Austin in 1924 and 25. After leaving the university, he became a field geologist with Humble Oil. Over the next few years, he made rapid progress and eventually became chairman of the company. Davis was appointed as president of the American Association of Petroleum Geologists (1952-53). In 1953, he received a master's degree in geology from UT Austin. He retired in 1963 but continued to work as a petroleum geology consultant in Houston. He was also president of the Geological Society of America (1969-1970). Davis died on December 31, 1979.

L. Decker Dawson began his career as a geophysicist with Republic Exploration Company in 1946. In 1952, at the age of 32, Decker founded Dawson Geophysical in Midland, Texas, for the primary purpose of practicing exploration seismology. Starting as owner/party chief with one 24-trace crew in the Permian Basin, he was interpreter, supervisor, marketer, and investor. His wife Lou, acted as "computer." Early efforts enabled the company to help discover several major oil fields, allowing expansion to five crews in 1955. Dawson served as president for many years and more recently as chairman of the board and CEO. He served as president of the Society of Exploration Geophysicists (1989-1990), received its Enterprise Award in 1997, and was awarded honorary membership in 2002. He was president of the Permian Basin Geophysical Society and is an honorary life member. He was chairman of the board and honorary life member of the International Association of Geophysical Contractors (1981). He was inducted into the Permian Basin Petroleum Museum's Hall of Fame in 1997. He serves as an honorary life member of UT's Geology Foundation Advisory Council.

Peter T. Flawn has a long and distinguished history as a leader in the University of Texas system as well as in science and industry in general. He served as president of UT Austin twice and UT San Antonio once. He was named president emeritus by the UT Board of Regents in 1985. He served as professor of geological sciences and director of the Bureau of Economic Geology at UT Austin from 1960 to 1970. He became professor of geological sciences and public affairs in 1970 and Leonidas T. Barrow Professor of Mineral Resources in 1978. From 1970 to 1972, he served as vice president for academic affairs. He was elected to the National Academy of Engineering in 1974. He was president of the Geological Society of America in 1978 and president of the American Geological Institute in 1988. He was a member of the National Science Board from 1980 to 1986. The American Geological Institute awarded him their most prestigious honor, the Ian Campbell Medal, in 1993. He began his career as a junior geologist in the Mineral Deposits branch of the U.S. Geological Survey in 1948. He also conducted research at the Bureau of Economic Geology from 1949 to 1960. He received his B.A. from Oberlin College in 1947 and Ph.D. in geology from Yale University in 1951. He is a professor emeritus at UT Austin and an honorary life member of the Geology Foundation Advisory Council.

William E. Gipson began his career as a geologist working for Marathon Oil in Midland in 1949. He co-founded Stetco Petroleum in 1962, which was merged into Pennzoil Company the following year. He continued to work for Pennzoil, first as vice president for exploration and then as executive vice president and director of Pennzoil Offshore Gas Operators (POGO). In 1977, Pogo Producing Company was spun off, with Gipson serving as its president until 1989. He continued with Pogo until 1991 as a consultant and managing director of exploration. He has held leadership positions

William Fisher (left) and Peter Flawn (right).





David "Scotty" Holland (left) and William Gipson (right).

in numerous professional organizations, including director of the National Ocean Industries Association, president and director of the Domestic Petroleum Council, vice chairman and chairman of the AAPG Foundation Trustee Associates, and vice chairman and chairman of the Geology Foundation Advisory Council. Gipson served three years in the U.S. Navy during World War II on an amphibious gunboat in the South Pacific. Gipson received bachelor's (1948) and master's (1949) degrees in geology from UT Austin. In 1991, he became an honorary life member of the Geology Foundation Advisory Council. He is also treasurer of the AGI Foundation and a trustee of the AAPG Foundation.

John A. Jackson began his geology career at the Arkansas Fuel Oil Company in Shreveport and served in the U.S. Geological Survey during World War II helping to mine the state's bauxite fields for aluminum ore needed for the war effort. Jackson graduated from UT Austin in 1940 with a bachelor's degree in geology and used his perceptive skills in this area to discover the great Boonsville field in Wise County, Texas, one of the largest natural gas fields in the U.S. This success allowed him to form his own company, which he named Katie Petroleum to honor his wife, Katherine. The couple's major philanthropic support in later years focused on higher education and included the largest gift to a public university in the nation when Jackson chose in 2002 to give the balance of his and Katie's estate to the Geology Foundation, a gift of \$241 million in addition to \$25 million already provided to the university in 2001 to establish the John A. and Katherine G. Jackson School of Geosciences. He was an honorary life member of the Geology Foundation Advisory Council. The Jacksons' additional support of Geology Foundation efforts included endowment of the Jackson Teaching Fellowship, the Jackson Fellowship in Geohydrology, and the Jackson Fellowship in Exploration Geophysics. In 2003, the Geology Building at UT Austin was renamed the John A. and Katherine G. Jackson Geological Sciences Building. Jackson died in March, 2003.

**Leonard F. McCollum** set Conoco oil apart from the competition by taking chances and advancing the oil industry in unprecedented

ways. He led Conoco into innovative fields of foreign exploration, natural gas processing, fertilizers, detergents, and plastics. "He had dynamic ideas in business and was a pioneer in many areas," recalled his wife Eleanor. "He once bought a coal company for Conoco. They said he was crazy. It became their most lucrative investment." He attended UT to become a journalist, but a required geology course changed his fate. He went on to obtain his bachelor's degree in geology in 1925. Known affectionately as "Mr. Mc," McCollum began his career as a staff geologist with Humble Oil and Refining Company, then a Houston-based affiliate of the Standard Oil Company (Exxon). At 39, he was the youngest head of an oil company in the U.S. when he became president of Carter Oil Company, another division of Standard Oil in Tulsa. In 1947, he was recruited by Conoco, Standard's rival. He retired as CEO of Conoco in 1967. McCollum's greatest accomplishment may have been the development of Project Orbis, which turned a donated DC-8 plane into the "First Flying Eye Hospital." Containing a complete hospital, including a state-of-the-art operating room, the plane brings eye care to countries in need, educating local doctors on the latest innovations in eye care and surgery. Local doctors then treat their own people using the plane's facilities, equipment, and techniques. He died in 1993.

James R. Moffett orchestrated in 1981 one of the largest and most profitable mergers in Wall Street history-the merger of his oil exploration firm, McMoRan Oil and Gas Company, with Freeport Minerals Corporation, creating a \$4 billion enterprise. A geologist by training, Moffett was instrumental in the discovery and exploration of natural resource deposits around the world, especially the Grasberg gold mine in Papua, Indonesia. As CEO, Moffett oversaw a massive growth plan for the combined entities and expanded the firm's mining portfolio while successfully weathering a number of legal and environmental challenges. Moffett has also served as chairman of Freeport-McMoRan Copper & Gold Inc., president commissioner of its principal mining unit, PT Freeport Indonesia, and co-chairman of McMoRan Exploration Co. He received his bachelor's degree in geology from UT Austin in 1961. He is an honorary life member of UT's Geology Foundation Advisory Council.

Joseph C. Walter, Jr. began his distinguished career in the oil and gas exploration business as a geologist with Humble Oil & Refining Company, where he served from 1951 to 1957. He then founded Houston Oil & Minerals Corporation, where he served as chairman, CEO, and president until its merger with Tenneco Inc. in 1981. He formed Walter Oil & Gas Corp., where he served as chairman of the board. He later served as chairman of both Walter International Inc. and Walter Oil & Gas International, L.L.C. He served on numerous boards, including those of the Mid-Continent Oil & Gas Association, All American Wildcatters, the American Association of Petroleum Geologists, and the American Petroleum Institute. He was president of the Petroleum Club of Houston. Walter received his bachelor of science degree in petroleum engineering (1949) and master's degree in geology (1951) from UT Austin. Walter served as a member of the Geology Foundation Advisory Council from 1980 to 1984 and thereafter as an Honorary Life Member. He died on June 14, 1997. His name lives on at UT Austin in the Walter Geology Library and several endowed chairs in engineering and geology.**★** 



**BY KATHRYN HANSEN** The original version of this article appeared in the June 2006 edition of Geotimes. This edited version is reprinted with permission.

Sabrina Cervantez, a ninth grader at Del Rio High School in Del Rio, Texas, "loves learning about Earth" and "how our planet actually is," she said. "I want to know how and why things work, how they function, how they do things and why they do it."

As an eighth grader, Cervantez, who at that point had never traveled outside the state of Texas, entered the school science fair with a geology demonstration of plate tectonics, "but it didn't really get me that far," she said. That soon changed, however, after a teacher encouraged her to apply for GeoFORCE Texas, a summer program designed to shape the next generation of earth scientists.

In summer 2005, Doug Ratcliff, then assistant dean of the Jackson School of Geosciences, worked with colleagues from The University of Texas at Austin and industry to launch GeoFORCE Texas. Modeled after the Mathematics, Science and Engineering Academy, created by Isaac Crumbly at Fort Valley State University in Georgia, GeoFORCE initially planned to select 40 new students per year to spend about a

#### WANT TO LEARN MORE?

the Dean's Office at the Jackson School, dratcliff@jsg.utexas.edu,

week every summer from ninth through 12th grade learning about careers in geology.

The response to the initial year was so positive—with more than 100 students applying for 40 spaces—that at the urging of BP's Annell Bay and other industry champions, Ratcliff immediately added a second component, Young Geoscientists, a two-day course that takes students hunting for fossils and digging through quarries closer to home in Texas. By the summer of 2006, in just its second year, GeoFORCE was educating 180 students, Sabrina Cervantez among them. The program will educate 320 students when fully enrolled in 2008.

Ratcliff hopes that the intense program will address a key issue affecting the geosciences: the declining number of students pursuing degrees in math and science in "non-medicine-type" careers. Medicine is "pumped up by TV and movies," Ratcliff said. "We don't have a show about geologists driving Ferraris." Cervantez echoed his point, noting that among her classmates interested in science careers outside of medicine, most want to pursue jobs in technology and engineering, not geosciences.

After reviewing statements from the students and recommendation letters, Ratcliff and colleagues selected 40 students, including Cervantez, from a pool of top math and science students from school districts across South Texas. When she found out she was chosen for the program, "I was screaming my head off, I was so happy," Cervantes said. The students gathered in Uvalde, Texas, before embarking on a 12-day cross-country trip to meet geoscientists, tour national parks, and learn about career opportunities in the geosciences.

Nestled within the busy 12 days was a stop at the U.S. Geological Survey (USGS) in Reston, Va. There, GeoFORCE students explored career options through exhibits presented by participants such as the National Oceanic and Atmospheric Administration, the U.S. Environmental Protection Agency, and of course, USGS.

After this first trip in 2005, Cervantez returned with her classmates for the next year's academy, traveling through Zion National Historic Park in Utah, rafting down the Colorado River below Glen Canyon dam, and learning about differential erosion in perhaps the world's greatest living laboratory on the subject-the Grand Canyon.

"The goal is to try to get more students into that math-science pipeline that the nation is really thin on," said Stephen Hammond, a USGS hydrologist who worked to recruit exhibitors. A "huge bubble" of job vacancies will affect almost

all federal government jobs, from research to service, as baby boomers prepare to retire, he said.

Cervantez said that prior to GeoFORCE, she was not aware of the "amazing" variety of geoscience careers. She always knew she wanted to be a geologist but thought the field was limited to "certain categories." After visiting USGS, "I just got so excited," she said,

Left: Members of the 10th grade GeoFORCE academy approach a balanced rock near Lees Ferry, Arizona. Below: ExxonMobil's Christie Rogers, B.S. '97, poses with students before rafting down the Colorado River below Glen Canyon outside



#### **GEOFORCE SPONSORS**

Shell ExxonMobil BP Chevron Marathon

#### ConocoPhillips **Minerals Management** Service

Alcoa Foundation AT&T Foundation Dominion Exploration Halliburton Schlumberger Swift Energy Vulcan Materials Foundation

"there's hydrology, mineralogy-all these different fields."

To help increase numbers of math and science students, Ratcliff and colleagues targeted Geo-FORCE toward the mostly Hispanic and underrepresented region of South Texas. The program is open to students of any background-which the diversity of the classes reflects-but the regional focus translates into high Hispanic enrollment. Hispanics make up about 87 percent of the population living in the Lower Rio Grande Valley, according to Steve Murdock, a demographer for the Texas State Data Center. And from the total population in that area, almost 80 percent of people over 25 years old had not pursued a post-high school degree. Part of the reason, Ratcliff said, could be that the region is rural and not usually on the trail of college or industry recruiters.

Ratcliff hopes that after four summers of GeoFORCE, many if not all of the students will

be college-bound and that The University of Texas at Austin-and the Jackson School in particular—will be among their top choices. But he knows there is no guarantee. "I cannot tell you what a kid who is entering the ninth grade will do in four years," he said. "All we're trying to do is make an impression on them and show them what opportunities exist in the geosciences."

Page, Arizona. ExxonMobil allowed Rogers to serve GeoFORCE as an instructor for the entire week of the 2006 10th grade academy.

#### JSG CONTINUES STRONG TIES TO FORT VALLEY

GeoFORCE was modeled on the Mathematics, Science and Engineering Academy (MSEA), an established and highly successful program created by Isaac Crumbly at Fort Valley State University in Georgia. MSEA takes students from ninth grade onwards and exposes them to different concepts of earth processes which include field trips to major geologic sites, campus visits to universities partnering in dual degrees with Fort Valley State University, visits to oil and gas companies and federal agencies. As a dual degree partner with Fort Valley, the Jackson School has been proud to host MSEA 11th grade academies on campus, creating a rewarding curriculum complemented by field trips around Central Texas. MSEA and other students who enroll at Fort Valley have the opportunity to apply for the Cooperative Developmental Energy Program (CDEP), under which academically qualified students apply to complete their studies at The University of Texas at Austin, Pennsylvania State University, or other participating institutions. The University of Texas at Austin has enrolled four CDEP students, two in geosciences and two in petroleum engineering. JSG's first two, Stanley Stackhouse and April Duerson, graduated in May 2007. Stackhouse will continue at the Jackson School to pursue a master's degree.



Students from Fort Valley State University's Mathematics Science and Engineering Academy at the Jackson School (above) and atop Enchanted Rock.



#### IN THEIR OWN WORDS Members of the 2006 10th <u>Grade GeoFORCE Academy</u>

#### Hilary Prado, Uvalde High School, Uvalde, Texas

"The thought of one day being a geologist gives me butterflies. It's going to be a long way till I accomplish my dream but to me it's not about the money; it's a passion that drives me to go that extra mile."

#### Carlos de la Torre, Rock Springs High School, Rock Springs, Texas

Carlos has been speaking English for three years. He started ESL in California, where his parents were migrant workers. They came to Sabinal, Texas, because his dad said the cost of living would be lower. Carlos was selected as the top academic student in his GeoFORCE ninth grade academy. "I like the rocks, the strata, the rivers. I just wish it to be longer, the trip."



#### Sabrina Cervantez, Del Rio High School, Del Rio, Texas

"Being able to explore and study geology with peers that share my interest is invigorating. To be taught by expert geologists is inspiring. I want to prove I have the capability to be a great geologist someday. I can see myself one day working on a topographic map of the ocean floor or out on the field observing geological formations that are beyond belief."

#### Victoria Herndon, Nueces Canyon High School, Barksdale, Texas

Her first trip with GeoFORCE was her first time out of the state. She estimates that for more than half of the GeoFORCE kids in her class, the first year was their first trip out of the state. "Everybody gets along really well. Dr. Long was absolutely awesome and I learned so much on that trip."

#### Andy San Miguel, Hondo High School, Hondo, Texas

Another GeoFORCE student's mother, who is a teacher, got him to apply. The trip and the science "sounded cool." When he was admitted, he saw it as a chance to meet new people. "It helps us keep from just building stuff, working in the fields. GeoFORCE gives you more opportunities. A lot of people in my school are very laid back—they don't care about learning. Maybe we can start a trend."

#### Felipe Villanueva, Uvalde High School, Uvalde, Texas

Felipe, who has become interested in paleontology, had not previously been out of Texas and he sees GeoFORCE as a "chance to get away from home, to see new places," adding, "You know more—it helps you with school, and gives you more confidence to travel. It gives us a lot more chances."

#### Jacob Schroeder, Brackett High School, Brackettville, Texas

Jacob was in Young Geoscientists in 2005, but when a student dropped out because of a conflict, Jacob was able to maintain a B average in his courses at Brackett High and got the chance to attend the full academy. "Geoscientists do interesting things. It puts you in an atmosphere you couldn't easily be in otherwise—you wouldn't have the chance to do this in Brackettville." Jacob is interested in oceanography.



Getting students into the field helps to make a lasting impression, said Leon Long, the Second Mr. and Mrs. Charles E. Yager Professor and Distinguished Teaching Professor at the Jackson School, who has led some of the GeoFORCE field trips. A current college student recently told Long that after attending the introductory geology class trip to study uplift, he decided to major in geological sciences. Getting out into the field "has an enormous impact on these people," Long said.

The first-year academies included a trip to Carlsbad Caverns in New Mexico, the deepest limestone cave and the fourth longest in the United States. A guide led a walk through the cave, showing different types of limestone and where the area had once been under the ocean. Cervantez admitted she already knew some of the information from reading about different types of geology, "but actually seeing it and actually being able to go out there and get hands-on experience really made it stick in my mind," she said.

A geological field trip outside Taos, New Mexico, allowed students to apply classroom learning to the world around them. GeoFORCE took students, some of whom had never traveled outside of Texas, to get an up-close look at mountains, caves, and other geologic features.

Funding for GeoFORCE comes from the program's corporate and government sponsors, including Shell, ExxonMobil, BP, Chevron, Marathon and nine other companies and organizations (see complete list on page 63). The Jackson School itself also provides substantial funding from the Jackson endowment. The program is an all-expenses-paid event for the students, and the sponsors hope that down the road, they will see returns in that investment with more students deciding to enter geoscience fields.

In addition to providing the funding, however, the sponsors also participate. During the 2006 academy in Utah and Arizona, ExxonMobil sent geologist Christie Rogers, JSG B.S. '97, to serve as an instructor for the entire week. Having conducted her undergraduate research at Zion National Park, Rogers was a perfect match for the trip. Other industry professionals—BP's Patricia Hall and Tina Foster, JSG M.S. '03, Shell Exploration's Max Brouwers, and Chevron's Danielle Carpenter, JSG M.A. '96—also joined the academy, helping teach geology in the field and making presentations about the types of careers in geology.

#### TEACHERS GET HANDS-ON TRAINING

GeoFORCE relies on a network of educators to identify promising students. In return, the program looks for innovative ways to train teachers. In 2005, the program included a January training workshop with a professional development component, training educators on ways to teach Geographic Information Science through the use of free data sources and software, such as aerial photographs, satellite images, and Google Earth.

For 2007 the Jackson School hosted a field trip for science and math teachers from across Southwest Texas to see firsthand how modern oil and gas exploration is done. Teachers came from ten Southwest Texas towns, from Brackettville to Leakey. The workshop began with a field trip to see a frac job at an oil and gas well site in Three Rivers, Texas. Swift Energy Company, an independent oil and gas company based in Houston that owns and operates the 28,000



Jackson School graduate student Andrew Dewhurst prepares students from the 2006 ninth grade Young Geoscientists for some introductory petrographic identification during a visit to Vulcan Materials' traprock quarry in Knippa, Texas.

For 2006, the academies were pared back from 12 days to one week. Meanwhile, enrollment in the two-day Young Geoscientists course increased to 40 students per class.

Students have to maintain a minimum B average overall and in math and science courses to remain in the program. In the program's first two years, only one academy participant chose to leave Geo-FORCE, and none for academic reasons.

"The retention rate is extraordinary for a pre-college summer program," said Ratcliff. "It shows the great potential of these highachieving students and the excitement of the GeoFORCE approach to learning science from professionals in spectacular locations."

After her first two summers with GeoFORCE, Cervantez seemed to have made up her mind and said that she wants to become a planetary geologist. "It just blows my mind to see that there is this whole other world out there outside our own that we can explore." Time will tell, however, if two more GeoFORCE trips to come, including a 2007 academy in Washington state and Oregon, will reveal to Cervantez other yet-undiscovered and equally captivating geoscience careers. **\*** 

acre AWP Olmos field, hosted the event. Teachers learned how geoscientists and engineers explore for and produce hydrocarbons, integrate functional disciplines—professional and field alike—for success, and how they use science, math, and technology in their daily work.

"I have never been on an oil and gas site," said Marla Hibbits, a science teacher at Uvalde Junior High School. "It was amazing to see how they use all the technology to pull the gas out of the ground."

Swift Energy's Ed Duncan, Alan Goodwin, Richard Lang, David Coatney and Chris Miller graciously devoted several hours of their time to the tour, presentations, and a barbecue lunch.

"I am humbled that you have come to visit us," Duncan told the teachers. "I wouldn't be surprised if ten years from now, we saw some of your students come through here as employees."

The teacher workshop also included hands-on presentations from Jackson School professors and researchers on digital techniques for paleontological research, hydrogeology, and isotope dating.

# **EARTH SCIENCE EDUCATION GETS BOOST IN TEXAS**

**BY MARC AIRHART** To most readers of Texas newspapers, November 17, 2006, may have looked like just another day with nothing of importance reported from the Texas State Board of Education (SBOE) meeting, but for a cadre of earth scientists and educators, the day marked the culmination of years of effort and a major step forward for earth science education.

In the late 1990s, the SBOE removed earth science as an option for science credit for high school graduation. earth science education was also considerably reduced at the middle school level.

"It was very disappointing that when we at the university weren't looking, the curriculum was revised and we lost the opportunity to engage students in geosciences," said Sue Hovorka, a research scientist in the Jackson School's Bureau of Economic Geology (BEG).

Marcus Milling (then director of the American Geological Institute, formerly associate director of the BEG) took it as a call to arms; he arranged to have leaders of geoscience societies and organizations, professors, industry leaders, teachers, students, administrators, and even an astronaut testify and write letters to the SBOE extolling the importance of earth science.

Over the years they successfully lobbied the SBOE and the Texas State Legislature for a new high school course called Earth and Space Science. It would be a rigorous, lab-based, upper level "capstone program." Most importantly, it would count the same as other science courses such as biology, chemistry, or physics. The volunteers won approval in the fall of 2006 after several years of hard work.

Along the way, they also won approval for a new requirement that high school students take four years of science instead of three.

There are a couple of shortcomings, say supporters. Students have a choice between the new earth science course and several other options to fulfill their fourth year of science, and students and parents

State Board of Education Task Force on Earth Science (from left to right): Kenn Heydrick, Xandra Williams-Earlie, David Dunn, Susan Hovorka, Charles Kreitler, Janis Mergele, Ed Roy, Virginia Woods, Stan Pittman, and Sharon Mosher.



can petition to be allowed to follow a minimum graduation plan that doesn't require four years of math and science.

Still, supporters say, despite the limitations, Texas now has an opportunity to rebound from its rejection of earth science just a few years ago and set the pace for the future of earth science education in the nation's high schools.

#### EARTH SCIENCE CHAMPION

The person who had perhaps the biggest impact in this whole process was Sharon Mosher, the William Stamps Farish Chair in Geological Sciences at the Jackson School of Geosciences and then-president of the Geological Society of America.

She served along with Hovorka, Charles Kreitler, David Dunn and several public school educators on a State Board of Education Earth Science Task Force (ESTF) chaired by Ed Roy, a geology professor at Trinity University in San Antonio.

Roy worked tirelessly to promote earth science in Texas and to keep what was happening in Texas on the national agenda. Inspired by Roy's leadership, Mosher embraced the challenge and emerged as the community's champion in interacting with the State Board of Education.

After traveling the state for a year collecting input from the public, the Earth Science Task Force submitted a set of eight recommendations to the board in 2003, including a new earth science course at the high school level.

But this was just the beginning of the battle-three years of advocacy, letters, testimony, phone calls and long SBOE meetings followed. The Byzantine process eventually took Mosher and Kenn Heydrick, President of the Science Teachers Association of Texas and fellow ESTF member, to the state capital. Although that summer legislative session on education failed, the very next year the legislature mandated four years of science and math for high school graduation, a key step towards adding earth science.

According to Peter Flawn, president emeritus of the University of Texas at Austin and professor emeritus in the Jackson School's Department of Geological Sciences, "Sharon drove the effort here at the university and I think she deserves the credit for success."

Mosher's testimony and advocacy before the State Board of Education was crucial for the change, but she played an even more vital role coordinating the measure's supporters and creating a powerful lineup of figures to make the case to the state.

"I got people to testify, including Scott Tinker, William Fisher and Peter Flawn," said Mosher. "I made sure we always had a balance of academia and industry with different people for each SBOE meeting and tried to get people from different parts of the state to testify and write letters. I basically was a liaison between the Texas Education Agency (TEA) and the academic world and teachers."

In February 2004, Flawn testified before the State Board of Education that the benefits of the proposed course would extend beyond students planning to enter science.



Students explore groundwater issues with the Bureau's Aquifer in a Tank activity.

"Soon-to-be voting citizens must have basic knowledge about the Earth—what it is made of and how its natural systems function—if we as a society are to make good decisions about the relationship between the human species and the sustaining planet," said Flawn.

Tinker couched his advocacy in terms of state history, pointing out that "Texas depends more than any other state economically on earth science."

Kathy Ellins, the program manager overseeing educational outreach and public information at the Jackson School's Institute for Geophysics, provided public comments to the task force and other support. Ellins acknowledged that it was a group effort involving many people, including Ed Geary and Dan Barstow, leaders of a national movement called the Revolution in Earth and Space Science Education. However, Ellins said Mosher's contributions stood out. "Sharon was our champion in respect to dealing with the state legislature," she said. "We could have done all sorts of other things, but if the legislature hadn't heard us, there would be no capstone course. Her contribution was critical. She was just so determined and she had the political skills to do it. She also had the gravitas as she was

the president of the GSA at the time."

"She was a voice of reason throughout," said Hovorka. "She had a strong impact on the process. There were somewhat tempestuous debates that went off in wild directions. She was good about dragging them back to central issues that were important to earth science."

Mosher gives much of the credit for success to her public school educator colleagues. "Without the strong support and advocacy by earth science teachers and science administrators, we wouldn't have carried the day. When Kenn Heydrick and I went to the legislature and to the State Board together, it demonstrated a powerful alliance between academia and public school educators."

#### CAPSTONE

Today, the Earth and Space Science course only exists on paper. It is meant to be a "capstone" course, one that integrates what students have already learned in biology, chemistry, and physics to better understand the world around them.

"We think it is going to be a popular course and a national model," said Irene Pickhardt, assistant director for science at TEA. "It's very exciting." Pickhardt and Chris Comer, director for science at TEA, assisted in the process of changing the curriculum.

"Texas has an amazing opportunity to lead the nation in redefining earth science education for the 21st century," said Ellins. "It's going to be a rigorous, integrative course that shows how rich the field is and how essential it is to have the computational skills that the 21st century demands to acquire, analyze, and display data."

While huge strides have been made, the work is far from over. Supporters are now working behind the scenes to turn a great idea into reality.

A first order of business is writing a new set of guidelines for what will be taught in the Earth and Space Science course. This effort will be just one part of an overhaul of the entire TEKS or Texas Essential Knowledge and Skills, the guidebook that Texas teachers use to determine what they are required to teach.

"People think changing the TEKS is a simple process," said Pickhardt. "It's not."

Several of the Jackson School's researchers, educators, and alumni are ready to assist in rewriting the TEKS if asked to do so by the SBOE. They hope the changes will inspire more students to go into geosciences at the university level and in their careers. Even those students who don't go into geosciences should gain more exposure to the discipline, understanding how it relates to their everyday lives and perhaps becoming more receptive to public funding of research.

"Geologists have long suffered from the label 'Rocks for Jocks," said Hovorka. "That is, that geology is just studying pretty minerals and dinosaurs, that it's an easy science that anyone can get through."

She said it is easy in that it is exciting, relevant, and accessible, but it is also quantitative, inquiry-based, and rigorous. As pointed out in Mosher's and Heydrick's request to the SBOE, "Earth and Space Science, because its subject matters, is intrinsically fascinating and inspiring, thus perhaps giving students the emotional motivation to study science and engineering and master these rigorous disciplines."

"One thing the Jackson School needs to do is bring our clout forward and say when we study dinosaurs, they aren't the ones you get in your cereal box," said Hovorka. "We're using a CT scanner to look inside dinosaur eggs. Or when we work on minerals, we aren't categorizing them like they did in the eighteenth century." Instead, she said, they study how the minerals interact with subducting plates or with water inside Earth.

"We need to bring in that exciting and high tech quantitative perspective," she said.

Supporters have time to work on that. Although the new course could be taught as early as the fall of 2007, schools won't be required to offer it until the fall of 2011.

So when will kids in Texas actually start taking the new course? "In state government, I have learned not to put a hard and fast time on anything," said Pickhardt. "We expect the whole process to take some time."

Despite the sometimes glacial process, Mosher isn't deterred.

"I think it's extremely important for all people to understand how geological processes affect them and how they affect geological processes," said Mosher. "They have a profound affect on the Earth and they're going to have to make decisions. So it's important for all students to have earth science. It's the right thing to do." \*

# GEO FOUNDATION

#### **Geology Foundation News** NEW MEMBERS, GIFTS SPUR STRATEGIC VISION

On March 24, 2006, the Advisory Council of the Geology Foundation held its 100th meeting, an august occasion preceded March 23 by a ceremony inducting 16 legends into the newly constituted Jackson School Hall of Distinction (see related story on page 58).

The Geology Foundation and its Advisory Council were formed by The University of Texas Board of Regents in 1953. Through the dedicated efforts of the Advisory Council and many friends and alumni over the years, the Foundation has become a defining element of the Jackson School of Geosciences and is today the largest foundation at The University of Texas at Austin. As of September 1, 2006, total endowed and mineral assets of the Foundation exceeded \$408 million.

The driving force of the Foundation is its Advisory Council, which historically has included many of the corporate leaders in the energy, mineral, and environmental industries, as well as leaders from academia and government—a trend that continues today. The chairman as of September 1, 2006, was Fred L. Oliver, president of PVT,

Inc., of Dallas. The vice-chairman was James W. Farnsworth, at the time vice president of worldwide exploration for BP, and currently president and chief operating officer of Cobalt International Energy, L.P. The Foundation is governed by the Executive Committee, which for 2005-2006 was chaired by Foundation Director Bill Fisher and consisted of the unit heads of the Department of Geological Sciences, the Bureau of Economic Geology, and the Institute for Geophysics.

Joining as new Advisory Council members in 2005-2006 were Stephen R. Brand, vice president, exploration and business development, ConocoPhillips; Stephen C. Jumper, President and CEO, Dawson Geophysical Company; Andrew I. Quarles, vice president Canada exploration, Chevron Corporation; and David I. Rainey, vice president, Gulf of Mexico exploration, BP America Inc.

New endowments were established from the Jackson Endowment to create chairs in computational geosciences (\$1 million matched with another \$1 million from an

anonymous donor), energy and mineral resources (\$1 million), and to endow student support for the Energy and Earth Resources (EER) graduate program. The funds helped recruit chaired professors Omar Ghattas, who came from Carnegie Mellon University, and Charles Groat, director of the EER program, who joined the school in the summer of 2005 following six-and-a-half years as director of USGS. The endowed student support will help Groat expand and revitalize EER, which was formerly known as the Energy & Mineral Resources graduate program.

During the year, a new search committee consisting of 21 members, chaired by Sharon Mosher of the Department of Geological Sciences and including Advisory Council members Fred Oliver and Chuck Williamson, began to recruit the Jackson School's next dean. So as not to constrain the next dean, Inaugural Dean Fisher established a quasiendowment fund to allow monies to be reinvested for short terms to earn a higher rate of interest but still be available for use when needed. Funds from this endowment have been used for various activities such as the recruitment of new faculty and the construction of the new Institute for Geophysics building. The move leaves no long-term encumbrances for the new dean.

Members of the Jackson School community stand with JSG Inaugural Dean Bill Fisher and Institute for Geophysics Director Paul Stoffa (center) at the groundbreaking for the new Institute for Geophysics building on The University of Texas at Austin Pickle Research Campus, Sept. 26, 2005. Construction was funded with \$10.5 million from the Jackson Endowment.



Even as the school recruited its new dean, Eric J. Barron, a Strategic Planning Committee began work laying the ground work for the school's future vision. The council consists of two members from each of the school's three major units, working under the leadership of James Farnsworth (chair) and the Bureau's Martin Jackson (vice chair).

The Bureau of Economic Geology and Institute for Geophysics' endowments are now carried in the Foundation's portfolio. As of Aug. 31, 2006, the market value of the Jackson School endowments increased from \$285.3M to \$307.3M (+7.37%). The market value of the royalty interests was estimated at \$100.5M, resulting in a total market value of \$408M.

Alumni and industry contributors continue to provide substantial support for Jackson School activities. An array of companies provided support for students including BHP Billiton, BP, ConocoPhillips, ExxonMobil, Marathon Oil, and Shell, among others. The Chernoff family launched the new Chernoff Family Library Fund for Geopysics and Earth Systems Sensing with a gift of \$80,000, encouraging friends and colleagues of the late Charlie Chernoff to reach a goal of \$100,000. The Foundation greatly appreciates all of these contributions.

#### **Geology Foundation Advisory Council Effective September 1, 2006**

#### Chairman

Mr. Fred L. Oliver PVT, Inc.

#### Vice Chairman

Mr. James W. Farnsworth Cobalt International Energy, L.P.

#### **Honorary Life Members**

Dr. Thomas D. Barrow

Dr. Robert E. Boyer

Mr. L. Decker Dawson Dawson Geophysical Co.

Dr. William L. Fisher

**Members** 

Corporation

Dr. Peter T. Flawn

Mr. William E. Gipson Gas Fund, Inc.

Mr. James R. Moffett Freeport-McMoRan Copper & Gold, Inc.

Mr. Michael S. Bahorich

Technology Apache

**Exploration and Production** 

Mr. Ed Duncan Mr. Thomas E. Fanning

Mr. Paul D. Ching Shell International Exploration and Production Research and Development

Mr. Richard J. Chuchla ExxonMobil Exploration Company

Dr. Ronald A. Bain

Ms. Annell R. Bay

Company

Endeavour International

Mr. Kenneth T. Barrow

Shell Energy Resources

Mr. Robert R. Beecherl

Dr. Stephen R. Brand

Mr. Thomas M. Burke

Mr. A. T. (Toby) Carleton

ConocoPhillips

Tocor Exploration

Mr. Weyman W. Crawford

Dr. Rodger E. Denison

Swift Energy Company

sensing. The Chernoff Family Library Fund for Geophysics and Earth System Sensing will help the Walter Geology Library grow its geophysics collection A corporate match from ConocoPhillips will comp nent the gifts. The donors invite friends and colleagues of Chernoff to contribute to the fund to honor Charlie Chernoff. The goal is to raise a total of \$100,000. "I'm really excited about this new opportunity," said Senior Librarian Dennis Trombatore. "This will give us more security against the vagaries of library budgets as we grow. I'm really grateful to the Chernoff family for keeping our library among the very best." Charlie Chernoff retired from Chevron in 1992. He was born in Kamsack Saskatchewan. Chernoff started his career doing geological field mapping for Standard

#### New Library Fund Honors Charlie N. Chernoff, Contributions Welcome

Family members of Charlie N. Chernoff, a former chief st at Chevron Geosciences and past recruit icists at The University of Texas at Austin, have made pledges in his honor to establish a fund supporting library information in geophysics and remote



Oil. In 1960, he transitioned into geophysics. He remained in geophysics for the next 32 years, holding at retirement the position of chief geophysicist at Chevron.

Chernoff's career encouraged several family members to pursue the geosciences. His Two other Chernoffs, Michael's daughter Cathy and Charlie's daughter Cheryl, graduated from the School of Architecture at UT Austin.

Friends of Charlie Chernoff interested in contributing to the fund should contact Dennis Trombatore in the Walter Geology Library, drtgeol@mail.utexas.edu, 512-495-4680.

Mr. Denis Francois TOTAL E&P USA, INC.

Mr. James A. Gibbs Five States Energy Company, L.L.C.

Mr. John W. Gibson, Jr. Paradigm

Mr. Gerald M. Gilbert InterOil Corporation

Ms. Robbie R. Gries Priority Oil & Gas LLC

Dr. Paul R. Gucwa

Mr. Bill D. Holland Holland Exploration, Inc.

Mr. David S. "Scotty" Holland

Mr. Stephen C. Jumper Dawson Geophysical Company

Mr. David L. Kirchner Basin & Range Hydrogeologists, Inc.

Mr. James T. Langham, Jr. Langham McKay & Company

Dr. Susan A. Longacre ChevronTexaco Fellow, Emeritus

Mr. William D. "Dusty" Marshall

Amerada Hess Corporation

Mr. Jack H. Mayfield, Jr. Mayfield I, Ltd.

Mr. F. "Woody" Pace, Jr. Marathon Oil Company

Mr. James C. Patterson

Dr. Donald L. Paul Chevron Corporation

Dr. Andrew I. Quarles Pioneer Natural Resources Canada

Dr. David I. Rainey BP America Inc.

Mr. Don B. Sheffield

Mr. Russell G. Slayback Leggette, Brashears & Graham, Inc.

Mr. Daniel L. Smith Sandalwood Oil & Gas, Inc

Mr. William T. Stokes, Jr.

Mr. Bryan C. Wagner Wagner Oil Company

Mr. Joseph C. Walter III Walter Oil and Gas Corporation

Mr. Charles G. Weiner Texas Crude, Inc.

Mr. Addison A. Wilkinson

Dr. Charles R. Williamson

Mr. Phillip E. Wyche

#### **Members, Ex Officio**

Mr. William C. Powers, Jr. President, The University of Texas at Austin

Dr. Stephen Monti Interim Provost, The University of Texas at Austin

Dr. Eric J. Barron Director, Geology Foundation Dean, Jackson School of Geosciences, The University of Texas at Austin

#### GEOLOGY FOUNDATION ENDOWED ACCOUNTS

Values as of August 31, 2006	Book Value	Market Value
Edwin Allday Centennial Chair in Subsurface Geology		\$2,156,389
Edwin Allday Lectureship in Geological Sciences		\$453,597
Mary and Ben Anderson Endowment for Graduate Studies in Geology		\$93,537
Millard B. Arick Memorial Fund in Petroleum Geology		\$21,711
Milo M. Backus Endowed Fund in Exploration Geophysics		\$345,374
Virgil E. and Mildred L. Barnes Distinguished Lecture Series in Geology		\$66,156
Col. E. M. Barron Trust Account		\$357,220
Barrow Periodical Fund		\$422,181
Leonidas T. Barrow Centennial Chair in Mineral Resources	\$1,203,108	\$3,235,815
Laura Thomson Barrow Graduate Fellowship	\$310,470	\$647,819
Bloomer Fund for Motivated and Late Bloomer Students		\$418,015
Leslie Bowling Professorship		\$544,206
Wayne Franklin Bowman Endowed Presidential Scholarship		\$360,149
Don R. Boyd Endowed Fund	\$48,771	\$63,499

#### Gifts to the Geology Foundation 6.1.2005 – 8.31.2006

Chicken, Mr. Darvl S.

Adams, Mr. Matthew D. Allday, Mrs. Doris F. Amaral, Mr. Eugene J. Asquith, Dr. William H. Avers, Dr. Walter B., Jr. Bahler, Mr. David D. Barrow, Dr. Thomas D. Bell, Dr. Christopher J. Berry, Dr. Margaret C. Bjorklund, Dr. Thomas K. Bloomer, Dr. Richard R. Boyce, Mrs. Susie B. Braithwaite, Mr. Philip Brewer, Mr. Herbert L. Bristol, Mr. David A., Jr. Brite Dunkle White, Mrs. Jane Brunson, Mr. Wallace E., Sr. Bryant, Mr. Leonard C. Buck, Ms. Sharon K. Burke, Mr. Thomas M Bybee, Mr. Robert W. Byerley, Mr. Leon G., Jr. Cage, Mr. Warren J., Jr. Cage, Ms. Susan K. Cahoon, Mr. Frank Kell Callender, Mr. Dean L. Camp, Mr. Rodney J. Carleton, Mr. Alfred T. Caughey, Mr. Charles A. Cazier, Mr. Edward C., III Cervantes, Mr. Michael A. Chernoff, Dr. Carlotta B.

Abbott, Dr. Patrick L.

Abbott, Mr. Peyton O.

Chuchla, Mr. Richard J. Clabaugh, Dr. Stephen E. Clanton, Dr. Uel S., Jr. Cloud, Mr. Kelton W. Darwin, Mrs. Pamela T. Dean, Mr. Henry C. DeFord, Ms. Marion Wier DeLancey, Mr. Charles J. Denison, Dr. Rodger E. Denson, The Reverend I. Lane, III Donnelly, Ms. Jean C. Duchin, Mr. Ralph C. Dunbar, Mr. Don, Jr. Dupre, Dr. William R. Epstein, Ms. Ruth L. Espinosa, Mr. Roger P. Everett, Mr. H. Rizer Fanning, Mr. Thomas E. Feibelman, Mrs. Irma M. Fisher, Dr. and Mrs. William L. Flynn, Ms. Patricia A. Fourment, Mrs. Temple Frasher, Mr. J. H. Friddle, Mrs. Annabelle R. Fry, Mr. James E. Ganus, Dr. William J. Garza-Hernandez, Mr. Abelardo Geddie, Mr. Thurman B. Germiat, Mr. Steven J. Gilbert, Mr. Edwin F. Gips, Mr. Jerry R. Gipson, Mr. William E.

Greenberg, Mr. Joseph G. Gregory, Mr. William J. Groat, Dr. Charles G. Guess, Mr. Roy H., Jr. Haenggi, Dr. Walter T. Haertlein, Mr. Albert Haertlein, Mr. James A. Hall, Ms. Shiela B. Halloran, Ms. Maureen A. Hamman, Mr. Henry R. Harmon, Mr. Russell S. Haun, Mr. Keith I. Hixon, Mr. S. B. Hoffman, Mr. Paul F. Holley, Mrs. David Hooper, Mr. Ben P. Hoover, Ms. Eleanor M. Houser, Mr. Richard T. Huang, Ms. Lindsey H. Hull, Mr. Jack Hummel, Mr. Gary A. Hurst, Mr. J. Thomas Huston, Mr. Daniel C. Iacono, Ms. Kelly J. Jackson, Mr. Russell W. Jacobs, Mr. Louis L. Jean-Paul V. Gestel, Ph.D. Johns, Dr. Mary K. Johnson, Mr. Charles G. Jones, Mr. Jonny R., Jr. Keenan, Mr. Ray H. Kent, Mr. Robert T. Klimchuk, Mr. Glenn A. Kuno Balke, Mr. Bennie

Lambert, Ms. Cori A. Lawrence R. Mack, Ph.D. Lawson, Mr. Douglas A. Lehman, Dr. David H. Locklin, Mr. Allen C. Lovell, Mr. Stephen E. Ludwick, Mr. Lester E. Lundelius, Dr. Ernest L., Jr. Maler, Mr. Michael O. Manning, Ms. Jane Marshall, Mr. Sabin W. Martineau, Mr. David F. Martinez, Mr. Louis M. Masterson, Ms. Amanda R. Mayfield, Mr. Jack H., Jr. McBride, Ms. Mary W. McBroom, Robert L., Sr. McCarty, Mr. Robert B. McDowell, Dr. Fred W. McKenna, Dr. Thomas E. McKinney, Mr. W. N., Jr. McRae, Mr. Asa D. Meade, Dr. C. Wade Miller, Mr. Wayne D. Mills, Mr. Steven D. Mills, Mrs. Martha B. Miss Barbara Yule Monroe, Mr. William A. Montante, Mr. William M. Muehlberger, Dr. William R. Mueller, Dr. Harry W., III Neavel, Mr. Kenneth E. Neavel, Mr. Richard C. Nelson, Mr. Eric W.

#### GEOLOGY FOUNDATION ENDOWED ACCOUNTS

#### Values as of August 31, 2006

Don R. and Patricia Kidd Boyd Lectureship in Petroleum Exp Brahman Energy Company Scholarship Fund ..... Charl A. M. Broquet Memorial Endowed Scholarship Fund . Jesse L. Brundrett Memorial Endowed Presidential Scholarsh Fred M. Bullard Professorship in Geological Sciences ..... Fred M. Bullard Student Research Fund ..... Thomas and Ray Burke Student Job Program ..... Hal H. Bybee Memorial Fund ..... Hal P. Bybee Memorial Fund ..... L. W. Callender Memorial Fund ..... Dave P. Carlton Centennial Professorship in Geology ..... Dave P. Carlton Centennial Professorship in Geophysics ... Dorothy Ogden Carsey Memorial Scholarship Fund ..... J. Ben Carsey, Sr. Special Maintenance Fund .....

Newcomb, Ms. Dorothy E. Newnam, Mr. Albert H. Norman, Mr. Isaac W., Ir. Olander, Mr. A. M. Ottmann, Mr. Robert D. Paige, Mr. Richard E. Patterson, Dr. Calvin C. Patton, Mr. Edward N., Jr. Pickens, Mr. William R., III Pope, Mrs. Dorothy B. Preston, Mr. John W. Pustka, Mr. David A. Ragsdale, Mr. James A. Randolph, Mrs. Cathy Ray, Mr. Robert Randolph Reagan, Mr. M. Allen, Jr. Reaser, Dr. Donald F. Rinne, Mr. Austin D. Roach, Mr. Jess P. Roden, Mr. Michael F. Roeder, Mrs. Lynn S. Rosenberger, Dr. Randall S. Ross, Ms. Lucy O. Rowley, Dr. Peter D. Russell, Mr. Jimmie N. Sabins, Mr. Floyd F., Jr. Sagasta, Mr. Paul F. Sanders, Mr. Jack S. Savage, Dr. D. Keith Sellars, Mr. Robert T., Jr. Sewell, Mr. Charles R. Shainock, Mr. Victor M. Slater, Mr. William P. Slayback, Mr. Russell G.

Smart, Mrs. Marriott W. Smith, Mr. Daniel L. Smith, Mr. Schaun M. Smyth, Mr. Brian M. Sneed, Miss Ann G. Snyder, Mr. John L. Spence, Dr. Sam Spiegelberg, Mr. Frederick, III Sprinkle, Dr. and Mrs. James T. Stowbridge, Mr. Michael J. Symon, Ms. Christina M. Terriere, Dr. Robert T. Thompson, Mr. G. Mac Toepperwein, Mr. Douglas N. Trombatore, Mr. Dennis R. Trudeau, Mr. Steven R. Tucker, Mr. Delos R. Turner, Dr. Neil L. Udden, Mr. R. Andrew Underwood, Dr. James R., Jr. Van Wie, Mr. Matthew C. Vest, Mr. Harry A. Wagner, Mr. Bryan Campbell Wahl, Dr. David E, Jr. Walker, Mr. Mark C. Walston, Mr. Virgil A., Jr. Warner, Dr. Ralph H. Weise, Ms. Bonnie R. Wermund, Mr. Edmund G., Jr. Wheeler, Mr. Joseph O. Wheeler, Ms. Gail B. White, Mr. Jamie V. White, Mr. Leslie P. Wik, Mr. Bruce D.

#### **Book Value**

#### **Market Value**

ploration	\$68,760 \$160,705
	\$23,384 \$63,702
	\$15,133 \$19,748
hip	\$56,475\$119,562
· · · · · · · · · · · · · · · · · · ·	.\$391,816 \$611,876
	\$48,407\$58,937
	.\$270,602 \$368,078
	.\$167,049 \$290,964
	.\$717,925\$1,803,798
	\$69,213\$191,219
	.\$793,072\$2,304,893
	.\$602.321\$1.668.230
	.\$260.674\$501.780
	\$233,219 \$413,445

#### G ΕO LΟ GΥ FΟ N D ΑΤΙΟ z

Woodruff, Dr. Charles M., Jr. Woods, Mrs. Mary C. Worthington, Dr. David A. Yilmaz, Dr. Pinar O. Young, Mr. Marvin Young, Mr. William C., III, Abilene Geological Society **AFMS Scholarship Foundation** Alaska Airlines Alfred P. Sloan Foundation Anadarko Petroleum Corporation Apache Corporation AT&T Inc. Foundation Austin Envirosolutions Austin Gem and Mineral Society Balcones Women's Golf Association BP Amoco Oil **BP** Foundation **Burlington Resources** Foundation Central Texas Medical Management Inc. Chevron Corporation Coltex Petroleum Inc. **Communities Foundation** of Texas ConocoPhillips Dominion Exploration & Production Inc. Edwin Allday Estate Estate of John A. Jackson Exxon Mobil Corporation

ExxonMobil ExxonMobil Foundation GX Technology Corporation Halliburton Energy Services Inc. Holland Exploration Inc. Houston Geological Society Howard Exploration Inc. Imagine Resources LLC Iteris Inc. J.D. & V.L. Langston Foundation Jarratt Realty Kerr-McGee Foundation Corporation Marathon Oil Company Foundation Mineral Acquisition Partners Inc. Paleozoic Society Perugia Trust R & T Robertson Foundation Robert S. Kier Consulting Sams Exploration Inc. San Antonio Area Foundation Schlumberger Technology Corporation Shell E & P Technology Company Shell Oil Company Shell Oil Company Foundation Solutient Geosciences Inc. Swift Energy Company The Boeing Company Wilkinson Family Foundation Williams Companies Foundation Inc. XTO Energy Inc.

#### **GEOLOGY FOUNDATION ENDOWED ACCOUNTS**

Values as of August 31, 2006	Book Value	Market Value
Chevron Centennial Professorship in Geology	\$302,345	\$778,933
S. E. Clabaugh Fund in Hard-Rock Geology	\$71,082	\$141,063
W. Kenley Clark Memorial Endowed Presidential Scholarship	\$58,298	\$151,009
Joseph S. Cullinan Memorial Scholarship in Geological Sciences	\$52,268	\$147,575
Robert H. Cuyler Endowed Presidential Scholarship		\$203,399
Morgan J. Davis Centennial Chair in Petroleum Geology	\$1,011,623	\$2,559,202
L. Decker Dawson Fund in Exploration Geophysics	\$1,067,953	\$1,323,176
Ronald K. DeFord Field Scholarship Fund	\$256,368	\$633,374
Alexander Deussen Professorship in Energy Resources	\$295,388	\$628,117
Michael Bruce Duchin Centennial Memorial Endowed Presidential Scholarship	\$68,377	\$151,114
John E. "Brick" Elliott Centennial Endowed Professorship in Geological Sciences	\$374,433	\$1,047,979
Samuel P. Ellison, Jr. Fund	\$120,184	\$286,698
Energy and Mineral Resources Fund	\$37,038	\$101,566
William Stamps Farish Chair in Geology	\$507,160	\$1,343,180
Peter T. Flawn Centennial Chair in Geology	\$876,310	\$2,253,245
R. L. Folk / E. F. McBride Petrography Fund	\$56,226	\$68,520
Robert L. Folk Excellence Fund in Geological Sciences	\$93,690	\$131,825
Fort Worth Wildcatters Association Undergraduate Scholarship	\$25,532	\$29,838
Geology Foundation Advisory Council Centennial Teaching Fellowship	\$124,002	\$280,516
Geology Foundation Excellence Fund	\$127,780	\$245,360
Getty Oil Company Centennial Chair in Geological Sciences	\$1,040,199	\$2,800,358
James A. Gibbs Hydrogeology and Engineering Geology Research Fund	\$63,162	\$67,613
Robert K. Goldhammer Chair in Carbonate Geology	\$1,007,928	\$1,147,023
Graduate Fellowship in Exploration Geophysics	\$552,709	\$691,797
Miss Effie Graves Scholarship Fund	\$33,943	\$101,026
Guy E. Green Endowed Presidential Scholarship	\$40,862	\$108,893
J. Nalle Gregory Chair in Sedimentary Geology	\$800,073	\$1,918,282
J. Nalle Gregory Regents Professorship in Geological Sciences	\$348,679	\$758,759
Thelma Lynn Guion Geology Library Staff Award	\$18,673	\$28,941
Karl Frederick Hagemeier, Jr. Memorial Endowed Presidential Scholarship	\$50,488	\$110,296
George S. Heyer Memorial Fund	\$116,759	\$338,199
Bill D. Holland Endowed Presidential Scholarship in Geological Sciences	\$50,484	\$69,517
Houston Oil and Minerals Corporation Faculty Excellence Awards	\$65,480	\$174,486
F. Earl Ingerson Graduate Research Assistance Fund in Geochemistry	\$67,204	\$135,916
John A. and Katherine G. Jackson Centennial Teaching Fellowship		
in Geological Sciences	\$186,010	\$436,745
John A. and Katherine G Jackson Chair in Computational Geosciences	\$2,053,029	\$2,253,042
John A. and Katherine G. Jackson Chair in Energy and Mineral Resources	\$1,000,000	\$1,110,313
John A. and Katherine G. Jackson Chair in Earth System Science	\$1,000,000	\$1,013,109
John A. and Katherine G. Jackson Decanal Chair in the Geosciences	\$1,500,000	\$1,519,663
John A. and Katherine G. Jackson Endowed Fund in Geosciences	\$247,954,190	\$300,905,496
John A. and Katherine G. Jackson Exploration Geophysics Fund	\$26,983	\$33,904
John A. and Katherine G. Jackson Fellowship in Geohydrology	\$300,696	\$506,606
John A. and Katherine G. Jackson Fund for Energy and Mineral Resources Student	\$1,000,000	\$1 021 110
G Moses and Carolyn G. Knebel Teaching Fund	\$112 747	\$296.402
Martin R. Lagos Student Desearch Fund for Micropoloontology	¢27 /20	402φ290,402
Clara Jones Langston Contonnial Locturachin in Vertebrate Paleontology	¢31.069	¢76 150
L Depeld Langeton Special Operations Fund	¢274 520	¢702.409
J. Donaid Langston Special Operations Fund in Vertebrate Delegatelery		
In and manetia Langston research rund in vertebrate Faleontology	120,822 · · · · · Φισο,822 · · · ·	2/3,5/2 ¢176 114
Nanov and Allon Looklin Endowed Scholarchin in Detroloum Coology	Φιου,υσο ¢ολ ολ1	4/0,114 Φος οςο
		¢110 مەت
		¢804,000
Ceorge W Marshall Ir Memorial Endowed Precidential Scholarship		
George w. marshall, Jl. methonal Endowed Freshellial Scholarship		

#### **GEOLOGY FOUNDATION ENDOWED ACCOUNTS**

#### Values as of August 31, 2006

Arthur E. Maxwell Graduate Fellowship in Geophysics . . . . John C. and Marian B. Maxwell Undergraduate Scholarship Jack H. Mayfield, Jr., Fund for Excellence in the Geological S John H. and Lujza McCammon Endowed Scholarship ..... Mr. and Mrs. L. F. McCollum Scholarship in Geology ..... Michaux Scholarship Fund ..... Joan A. Middleton Endowed Scholarship in Geology ..... Carroll C. Miller Endowed Presidential Scholarship James R. Moffett Scholarship Fund ..... William R. Muehlberger Field Geology Scholarship Fund .... Wes Ogden Memorial Scholarship in Geophysics ..... Fred L. and Frances J. Oliver Lectureship in Texas Hydrology Judd H. and Cynthia Oualline Centennial Lectureship in Geole Judd H. and Cynthia Oualline Centennial Lectureship in Petro Judd H. Oualline Endowment Fund ..... Ed Owen-George Coates Fund ..... James C. Patterson Fund for Excellence in the Geophysical Bill R. Payne Centennial Teaching Fellowship ..... Joyce Bowman Payne Centennial Teaching Fellowship .... Pennzoil and Pogo Producing Companies-William E. Gipson O. Scott Petty Geophysical Fund ..... Wallace E. Pratt Professorship in Geophysics ..... Louis and Elizabeth Scherck Geology Scholarship ..... Wilton E. Scott Centennial Professorship ..... Walter Benona Sharp Memorial Scholarship in Geological Sci Shell Companies Foundation Centennial Chair in Geophysics Shell Companies Foundation Distinguished Chair in Geophys F. W. Simonds Endowed Presidential Scholarship ..... William T. Stokes Centennial Teaching Fellowship in Geologic Structural Geology and Tectonics Fund ..... Harlan Tod Sutherland Memorial Scholarship Fund ..... John and Elizabeth M. Teagle Scholarship in Petroleum Geole David S. Thayer Memorial Scholarship Fund ..... Tobin International Geological Map Collection Fund ..... Total E&P USA Petroleum Faculty Fellowship in Geological So Udden Memorial Scholarship Fund ..... Glenn and Martha Vargas Endowed Presidential Scholarship Glenn and Martha Vargas Endowment for Gems and Gem Mi Glenn and Martha Vargas Fund for Gem and Mineral Curation Glenn and Martha Vargas Gemological Scholarship in Geolog Joseph C., Jr. and Elizabeth C. Walter Geology Library Fund Albert W. and Alice M. Weeks Centennial Professorship in Ge Albert W. and Alice M. Weeks Fund in Geology ..... E. A. Wendlandt Fund Arno P. (Dutch) Wendler Professional Development Fund . . . . Francis L. Whitney Endowed Presidential Scholarship ..... Francis L. Whitney Memorial Book Fund ..... Addison A. and Mary E. Wilkinson Endowed Presidential Sch Geological Sciences John A. Wilson Professorship in Vertebrate Paleontology ... Charles E. Yager Undergraduate Field Scholarship Fund ... The First Mr. and Mrs. Charles E. Yager Professorships .... The Second Mr. and Mrs. Charles E. Yager Professorships . The Third Mr. and Mrs. Charles E. Yager Professorships .... Keith and Ann Young Endowment for the Non-Vertebrate Pal

#### Market Value

#### **Book Value**

	\$107,773	
in Geological Sciences	\$137,486	
Sciences	\$529,263	\$1,076,202
	\$15,106	\$41,483
	\$30,781	\$77,545
	\$14,844	\$38,996
	\$11,661	\$17,937
	\$40,612	
	\$26,400	\$29,312
	\$145,888	
	\$15,553	\$32,522
and Water Resources	\$86,004	
logical Sciences	\$108,824	
oleum Geology	\$100,770	
	\$25,105	
	\$138,896	
Sciences	\$166,283	
	\$120,832	\$285,364
	\$117,186	
Scholarships	\$222,367	\$481,410
	\$260,350	\$632,381
	\$242,055	
	\$127,017	
	\$321,696	
eiences	\$51,291	
3	.\$1,308,358	\$3,170,237
sics	.\$1,114,541	\$2,782,719
	\$36,095	\$105,657
cal Sciences	\$185,607	\$425,830
	\$139,674	\$299,605
	\$60,026	\$124,515
ogy	\$798,421	\$1,732,397
	\$39,099	\$98,564
	\$101,696	\$288,394
ciences	\$224,447	\$486,457
	\$27,354	\$54,471
	\$43,943	\$85,680
inerals Instruction	\$81,438	
n	\$66,003	\$88,251
gical Sciences	\$21,127	\$47,988
	\$800,458	\$1,462,802
eological Sciences	\$236,250	\$565,015
	\$649,062	\$1,318,875
	\$11,138	\$28,212
	\$139,982	\$362,973
	\$59,067	\$158,201
	\$60,980	
nolarship in		
	\$74,904	\$106,524
	\$225,188	\$520,523
	\$68,636	\$179,710
	\$168,024	\$481,395
	\$158,787	\$469,876
	\$218,231	\$594,757
leontology Collection	\$49,070	

# ALUMNI NOTES



Members of the Class of 2006 at the Jackson School's inaugural Spring Commencement. Left to right, first row: Clark Wilson, Leon Long, Richard Kyle, David Kilventon, Rachel Wells, Sarah Pierson, Wendy Robertson, Kim Nguyen, Tom Lovitz, Josue Gallegos, Bill Fisher, and Lesli Wood. Second row: Michael Hudec, Scott Tinker, Ian Dalziel, Joseph El-Azzi, Lauren Petty, Sara Hanson, Erin McGuire, Andrew Hernandez, Chris Kautz, Stacey Bilich, Sharon Mosher, and James Reilly. Third row: Charles Kerans, Bill Muehlberger, Sarah Zanoff, Dennis Potapov, Ian Moede, Kevin Hall, Chris Nungesser, and Emilio Garciacaro. Fourth row: Charles Groat, Omar Ghattas, Luis Crespo, Thuan Phan, Kim Kumar, Holden Hanna, Brandon Johnson, Rob Ferguson, and Bill Carlson. Fifth row: Mark Helper, Stephen Grand, Luis Faya, Dax McDavid, Wei Gao, Kevin Bain, Thomas Macrini, Patricia Montoya, Paul Stoffa, and Mrinal Sen.

Peyton O. Abbott (B.S., 1950) is retired and living in Pueblo, Colorado.

Aaron P. Abel (B.S., 2000) lives in The Colony, Texas and can be reached at aabel@reed-engineering.com.

Samuel C. Adair, Jr. (B.S., 1956) is retired and writes, "Still living in Walden on Lake Conroe. Continue to travel. I plan to go to South Africa this Fall." Samuel can be reached at samueladair@consolidated.net.

George Alcorn (B.A., 1996) George lives in Houston, Texas and can be reached at galcorn@terralliance.com.

#### Stay in Touch!

Use the enclosed envelope or our online form to let us know what you've been up to and to update your contact information. www.jsg.utexas.edu/alumni/submit.html.

Elaine Marie Allan (B.S., 1983) writes, "Husband Chris Campbell is still teaching and writing music. Son Adam is 10 yrs. old. Daughter Erika is 20 yrs. old. I am still retired. I have spent the year teaching my free ESL classes for Asian teens and adults, helping Katrina victims from the day after the storm to present, teaching free ESL school in summer for Asian kids ages 5-9, volunteering at schools (mostly on the East side and at Walnut Creek), and delivering thousands of books donated by half-price books to AISD schools and other recipients." Elaine lives in Austin, Texas and can be reached at borntohelp@earthlink.net.

Michael Amdurer (M.A., 1978) writes, "We have two kids, Zach (18 - starts at Tufts in the fall) and Francesca (21 - senior at Brandeis next year, semester abroad in Dublin this spring). Have lived in Denver since 1990. 1990-1997 managing the investigation,

feasibility study (pre-design) and Record of Decision at the largest non-nuclear hazardous waste site in the US - Rocky Mountain Arsenal (final cleanup bill about \$2 billion). 1997-2005 managed the Denver office and the Science Department of Foster Wheeler Environmental (now Tetra Tech). Started at AMEC in December 2005. Business lines include water resource management (water supply, stormwater design and municipal stormwater utility development, floodplain mapping); environmental compliance, investigation & cleanup; emergency/ hazard mitigation planning & response (including post-Katrina); and energy auditing (including LEED and windfarms)." Michael lives in Lakewood, Colorado and can be reached at mamdurer@aol.com.

Tom Anderson (M.A., 1967; Ph.D., 1969) writes, "I was delighted in the publication of GSA special paper 393 on the Mojave-Sonora hypothesis. Although many folks may think (correctly) that is was 20, 30 years too late. I am happy that it appeared! I am very grateful for cooporation from several UT colleagues. New projects in Puerto Rico, Nevada, and New Mexico."

Nancy J. Anderson (B.A., 1950) writes, "I still remember being one of only a handful of women majoring in Geology in 1948-1950. It was not considered an appropriate field for a woman. I am glad things have changed a lot since then. In the early to mid-50's, I worked at the Bureau of Economic Geology. I will never forget the lesson learned from Josephine Casey and Dr. Virgil Barns." Nancy lives in Cedarhill, Texas.

Payton V. Anderson (B.S., 1945) writes, "Evelyn and I have been married for 60 yrs. Our three daughters are doing ok. Even at the age of 81, I am still busy in oil & gas explorations in most continental producing areas Also, Evelyn and I are world wide travelers. Have several trips in mind. Best regards to all UT Grads." Payton lives in Midland, Texas.

Randi Ashburn (B.A., 2005) lives in Houston, Texas and can be reached at rashburn@houston.oilfield.slb.com.

#### **Generations of Graduates**

grandfather - Joseph B. Avant, BS 1951). I keep my hand in the business with a little Texas and can be reached at savant@alumni.utexas.ne



r generations of UT geoscientists. The Avant Family near Tarpley, Texas - July 1998. From left: Joe t (B.S., 1951) deceased, Marvia Avant (daughter-in-law), Betty Avant (sister-in-law), Blair Avant ev (B.S., 2006). John Avant (brother). Rick Stanley. Jorden Stanley, Sara Avant-Stanley (B.S., 1978

usgs.gov.

Mark G. Avery (B.S., 1983) is Chairman, President and CEO of Ausam Energy Corporation and lives in Calgary, Alberta.

Byron A. Bachschmid (B.S., 1983) writes, "[I] returned to Texas in 2001 after working in Venezuela for six years. Last year Elba received her USA citizenship. Working as consulting geologist for independent oil company in Midland Texas." Byron can be reached at byronelba@msn.com.

Abhaya (Ajay) R. Badachhape (M.A., 1988) resides in Sugar Land, Texas and can be reached at ajay.r.badachhape@conocophillips.com.

Carol Swenumson Baker (B.S., 1984) is a geophysicist with ExxonMobil and writes, "The kids are getting older - 16 and 10. So are Rodney and I! No complaints - life is good." Carol lives in Houston, Texas.

Charles "Sandy" Beach (B.S., 1987) lives in Midland, Texas and can be reached at sbeach@beachexp.com.

William H. Asquith (Ph.D., 2003) is a research hydrologist and lives in Austin, Texas. He can be reached at wasquit@

**Don Bebout** writes, "[I] retired from the Bureau of Economic Geology in 1994. Since that time I have been a full-time potter, designing and making functional stoneware pottery." Don lives in Austin, Texas.

Ellis Belfer (B.S., 1987) writes, "[I am] living in Dallas and working as a network architect for Alcatel integrating voice, television, and data application over an all IP network." Ellis lives in Dallas, Texas.

Walter E. Belt Jr. (B.S., 1943) is retired and writes, "Virginia and I have lived in Sun City, Texas since August 2004." Walter can be reached at webjr@cox.net.

Martha Beltran (M.A., 1996) is a geoscience specialist and lives in Houston, Texas.

Charmaine Bentley (B.S., 1977) is a teacher and lives in Plano, Texas. Charmaine can be reached at charmainebentley@csta.acm.org.

Mark Berlinger (B.A., 1982) lives in Mount Pleasant, South Carolina and can be reached at marcladom@comcast.net.

Earl H. Bescher (B.S., 1942) writes, "Not many of my classmates are left. I left UT at conclusion and went with Humble oil and retired in 1981." Earl lives in Kingwood, Texas.

Carrie Beveridge (B.S., 2001; M.S. GSC 2004) is a hydrologist and lives in Austin, Texas. She can be reached at carriebev@ vahoo.com.

Don G. Bilbrey (B.S., 1953; M.A., 1957) is retired and writes, "I survived Katrina with only moderate wind damage to trees and house, no flooding or levee breaks here in Algiers. But it may be time to get out of hurricane country and return to tornado alley (North Texas) or to Seattle, to be near my daughter and her family. It's a big decision for a seventy-seven year old widower set in his ways and who still loves to play golf in warm weather." Don lives in New Orleans and can be reached at donbilbrey@webtv.net.

Sevin Bilir (M.A., 1992) writes, "I moved to Seattle last year and am enjoying the change from CA. I got through my first winter here, so I guess I can handle the weather. I'm currently working mostly on the hydrogeology at some county landfills. I'm also in the process of starting a business in the fitness field and I'm planning to continue in both fields, part-time. More later when the new business is up and running. On the personal



Congratulations to Bob Blodgett, (Ph.D., 1990), co-author of Natural Hazards: Earth's Processes as Hazards, Disasters and Catastrophes, published in 2005.

front, I've joined the locals and started playing soccer again after a 25 year lapse. I hope to hear from any UT friends."

William T. Biskamp (B.A., 1954) is retired and writes, "Eight grandchildren in the metroplex keep us busy. Our entire family is doing well. Mona is wheelchair bound for a time, due to a knee replacement. Other than usual ailments, we both are doing well. We sell some real estate from time to time. Currently moving to a smaller house (no pool and no yard!)." William lives in Dallas and can be reached at 7billbis@airmail.net.

Peter E. Bittenbender (M.A., 1991) writes, "I continue to do mineral assessment of public lands in Alaska. Great job! I travel across the state, do some real geology, and work with some smart people. Karen still teaches high school English. Asha is going into 4th grade. Juneau's beautiful - you should see it some time. Call if you're in town.

Keith D. Bjork MD (B.S. 1984) writes, "[I am a] practicing Orthopedic surgeon specializing in sports medicine in Amarillo, TX. Greetings to my fellow geology travelers who went to Switzerland for the GEO 660 requirement. Keep in touch. You know who you are." Keith lives in Amarillo and can be reached at kbjorkmd@aol.com.

**Tom Bjorklund (M.A., 1962)** writes, "I continue to spend some of my retirement time as a Research Scientist at the University of Houston. The focus of my research is on the structural evolution and petroleum potential of the Los Angeles basin and continental borderland and the application of seismic attributes to characterize complex reservoirs." Tom can be reached at tbjorklund@uh.edu.

**Frederick S. Blackmar (B.S., 1955)** writes, "Gave up the golf club business. Still teaching a bit and playing golf (ladies tees). Recently shot 39 on back 9 at country club and missed an ace by two inches on #17. All playing standing up in my walker and sans right hip. Still cutting and polishing agates from around the globe. Carolyn and I had our 51st anniversary this February." Frederick lives in Corpus Christi can be reached at fcblackman@webtv.net.

Asa L. Blankenship, Jr (B.A., 1950; M.A., 1952) is retired and writes, "Would like to hear from old friends. Call me anytime @ 713-778-5838." Asa lives in Houston, Texas.

Robert H. Blodgett (Ph.D., 1990) is a professor and writes, "In the past year, I marked a decade of teaching at Austin Community College and co-authored an introductory geology textbook with Ed Keller of UC -Santa Barbara. Our book, entitled Natural Hazards; Earth Processes as Hazards, Disasters, and Catastrophes, was published in July 2005. The reception for our book has been encouraging with adoptions by over fifty colleges and universities in the U.S. and Canada. Courses with a focus on natural hazards/disasters are becoming a popular way of teaching geosciences to non-majors." Bob lives in Austin, Texas and can be reached at rblodget @austincc.edu.

Kelly Bobbitt (B.S., 1986) lives in Atascadero, California and can be reached at family@kbobbitt.com.

Patricia Bobeck (M.A., 1985) writes, "2006 has been an exciting year with two trips to France related to Henry Darcy. In May I participated in the IAH International Colloquium in Dijon to celebrate the 150th anniversary of the publication of Darcy's Law. Darcy published the law in 1856 in his book titled Les Fontaines Publiques de la Ville de Dijon, and my English translation of the book was

published in 2004. Since I was in Paris for a few days, the Société Française des Traducteurs invited me to give a presentation about the Darcy book at the Académie des Sciences. In 1857, Darcy was invited to join the prestigious Académie, but died in January 1858 before he had the chance to do so. In August, I led my first Darcy field trip to France. The group visited the Darcy sites

in Paris, including the Sewers Museum (a tourist must!). In Dijon, we followed the trace of Darcy's water supply system using Darcy's map. We visited the spring that supplies Dijon's water and followed the trace of Darcy's 13-km aqueduct. We were able to go down into one of Darcy's reservoirs. We also spent an afternoon with Darcy's descendants. To round out the trip, we went to Chamonix and took two cable car rides over the glacier to Italy, and then to the south of France to see the Pont du Gard, the aqueduct built by the Romans, and the Fontaine de Vaucluse, the largest karst spring in France. We ate wonderful French food at every meal, but ended up losing weight because of all the walking we did. We had a great time, and are planning to go back to visit additional sites next year." Patricia lives in Austin, Texas and can be reached at pbobeck@earthlink.net.

Dan Bodner (M.A., 1985) writes, "While I started in the environmental business out of UT and worked in that industry for ten years, I eventually parlayed my managerial and computational experience into a computer consulting profession. Now I own Bay Office Computing, LLC which specializes in out-sourced IT support and has been serving clients for five years. I met my wife Ruth six years ago and we have two redheaded children, Rebekah, almost four, and Cole, almost two. We love our Oakland home and living in the Bay Area but we do fret about the condition of the California public school system." Dan can be reached at dan@ BayOC.com.

Gerald Pat Bolden (B.S., 1951) is a Monroe Cheney Science Award, SW Section Am. Assoc. Pet. Geologist, Honorary Life Member W. Tex Geo Soc. Speaker at all nine Geo Soc SWS AAPG & others plus National AAPG & SEG. Vet WW2 and still prospecting. Shell-25mmBO, Hinkle, Moralo & others 10mmBO, Treasurer SWS AAPG 2000-2002. "I am healthy but tired of going to funerals of my friends and classmates. Come see me in Midland or call 432-559-3279. I will take you to lunch."

#### Silverio "Sil" Bosch (B.S., 1974; M.A., 1975)

writes, "[I am] continuing South Texas Exploration, primarily in the Wilcox. Becom ing more of a computer nerd every day with SMT, but keep reminding myself to look at logs, draw contours with pencils, and use common geologic sense. Oldest son Matthew (18) entering UT in Fall 2006; leaning towards biomedical engineering/pre-med. Younger son Eric (16) entering junior year in high cchool; leaning towards spending money. Lisa, the boys and I all had a great scuba diving vacation in Cozumel, after the boys finally got certified with their checkout dive at Lake Travis (polar diving in Central Texas) in May 2005. Glad to see Horns do so well in all sports this year, and to see the Geological Department become such a world class organization. We need more geoscientists because the attrition rate due to death and retirement is horrendous.

Best wishes to al the AARP members I went to school with (scary)!!" Sil lives in Corpus Christi, Texas.

Patti (Yates) Bourland (B.S., 1980) writes, "Gregg is at Phoenix Gas Pipeline and I am at ExxonMobil. We have been ten minutes door to door from home in Bellaire to work for over ten years now. Our oldest daughter finished her first year at Trinity University and our younger daughter will go to TCU in Fort Worth in the fall. In the next twenty-five years we plan to be living full time at Lake Travis. Been in Houston way too long. Hey Suzy, where are you?" Patti can be reached at pabourl@aol.com.

Walter A. Boyd, Jr. (B.S., 1953) is retired from Columbia Gas and lives in Houston, Texas. He can be reached at wildbill@p38.com

ALUMNI NOTES

Walt V. Boyle (B.S., 1954, M.A., 1955) writes, "Enjoying retirement. Traveling, men's church organization and gardening. Vada Marie is serving her third term as Vice-President of the Houston Symphonic League for Education." Walt lives in Houston, Texas.

**Cynthia A. Bradford (M.A., 1982)** Cynthia resides in Metairie, Louisiana.

Philip Braithwaite (M.A., 1958) writes, "Our main news this year is that our daughter Bridget died unexpectedly of a heart attack in March. Of course it has been a sad time for both of us." Philip lives in Dallas, Texas.

**Robert F. Brandt (B.S., 1957)** writes, "Semiretired, teaching part-time, physical geology and environmental science, on the Internet (Distance Education) at Houston Community College." Robert lives in Houston, Texas and can be reached at rfbrandt@aol.com.

Marcia Branstetter (Ph.D., 2001) Marcia lives in Oak Ridge, Tennessee and can be reached at branstetterm@ornl.gov.

**Clay Brollier (B.A., 2005)** Clay lives in Houston, Texas.

**Gerald R. Brooks (B.S., 1958)** is retired and lives in Bossier City, Louisiana. He can be reached at tutugrb@bellsouth.net.

Neil Brooks (B.S., 1978) writes, "After working fourteen years with large companies, first with Oxy and then with Pennzoil, I did the consulting thing for five years; mostly in Mexico but also in Venezuela. Working on fields in various basins-Burgos, Veracruz, Salinas del Ismol, Tampico/Misantla and Campeche-was interesting. But while occasional travel may be okay, constant travel is not. So I am back with a large oil company again. In 2001 I joined Agip Petroleum (now called Eni) and am still here, working only in the offshore portion of the U.S. Gulf of Mexico." Neil lives in Houston, Texas and can be reached at neilcb@hotmail.com.

C. Elmo Brown (B.A., 1976) writes, "This marks the year that I serve as President of the Rocky Mountain Association of Geologists (RMAG). Part of the job entails writing a letter in each of our monthly newsletters and, unlike my presidential predecessors, the accompanying personal pictures that I have been including revolve around my young years (I was much cuter back then) including a few pictures of my time in the University of Texas geology program. Digging through all of these old pictures bring up fond memories of field trips, discussions, and social activities in the Texas geologic community. My involvement in the Rocky Mountain and national geologic communities definitely evolved from those early experiences. This history has guided my push to increase public outreach to not only the general public, but also to university-based geology societies. If you are interested in reading these past articles, check out the RMAG website and click on the Outcrop icon. Better yet, join the RMAG!! (Hey, what do you expect from the RMAG president?)." Elmo lives in Denver and can be reached at elmob@voyagerexploration.com.

Leonard C. Bryant (B.A., 1957) is retired and lives in Hattiesburg, Mississippi.

Mehmet Sahankaya sent in this photo of the framed diploma earned by his father, Sait Sahankaya, M.A. '52. Sait Sahankaya died in 1971 in Turkey following a successful career in the Turkish Petroleum Corporation. "We, his three sons and wife, are still very proud of him," writes Sait.



Nathan Bryant (B.S., 2002) is a hydrogeologist and lives in Las Vegas, Nevada. He can be reached at Nate\_Bry\_reg@yahoo.com.

J.E. 'Woody" Bryant (B.S., 1943; M.A., 1948) lives in Fredericksburg, Texas.

Johnathan Bumgarner (B.S., 2002; M.S., 2005) lives in Austin, Texas and can be reached at jbum@mail.utexas.edu.

T.J. "Jeff" Burnett, Jr. (B.S., 1949) is retired and writes, "I am a proud great-grand pa." Jeff lives in Houston, Texas and can be reached at tomjbjr@sbcglobal.net.

Dr. Arthur B. Busbey III (B.S., 1974; M.A., 1977) writes, "I continue to work in the Geology Department at TCU in a variety of rolls. Janet Busbey Nilsson (B.S., 1976) still teaches at the same middle school and bemoans the destruction of the middle school earth science curriculum in Texas middle schools. Our eldest, Saramae, was married in Florence, Italy in December of '04 in a small medieval castle and lives in Durham, North Carolina. Our youngest remains in Fort Worth. I get out to Big Bend 2 to 5 times a year (doing research on the Rosillos Mountain Ranch) and every time I pass the old Leary Ranch I think of field camp in the Marathon Basin in 1974. Hard to believe it is over 30 years ago now." Art lives in Fort Worth and can be reached at a.busbey@tcu.edu.

Hussam Busfar (B.S., 2004) lives in Dhahran, Saudi Arabia and can be reached at h\_busfar@hotmail.com.

Gary L. Byrd (B.S., 1984) lives in Rockwall, Texas.

Frank Kell Cahoon (B.S., 1957) writes, "[We] travel with our children and grandchildren. Sometimes we travel without them." Frank lives in Midland, Texas.

Eleanor Camann (B.S., 1999) writes, "I received my Ph.D. from the University of North Carolina at Chapel Hill in August 2005. My dissertation research focused on beach-dune-nearshore interactions on Shackleford Banks, an undeveloped barrier island in North Carolina. I am currently an Assistant Professor in the Department of Geology and Geography at Georgia Southern University." Eleanor lives in Statesboro, Georgia and can be reached at ecamann@georgiasouthern.edu.

Bill Norris Camp (B.S., 1947) lives in San Antonio, Texas.

#### The Candelaria Kids Then and Now



Top: "The Candelaria Kids," August 1954, Ruidosa Hot Springs. Left to right: Dave Amsbury, Benny Buongiorno, Joe Peterson, Joel Carlisle, Professor R.K. DeFord, Chuck Sewell, Charlie Mankin, and Bill McGrew. Above: Members of the "Candelaria" group at the 1950s reunion. Left to right, Charles Sewell Sidney Moran, Dean Callender, Joel Carlisle, Charles Mankin, and J. T. Smith.

Donald M. Campbell (B.A., 1955) is retired and writes, "Still living in Abingdon, Maryland. I keep busy, working part time at the local library branch. Travel to the family ocean city condos several times a year and go to some of our local pro Football and baseball games. Enjoy our thirteen year old grand daughter-now in cheerleading, lacrosse, etc. In regards to my best work in geophysics and geology; I miss my foreign travel very much. I have been to all of the countries in Latin America, all fifty states, many islands in the pacific and a few Asian countries. Still miss Texas. My e-mail is mail.dctexaslh@aol.com."

Paul S. Cariker (B.S., 1975) lives in Fredericksburg, Texas.

AT "Toby" Carleton (B.S, 1951; M.A., 1952) writes, "I continue to be actively involved in oil and gas exploration and production, ranching and the wind power business. Family consists of wife Corinne, three children and six grand children. All is well in my world." Toby lives in Midland, Texas.

Karen (Brock) Carlisle (B.S., 1981) is an Assistant United States Attorney and writes, "I have great memories of my days in the School of Geology. My daughter is now a

junior at UT-Austin, majoring in ME. We have 3 other kids we hope will head that way as their time comes. I'd love to hear from old classmates!" Karen lives in San Antonio and can be reached at carlisle.karen@sbcglobal.net.

Paul Carpenter (B.S., 1986; M.A. 1990) writes, "I'm working on the state oversight of mine site and railyard brownfield cleanups here in California, which the recent real estate boom made a priority. I'm also on the faculty at Sierra College, struggling these days to keep global warming hysteria in perspective with empirical climate change facts. I hope everyone from the Geo 660 Class of '86 is well." Paul lives in Sacramento, California and can be reached at pcarpent@ dtsc.ca.gov.

Jack C. Cartwright (B.S., 1951; M.A., 1955) writes, "Barbara and I are settled into a wonderful new home in the Manor Park Village In Midland. We manage our business affairs from my home office. Our family is active in their careers. Grandchildren are graduating and starting their work life. We have now been away from UT and Austin for 51 yrs." Jack can be reached at jccaxtw@sbcglobal.net.

Chuck Caughey (B.S., 1969; M.A., 1973)

writes, "ConocoPhillips transferred me from Indonesia to Houston last year to coordinate implementation of a global early-career development program for geoscientists and upstream engineers. I am also involved in recruiting both fresh graduate and experienced geoscientists, with a side benefit of occasional trips to visit the Jackson School. Involvement with career development for the next generation of oil finders has been great, but I am now looking forward to getting myself back to the rocks." Chuck lives in Houston, Texas and can be reached at Chuck.Caughey@ConocoPhillips.com.

Norma Chaires (B.S., 2005) lives in Houston, Texas and can be reached at nchaires@alumni utexas.net.

Robert Chapin (M.A., 1981) is a client service manager and lives in Austin, Texas.

Jianli Chen (Ph.D., 1998) lives in Austin, Texas and can be reached at chen@csr.utexas.edu.

Carlotta Chernoff (B.S., 1992; M.A., 1995) writes, "I am still enjoying working for ConocoPhillips and I recently moved to our office in Perth, Australia. Stop by and say

hello if you are in Perth for the International AAPG Conference."

Daryl Scott Chicken (B.S., 1988) lives in Magnolia, Texas and can be reached at chicken@anderguage.com.

J.B. Chimene (B.S., 1979) writes, "Over the past 20 years I've gone from microscopic examination of Cretaceous ostracodes to microscopic examination of worldwide government rules on information privacy and security. Still take the kids out to find fossils and look at geology around the state, so I'll always be a geologist." J.B. lives in The Woodlands, Texas and can be reached at secure@ chimene.com

Wan-Joo Choi (Ph.D., 2004) resides in Houston, Texas.

Stephen Chung (B.S., 1984) writes, "[I am] currently Senior Counsel at ConocoPhillips working primarily environmental and litigation matters. I have a wonderful wife, Kim, of 10 years and 2 daughters, Natalie, 5, and Kendall, 2. I have lunch occasionally with John Farrelly since he is just across the highway as well as Mike Stinson, whose office is 2 doors down from me. Not much else going on other than trying to keep up with the youngsters." Stephen lives in Cypress, Texas and can be reached at stephen.chung@ conocophillips.com.

John U. Clinch (B.S., 1981) lives in Houston, Texas and can be reached at jclinch@ tricresources.com.

**Joel Coffman (B.S., 1984)** lives in Vacaville, California and can be reached at jcoyotel@yahoo.com.

lives in Corpus Christi, Texas. Deanna Marie Combs (B.S., 1999) lives in Dallas, Texas and can be reached at deanna.combs@sbcglobal.net.

Thomas C. Connally, Jr. (M.A., 1981) writes, "That's right, back to the Middle East for this geo. Not enough consulting work to keep me in beer and beans, back in Texas. Besides,

there is no beating a steady paycheck. I work

Michael Clark (B.A., 1989) writes, "After 11 years of working for the state, I've finally graduated to the corporate world." Michael lives in Cedar Park, Texas and can be reached at mjc@compuserve.com.

James W. Collins (B.S., 1956) writes, "Still operating wells and doing Geology." James



Left to right: Clark Wilson of the Department of Geological Sciences, Lesli Wood of the Bureau of Economic Geology, and geology students Asher Price, Kevin Bain, Matt MacDonald, and G. Russell Young prepare to head out to sea for a summer 2006 Alaska research and survey cruise.

for RasGas, punching holes in the world's largest gas field, the North Field of Qatar, estimated reserves over 900 TCF, give a T or 2. I have also re-married, for the third time, and I think I finally got this marriage thing figured out. I am happy, and I think she is, we are still together after nine months of wedlock. I still maintain roots in Austin, and hope/pray to retire there one of these years. Yes, Qatar is safe and sane, not like Saudi. Look me up if you come this way. Hook'em Horns!" Thomas lives in Doha, Qatar and can be reached at tccpnnally@rasgas.com.qa.

Beaumont Brewer Cooley Jr. (M.A., 1956) lives in Austin, Texas.

Timothy E. Crump (B.S., 1991) lives in Houston, Texas and can be reached at bumptywoof@msn.com.

David Cunningham (B.S., 1981) writes, "[I] went to Texas A&M for MS Geology Degree. Worked for Tenneco from 1985-1988. Received BBA from University of St. Thomas (in Houston) in 1989. Worked for Arthur Anderson (2 years), Enron (5 years) and currently at Anadarko Petroleum Company in Property Tax Department." David lives in The Woodlands, Texas.

Yann Curtis (B.S., 2002) lives in Austin, Texas.

Darecy (Brooks) Cuthill (B.S., 1993) writes, "After graduating from UT In 1993 I went to work as a geophysicist at AMOCO in Houston. I transferred to Calgary with my Canadian fiance where I eventually changed careers and began working in sales and marketing for Landmark. Currently I am managing Halliburton's real-time operations center as

well as enjoying being a new mother to a baby girl born in November 2005." Darcey lives in Calgary, Alberta and can be reached at darcey@lionheadeng.com.

John T. Dasch (B.S., 1975) lives in Dallas, Texas.

Julius Dasch (M.A., 1960) writes, "After UT I received a PHD in geochemistry at Yale University, most of my career I taught geology at Oregon State University. For seventeen years I worked at NASA Headquarters in Washington DC, where my main interests were moon rocks, meteorites, and higher education. My research focus was isotope geochemistry. My wife Pat and I retired three years ago and moved to Alpine, Texas where I received my B.S. degree. I teach introductory geology about once a year, and Pat and I will teach a new course, "Rocket Science" in the Fall of 2006. We recently enjoyed a five country trip to South Africa." Julius can be reached at edash@sulross.edu.

Captain H.E. "Ward" Davenport (M.A., 1992) writes, "[I am] an independent geologist in Austin, Texas. My wife, Elina, and I continue to enjoy living in Austin with our two fox terriers. I took an early pension from the shipping company I had been working for, and am no longer going to sea. Prior to taking the

pension, I sailed as captain of the SS Nuevo San Juan. I sure never expected to go to sea long enough to sail in that capacity. Anyway, it was a good time to come ashore, and I now describe my occupation as independent geologist and retired master mariner."

Benjamin R. Davis (B.S., 1987) writes, "graduation after Field Geology 660 class, July, 1987. I'd love to hear form anyone from the old days. Looks like our 20-year anniversary is coming up soon. Drop me a line if you can!" Ben lives in Alpharetta, Georgia and can be reached at 123davis123@bellsouth.net.

Donald Dean (B.S., 1983) is a senior geophysicist and writes, "I am now at a small private oil and gas company and having a great time learning the oil business first hand and doing many different things. In my years at UTIG, ARCO, and Veritas, I was always in a research/tech service type role. I am now involved in drilling wells. I have three teenagers on the home front and a wonderful wife who keeps it all together for us." Donald lives in Katy, Texas and can be reached at dean.don@gmail.com.

Carlos Deere (B.S., 1950) writes, "Oil Geologist: A Hot Commodity' — this was the headline in the Houston Chronicle during the offshore convention here this year.

Where was this when we were looking for work? If my legs could do it, I'd climb a rig and shout 'NOW YOU TELL ME'. A day late and many dollars short." Carlos lives in Bellville, Texas.

Timothy "Tim" Diggs (M.A., 1989) lives in West University Place and can be reached at Timothy.Diggs@shell.com.

Robert E. Doyle (B.S., 1955; M.A., 1957) is president of American Energy Investment Group, Inc and writes, "The June, 2006 Austin reunion was a clear success for all the people that I spoke to. It was wonderful to have the opportunity to chat with the faculty members and old classmates. We continue to work mostly on oil development drilling in the Jurassic and Cretaceous sandstones of the Western Siberia Basin, Russia," Robert lives in Houston, Texas and can be reached at rbtdoyle1aeig@aol.com.

John Drake (B.S., 1974) is a geoscience manager and Callaway Energy and writes, "Life is great! Empty nest, \$50 oil, and good health: What more could I ask for." John lives in Plano and can be reached at jdrake@callawayenergy.com.

Frederic G. Dupuy (B.S., 1999) writes, "Since graduation, I have owned and operated Lakeside Motorsport Raceway in Bastrop,

Geology graduates and their families met on campus for the 1950s reunion in June 2006 (see other group photo on facing page). 1st Row l-r: Peggy Freeman, Tom Freeman, Ted Schulenberg, Janet Schulenberg, Carole Miller, Wayne Miller, Corinne Carleton, Marianne Green, Will Green, Philip Braithwaite, and Julius Dasch; 2nd Row l-r: Robert Doyle, Nelson Webernick, Peggy Webernick, Sidney Moran, Alice Nichols, John Nichols, Toby Carleton, Mary Anne Pckens, Bob Pickens, and Don Winston; 3rd Row l-r: Bob Brogden, Joel Carlisle, Harry Vest, Zoe Vest, Don Reaser, Bette Reaser, Hazel Dietrich, James Nienaber, Evelyn Nienaber, Sandra Jansen, Gerhard Jansen, Nancy St. John, and Bill St. John; 4th Row l-r: Dwight Cassell, Ron Marr, Tulie Dixon, John Dietrich, Edith Zinn, Leon Lampert, Tom Rogers, Uel Clanton, and Joseph Clark; 5th Row l-r: Bill Dixon, Delos Tucker, Hugh Hay-Roe, John Snyder, Nancy Twiss, Bob Zinn, Beaumont Cooley, Pagee Twiss, Barbara Cooley, LaVonne Rogers, Mike Wiley, Jim Underwood, and Bill Tiptor





Geology graduates and their families met on campus for the 1950s reunion in June 2006 (see other group photo on facing page). 1st Row l-r:L Mario Messina, Jennifer Messina, and Louise Sewell; 2nd Row l-r: J.T. Smith, Carolyn Smith, Betty Bellis, Linette Harwell, George Harwell, and Chuck Sewell; 3rd Row I-r: Charles Mankin, Terry Bills, Bill Blankenship, Dean Callender, and James Ragsdale

managed a same day delivery courier service, worked for Trinity Engineering (a geotechnical engineering firm), became an airline pilot for Northwest Airlink and now I'm a financial planner for Primerica Financial Services. I miss those rocks though." Frederic lives in Austin, Texas and can be reached at dupuyenterprises@hotmail.com.

William Duran (B.S., 1983) lives in Lago Vista, Texas and can be reached at kent@ austinevirosoluttions.com.

William K Duran (B.S., 1983) lives in Lago Vista, Texas and can be reached at kentduran @austin.rr.com.

Fred A. Ealand (B.S., 1948) writes, "Added new granddaughter to family in 2005. Will celebrate 58 years of wedded bliss in December. Life Is Good!" Fred lives in Houston, Texas.

Ruben Ellert (B.S., 1950) writes, "[I am] in good health and still enjoying retirement." Ruben lives in Corpus Christi, Texas.

Patricia Mench Ellis (Ph.D. 1985) writes, "Last summer (2005), the kids and I packed up, left my husband Dave at home to take care of the pets, and we headed for Nepal and Tibet for three weeks with a group from school. After a day or two in India, sweating in Delhi and at the Taj Mahal, we headed for

Kathmandu in Nepal to pick up our guide. Other than great shopping, we visited several UNESCO World Heritage sites, including Bhaktapur and Durbar Square. A few days later, we headed for Tibet (oops, China, since that's what the visas say). Escaped Nepal after a few days, not having gotten caught up in any of the Maoist activities. What mother in her right mind hauls her kids off on a trip to a country that our State Department would rather have us avoid? After driving straight

up for about a mile, we crossed the border at the not-so friendly Friendship Bridge. Over about the next two days, gaining about another mile in altitude, we reached Chomolangma (known to us gringos as Mt. Everest) Base Camp, just below the 18,000 foot mark. Sixteen out of 18 members of our group are feeling some effects of altitude sickness. Old Mom, whose kids said was too old for the trip, is bouncing along feeling absolutely great. The last 8 kilometers of the trip was done in Tibetan pony carts, kind of like being in a chariot race! Chomolangma has been shrouded in clouds for days, but we got there on a perfect day. My gosh, that's a huge chunk of rock! We were going to stay overnight at the Buddhist Monastery, but our trip doctor decided that too many people were sick from the altitude, so we headed back down to the Tibetan Plateau at only 12,000 feet. I'm impressed what our Toyota Land Cruisers survived on the trip, and that we survived all the bouncing. Very little of the road is paved between where we crossed into Tibet and Lhasa, several hundred miles away. How Tibetans survive in some of the areas that we saw is amazing. My favorite town was Gyantse, because it had been less altered by the Chinese, and still retained a lot of Tibetan flavor. Speaking of flavors - yak meat isn't too bad! Yak butter tea, on the other hand, is ...... It must be an acquired taste. My son John OD'd on monasteries after the first few. Katie and I loved them all, but they did start to all look alike toward the end of the trip. It was fantastic watching the monks debate – from little kid monks, 5 or 6 years old, to monks that looked older than

Bob and Marge Folk at the 2005 GSA meeting in Salt Lake City.



the mountains. I loved the Tibetan quarter in Lhasa, but the rest of the city was too Chinese. I hope that the culture isn't lost. After 3 weeks, it was back to Kathmandu, Delhi, Delaware, and a mountain of the world's dirtiest laundry! "This year, I dumped my husband and both kids and headed off to Egypt for a few weeks. We climbed a little way up the pyramids, slithered inside them (cracking my head on the 3-foot high tunnels about a dozen times), and rode around them on camels. Managed to visit the pyramids on the day of a sandstorm, so we got a little bit sandblasted. We cruised up the Nile for a few days – very relaxing – hopping off frequently to explore temples and the Valley of the Kings. The tombs in the valley are so close together that it's a wonder that they don't all interconnect. We ended up at Abu Simbel before flying back to Cairo. We had a fantastic tour guide named Osama - a former history/art history/archaeology professor who made everything come alive. This year, John will head off to Clarkson University in upstate New York to major in engineering. He ran circles around everyone in Cross Country this year, sometimes finishing two minutes ahead of his teammates. Katie heads back for her final vear at Wellesley College, after spending last summer in Sri Lanka doing tsunami relief work, fall semester in Santiago, Chile, and spring semester in Dakar, Senegal. She'll spend the summer in Washington, D.C. working for Hillary Clinton on a summer internship. John and husband Dave have more karate testing this summer - John will be testing for 3rd degree Black Belt in Tang So Do, and Dave will be testing for 2nd degree. The house is so peaceful in the evening when they're at class - I just sit and work on my quilts. After 16 years of trying, the MTBE is finally out of our gas!" Patricia

Franklyn R. Engler (B.S., 1958) writes, "Still kicking. Oil and gas prices are very good!" Frank lives in Harlingen, Texas and can be reached at Frankengler@sbcglobal.net.

lives in Newark, Delaware and can be

reached at Patricia.Ellis@state.de.us.

Rojelio P. Espinosa (B.S., 1985) lives in San Antonio, Texas and can be reached at respinosa@2esatx.rr.com.

Laura Faulkenberry (M.S. GSC, 1999) is a geologist at Conoco Phillips and lives in Houston, Texas. Laura can be reached at laura.l.faulkenberry@conocophillips.com

Irma Morgan Feibelman (B.S., 1959) Irma lives in Canyon Lake, Texas and can be reached at jimirma@grtc.com.

Jianhua Feng (Ph.D., 1995) lives in Houston, Texas and can be reached at feng8216@sbcglobal.net.

H.C. "Kip" Ferguson, III (B.A., 1988) is President of Sharon Resources, Inc and lives in Houston, Texas.

Jeanne Allen Ferrin (B.A., 1948) is retired and writes, "[I] worked 8.5 yrs for Gulf Oil Exploration in Amarillo, Houston, and Denver. Married Dr. Charles Ferrin - family physician - now retired. His first degree is from Dartmouth College in Geology. We have two daughters (UT Grads) & five grandchildren." Jeanne lives in Austin, Texas.

Christine R. Fox (B.S., 1995) lives in Montbonnot Saint Martin, France.

Curtis C. Franks (B.S., 1950) lives in Fair Oaks Ranch, Texas and can be reached at ccfrtx@hotmail.com.

Jonathan Franzosa (Ph.D., 2004) lives in Austin, Texas and can be reached at jfranzosa@yahoo.com.

Tom Freeman (M.A., 1962) is President of the MU Retirees Association and writes, "[I am] writing and illustrating geology laboratory manuals (physical geology and environmental geology). Enjoying our home in the country ('Los Balcones')." Tom lives in

Geophysics during the 2005 SEG meeting in Houston.



Columbia, Missouri and can be reached at freemant@missouri.edu.

Annabelle Bannahan Friddle (B.A., 1945; M.A., 1950) writes, "I am still involved with San Juan College in Farmington, New Mexico. I am in good health and still taking classes."

Michelle Mallien Fullen (B.S., 1990) writes, "Life is full of changes and my life has changed again. I am now a geologist with Seismic Micro-Technology in Houston. I am marketing the geological and geophysical tools sold by SMT. Please come visit me at the next convention. On a personal note, I have remarried and settled in Houston. Kathleen is now 14 and in the 8th grade, Allison is 11 and in the 5th grade. My baby is now 7 and in the first grade." Michelle lives in Houston, Texas and can be reached at mfullen@seismicmicro.com.

Roy Fuller (M.S. GSC, 2003) lives in Provo, Utah and can be reached at rwalfuller@juro.com.

James Furrh, Jr. (B.A., 1947; B.S., 1950) writes, "I am still looking for oil & gas, primarily in East Texas, Louisiana, Mississippi & Alabama. I am a partner in a drilling company that owns eight deep rigs and that investment has turned out to be a real success." James lives in Jackson, Mississippi.

Lisa M. Gahagan (M.A., 1988) is a research scientist associate for the Institute for Geophysics and resides in Austin, Texas.

Imtiaz Ahmed, Ph.D. '03, gets indoctrinated into the JSG brand by Patty Ganey-Curry of the Institute for



Bill Muehlberger blesses a 1978 field trip on sedimentary geology methods. From the collection of Earl McBride.

Douglas Gale (B.S., 1997) is an assistant vice president for CitiBank Texas and resides in Dallas, Texas.

Ray Gedaly (B.S., 1981) lives in The Woodlands, Texas.

Christianne Gell (B.S., 1996) writes, "Charlie and I are still in Houston and both working for Halliburton. I moved to the Production Optimization division in April of 2006, meaning that \*finally\* all of those hydro classes I took are paying off.....I don't think I had heard the words 'Darcy's Law' since grad school, but now I deal with fluid flow every day. Sharp should be proud. Look me up if you're in Houston - sometimes we have UT Geology get togethers!" Christi lives in Houston, Texas and can be reached at christigell@hotmail.com.

Jean-Paul Van Gestel (Ph.D., 2000) writes, "After a hectic year when I got married and bought my first house, I thought things would slow down for a while. But then me

and my wife got jobs with BP in the Hague, The Netherlands, so big move and more craziness to finish the year. We should be moved by January. Let me know when you are in the neighborhood." Jean-Paul can be reached at jpgestel@yahoo.com.

Charles Goebel (B.S., 1980) is a senior geologist with J-W Operating Co. and writes, "I am still working East Texas with JW Operating (office in Addison), living in Plano. Both of my older children are undergrads at UT Austin." Charles lives in Plano, Texas and can be reached at cgoebel@jwoperating.com.

Carmen Gomez (M.S. GSC, 2005) lives in Stanford, California.

Dalia Gonzalez (B.S., 1980) writes, "[I] worked for Mobil as a geophysicist. Retired in 2000 after twenty years of service to Jackson Hole, WY." Dalia can be reached at daliashopg@besnaw.net.

Texas.

Brian S. Goodman (B.S., 1980) is a hydrologist/environmental scientist for the Montana Department of Transportation and writes, "Still not missing those Gulf Coast summers except when it is -20F and I forgot what my toes feel like. I left consulting last year and

Fred M. Gibson (B.A., 1951) is retired and lives in Austin, Texas.

Gretchen Gillis (M.A., 1989) is an executive editor and lives in Houston, Texas.

Wyeth L. Goode (B.S., 1953) lives in Midland,

enjoy the new position in government. Feel free to pay more taxes and stop in for a visit." Brian lives in Helena, Montana and can be reached at goodmab@hotmail.com.

Kimberly Gordon lives in Austin, Texas.

Ronald L. Graner (B.A., 1958) is still enjoying retirement in Brentwood, Tennessee and can be reached at ron@graner.us.

Volker C. Grasso (B.S., 1949) is retired and lives in Oklahoma City, Oklahoma.

Will Green (M.A., 1955) writes, "I was elected President-Elect of AAPG for year 7/1/2006 - 6/30/2007 and will be President 7/01/2007 -06/30/2008." Will lives in Midland, Texas and can be reached at wgreen@midland.edu.

Redge Greenberg (M.A., 1973) is a consulting geologist and lives in Durango, Colorado. He can be reached at rgreenberg@mydurango.net.

John C. Griffiths (B.S., 1975) writes, "Still working East Texas Basin and Upper Texas Gulf Coast. Who would have ever thought East Texas would be such a hot area again? Did consulting with an international engineering consulting group on projects located offshore Brazil, offshore Thailand and

onshore Nile Delta, Egypt within last year. Very interesting and fun work. Fortunate to be able to work with and/or do some business with friends from UT days." John lives in Houston, Texas and can be reached at jgriff@calvinresources.com.

Steve Grimes (Ph.D., 1999) writes, "I am back in Texas, and back in the University (system, that is). I am teaching down on the border, at UT Brownsville, in the Dept. of Chemistry & Environmental Science. We have got rapidly growing program in the Enviro. Sci. major. I am trying to figure out how I can work my still-Precambrian obsessions into the program (there is a way!), and returning to my research in West Texas. So drop a line, or come on by if you are heading to South Padre or NE Mexico!" Steve lives in Rancho Viejo and can be reached at sgrimes@utb.edu.

**Jose I. Guzman (Ph.D., 1999)** is a senior research geoscientist at C&C Reservoirs, Inc. and lives in Katy, Texas.

**Rosamond Haertlein (B.A., 1947)** is retired and lives in Fredericksburg, Texas.

Kevin Hall (B.S., 2006) lives in Houston, Texas.

NOTES

ALUMNI

Richard L. Harding (B.A., 1981) lives in Graham, Texas and can be reached at rharding @digitalpassage.com.

**Louis H. Haring, Jr. (B.S., 1938)** is the President of Haring Energy Company and lives in San Antonio, Texas.

Russell & Karen Harmon (B.A., 1969; B.A., 1970) Russell (B.A., 1969) and Karen Harmon (B.A., 1970) continue to enjoy life in the Piedmont Region of central North Carolina. Karen is a hydrologist with the State of North Carolina and presently working on a revision of the rules for the cleanup of petrochemical spills from underground storage tanks. Russell is senior program manager for Terrestrial Sciences at the Army Research Office, where he is responsible for funding basic research in geophysical remote sensing, geospatial and terrain analysis, hydrology, and sustainable land use. The twins, now 22, have completed their undergraduate study. Brendan is a first-year student in landscape architecture at the Harvard Graduate School of Design and Jonathan will begin graduate study in architecture at MIT this coming autumn.

H. Lee Harvard (B.A., 1955) writes, "Joanne (UT 1955) and I are in good health and are enjoying life. I continue to be active in Harvard Petroleum and she is busy with Harvard Designs, a landscape design business. Jeff, (UT 1984) is President of Harvard Petroleum and is a past president of the Independent Petroleum Association of New Mexico. He and his wife, Jane, (UT 1986), have a boy (14) and a girl (10)."

**Keith Haun (B.S., 1974)** writes, "I've been with Duncan Oil for 15 years now, much

Founder of Republic of Texas Biker Rally is JSG Grad

Jim Henry (B.S., 1970) writes, "In 1995 I founded the Republic Of Texas Biker Rally in Austin. For a dozen years now, it has been the largest motorcycle rally in Texas and surrounding states, and by 2003 it had surpassed the week-long South By Southwest film and music festival to become Austin's largest annual tourist event. I still do a bit of consulting work in the Barnett Shale play of North Central Texas." Jim lives in Frisco, Texas and can be reached at henry@rotrally.com.

longer than I ever thought I would spend in

one place. I must be getting senile, because I

our wells. I don't know if that is screwing up

the next boom as we all promised not to do

or not, but it sure doesn't do much for the

Miles O. Hayes (Ph.D., 1965) writes, "With

Tom Freeman's son - Tom made a movie

called WALKING TO KUWAIT based on

blood pressure." Keith lives in Houston,

Texas and can be reached at khaun@

duncanoil.com.

started taking working interest in some of

Henry, B.S., 1970, is co-honcho of the Republic of Texas Biker Rally, held every summer in Austin, Texa



experiences in Saudi Arabia. We will probably be working there for another year or two." Miles can be reached at mhayes@researchplanning.com.

**Brad Henderson (B.S., 1986)** Brad Henderson is a staff scientist at Los Alamos National Laboratory in group ISR-2, Space and Remote Sensing Sciences. He got his Ph.D. in Geophysics from the University of Colorado in 1994 and has been working in remote sensing since 1989. Right now he is working on a number of different projects in hyperspectral remote sensing, including atmospheric aerosol retrieval, atmospheric compensation, material identification, and emission polarization. He is married and has two children, ages 4 and 1. Brad lives in Los Alamos, New Mexico and can be reached at henders@lanl.gov.

**Reid Hensarling (M.A., 1981)** writes, "Continue the great work you are doing in the geological sciences. Bravo!" Reid lives in Lakeland, Florida.

**Suzanne Mechler Hewitt (B.S., 1989)** lives in Colleyville, Texas and can be reached at suzmeister@juno.com.

**Charles H. Hightower, Jr. (B.S., 1956)** is a petroleum geologist and lives in Lafayette, Louisiana.

Nolan Hirsch (B.S., 1944) writes, "Still trying to keep up in oil patch however don't look for me in office until after 10:00A.M.. I stay till 6:00pm with good coffee break. Have interests in three tests drilling. Check with me later." Nolan lives in Midland, Texas.

**S. (Dave) Hixon (M.A., 1959)** lives in Friendswood, Texas.

**Ben P Hooper (B.S., 1980)** writes, "I continue to explore the Gulf Coast for Joy Resources/ John H. Young, Inc. Enjoy gardening, fishing, cooking and running in my spare time. Ran my first 26.2 mile marathon in Houston this year. Debbie and daughters are great. Mary (19) is a journalism major at UT-Austin, Kelly (17) is a senior in high school." Ben lives in Houston, Texas and can be reached at joseyhoop@msn.com.

Louis G. Hooper, Jr. (B.S., 1960) is retired and lives in Rosanky, Texas and can be reached at lghooper@gvtc.com.

**Eleanor "Ellie" M. Hoover (B.S., 1956)** writes, "Thanks to Charles Sewell for sharing the "Hook'em Horns" salute via the saguaro can be reached at geol51@sbcglobal.net. **Charles M. Hoskin (Ph.D., 1962)** writes, "We were on a field trip to find fossil crabs with Dr. Scott. J. Dean Powell said...'Skip, move your feet.' Why? I said. 'Because you are standing on two fossil crabs.' My reward for the discovery was to remove the matrix from these two fossils." Charles lives in Kingston, Washington and can be reached at drdirt2@juno.com.

Kathleen Howard (B.A., 1993) writes, "[I] worked at the UT School of Law for almost 10yrs. Now working at the Midland Sub-Surface library located at the Bureau of



Gerhard Jansen (left), M.A. '57, Robert Pettigrew (right), B.S. '52, M.A. '54, and his wife enjoy the 1950s reunion on campus during the summer of 2006.

cactus photo. Fantastic scenery. After my BS in 1956 and some thirty-six years working for ExxonMobil, I'm attending lots of reunions: family, company, high school, community all in the great state of Texas. What a privilege to be a Texan. Congratulations to National Champions, UT Longhorns." Ellie lives in Conroe, Texas.

**Seth Hopkins (B.S., 2005)** lives in Austin, Texas and can be reached at seth.hopkins@westonsolutions.com.

**Curtis Horn (B.S., 1981)** lives in Midland, Texas and can be reached at curtis.horn@oxy.com.

**Carlton W. Hornbeck (B.S., 1953)** writes, "[I am] an independent petroleum geologist in Round Rock, Texas. All my old buddies are passing on. I am about to "hang them up" too - but it sure is hard to do when oil is \$65.00/bbl and gas is \$9.00/ MCF." Carlton can be reached at geol51@sbcglobal.net.

Economic Geology in the Pickle Research Center." Kathleen can be reached at KHoward15@Austin.rr.com.

Jack M. Howard (B.S., 1951) writes, "Employed for approximately 10 yrs with Stanolins and Pan American Petroleum, Employed 61-85 in General Land Office, Austin. Employed BEG UT System from 1985-1992. Retired 12/31/92. Consultant for UT Law School Foundation, UT Endowment, Chevron, and Exxon." Jack lives in Austin, Texas.

**Lindsey Huang (B.S., 2004)** is a hydrogeologist at Pastor, Behling & Wheeler, LLC and lives in Port Lavaca, Texas.

**Emmett A. Humble (B.A., 1949; M.A., 1951)** writes, "[I am] fully retired, caring for Lorine and watching my grandchildren and great grandson grow older while I remain the same. My best to all my many friends." Emmett is retired and lives in Houston, Texas. He can be reached at ehumble@houston.rr.com.

Brian B. Hunt (B.S., 1996; M.S. GSC 2000) lives in Austin, Texas and can be reached at brianh@bseacd.org.

Elvin M. Hurlbut, Jr. (B.S., 1943) is retired and writes, "Virginia and I still keeping the doctors in business. [I] was research assistant for Dr. F.M. Bullard 1941-1942 on heavy mineral study of Mexican beach sands (east coast). I was teaching assistant for him 1942-1943, teaching Geology 26 (Petrography) lab. In 1943-1944 I was Dr. H.B. Stengel's assistant

in surface mapping in northeastern Houston County in East Texas. Continued same job summer of 1946 after World War II stint. Got M.A. degree in geology at University of California, Berkeley, February 1948. Commencement speaker: President Truman. Worked for Shell Oil January 1948 - September 1964." Elvin lives in Tyler, Texas.

#### Kelly Iacono (B.S., 2004) lives in Austin, Texas and can be reached at Kelly.Iacono @gmail.com.

Cecil Irby (B.S., 1982) writes, "After working various petroleum production related jobs for a couple of years after graduation, I have been working in the environmental arena for over fifteen years. I worked in Petroleum Geology and found too much water in the oil and the client was unhappy, now I work in the environmental arena and find too much oil in the water and the client is unhappy. Not sure I could recommend this line of work to any youngsters but I have found it interesting, rewarding, and not a little frustrating. I currently work on DOD projects remediating hazardous waste in soil and groundwater at Air Force and army installations. Hello to all the Phantom riders. I think we have an upcoming reunion at Darrs' new mountain pad." Cecil lives in San Antonio, Texas and can be reached at cirby@satx.rr.com.

NOTES

ALUMNI

Logan Irvin (B.S., 1979) lives in Midland, Texas and can be reached at lirving@lamaenergy.com.

S. Lance Jackson (B.S., 1979) writes, "Oldest daughter is getting married this spring. Only four more to go. I would be thankful if Midcontinental gas stays above \$7.00." Lance lives in Kingwood, Texas.

Russell W. Jackson (B.S., 1976) can be reached at rwjtogi@cox-internet.com.

Gerhard Jansen (M.A., 1957) is retired and lives in San Clemente, California.

Karen Jarocki (B.S., 1992; M.A., 1994) is a senior hydrologist and lives in Albuquerque, New Mexico. Karen can be reached at karen@jarocki.org.

L. Chris Johnson (B.A., 1974; M.A., 1980) lives in Shreveport, Louisiana.

Charles G. Johnson (B.S., 1983) writes, "Chasing opportunities in old oil fields and my five kids at the same time." Charles lives in Jackson, Mississippi and can be reached at charliegj@aol.com.



Debbie Carlo of ExxonMobil and Michael Tryggestad, formerly of ExxonMobil, present Bill Fisher, dean of the Jackson School, with a check for \$125,000 from ExxonMobil and its employees supporting outreach, scholarships, and research at the Jackson School for the 2005-06 academic year. Julie Spink, GeoFORCE program manager, stands at the left.

Jamey Jones (Ph.D., 2005) lives in Morris, Minnesota and can be reached at jonesjv @morris.umn.edu.

J. Phil Jones (B.S., 1964) writes, "One year older and enjoying the boom that show up every 25 years, whether we need it on not. I'm delighted to still be fully engaged in the business of developing badly needed domestic reserves of oil and gas. My work as a Land Advisor has me busy in eastern Oklahoma with CBM and shale plays and in the Texas Panhandle with Granite Wash opportunities. I'm excited about UT's Jackson School and the promise it brings to developing much needed new geologist and geophysicists. Best wishes on another successful year." Phil lives in Edmond, Oklahoma and can be reached at philj1@cox.net.

Gene (Funkhouser) Keyser Jones (B.S.,

1948) is retired and writes, "It's spring in West Texas, there are rigs on the horizon and hustling in the downtown area. What a welcome change from the last many years. I feel so fortunate to be in good health and enjoying all of the above. Much of my time at home is spent keeping up with our oil & gas properties-both my own and family trusts since my parents are gone. My five children have grown, gone and multiplied. Thirtythree family members will gather to celebrate the wedding of my grandson just home from a year in Iraq." Gene lives in Midland, Texas.

Edwin N. Kasper, Jr. (B.S., 1951) writes, "Ex Student's Association has started up again its excellent summer programs! I am happy to be coming back for the programs. They have been excellent and I am looking forward to being back in Austin." Edwin lives in Houston, Texas and can be reached at ekasperjr@evi.net.

Steven G. Katz (Ph.D., 1975) writes, "Connie and I continue to enjoy living in Granville, Ohio. We have been doing some traveling this past year, including trips to California, Scandinavia and Australia. We are grateful for our geological education when we visit such places, because it helps explain the landforms we see, the climate, the economy, and the culture. Regards to everyone at UT!"

Keri Kelley (B.A., 2004) lives in Austin, Texas.

Don Kerr, Jr (B.S., 1960) is retired and lives in Houston, Texas. He can be reached at DonKerrIr2@hotmail.com.

Ralph Kerr, Jr (M.A., 1976) writes "I graduated from UT in 1977. I worked in the oil business for 3 years in Houston and for 7 years in Denver. I've been working as a hydrogeologist in Florida for the past 20 years. My wife, a Texas A & M graduate, and I recently celebrated our 25th anniversary. We have two kids, both of whom are attending college here in Florida. I recently attended a conference given by the NGWA here in the Tampa Bay Area. I saw two excellent presentations about Barton Springs in Austin, which reminded me of my days at UT 30 years ago. Hope everything's going well for

all of you." Ralph lives in Valrico, Florida and can be reached at ralphokerr@yahoo.com.

Marcus M. Key, Jr. (B.S., 1983) writes, "Promoted to full professor. Looking forward to sabbatical next year in New Zealand studying neogene bryozoans." Marcus lives in Carlisle, Pennsylvania and can be reached at key@ dickinson.edu

Howard W. Kiatta (B.S., 1958) lives in Houston, Texas.

Robert S. Kier (Ph.D., 1972) writes, "I have continued in my one-person shop specializing in hydrogeology and engineering geology. I can't say that I have gotten rich, but I have always had work. Oldest daughter, Katie, went off to Baylor University to become a nurse and came home a geologist. She graduated last May from the Jackson School at UT with a MS and now works for RMT in Austin. Middle daughter, Megan, is working on her internship and a MS degree in nutrition at Texas Woman's University in Houston. Youngest daughter, Molly, is a freshman at Texas State University majoring in having a good time. She has shown no interest in the science of geology, but does prefer the company of burpin', spittin' boys to frilly girls. I guess when I get through paying their education, and maybe some other events, I'll retire, but I don't see that in the near-term. The SOB I work for is a slavedriver, but won't let me quit-that's me, not my wife, Nancy." Robert lives in Austin, Texas and can be reached at bkier@austin.rr.com.

Katherine Kier (M.S. GSC 2004) is a geologist at RMT, Inc. and lives in Austin, Texas. Katherine can be reached at katiekier@hotmail.com.

Wilton Hays Killam (B.S., 1949) writes, "I am considering retiring from present part time teaching at Angelina Junior College at Lufkin Texas. Fifty six years may be long enough to teach. My wife loves to travel and maybe I can impress her with my knowledge of geology." Wilton lives in Lufkin, Texas and can be reached at wkillam@consolidated.com.

Robert J. Killian (B.S., 1977) writes, [I] have joined Lee, Hite & Wisda, Ltd. After several years with Texas Resources. Will be focused on prospect generation in Texas Gulf Coast." Robert lives in Houston, Texas and can be reached at mavrah@yahoo.com.

Jesse B Kimball (M.A., 2004) taking the entrepreneurial route, is in the beginning

Vince Kluth (B.S., 1986) writes, "Hard to believe I've been out 20 years now. Married to Angela in '96, now have 3 kids (ages 1-1/2, 5 and 7). Had a hard start, but life's been good. Oil crash of '86 drove me out of Texas oilfields to computer engineering for mapmaking customer in S.California with Gen. Dynamics. Various defense industry consolidations led to my inclusion into BAE. Moved to Maryland in 2000, still with BAE but serving an Intel military customer. Ran into my same era of geo grads out in St.Louis, working in my same field for the military, using software to look for caves via hyperspectral analysis of surface debris field to determine cave depth and location. Science background has tremendously helped accelerate my adaptation into engineering from science. Fundamental difference is creation versus discovery, but the scientific method of investigation remains valid in engineering trade studies. Not doing much hard science these days, but more project management (read: manage expectations) and HR type duties (hiring, performance appraisals). Speaking of creation, Dr. Walter Brown, Ph.D. MIT, USAF Col. (retired), and tenured prof (physics, math) at USAF Academy, has an excellent treatise on his Hydroplate Theory which runs circles around current prevailing theories on earth's geodynamics (plate tectonics, paleontology, principle of uniformitarianism, etc.). A very serious piece of RESEARCH worth considering. See www.creationscience.com for free PDF download, or better yet get the book (7th edition) at a reasonable cost. Do not quickly dismiss as religious fanaticism! Although it contains a religious premise, the work is unique in that it documents a serious scientific approach and offers credible physical/mechanical explanations which align well with nearly ALL the documented evidence available. Excellent tables compare various other theories against his, showing strengths/ weaknesses point-by-point. Dr. Brown does tremendous justice by spanning many of the natural sciences quite comprehensively. This is a must-read. Hi to Cathy [Mayes] and Bob, Art "Chico" Seay, many others whose faces I see but names escape me. Howdy to Haley and Gordo — hey Lump, where do you find

stages of starting his own oil and gas investment company. Jesse lives in Austin, Texas and can be reached at kimballj@windsweptenergy.com.

Paul Kirby (B.A., 2002) lives in Austin, Texas and can be reached at paulbkirby@yahoo.com. time at work to send me all those joke emails? Do you ever work? Glen "Gurn Blanskin", where you at? Welcome all emails, kluth vs@surfbest.net. Finally, HOW 'BOUT THEM HORNS! Walked around in a daze for 24 hours. OB's got a great name, too ..." Vince lives in Derwood, Maryland.

Mary Koch is retired and lives in Georgetown, Texas.

Rick Kolb (M.A., 1981) writes, "Been an environmental consultant in Raleigh for 16 years after 8 years with Mobil in New Orleans. Left Mobil because I was ready for a weather and geological change. Like the variety of work consulting brings, and enjoy the Raleigh area (2 hours to the beach, 2 hours to the mountains), but miss the character of New Orleans, even post-Katrina. My bornin-Austin daughter has returned to the city of her birth and plans to attend UT eventually, but to study journalism. My born-in-New-Orleans son has returned to Raleigh after travelling in Australia and Southeast Asia, and plans to move to Arizona for college. Not for geology, either. Both seem to be following their father's pattern of getting a late start in college, but as he did they are having fun in the interim (and maturing, thankfully!). Oldest stepson graduated from his school this year and is off to college (NCSU) next fall. Youngest stepson is a rising sophomore in high school. Three more years until all kids are out of the house and the freedom begins (except for the money part). Wife is a long-time IBM'er and hopes to avoid the regular RIF's that hit tech this millenium like those of the 80's in the oil patch. I have many geologist friends in North Carolina that were formerly in petroleum; it is fun to swap horror stories, even with Aggies!" Rick can be reached at rkolb0915 @aol.com.

Roger Kolvoord (Ph.D., 1975) is Vice President of Metalline Mining Co. Inc. and lives in Poulsbo, Washington. He can be reached at rkolvoord@earthlink.net.

Khib A. Kugler (B.S., 1988; M.A., 1993) writes, "After graduating in 1993, I spent several years working for Texaco (ChevronTexaco) as a sequence stratigrapher in their international exploration offices in Bellaire and London. My work took me to many of the famous turbidite outcrops around the world, and allowed me several field seasons in far away places like Siberia and Kazakhstan.

I met my wife, Michelle, while working in London, and we now have a two year old boy named Khael (who is growing up too fast). In 2002 I returned with my family to Austin where I work with my father and brothers in our family oil and gas company." Khib can be reached at Khib@AKGcompanies.com.

Ralph L. Kugler (Ph.D., 1987) lives in Milwaukee, Wisconsin and can be reached at rlkugler@arenisca.com.

J. Scott Kuykendoll (B.A., 1975) lives in San Antonio, Texas and can be reached at scott.kuykendoll@PSIUSA.com.

George Laguros (M.A., 1987) writes, "Still with Marathon in Houston, working the Anadarko Basin. Michael (16) has started driving, Daniel (13) plays the cello, Virginia (age undisclosed) tries to keep us all in line." George lives in Katy, Texas.

Sandra Scott Lake (B.S., 1985) lives in Coppell, Texas and can be reached at sandra @cainwatters.com.

James L. Lamb, Jr. (B.S., 1956) lives in Austin, Texas and can be reached at jimlamb @austin.rr.com.

Cori Lambert (B.S., 1996; M.S., 2000) lives in Houston, Texas and can be reached at cori\_lambert@hotmail.com.

Kristina Witt LaRue (B.S., 1983) lives in Austin, Texas.

Bill Layton (B.S., 1981) writes, "Independent Petroleum Geologist in San Antonio, Texas and consultant. Drilling and generating TX

Gulf Coast Prospects. Jessica, 21, is a senior at UTSA, Jordan, 17, is a senior in high school. KC and I are almost "empty nesters" these days... Still play a lot of handball...Special hello to 1981 660 friends. Go Phantom Go ... " Bill can be reached at bill-n-kc@yahoo.com.

Joel Le Calvez (Ph.D., 2002) lives in Houston, Texas and can be reached at lecalvez@ alumni.utexas.edu

Wayne Leake (B.A., 1959) is retired and lives in Tyler, Texas.

H. Louis Lee (B.A., 1954; M.A., 1958) writes, "I am enjoying the current drillings boom. It is great for the consulting business. Looks like this one may last a bit longer than the 1980's boom. Enjoyed working on the 50's grad students' reunion. Good to see and visit with some of the guys I haven't seen in fifty years. Many thanks the Glynis Morse, Bill Fisher and many others in the Geology Foundation for making the reunion possible." Louis lives in Austin, Texas and can be reached at llee356@yahoo.com.

Ray Leonard (M.A., 1977) writes, "I completed my first full year as senior Vice President for Exploration and Production with MOL, the national oil and gas company of Hungary. Oldest son, Ben, will receive M.A. from UT Austin in Petroleum Engineering in December. Son, Dan, is teaching English in China while daughter Anya is finishing M.A. at University of Edinburgh in Scotland. I love Budapest and look forward to contact with UT classmates." Ray can be reached at

Tom Fanning, Ted Stanzel, Jim Richards, and Bill Fisher at the 50 year UT Reunion.



Robert A. Levich (M.A., 1973) writes, "I retired from the Federal Government at the end of 2004, following thirty-one years with AEC, ERDA and DOE, studying uranium resources and geologic disposal of nuclear waste. Stella and I have lived in Las Vegas since 1986, and we intend to keep our home here. We are also building a retirement home in Ghana, above a sea cliff on the Gulf of Guinea, thirty miles west of Accra, and we split our time between West Africa and Southern Nevada. We expect to finish the house this year, and invite all our UT friends to visit us and enjoy the waves crashing on the sea cliff fifty feet below, as well as the adjacent coconut lined beach. Best regards to everyone." Robert can be reached at cpgeologist@yahoo.com.

Jim Levy (B.S., 2001) writes, "I'm currently exploring, drilling and producing oil and gas in Concho, Menard and Schleicher counties on the Eastern Shelf of the Permian Basin. We expect to drill ten wells during the coming year, and put eight more on pump. As a student during the heyday of the "dep-dump superstars" (Luigi Folk, "Uncle Al the kiddies' pal" Scott, Earle the Pearl McBride, etc.), I was fortunate enough to have been taught by the best depositional teachers in the world. Their excellence can still be seen, where just last year, US News and World Report rated UT Austin as having the #1 sedimentology graduate program in the world, over 20 years after the sed department's actual peak. Talk about the 1927 Yankees! I remember when some of the "hard-rock" guys (OK — just Bill Muehlberger, but he'll count for three normal-sized people) would deride us "softrock" folks, calling our beloved sedimentology field "just a bunch of dirt and vegetables". Well, every time I cash an oil run check these days, I have to say, "hooray for dirt and vegetables!" Best of all (even better than \$75 oil), my wife Liz and I are raising Leah - our little six year old paleontologist-in-training. As a father, I've found that kids think that we geologists are really cool; we know all about the same stuff that they like: dinosaurs, volcanoes, earthquakes and asteroids... Try to have a kid think you're cool if you're some damn tax accountant (not that there's anything wrong with that...)! Would love to hear from other (cool) alumni." Jim lives in El Paso, Texas and can be reached at jim@ geotexas.com.

Eugene Lipstate (B.S., 1949) writes, "Retired from Vice-President of exploration at Northwest Oil Co. in 1942 in Lafayette, LA.



Texas v. Oklahoma Game 1957: Libby Mullinix (Lead Majorette), Victor Borge, noted musician and comedian, and alumni Jim Richards, B.S., 1956, in the front row. This photo was on the front page of the Dallas Morning news the following Sunday.

Remained in semi-retirement as managing partner in Lipstate Assoc. I just received a notification of 55 years in the AAPG. Served as a delegate for three years and also on the Board of Advisers for the Certified Petroleum Geologists for three years. I have bee a member of SIPES for many years." Eugene lives in Lafayette, Louisiana and can be reached at e1state@cox.net.

Nancy Green Lister (B.A., 1955) writes, "Greetings to all! Ray and I stay very busy with daily chores, trips and activities with our children and grandchildren. Would love to hear from fellow classmates from 1952-1956 or any other years!" Nancy lives in Houston, Texas and can be reached at RayLister3@aol.com.

Jim Lockley (B.S, 1978) is a geophysicist and lives in Spring, Texas. Jim can be reached at jlockley@centurionexp.com.

Allen C. Locklin (B.S., 1954) writes, "Glad to see another 'oil boom'. Just wish I were 46

instead of 76. Still active though & loving it. Bride Nancy Summer Locklin & I nearing our 52nd anniversary. Granddaughter Macy Shaver graduated UT-Austin May 2006. Hook Em!" Allen lives in Tyler, Texas.

R. Michael Looney (B.S., 1971; M.A., 1977) writes, "We had a great year. First grandson, Clayton Reid! Completed \$42mm equity funding for Texas and Louisiana exploration. Spent some great time in Utah and Colorado. Would like to hear from more 1971 thru 1975 grads." Michael lives in Houston, Texas and can be reached at mslooney@ houston.rr.com.

Lester E. Ludwick (B.S., 1950) is retired and writes, "Nothing new to report, enjoy getting back occasionally to visit and see the Horns play football. Hard to believe the size of Austin compared to the forty's and fifty's. Congratulations to UT and the Department of Geological Sciences for their making this department and UT in general the flagship

educational giant it is." Lester lives in El Paso, Texas and can be reached at lml321@aol.com.

Chad Lyons (B.A., 2003) is an exploration geologist and lives in Houston, Texas. Chad can be reached at lyonsch@yahoo.com.

Ana Manzolillo (B.S., 2006) Ana lives in Houston, Texas and can be reached at amanzolillo@alumni.utexas.net.

Christopher Marshall (B.S., 1997) writes, "My darling wife Cindy just gave birth to our first child. Little Griffin Marshall came into this world on April 18th 2006 and already has his first Burnt Orange Shirt & a Brunton compass. Cindy & I will try to keep our travel expeditions going even with a new baby. 2005 saw us in Europe for three weeks. Awesome! 2004 had us in Belize for ten days & Cozumel a week. In addition to traveling, Cindy & I continue to strengthen our family & friend relationships along with being active in our church. Adios from Frisco Texas." Christopher can be reached at cristoph.marshall@sbcglobal.net.

Sabin W. Marshall (B.S., 1952) writes, "Still retired. Enjoy traveling. Went to France and visited pre-historic caves in limestone in Dordogne area." Sabin lives in Houston, Texas.

Dave Martens (B.S., 1984) writes, "After 12 years in Bangkok working for Unocal, my family and I moved back to Houston in the summer of 2005 where I held the position of Chief Geologist for the Gulf of Mexico. With the merger with Chevron, I was assigned to the Reservoir Management Team within the North American Headquarters group. In April 2006, after more than 21 years with Unocal / Chevron, I have decided to move on to Marathon Oil in Houston." Dave lives in Katy, Texas and can be reached at domartens@houston.rr.com.

Owen Martin (B.A., 1990) writes, "I am still working for Enviance selling enterprise level environmental compliance software to future 1000 companies. My kids are now old enough to drag into the field. In January we found 20 different types of fossil shells in the Brazos river bank near Brian. In March we found a mystery bone in a San Marcos river gravel bed - large rib? Does anyone know about the Houston Gem & Mineral society?" Owen lives in Houston, Texas and can be reached at owenmartin@yahoo.com.

Arthur E. Maxwell Arthur lives in Santa Fe, New Mexico and can be reached at colnart@ cybermesa.com.

Sharon Pickett Maxwell (B.S., 1978) writes, "This past year or so has been a time of change, and through all we strongly see God leading and upholding us. Completing six years as a Ministry Assistant at First Baptist Church Dallas, and after receiving three totally independent phone calls from Criswell College, I realized that God was nudging me out of my comfortable niche at the church. Now, after more than twenty-five years in a non-educational setting, I find myself back in a collegiate setting - and loving it! Isn't God's sense of humor amazing?.....Steve's father came very near death in November/December 2004, and we truly thought that God was calling him on Home. Thankfully, God allowed him to recover enough to go home, and at the time of this writing, he is holding his own. Our son, Nathan, made it through his senior year at Lake Highlands High School; graduation was May 21st ~ ~ hallelujah! Plans included a family graduation trip in the summer - - to celebrate this milestone, and to launch him into the next phase of his life. Steve continues to work full-time as a CPA at Pickett & Maxwell, P.C., serve bivocationally as Minister of Music at our church (Park Central Baptist, Dallas), and sing in the Singing Men of Texas (statewide choral group for Ministers of Music). Nathan is very active in student activities at church, and with his close buddies from church, attending community college here in Dallas, and working as much (little?) as possible. I'm right in there with them at church, as well as singing in the Singing Women of Texas (statewide choral group for women involved in the music ministry of their church). Now that I am back 'in college', I will probably begin again to work on that Master's degree! I'd love to hear from those that graduated in or around 1978specifically Janet, Charlie, Rick, and James, and those with whom I worked as a geologist at Placid Oil Company, Alto Energy, and Relco Energy back in the late 70's and early 80's (Paul, Bill, Jack, Bob, Elaine, Brita).

NOTES

ALUMNI

Bob lives in Lakeway, Texas and can be reached at rmccarty3@austin.rr.com.

M. Tim McCoy (B.S., 1991) writes, "I have been in the environmental business since 1990. Why? No, I am asking, would somebody please tell me...a piece of advice for someone who may be contemplating it, Don't! Run! Go open a bongo shop on a beach somewhere instead! So, I'm in it for the long haul. Anyhow, all kidding aside, hope you all are doing well and HOOK ' EM - what a run." Tim lives in Houston, Texas and can be reached at rockssg@aol.com.

Richard McGlathery (B.S., 1976) writes, "I have been active for several years as project geologist on archeological excavations at Qumran Israel. Married to Paige McGlathery. Active in climbing." Richard lives in Oklahoma City, Oklahoma and can be reached at dmcg@panra.com.

Wayne E. McIntosh (B.S., 1956) writes, "Still consulting and traveling in our motor house with several RV groups. Have nine grandchildren. Ages are from 9 months to twenty one years." Wayne lives in Rio Rancho, New Mexico and can be reached at WEMHUZ1 @AOL.COM.

#### Michael L. McLead (B.S., 1986) is a geologist and lives in Concord, California.

Tim McMahon (Ph.D., 1994) writes, "Since leaving Austin, Amy and I have lived in Houston, Bakersfield, Calgary and now Houston again. We have had two children along the way: Emily is 5 and Virginia (Gigi) will be 4 in August. Amy has been staying home with the girls since leaving Landmark Graphics in 2004. I also left Landmark Graphics in 2004, and went to work for Burlington Resources. Since ConocoPhillips bought Burlington this spring, I have been working as an exploration geologist for COP's New Ventures group, focusing on SE Asia." Tim can be reached at tim\_mcmahon@sbcglobal.net.

Jude McMurry (M.A., 1982) writes, "I've returned to Texas after more than 15 years in Canada. Finally, enchiladas. Still involved in high-level radioactive waste management, now as a technical advisor for the Nuclear Regulatory Commission." Jude lives in San Antonio, Texas and can be reached at jmcmurry@satx.rr.com.

Alex McNair (B.S., 1978) is an exploration geophysicist and writes, "I'm generating

South Louisiana prospects for Houston Energy. Should see a few wells drilled this year in St. Mary and Terrebonne parishes. After spending most of a career with Arco/Vastar in Lafayette, I moved back to Texas to get in the big middle of it (downtown Houston). But my son is still back there, now a police officer in Lafayette. That boy loves cajun country so much he wants to put 'eaux' on the end of McNair." Alex lives in Houston, Texas and can be reached at alex\_mcnair@yahoo.com.

Peter K.M. Megaw (B.A., 1976; M.A., 1979)

is the president of IMDEX, Inc. and writes, "Life has changed completely with the renaissance in metals exploration ... plus 3 of our silver projects in Mexico have been extremely successful. Downside is more corporate work than rock knocking, but at least manage to do both in interesting places. Mineral collection and library are starting to take over my life...but that's fine. Know anyone looking to donate a library, I've been organizing book transfers to needy universities in Mexico for 25 years...and they need more! AGS Symposium in Tucson in September 2007...ya'll come!" Peter lives in Tucson, Arizona and can be reached at pmegaw@imdex.com.

Wayne D. Miller (M.A., 1957) writes, "Not much change from a year ago. Staying very busy consulting. I have more work than I can handle with all the clients wanting things done immediately with the oil business finally back on top. Family are all fine and looking forward to this years newsletter. Wayne lives in Midland, Texas and can be reached at wdmillergeol@aol.com."

Kristine Mize (M.S. GSC, 2004) is a geologist at EnCana Oil & Gas (USA) Inc. and resides in Centennial, Colorado.

Karen I. Mohr (Ph.D., 2000) writes, "I was recently promoted to Associate Professor with tenure in the Department of Earth & Atmospheric Sciences at the University at Albany SUNY in Albany, New York. I teach courses in hydrology and remote sensing. My research area is land/atmosphere interaction and its impact on the development of clouds and precipitation." Karen can be reached at mohr@atmos.albany.edu.

Charles A. Montero (B.A., 1984; B.S., 1984) is a senior hydrologist and lives in Austin, Texas.

Michael E. Moore (B.S., 1980) writes, "[I am] currently working Zapata, Webb, Jim Hogg,

and Starr counties in South Texas. Partnered with Eagle oil and gas out of Dallas. Try to spend 3-4 months a year in southern Costa Rica reforesting a waterfall property and spending lots of time looking at tide charts. The girls are growing like weeds. Puravidababy." Michael lives in Corpus Christi and can be reached at pigfatsurfer@hotmail.com.

R. McKay Moore (B.A., 1952) lives in Winnsboro, Texas.

Ken Mosley (B.S., 2001) is a XRD Mineralogist/Geologist II at Core Lab and lives in Houston, Texas.

James Muncey (B.S., 1981) writes, "In June 2006 joined Shell Business Planning and Support. Currently supporting Shell Non-Operated Ventures. Responsibilities include E&P economics in deepwater Gulf of Mexico." James lives in Houston.

Pat "Frank" Murta (B.A., 1941) writes, "I will be 86 in August. Working on my third wife. Swimming 200 yards/day for my health. Most of my contemporaries are dead, but if Seymore Myers (sat next to him in class) is living, I would like to hear from him." Frank lives in Tulsa, Oklahoma.

Robert T. Muzney (B.A., 1971) writes, "[I] retried in 2005 from U.S. Army Corps of Engineers in Galveston, Texas after 30 years as an environmental specialist." Robert lives in Lake Jackson, Texas and can be reached at rmuzney@houston.rr.com.

Peter Rose (left), B.S. '57, M.A. '59, Ph.D. '68, talks with Walter Geology Librarian Dennis Trombatore (right) and his wife Sheila during the 1950s reunion on campus in the summer of 2006.



G. Allan Nelson (B.S., 1947) writes, "33 Vets got our B.S. in 1947, only two of whom were 'Dam Yankees' - Me & John Osmond. 55 years later John & I ended up working in the same building. Not in Texas but in Denver, Colorado. Still see him at coffee." Allan lives in Westminster, Colorado.

David Noe (M.A., 1984) writes, "Finally, I have become...Dr. Noe! Yes, I graduated from Colorado School of Mines in December 2006 with a degree in Geological Engineering. Now to concentrate on being an evil genius and taking over the world. Otherwise, I am approaching 16 years with the State of Colorado, 20 years with Denise, 40 years of trombone playing, and 50 years of life wow!" David lives in Boulder, Colorado and can be reached at dave.noe@state.co.us.

Sylvia Nordfjord (Ph.D., 2005) can be reached at sylvian@mail.utexas.edu.

Carol Doran Northern (B.S., 1984) writes, "Hello to all the GeoBuddies from 1984 field camp. Just think, we could have thought up Sponge Bob! Have spent the last seventeen years doing environmental consulting for industrial clients, helping them comply with Federal and State laws. Not as much fun as hunting for oil and gas, but it pays the bills. Both kids keep us busy with scouts, sports,

92 Jackson School of Geosciences

I were active in it again...Regards to all.

God's blessing to all!" Sharon lives in Dallas,

Robert B. McCarty (B.S., 1950) is retired and

where my wife Mary Louise and I can enjoy

the cultural and sporting activities of the

University. I miss seeing my old classmates

and would love to hear from them. The new

technology in the oil business makes me wish

Texas and can be reached at smaxwell1@

writes, "It is great to be living in Austin,

hotmail.com.

Matt Myers (B.S., 1983) writes, "Back In Tyler for the third time. Now working for EOG Resources and enjoying small city life."

church and school activities. I'd love to hear from the geobuddies so look me up if you are ever in the Atlanta area or drop me and email at cdnorthern@premiercorp-usa.com."

Josh W. Oden (B.S., 1956; M.A., 1958) is retired and lives in Corpus Christi. Josh can be reached at joden@stx.rr.com.

A.M. "Red" Olander (B.S., 1948) is retired from Exxon and lives in Austin, Texas.

Jeffrey J. Palmer (M.A., 1982) writes, "It's hard to believe that almost 24 years has passed since I left UT. I trained on with Exxon in New Orleans in 1982 and transferred to Houston in 1994. I am currently working for ExxonMobil Exploration company exploring for new fields in Chad. I am officially now one of the "old guys" which sounds both good and bad." Jeffrey lives in Spring, Texas.

Petro K. Papazis (B.S., 2003; M.S. GSC 2005) is a development geologist at Chevron International E & P Co. in Houston, Texas and can be reached at p.papazis@alumni.utexas.net.

Matt Parsley (M.A., 1988) lives in Midland, Texas and can be reached at mparsley@ geospectrum.com.

Lisa Hawkins Paton (B.S., 1985) writes, "We are now living in Laredo. I still work in the schools and our girls, Sarita and Selina are in 7th and 9th grade. I would love to hear from the 1985 660 Class!"

Ethan Perry (M.S. GSC, 2005) lives in Ashland, Maine.

Loren Phillips (B.S., 1982) writes, "[I] have been conducting environmental investigations of military test and training ranges for several years. Training at UT has served me well. My two boys, ages 17 and 4, keep me busy at home. One wants to know about college, the other Sesame Street. Have been enjoying the Mid-Atlantic and Chesapeake Bay for almost twenty years now. Say hello to Jack Sharp for me." Loren lives in Belair, Maryland and can be reached at loren.phillips@us.army.mil.

Jack Phillips (B.S., 1949) career includes: Vice-President E&P-OXY, President-Longhorn O&G, President-Dillingham Energy, Consultant. Jack is now retired in Houston TX.

Jack L. Phillips (B.S., 1949) lives in Gladewater, Texas.

#### **Can You Help Us Identify These?**

Sara Avant-Stanley, B.S. '78, sent these images from the personal collection of her late father, Joe Avant, B.S. '51. She believes they are from a GEO 660 Field Camp circa 1950. In the camp fire photo, her father is seated third from the right wearing a white cowboy hat and white shirt, "Actually, that seems to be the uniform," notes Avant-Stanely. (Joe Avant was the first in the Avant line to attend UT in geology. The latest is Blair Stanley, who graduated in 2007.) If you can help identify any of the subjects in these photos, please e-mail information to communications@jsg.utexas.edu or send USPS to

NOTES

ALUMNI

#### J.B. Bird

**Jackson School of Geosciences** The University of Texas at Austin PO Box B, University Station Austin, TX 78713-8902

And if you have some photos you'd like identified-or just showcased-in the next alumni newsletter, we want to know about those too.





Eric Phinney (M.A., 1997) lives in Houston, Texas and can be reached at phinney@bp.com.

George B. Pichel (B.S., 1951) is retired and writes, "[I] was offered a job by a Houston Independent. They wanted a resume - mine would have won a Pulitzer Prize. I made one mistake - I put my age." George lives in Oceanside, California.

Jerry Pitts (B.S., 1954) lives in Midland, Texas and can be reached at jerry@pitts energy.com.

Thomas I. Poe (B.S., 1962) writes, "Well, I'm back in Texas where I started, literally. I am living in the house where I grew up. Got tired of Colorado. All those mountains block the view. Trying to get a shop built so I can resume my gunsmith business, but no rush. Like they say, a retiree's weekend is six Saturdays and a Sunday. Anyone is welcome to visit." T.I. lives in Luling, Texas and can be reached at pogopoet1@juno.com.

Craig Pollard (B.S., 1981) is the Vice President of Exploration and owner of Cinco Natural Resources. Craig lives in Austin, Texas.

John Proctor (B.A., 1950) is retired and writes, "Last spring we went on a Caribbean Cruise that embarked at Galveston. It was a terrific cruise. Texas flags were draped all over the ship. We learned how to play 'Texan 42'. John lives in New Braunfels, Texas.

Victoria J. Pursell (M.A., 1985) writes, "I have been living in Salt Lake City for the past 10 years but will be moving to Silver Spring, Maryland this summer with my two sons, Stephen (age 13) and Michael (age 10). I am currently a stay-at-home mom but will be looking for work as a scientific writer in the D.C. area after we move." Victoria can be reached at pursell.victoria@comcast.net.

Donald F. Reaser (Ph.D., 1974) writes, "I'm teaching a graduate course for science teachers at UT-Arlington this spring and working on the second edition of my book on Dallas/Fort Worth metroplex geology. We are looking forward to a Mediterranean cruise in September." Donald lives in Waxahachie, Texas and can be reached at breaser\_2000@yahoo.com.

James "Jim" W. Richards (B.S., 1958) writes, "I am no longer active in the oil & gas business. We have a vineyard and small winery in CA." Jim lives in St. Helena, California.

James "Jim" V. Richards (B.S., 1956) writes, "Continuing as a consultant for Genesis

Producing Company in Houston. Enjoyed the tour of Jackson School of Geosciences on our 50 UT Reunion. Writing a lot of essays, many of which are published on the SIPES Website. Still playing as one of the oldest members of the Longhorn Alumni Band." Jim lives in Houston, Texas and can be reached at jr1934@aol.com.

Wade C. Ridley (B.S., 1953; M.A., 1955) is President of Ridley Oil Co. and writes, "Still 'hanging out' at the office. Had a great trip to the Rose Bowl and hope to do it again." Wade lives in Tyler, Texas and can be reached at cridley@cox-internet.com.

Jess P. Roach (B.A., 1941) is retired and writes, "I am proud of the Jackson School of Geosciences and I cherish Texas' accomplishments as the National Champion in football and baseball. Surely soon the Jackson School will be recognized as one of the top if not the top Geosciences School. 2005 was a good year for me as well. No bad illnesses." Jess lives in Austin, Texas.

Ron S. Robinson (B.S., 1958) writes, "'It was the best of times...' as a graduating 'green' geologist in 1958, I began a career which included practicing in nine states, selecting well locations on the flat plains of Texas to the mountains of West Virginia. Graining experience beyond standard rotary rigs to include air drilling and cable tool operations, was an education in itself. I indeed have been blessed. Firmly believing that careers are for enjoying, I have certainly done that. A transition from subsurface to surface occurred and real estate has more recently been my day job. The two careers have at least one thing in common, i.e. both parties to any contract need to feel equally good (as if each got the best deal) at the end of the day. In closing, I had planned to mention the Boquillas Express, when the Rio Grande was only 2.5 feet deep, but I'll save that for another time. The statue of limitations still has a couple of years to run." Ron lives in El Dorado, Arkansas and can be reached at ron@robinsonrealestate.net.

Robert Rogers (Ph.D., 2003) writes, "[I] started a new tenure-tract position at California State University, Stanislaus in fall 2006." Robert lives in Turlock, California and can be reached at rrogers@geology.csustan.edu.

Texas.

Rollins M. Roth (B.S, 1958) writes, "Working full time. Enjoying my second oil boom and probably last." Rollins lives in Brekenridge,

Tony Runkel (Ph.D., 1988) "I am a pious man of modest means. My training at UT prepared me well for my job as a poultry inspector. I married a Quaker woman and we have seven children. Vertebrate paleontology is still my love. My best regards to all my old professors, especially Jim Sprinkle!" Tony lives in Shoreview, Minnesota.

Jimmie Norton Russell (B.A., 1952; M.A., 1954) writes, "Dear Bill, Congratulations! Many wonderful things have been accomplished this year. Without a doubt, you were the 'guiding light'. I enjoy receiving the 'Newsletter'" Jimmie lives in Austin, Texas.

Jimmie N. Russell (B.A., 1952; M.A., 1954) writes, "Having 'retired' from the geological profession in 1993, I am in my 12th year in public education and my 9th year at the GOALS Learning Center of the Round Rock, Texas Independent School District as an assistant teacher working with emotionally disturbed students with special needs in grades 6th - 12th. It is a 'rewarding' hobby. I heartily encourage alumni to provide contact info of our 'lost' alumni, as I enjoy hearing about all of you, and miss hearing news about the 'lost' ones."

Clair Russell Ossian (Ph.D., 1974) is a professor at Tarrant County College and writes, "I am still teaching, although retirement will be in a year or two. After those twenty years in the oil patch, I find teaching to be what I wanted all along. I still publish regularly and my current research is mainly directed at Egypt, working with Egyptologists, in both lab projects and field excavations in Egypt. The years have slowed me down a bit, and my wife has already retired, but I still feel younger than my years. As long as the students are still a joy to me I'll probably keep at it." Clair lives in Carrollton, Texas and can be reached at clastic@airmail.net.

Carolyn Rutland (M.A., 1979) writes, "I made my second mission trip to Cuba in March 2006. This year our team stayed in Havana and worked on a small building that will have apartments for retired ministers. I scraped rusty iron grates and things that will be used over windows and doors. Others laid tile, installed bathroom and kitchen fixtures, dug holes for and poured concrete footings, and built walls. I got to see a little of the north and south coasts and part of central Cuba. It's a lovely country and the people are some of the friendliest I've met anywhere. My older son graduated form college in

December 2005 and is now gainfully employed doing market analysis for automobile companies. He's getting married in our backyard, from rehearsal to reception, in June. My younger son is still in college. My three dogs, two chocolate Labs and a beagle, are thriving. I still manage environmental projects for the City of Kalamazoo. Fortunately, the City hasn't become a responsible party on any new sites, so my job responsibilities are broadening into other areas. It's interesting. My husband is still a geology professor at WMU. My knitting projects this year have been mostly socks and prayer shawls." Carolyn lives in Kalamazoo, Michigan and can be reached at rutlandc@kala mazoocity.org.

Floyd F. Sabins (B.S., 1952) is the President of Remote Sensing Enterprises, Inc. and writes, "The growing world-wide demand for non-renewable resources provides new opportunities for overseas remote sensing exploration. The newer satellite imaging systems enhance our abilities to define targets. One of our remote sensing projects in the early 1990s has resulted in a significant gold discovery in Peru." Floyd lives in Fullerton, California and can be reached at ffsabins@ adelphia.net. Marel A. Sanchez (M.S. GSC, 2001) lives in Caracas, Venezuela and can be reached at marelsanchez@yahoo.com.

Jack S. Sanders (B.S., 1957) writes, " [I] enjoy remaining retired and vertical. Fortunately, my wife and I continue to experience traveling. It is gratifying to note the advances of the University's geology and geophysics programs." Jack lives in Dallas, Texas.

**Elsie Chalupnik Schiemenz (B.A., 1943)** is retired and lives in Mobile, Alabama.

**Chris Schneider (Ph.D., 2003)** lives in Bakersfield, California.

**Romy Schneider (B.S., 1999)** lives in Honolulu, Hawaii and can be reached at romydsch@yahoo.com.

**Louis I. Schneider Jr. (B.S., 1960)** lives in Houston, Texas and can be reached at LISJR@aol.com.

Milton R. Scholl, Jr., (B.S., 1947; M.A., 1948) is retired and writes. "Appreciating and enjoying good health and wonderful family. It is a pleasure to watch the grandkids progress through school and into college." Milton lives in Chula Vista, California and can be reached at mrscv@aol.com. **Ted Schulenberg** (**M.A., 1958**) lives in Kerrville, Texas and can be reached at schulem@ktc.com.

**Eugene Patrick Scott (B.S., 1957)** writes, "I am still a Petroleum Geologist Consultant in Corpus Christi, Texas."

John E. Seale Jr. (B.S., 1941) is retired and lives in Houston, Texas.

**Clyde Seewald (M.A., 1966)** writes, "still trying to get a few more wells drilled in East Texas." Clyde lives in Henderson, Texas.

William "Bill" W. Sharp (B.A., 1950) writes, "In April 2005 the 24 year old thug who tried to rob and car jack me was sentenced to five years in prison. I am sure it looked very funny for an 82 year old gray haired man to be chasing a young thug down a Dallas alley. Made it through several other adventures but all is well now." Bill lives in Dallas, Texas.

**Perry L. Shaw (B.S., 1976)** writes, "After spending 20 years working as a gulf coast geologist for oil and gas independents, I began making oil and gas acquisitions for my own account. I also helped establish a nonprofit organization, you can check out the school we are building in Guatemala and

Geo 660 Through Time: L.T. Barrow, B.A. '21, M.A. '23, Baker Hoskins, C.E. Cook, L.C. Reed, and C.B. Vertrees, B.A. '23, tend their moustaches during summer field camp in Mason Co., Texas, 1921.



our other projects at www.nbri.net. Perry lives in Porter, Texas.

Stephen L. Shaw (B.S., 1971; M.A., 1974)

writes, "I retired from Burlington Resources in 2005, and started my own exploration company, Firstview Resources. Nancy and I still travel a lot to see grandkids, and I stay busy running our family ranching operation. Nancy and I send our best to all our friendsold and new." Stephen lives in Midland, Texas and can be reached at sshaw-firstview@ sbcglobal.net.

**Jerry (B.S., 1957) & Gay (B.A., 1957)** Shelby (B.S., 1957 and B.A., 1957) live in Amarillo, Texas.

Mark Shield (B.S., 1988) writes, "I have left but not forgotten the Geoscience workforce. I am currently Test Engineering Manager for a world class provider of multi-source intelligence solutions for the warfighter, first responder and policy maker." Mark lives in Austin, Texas.

Rubin A. Shultz, Jr. (B.S., 1961) writes, "Still working for TX Dot. It's been a busy year with all the hurricanes. Grand kids growing up quick. Nancy and I are looking forward to our annual trip to Maui, HI." Rubin lives in Corpus Christi, Texas.

Clint Simmons (B.A., 1982) lives in Austin, Texas and can be reached at clint.simmons @cpa.state.tx.us.

Samuel J. Sims (M.A., 1957) writes, "I am still doing consulting work for the local stone industry and keeping busy at it. I am sorry that I missed the 50s reunion last year; I'm sure it was a fun affair. Nothing else to report." Samuel lives in Bethlehem, Pennsylvania and can be reached at sims1961@ptd.net.

**Robert Samson Singer (B.S., 1961)** writes, "Still working as much as possible as Reservoir/Reserves Engineer." Robert lives in Houston, Texas.

Robert Single (M.S., 1993) writes, "[I am] currently working as a geologist for Anadarko in Denver. I'm involved in the exploration and production of natural gas in northeastern Utah." Robert lives in Denver, Colorado and can be reached at robertsingle@earthlink.net.

Matt Sjoberg (B.S., 1986) writes, "I'm in Austin and a partner at Jackson, Sjoberg, McCarthy & Wilson, L.L.P., an oil, gas, and natural resources law firm. My practice Texas. **Dan L. Smith (B.S., 1958)** writes, "I am still working full time doing exploration in the Gulf Coast Province and am having a ball. I just finished my six year commitment as President of the America Association of Petroleum Geologist. Also, I continue serving on the Geology Foundation Advisory Council." Dan lives in Houston, Texas and can be reached at dsmith@soginc.net.

Edwin L. Smith (B.S., 1951) writes, "I continue to be active in the oil and gas business



Abhaya R. Badachhape, M.A. '88, and Galen Treadgold, M.A. '85, reconnect during the 2005 SEG meeting in

consists mainly of trial work and contested matters before the Texas Railroad Commission. I am board certified in Oil, Gas, and Mineral law by the Texas Board of Legal Specialization and am a licensed professional geologist in Texas. Best wishes to the class

Houston

of 1986."

William P. Slater (B.A., 1950) writes, "Perhaps my 89 prospects will be more marketable with oil at \$60/bbl...But Canyon Lake is not a center of oil & gas exploration! And, will wild cats ever sell again?" William lives in Canyon Lake, Texas.

**Traci Trauba Smith (B.S., 1983)** writes, "Hard to believe it has been over 20 years since graduation!" Traci lives in Lake Jackson, Texas and can be reached at trackeye @swbell.net.

**Charles E. Smith (B.S., 1954)** writes, "I am retired but have been awarded Emeritus designation by A&PG. My new telephone number is 214-552-4180." Charles lives in Dallas,

both in exploration and production. I also invest in prospects and manage my interests. Finding prospects is not as difficult as getting drilling rigs. My wife Betty and I have been married for 55 years and have a daughter, a son and five grandchildren which we enjoy very much. What a great year for the Longhorns. I still like to say 'Hook em Horns.'" Edwin lives in Wichita Falls.

Paul K. Smith (B.S., 1984) writes, "I am working full time as an Activities Instructor at Lake Austin Spa Resort and part-time as Adjunct Professor of Fitness Technology at Austin Community College." Paul lives in Austin, Texas and can be reached at bluegeckoyoga@aol.com.

**Traci Trauba Smith (B.S., 1985)** writes, "[I am] Office Manager for Birdstone Real Estate in Lake Jackson, Texas." Traci can be reached at trackeye@swbell.net.

Brian Smyth (B.S., 1976) lives in Houston, Texas and can be reached at bsmyth@nothwindexploration.com

John L. Snyder is retired and lives in Arlington, Texas.

Stephen W. Speer (M.A., 1983) writes, "Enjoying everyday living in South Carolina, working SENM oil and gas. Modern communications allow us all to do amazing things. Best news of the past year: Therese and I are now grandparents of our eldest daughter Sarah's son, Noah Samek. Sarah had the singular pleasure among our children of

"attending" UT grad school. Amazing how time passes when you're having fun! Hello to all our friends out there, and if you're in the Charleston area, give us a buzz."

Bill St. John (B.S., 1958; M.A., 1960; Ph.D., 1965) writes, "\$60-70 oil keeps everyone busy. In the past six months, I have visited Abuja in Nigeria, Kinshasha in Dominican Republic, Congo, Dar es Salaam in Tanzania, Nairobi and Lake Naivasha in Kenya, and Delhi and Mumbai in India. All consulting trips."

Theodore "Ted" Stanzel (B.S., 1956) writes, "I was very pleased to visit the UT Campus and the Jackson School of Geosciences last April for the 50th graduation reunion. A great experience made possible by Texas Exes, geosciences staff and students. Thank You. I continue my work as director on the Stanzel Family Foundation Board of Directors and the Model Aircraft Museum. Volunteer work continues for donations to build a new city

NOTES

ALUMNI

public library which we hope to construct this year. Serving as the chair person for Colorado Fayette Medical Center Board of Directors." Ted lives in Schulenburg, Texas.

Frank L. Staplin (B.S., 1949; M.A., 1950) writes, "Retired from Esso Resources Canada in December, 1982. Ph.D., University of Illinois, 1953." Frank lives in Calgary, Alberta and can be reached at staplinfl@shaw.ccl.

Wilford Lee Stapp (M.A., 1946) writes, "Dear friends, Getting along in years (87) and now finding a (financial) home for oil and gas prospects I have accumulated over the years in South Texas and some overseas. If you come to my office I am always good for coffee, lunch, or something. Took a couple of young people by the geology department, and had not been on campus in years, and was delighted and very proud of the facilities and highly impressed with those I met there." Wilford lives in San Antonio, Texas.

#### From the Archives: Abdullah Tariki in Texas

In the late 1950s, the Venezuelan lawver and diplomat exporting countries. Generally credited as "the father of OPEC." Pérez Alfonzo was not the only founder of that proanization with a background in Texas

wave of elite Saudis sent abroad for education and trair ing. He became head of Saudi Arabia's Directorate of Oil

and Mining Affairs in 1955, helping guide Saudi domestic and international oil po in oil profits for exporting countries. In the near term, exporters wanted to push back the "fifty-fifty" profit sharing arrangements between host countries and international oil companies. Their long-term play was greater nationalization of reserves and international cooperation, drawing on lessons of the Texas model to regulate price

Tariki was sometimes known as the "Red Sheik" because of his support for the brand of Arab nationalism promoted by Egypt's Gamal Abdel Nasser. According to Rachel influenced his later relations with Americans.

Power (Simon Schuster, 1991), Stephen Duguid, "A Biographical Approach to the Study

with the kids, Shara is still teaching fourth grade at Matthews Elem. in Austin ISD, and has been married for two years. Our first grandchild was born in June 2005, and Kale Turner is growing fast and talking and crawling up a storm. Susan graduated in 2005 from Whitehouse High School, and has just completed her first year at UT Tyler. Sororities were allowed at the school last year, and she is now a founding member of the Alpha Chi Omega chapter in Tyler. She also continues cheerleading and is working at a local cheer/tumbling gym. Kyle has finished second grade at Owens Elementary, where Angela teaches, and is enjoying the summer break with his Mom. He's all boy, and enjoys cars like his Dad. Angela has completed her 20th year teaching and is still enjoying her profession. She also continues to put up with me after 26 years. I have finished my fourth year with Allied Waste, and have just accepted a promotion. The good news is that I now am at the Region level as opposed to the District level, the other news is that the Region office is in Houston. The Region covers all Allied Waste facilities in Utah, Colorado, Oklahoma, Texas and Louisiana. I will still be working with all of my great co-workers, but will now be in the Houston area. Since our Region office is near Beltway 8 and I-45, living in Tyler became a bit of a commute. By the time the Newsletter is published we should reside at 20618 Crescent Arbor in Spring, Texas 77379. Our move date is the week of June 12th, and unlike our move to Tyler, someone else is packing and moving the Stengl household. Angela was offered three teaching positions in the Klein ISD, and accepted a second grade job at Hassler Elementary which is very close to the new house. I will update you next year on the move back to suburbia. In the mean time, hello to all of the '85 graduates, as well as those of you who graduated with my Dad, Gerald Stengl (Walt Boyle, Will Green, Jimmy Russell,...). Have a good year. You may reach me anytime at burgess.stengl @awin.com."

Burgess Stengl (B.S., 1985) writes, "Starting

Tom Stidham (B.S., 1995) writes, "After graduating from U.T. in 1995, I went to U.C. Berkeley to complete my Ph.D. in Integrative Biology. After finishing my thesis on an extinct group of birds in 2001, I worked as a lecturer in Integrative Geology and as a postdoc in the Laboratory for Human Evolutionary Studies in Berkeley. I was finally able to return to Texas after I started a tenure-track job in 2004 at the



Jackson School and the Leonidas T. Barrow Centennial Chair in Mineral Resources; Will Green (2007-2008), independent/consultant, Green Energy Resources, JSG M.A. 1955; and Peter Rose (2005-2006), senior partner, Rose & Associates, Inc., JSG B.S. '57, M.A. '59.

"other" school, Texas A&M. Currently, I'm an assistant professor in the Department of Biology and I also have an appointment as the Director of Lower Division Instruction in Biology. As a result, I get to warp the young minds of thousands of aggies. I can be reached at furcula@mail.bio.tamu.edu."

Ted Stout (B.S., 1985) writes, "[I am] going on my third year as Chief of Interpretation/ Education at Craters of the Moon National Monument and Preserve in Idaho. We live in the tiny town of Picabo outside of Sun Valley. We bring in interns every summer through G.S.A. who lead walks and conduct research in this fascinating lava landscape." Ted can be reached at ted-stout@nps.gov.

Michael W. Strickler (B.S., 1978) is a geological advisor for Deep Gulf Energy, LP and lives in Katy, Texas.

Hal Stubblefield (B.S., 1954) writes, "Wife Barbara and I celebrated our 50th wedding anniversary on March 2, 2006. Sadly our youngest daughter, Amy, age 44, passed away on Jan 28, 2006 after a long fight against breast cancer. She is survived by her husband Steve Francis and six children." Hal lives in Kingwood, Texas and can be reached at halstub@pdq.net.

Yusliza Mohd Sufian (B.S., 2004) lives in Kuala Lumpur, Malaysia and can be reached at yusliza\_s@petronas.com.my.

Bruce Swartz (B.S., 1982) lives in San Angelo, Texas and can be reached at swartzoil@ wesonline.net.

earthlink.net.







Karen (Bergeron) Thompson (B.S., 1992)

writes, "Last five years I've been working at a meeting planner. Since June 2005 I have returned part time to using my hydrogeology background as a technical assistant at ARCADIS... it has been fun getting back to using the jargon." Karen lives in Helena, Montana and can be reached at mtntrio@

C. Brian Trask (M.A., 1972) lives in Champaign, Illinois and can be reached at trask@ isgs.uiuc.edu.

Everette Travis (M.A., 1951) is a retired professor and writes, "Enjoying the beautiful Hill Country, Highland Lakes (especially Buchanan), Llano Uplift and my new bride." Everette lives in Tow, Texas.

Robert F. Travis (B.A., 1957) is retired and writes, "I am still kicking. Major interests now are art, tennis and boating." Robert lives in Corpus Christi, Texas.

Tony Troutman (M.S., 2004) writes, "I am currently working as an exploration geologist at Swift Energy Exploration Services, a subsidiary of Swift Energy. Our primary focus is in the coastal transition zone of the Gulf of Mexico. One of our recent exploration wells tested 7429 b/d and 5.5 MMcfd. Our other work is in New Zealand, Texas, and we recently entered Alaska. Here in Carpinteria we have tar sand outcrops on the local beaches, extensive outcrops of Cretaceous through Pleistocene rock, and numerous active oil seeps to keep us thinking about petroleum systems. Surfing after work is a regular activity and keeps us inspired." Tony lives in Carpenteria, California and can be reached at tony.troutman@carbonates.us.

Sarah Lindsay Tsoflias (Ph.D., 1999) lives in Lawrence, Kansas and can be reached at sarahlt@ku.edu.

John Tuohy (B.S., 1939) lives in Canyon Lake, Texas.

David A. Wallace with his two children.

James Underwood (M.A., 1956; Ph.D., 1962) writes, "An exciting time for someone with a long-time interest in Mars...and in grandchildren. Margaret Ann and I welcomed Claudia Margaret Pollarson in December 19, 2005 to our family." James lives in Austin, Texas and can be reached at jrujr@flash.net.

Don Urbanec (B.S., 1960) writes, "[I am] still working at finding hydrocarbons and having a lot of fun." Don lives in Boerne, Texas and can be reached at durbanec @ev1.net.

Robert Valerius (B.S., 1959) is retired and lives in Corpus Christi, Texas.

James B. Vanderhill (Ph.D., 1986) writes, "I am still in Houston, working in ExxonMobil's U.S. Production group, after being in the U.S. Joint Interest group for the last 5 years. I have responsibilities for stewarding drilling operations for part of our Gulf of Mexico portfolio. I'm enjoying being involved again in day-to-day well operations. Other than that, I am busy with three daughters, three dogs, and a little carpentry." James lives in Bellaire, Texas and be reached at jim.b. vanderhill@exxonmobil.com.

Joseph Versfelt (B.A., 1985) writes, "After graduating from UT Austin in 1984, I attended the graduate program at Duke University, participating in the research program 'Project PROBE' dedicated to acquiring multichannel seismic data and geological field studies in East Africa's giant rift lakes. Upon graduating with MS geology/geophysics in 1988, I started at Texaco working

West Africa and Brazil, and concluded my 10 year stint there working the Far East, China, and the Caspian regions. Since then I have worked West African deepwater and Andean projects for CMS-NOMECO, Alberta Energy/EnCana, and Occidental. I joined El Paso in late 2004, as International Exploration Manager. Currently managing one of largest IOC E&P portfolios in Brazil, and growing rapidly in North and West Africa." Joseph

Makenzie Maureen (Smith) Vessely (B.S., 2001) is an environmental scientist and lives in Austin, Texas.

lives in Houston, Texas.

Harry A. Vest (M.A., 1959) is retired and lives in Houston, Texas. He can be reached at harryvest@aol.com.

J. Mac Vilas (B.S., 1984) "Enjoying my new position as a senior project manager in the TCEQ Remediation Division State Lead Section. Spring time in Austin is great. Carla and I keep busy raising our two daughters." Mac lives in Austin, Texas and can be reached at mvilas@tceq.state.tx.us.

Don E. Wade (M.A., 1954) is retired and lives in Austin, Texas.

Thomas J. Waggoner III (B.A., 1957) writes, "Retired and spending most of out time in Montana. Grateful for gas prices. Not generating drilling prospects but participating in the continued development of increased density drilling. Proud of the University's developments. Go Horns!!" Thomas lives in Bigfork, Montana and can be reached at waggoner@montanasky.net.

Peggy and Nelson Webbernick, M.A. '52, at the 1950s reunion.

Mark C. Walker (B.A., 1981) writes, "I am excited to announce that I have now joined the El Paso office of Brown McCarroll, L.L.P., an Austin-based law firm. I look forward to more trips back to Austin." Mark can be reached at mwalker@mailbmc.com.

David Wallace (B.S., 1986) writes, "The last year has been pretty eventful. We moved back to Houston from Denver and I returned to the oil and gas industry. We are living in The Woodlands and I'm working with SAIC, Inc. in their upstream consulting group. Marcy, Zoe & Zander are doing well although Zoe wants to know why it is so hot in Texas." David lives in The Woodlands, Texas and can be reached at dawallace@yahoo.com.

Anthony W. Walton (M.A., 1968; Ph.D., 1972) lives in Lawrence, Kansas and can be reached at twalton@ku.edu.

Daniel L. Ward (B.A., 1949, M.A., 1950) is retired and lives in Grand Junction, Colorado. Daniel can be reached at dward @2csol.net.

Bernie Ward (B.A., 1955) writes, "Grandchildren now moving into baseball season, and love to do our part to keep the price of gasoline up by driving to Longview on the weekends to watch the games. All is well. We manage to do a little traveling." Bernie lives in Tyler, Texas.

Ralph H. Warner (M.A., 1961) is retired and writes, "Enjoyed the success of UT sports team this past year. Marilyn and I also achieved the status of great grandparents. May terra continue to stay firma and bless us all with another successful year." Ralph lives in Kingwood, Texas.

Abigail L Watkins (B.A., 2005) lives in Dallas, Texas and can be reached at abigail @paperclipped.net.

Richard L. Watson (M.A., 1968; Ph.D., 1975) writes, "After living and traveling on sail and motor yachts for 23 years, Betsy and I buried the anchor in Port Aransas and moved ashore in 1995. We lived about 1/2 time on the island of Roatan in Honduras from 1982 to 1998 and also traveled to other countries in Central America and Mexico. We would return to the U.S. for Geology Consulting, mostly pertaining to boundary disputes on the Texas Gulf Coast. At other times I ran offshore oilfield vessels and delivered commercial vessels just about everywhere between Virginia and California. I have

#### Latent-Heat-of-Fusion Dejà Vu

Leslie Pittman White (B.S., 1956) Clabaugh and a group of his ex stu dents are together again, this time at <u>Stev</u>e's beautiful place on the Pede nales arm of Lake Travis. We viewed a Cow Creek reef.

mud crack geome



Sabal palms and other sights and curiosities. A highlight was a brief discussion about a frost weed plant. Almost any time Steve's students get together someone will mention his classroom discussion of latent-heat-of-fusion, illustrated by the anecdote of him and his wife turning the sprinkler on the roses to protect them from freeze. It is as vivid as it were yesterday. Then, a swift half-century later, as we stood around a frostweed plant, Steve ned its behavior of extruding ice from its stem during the first freeze; a change-ofstate with the purpose of protecting the root below. Latent-heat-of-fusion deja vu. See photo. The group is, left-to-right: Bob Pickens, Bill Willard, Bill Lindemann, Don Haynes, John Dietrich, Jim Underwood, Uel Clanton, John Wood and Steve Clabaugh. Les White is behind the camera tripod, unable to figure out the self-timer. It was a great day. Rex, we missed you." Les lives in Austin, Texas and can be reached at

been a pilot for 15 years and my website has a major section with aerial photos of the Texas Coast, especially inlets. I will soon be enlarging this to include many more aerial photos as well as surface photos of Texas Coast Geology. Still doing some consulting, but am about 3/4 retired. Well the truth is that I have always been about 3/4 retired, except between adventures. Betsy has unretired and has her own real estate brokerage in Port Aransas. I would love to hear from some of the people from the good old days." Richard can be reached at richard@texascoastgeology.com.

Bill D. Watson (B.S., 1958) is retired and writes, "Jean and I are moving to a new home after more than thirty years in the same house. Still playing golf and keeping up with the eleven grandkids. Enjoying life." Bill lives in Missouri City, Texas.

Gerald E. Weber (M.A., 1968) writes, "Retired from teaching at UCSC Earth Science Department. Consulting, drinking beer, rowing rivers...." Gerald lives in Santa Cruz, California.

Richard J. Weiland (M.A., 1993; Ph.D., 1999) lives in Houston, Texas and can be reached at weilanrj@bp.com.

#### Amy L. Wharton Vanderhill (B.S., 1983)

writes, "After 11 years with Mobil, by the time the alumni Newsletter is published, I'll have reached the same with Pogo Producing Company. We have had tremendous success with our south Texas Wilcox plays and now I've been given a new challenge, southeast Texas. Bugs?? Now, how do you say that?? Wish I had learned those names in Paleo class! We are busy interpreting a new 3-D survey and looking for prospects with our partner. At home, Ceili is 17, and looking at A&M or UT for the Fall 2007 semester. Shannon is 15 and working on her Driver's License. Meagan is 13 and this will be her last year in middle school. The dogs are doing well in AKC Agility, Colby has his Excellent titles and is working on his Master titles. Gus has his Open titles and is working on his Excellent titles. Rebel just acts like the stud he is! Shannon's, Maine Coon cat, Sydney joined us in April. We are having a blast with our zoo!" Amy lives in Bellaire, Texas and can be reached at vanderhill@ sbcglobal.net.

Kristin Miller White (B.S., 1999; M.S., 2005) is the owner of Escarpment Environmental and lives in Austin, Texas. She can be reached at kmwhite@escarpmentenvironmental.com.

Steven L. White (B.S., 1978) writes, "I'm still enjoying the oil business as an Independent in Tyler."

Rex H. White, Jr. (B.S., 1956; M.A., 1960) is an attorney and lives in Austin, Texas. He can be reached at rex@rexwhite.com.

#### Marriott Wieckhoff Smart (B.S., 1957)

writes, "John and I continue to live in the Metro Denver area. I have been retired from my research business since 1998. John continues to do consulting with various small oil companies from time to time. Both of us are fortunate to be healthy. We have had some interesting trips since my last report. In 2004, we spent a couple of weeks in Ireland. This spring (2006) we spent two weeks with friends on an "adventure" trip to the Copper Canyon region in the Sierra Madres of NW Mexico. Copper Canyon, unlike the Grand Canyon, is volcanic and consists of several rivers and remote canyons. The trip was an awesome experience. We saw beautiful sights, hiked quite a bit, and learned about the Indian population and general Mexican culture. We recommend this area to everyone who wants a different kind of vacation." Marriott lives in Centennial Colorado, and can be reached at marriott@ix.netcom.com.

Fredenzk W. Wiegand, Jr. (B.S., 1969) writes, "During 1995, Fred Wiegand worked for Pogo Producing, Trans Jordan Exploration & Plains Exploration in South Texas. Worked next to the Dead Sea in Jordan, OCS Santa Barbara California; and also TXM-Hungary in drilling. Designed and supervised the drilling of exploration wells. Fred's oldest son Carl Jonathan Wiegand worked with his father in Jordan. The other Wiegand brothers are doing fine." Fred lives in Lockhart, Texas.

Warren James Wiemann (B.S., 1998) lives in Austin, Texas and can be reached at jwiemann@espspares.com.

Willliam D. "Dave" Wiggins (Ph.D., 1982) writes, "I am an exploration geologist with Chevron, currently working on the Black Sea and surrounding areas. I will be living in Buenos Aires, Argentina, beginning in late 2005 - with or without my Chevron career intact. Take care all." Dave can be reached at davewiggins@chevrontexaco.com.

Michael A. Wiley (B.S., 1957; M.A., 1963; Ph.D., 1970) writes, "Remembering the Geology Department of the 1950's and 1960's, the Jackson School simply amazes me. The dedicated effort of faculty and staff required to

establish the Jackson School and its reputation for excellence must be recognized by one and all. I eagerly anticipated the 1950's Reunion and the opportunity to see the Jackson School first hand and to renew many old friendships. Still doing limited consulting work, mostly writing software for the environmental remediation industry, but some scattered real geology. After six years as Treasurer of Energy Minerals Division of AAPG, I stepped down and became the Gulf Coast Councillor for EMD. At the recent AAPG convention in Houston, EMD awarded me Honorary Membership, its highest award. The award is much appreciated but is deeply humbling because there are surely others more deserving. If you are ever close by Canyon Lake, call, come by, and we'll swap lies! The beer is always cold!" Michael lives in Canyon Lake, Texas and can be reached at mawiley@gvtc.com.

NOTES

ALUMNI

Jefferson William (B.A., 1988) lives in Los Angeles, California and can be reached at jeff.williams@acousticpulse.com.

**Robert R. Williams (B.S., 1954)** is retired and writes, "A good year for the petroleum business and also UT sports. Enjoy reading news of friends." Robert lives in Dallas, Texas.

Ed Williamson (B.S., 1969) is the current Chair of the Geology Development Board and received a University of Missouri College of Arts and Science Distinguished Alumni Award on Friday February 17th. 2006. The Williamson family established an endowment that the department uses to bring in external speakers for our colloquium series. You can find out more about this year's A&S Alumni Award recipients at: http://coas.missouri.edu/asweek/award\_winners.html."

James C. Willrodt (B.S., 1977) writes, "I am staying busier than ever rotating into

In June 2006, the Bureau of Economic Geology hosted a day of filming salt-tectonics research for a four-hour television series called "Faces of Earth," which the Discovery Channel will broadcast in 2007. The film, which aims to give a face to the geoscience community, is being produced by Evergreen Films, LLC, maker of Emmy-award-winning productions about dinosaurs. The American Geological Institute is sponsoring the series, and the Jackson School of Geosciences is both a major financial and content contributor, with Jackson, Bureau Director Scott Tinker, and Department of Geological Sciences Professor Charles Kerans appearing in the series.



Equatorial Guinea. Hello to all the old gang." James lives in Houston, Texas.

**Douglas Wilson (B.S., 1980)** writes, "I'm assigned to International Deepwater Exploration for Anadarko focusing on finding large reserves in West Africa. Rebecca and Rachel are doing well. Rebecca and I have been married 25 years this July. We were married at the Travis County Court House the week after I returned from 660 in 1980." Douglas lives in Spring, Texas.

Jennifer Wilson (B.S., 1995; M.S. GSC 2001) writes, "Racked up ten years at the USGS in Austin TX. Racked up five years as a roller derby skater. Upcoming field work in Minnesota and Arizona. Upcoming vacation in Hawaii." Jennifer lives in Austin, Texas and can be reached at jenwilso@usgs.gov.

#### William Feathergail Wilson (B.S., 1960;

M.A., 1962) writes, "Working in the Texas Hill Country on ground water consulting. Performing pump tests, water availability studies, ground water modeling and litho logic logging. Semi-retired working 7 days per week." William lives in Bandera, Texas and can be reached at featherg@hctc.net.

Jennifer Winkler Truax (B.S., 1992) writes, "I love being home with my kids. Clara is in the Gifted and Talented 1st Grade Class and Carter is in MDO2 part time. For the last few years I have been the Director of Finance and Registration of F.R.O.G. Camp - Church summer day camp. One day I hope to return to work in Geological Sciences, but for now I give talks to elementary school aged kids about Geology." Jennifer lives in Rowlett, Texas and can be reached at cjckct23@ verizon.net.

**I.T. Winter (B.S., 1953)** writes, "Just like being a UT Geology Alumni with nothing to add to the newsletter. (Class of '53 seems to have little to say! Thank You anyway!) I.T. lives in Fort Worth, Texas.

**Clarence Winzer (B.A., 2001)** is a geologist and environmental scientist with Shaw Environmental & Infrastructure and resides in Austin, Texas. Clarence can be reached at clarence.winzer@shawgrp.com.

James A. Wolleben (Ph.D., 1966) is semiretired and living in Austin, Texas.

**Amy Wood (B.S., 1985)** lives in Austin, Texas and can be reached at amywood@alumni. utexas.net.



Geo 660 from 1971, lunch at Del Norte Gap, in the region of Marathon, Texas. From the collection of Earl McBride. Identifications from McBride: Left to right, front: "Don Parker (TA), Blevins, Tony Fallin (TA); middle: Dick Crawley (TA), Ernie Lundelius, Ralph Kehle. Boy is Kehle's son. Far right is Winn Goter (TA)."

William Woods writes, "[I] worked as the Executive Assistant in the Department of Geological Sciences for 21 years (1983-2005), and a total of 27 years at UT. I retired in September, 2005, and since then have traveled and done some temporary work for UT. My longest work period was with ICC for 5 months. I have traveled to El Salvador, South Carolina, and to Scandinavia, and am enjoying retirement. I keep in touch with the Department from time to time and wish everyone well." Bill lives in Austin, Texas and can be reached at billw@mail. utexas.edu.

Arnold Woods (M.A., 1981) writes, "Another year gone by already? Been so busy I hadn't realized how much time had passed. I'm still 'playing' with dinosaurs, especially during the summer. I'll be working this summer with a group measuring theropod trackways in the eastern part of Wyoming. I'm also sitting wells (for those of you wondering if petroleum geology is a good thing, wellsite geologists are getting \$700/day, which ain't bad). Updated the little book I wrote on the dinosaurs of Wyoming and am looking for a publisher. Doing talks at schools throughout the state on everything from dinosaurs to crocodiles to Incas. I'll be adding in talks on robots and basic physics this fall. [I] am an adjunct staff member at the local community college, teaching physical geology labs and introductory petroleum geology. Working with the geology department on their new extractive minerals program (I'll be doing well logging, among other things). Working with a teacher from Midwest High School on an extracurricular program to teach students how to find and extract dinosaur and other fossils. Maybe we'll get some students interested enough to head to UT for a degree in vertebrate paleo! Aside from that, just writing articles and getting back into martial arts. Anyone interested can shoot me an e-mail." Arnold lives in Casper, Wyoming and can be reached at arnold@alluretech.net.

Steve "Stephens" Wright (M.A., 1980) writes, "With Chevron's much expanded Alaska portfolio. I've returned to Anchorage as CVX's Alaska Asset Development Manager. This is a great opportunity professionally and my family is thrilled to "be going home", as my daughter says. If you are heading north to the last frontier give me a call and stop by for a home-brew!" Steve lives in Anchorage, Alaska and can be reached at sswr@chevron.com. **Cee Yager (B.S., 1984)** lives in Fort Worth, Texas and can be reached at ceeyager@worthingtonbank.com.

John C. Yeager (M.A., 1960) is an independent geologist and lives in Lafayette, Louisiana.

Leonard M. Young (Ph.D., 1968) writes, "Retired from Geosciences Dept at University of Louisiana at Monroe in 2002 after 35 years. Wife Mary Frances recently retired from 23 years of teaching high school (Special Ed), so now we may be able to travel. Current interests seem mainly to be enjoying standard poodles (#'s 4 and 5) and collecting art deco. Friends say we have the makings of a museum." Leonard lives in Monroe, Louisiana and can be reached at Imyoung25@colla.com.

**Susan Young (B.S., 2005)** is a senior field engineer for Schlumberger Wireline & Testing and lives in Tyler, Texas. Susan can be reached at youngsa@gmail.com.

William C. Young III (B.A., 1961) writes, "Still enjoying traveling, bridge and postal chess." William is retired and lives in Shreveport, Louisiana.

**Sarah Zanoff (B.S., 2006)** lives in Houston, Texas and can be reached at sezanoff@ gmail.com

# MEMORIALS

#### Alumni

William "Bill" Moore Beecherl, passed away September 11, 2006. Bill was born January 9, 1928, in Dallas, Texas, the son of Louis A. Beecherl, Sr. and Miriam Moore Beecherl. Bill graduated from Highland Park High School in 1945, served in the U.S. Navy in 1946, and graduated from The University of Texas at Austin in 1949 with a degree in geology. He is a long-time member of The Church of the Incarnation. Bill first worked as a geologist in the oil business, but later spent many enjoyable years traveling the world as a tour guide. He was preceded in death by his father and mother, and survived by his brother, Louis A. Beecherl, Jr., and Louis' wife, Julia Tutt Beecherl. He leaves three nieces and five nephews, many other extended family members, and friends he met over the years of traveling the world. In lieu of flowers, memorials may be sent to the Alzheimer's Association, 4144 North Central Expressway, Suite 750, Dallas, Texas 75204.

Warren J. "Jack" Cage, Jr., of Georgetown, passed away at the age of 80 on November 13, 2006. He was born October 29, 1926 in San Marcos, Texas. He graduated from Kingsville High School in Kingsville, Texas in 1944 and spent one semester at A & I College in Kingsville. He enlisted in the U.S. Army Air Corp, eventually being stationed at Kobe/Howard Field, Panama. After being discharged from the military, he entered the University of Texas at Austin, where he received a bachelor's in geology. While there, Jack met Susan Kiefner who later became his wife of 53 years. Both were employed by Gulf Oil Corporation as geologists and enjoyed their travels with the company and on their own. He retired in 1984 and moved to Fair Oaks Ranch and Golf Club, north of San Antonio where he enjoyed golf, the pleasures of the Texas Hill Country and his dog, Charley and cat, Patty. After developing Parkinson's Disease in the 1990's, Jack and Susan moved to Sun City in Georgetown in 1998. He was a member of Wellspring United Methodist Church in Georgetown. Always a diehard fan of the Texas Longhorns, he could remember scores, players' names and game dates until the end.

John Henry Dante peacefully passed away on April 26, 2006 at the Heritage Health Care Center, Naples, Florida. He was born August

3, 1913 in Washington. He was a fourth generation Washingtonian. His great-greatgrandfather fought with the D.C. Militia in the battle of Bladensburg during the War of 1812. The small coal town of Turkey Foot, Virginia officially became Dante on January 12, 1903 with the opening of the Dante post office. The name change came about because his father, William, helped in getting railroad service to transport the coal. John attended St. John's College High School in Washington, received a bachelor's degree from Holy Cross College, Worchester, Massachusetts in 1936. He attended Catholic University in Washington, D.C., where he received his master's degree. He also attended the University of Texas at Austin. John worked as a geologist for the Federal Power Commission in Washington from 1954 until 1973 when he retired to Naples, Florida. He is survived by his loving wife of 52 years, Rosalia Ottomeier Dante; five children, Philip Dante, Joseph Dante, Susan Milligan, Paula Dante and Julianne Dante; five grandchildren; three great-grandchildren; and many nieces and nephews. In Naples, he had been active in the Naples Stamp Club, a life member of National Model Railroad Association, Southwest Florida Archaeology Club and volunteered at the Creighhead Lab at the County Museum. For 70 years, John had been a member of the Knights of Columbus; in Naples he belonged to Council 4357. He was also active as a case-

Robert Wynn Grayson was born on November 13, 1921 in Lufkin, Texas, and passed away on July 5, 2005 at the age of 83 in Austin, Texas. Mr. Grayson received his bachelor's in geology from the University of Texas at Austin in 1948. He worked for Ohio (Marathon) Oil Company as a geologist, exploration manager, and strategic planner. He held memberships in the AAPG, the Austin Geological Society, Rotary International, and the University of Texas at Austin Texas Exes. When Mr. Grayson was young, he was involved in the Boy Scouts of America. In 1943, he enlisted in the Marine Corps. He was known for his high ideals and firm beliefs. He is survived by his wife Billie Fay Phinney Grayson, his five children: Robert Wynn Grayson, Jr. and wife Nancy, William Long Grayson and wife Cecilia, Glenn Edward Grayson and wife Liz, David Phinney and wife Priscilla, and Cynthia Phinney

worker with the St. Vincent de Paul Society.

their spouses, and five great-grandchildren. James Roy Jackson, Jr., a native of Mont-

gomery, Texas, passed away September 10, 2005. He graduated from Texas A&M with a bachelor's degree in geology, where he was commissioned a 2nd Lieutenant and was a member of the Ross Volunteers. He began his career with Standard Oil Co. of Venezuela. He returned to the U.S. and entered the University of Texas at Austin, earning a masters' degree in geology. He was activated as an officer in the U.S. Army in 1941, serving in Texas, North Carolina, California, and Hawaii. He participated in the invasion of Peleliu in the Palau Islands. After separation from the Army as a Major in 1946, he began a 40-year career with Humble Oil & Refining Co. (later Exxon) in New Orleans. His life's desire was to discover oil, which he did in a big way; including being involved in the Prudhoe Bay oil field in Alaska. He was active in numerous industry, professional, and public affairs organizations including AAPG, API, NOIA, AIPG, and OTC. After his retirement from Exxon, he had another 10-year career with Petroleum Information. He was also an avid golfer and longtime member of Riverbend Country Club. He is survived by his beloved wife Norine, son David and wife Angela, their sons James Roy III and Richard, daughter Judy and husband Jeff, their children Brian and Lindsey.

Selman and husband Jack; his brother Bruns

Holland Grayson, eight grand-children and

Lois Jean Peterson, died peacefully at the age of 44 at her home Sunday, March 26, 2006 following a lengthy battle with brain cancer. She is survived by her husband of 23 years, Joe, and sons Robert and Kevin, both students at Dripping Springs High School. She is also survived by her parents, Mary and Jim Waggoner of Houston, a sister, Karen Whitney of Clarksville, Maryland, and two brothers, Bruce Wagoner of Las Vegas, Nevada, and John Waggoner of Katy, Texas. Lois was born September 18, 1961, near Livermore, California, and always considered California home. As a child she camped and backpacked in many of the national parks with her family and learned to love the outdoors and nature. She moved to Houston at the age of 10 where she later graduated with the 1980 class at Memorial High School. Lois spent the summer after her high school graduation working as an assistant park ranger in the Grand Canyon with the Student

Conservation Association. She then entered the University of Texas at Austin, married Joe Peterson in 1982, and graduated with a bachelor's degree in geology in 1984. She worked for the State of Texas Health Department until Robert was born in 1988, when she decided to be a stay-at -home mom. In addition to raising two wonderful boys, Lois was very active as a volunteer with the Dripping Springs schools, the Dripping Springs Community Library, the Brackenridge Hospital Sewing Room, Cub Scouts, Boy Scouts, and the Dripping Springs United Methodist Church. Lois survived a brain tumor in 1972 when she was 11 years old, and went on to have a wonderful, loving marriage with Joe and raised two fine boys.

Tommie Joe Thompson (T.J.) passed away May 29, 2005, at age 75 from a sudden cerebral hemorrhage. Born on Jan. 16, 1930, in Rockwall, Texas, he was raised by his grandmother, Dora Jane Fondren in Rockwall. He graduated from Rockwall High School in 1947 and joined the Navy after graduation at age 18. He served in the Korean War, where he was stationed in Japan, Hawaii and Bayonne, New Jersey. Later he was stationed in Norman, Oklahoma, where he met his future bride, Marylyn Thomas. He earned a degree in geology from The University of Texas at Austin. Upon graduation he established a career as a petroleum geologist for Shamrock in Amarillo, Texas. He moved his family to Rockwall in 1973, where he built a successful business as an independent petroleum geologist. He was actively involved in his community and served on the board of Camp Fire Girls Association. He was very proud of his long family history in Rockwall County and was instrumental in organizing reunions and the scholarship fund for the Rockwall Alumni Association. He was a longtime member, leader and Sunday School teacher at First Baptist Church in Rockwall. He was a devoted Yellowjacket and Longhorn fan but his greatest joy and dedication was for his family "Grandma and Grandpa" spent much of their time in retirement visiting and spending time with their children and grandchildren. He was greatly loved and will always be remembered by the many people who knew him for his warmth, depth of character, colorful stories and sense of humor. He is survived by his wife of 50 years, Marylyn, daughters Teri Whetstone, Cindy Graham and Toni Alexander, son Joe Thompson, sister Mildred Scoggins, brother James Thomp son, as well as numerous nieces, nephews, grandchildren and a great-grandson.

#### **Advisory Council Members**

Bloomer, age 87, a longtime resident of Abilene, died December 26, 2005, in Austin. "Dick" Bloomer was a prominent independent geolo-

John Weldon White was born February 28, 1932, near Cisco, Texas, and died March 20, 2006, in Austin. John's boyhood was spent in several small West Texas communities, including Swedonia, near Hamlin, as his parents were school teachers. World War II brought the family to Austin after his Dad made a job change to the forerunner of TEC. In Austin he finished high school and started UT. Those summers were spent on archeological 'digs' for the Texas Memorial Museum. After serving in the US Army during the end of the Korean Conflict, he re-entered UT, earning bachelors' and master degrees in geology. He was employed by the State Water Agency, retiring in 1987. John has been a member of University Avenue Church of Christ having worked and worshiped there since his teenage years. An avid "birder", John continued to watch and list the birds he saw and heard from his front porch after his health prevented him from birding any other way. John is survived by his wife of 50 years, Barbara; by children, Ardeth, Russell, Laura and Hayley Still, Romaine White and Phillip Monk. Also by two sisters, Cherie and her family, and Linda and her family.

# **Richard Rodier**



gist who along with his wife, Anne, discovered their first oil field in 1954. He was successfully involved in exploration on the Eastern Shelf of the Permian Basin ever since. He was one of the first geologists to recognize that many of the shallow oil fields on the Eastern Shelf were producing from channel sandstones. He correlated these sandstones basinward and discovered that they were the source of reservoir sandstone deltas and submarine canyon fans. This model was the basis for many subsequent discoveries. He served as a pilot in the U.S. Air Corps during World War II, flying bombs and gasoline over the "Hump" (the Himalayan Mountains) from India to China. In 1949, he completed his Ph.D. in geology at the University of Texas at Austin. In 1952, he and his wife moved to Abilene and opened a business as

independent petroleum geologists. Bloomer was a member and leader of many professional organizations, including serving as president of the Abilene Geological Society and as president of the Southwest Section of the American Association of Petroleum Geologists (AAPG). He was the first recipient of the Cheney Science Award of the southwest section of AAPG. He joined the Geology Foundation Advisory Council at the University of Texas at Austin in 1982. He served as vice chairman and chairman of the foundation from 1997-2001 and was elected an Honorary Life Member in 2003. In the foundation, he established the Bloomer Fund for Motivated Students. Recalling his freshman year in college where he received poor grades but was motivated to improve and succeed, he wanted to help geology students in similar situations. Recipients through the years have come to be known as "Late Bloomers." Bloomer conceived of and paid for two lifesize bronze statues celebrating the pioneering petroleum exploration work of Ed Owen and Ronald DeFord.

#### Faculty

John C. Maxwell passed away on January 23, 2006. He embraced life with enthusiasm and lightened it with his sense of humor, much appreciated by his students during long summer traverses in Italy and California. He earned a degree in geology from DePaw University in 1936 and a master's at the University of Minnesota in 1937. He then took a job with Sun Oil Company in Beaumont, Texas, where he met and married Marian Buchanan. The academic world was his real interest, and in 1940 he and Marian drove to Princeton University, he on scholarship, and she hoping to find a job. He was always appreciative of the scholarships he received, and in 2001 he started an endowment at The University of Texas at Austin to establish an undergraduate scholarship in the Department of Geological Sciences. During World War II, he enlisted in the Navy and was stationed in New York City and at the South Pacific Headquarters in New Caledonia. In October, 1945, he returned to



Princeton to complete his PhD. His teaching career began at that time and lasted at Princeton until 1970, when he accepted the William Stamps Farish

Chair in Geology at The University of Texas at Austin. One of his former graduate students, now a professor himself, wrote : "John Maxwell was revered by his students, who found him to be an enthusiastic lecturer, a supportive advisor and one who never tried to push his ideas onto his students. His cheerful, infectious humor and his hearty laugh brightened many in a classroom and defused many awkward situations." He served as president of the American Geological Institute, 1971; president of the Geological Society of America, 1973; chairman, Earth Sciences Division, National Research Council, 1970-1972 and 1981-1985; chairman, Advisory Panel, Earth Sciences Division, National Science Foundation 1975-1976. He was a Fulbright Research Scholar in Italy in 1952 and a Guggenheim Scholar in Italy 1961-1962. His geologic work centered on ophiolite complexes, particularly those exposed in Tuscany and Liguria, Italy. He influenced a new generation of geologists with his insights into the ophiolite sequence. In the 1960's he began a mapping project in northern California. Over the next decade, he and his students mapped a complete transect of the Franciscan rocks of the northern California Coast Ranges. This work still stands as the most detailed systematic mapping of an entire transect across the northern Coast Ranges of California.

#### Staff

MEMORIALS



**Rosemary Brant** Barker passed away in the summer of 2006. On what would have been her 61st pirthday, July 11, 2006 at sunset, friends and fam-

ily of Rosemary Brant Barker met at Bright Leaf State Natural Area, where she had been a docent, to honor her life and her memory. "Ro" had been part of the Department of Geological Sciences for more than 20 years in one capacity or another, first as a secretary for several years, then as Dan Barker's wife, faculty helper and Walter Geology Library volunteer, where she devoted over 4,000 hours to inventorying and processing gifts, preparing shipments, shelving, and many other tasks. Rosemary was always eager to "put things in order."

Rosemary was a talented and creative person whose daily routines were focused

106 Jackson School of Geosciences

around the creation and maintenance of community wherever she went. Rosemary kept a sharp eye out for people's emotional tones, their stress levels, their interests and their birthdays. She loved to organize a party and was always right there if anyone was in need. She also was a great conversationalist, with a ready laugh, smart repartee, and wide reading to back her up. She was a talented painter and forgot more about film than most people ever dream of knowing. She loved the outdoors, especially helping Dan with field work in Big Bend and traveling with him to volcanic sites, and she was very knowledgeable about plants of all kinds. Ro had a big and generous heart, and her passing leaves a hole in the lives of all who knew her.

As the sun dipped below the hills that Tuesday evening, we had a moment of silence, then shared stories of Ro's presence. As one person said, "Rosemary made me feel like I was her only friend." Lots of heads nodded in thanks and in sorrow. May she rest in peace. — Dennis R. Trombatore



Bureau of Economic Geology, died October 17, 2006 at his home in Reston, Virginia. Dr. Milling's professional career began as a research geologist with Exxon in 1968. He remained at Exxon until 1980 holding the title of District Geologist. From Exxon he went to ARCO Oil and Gas as a general manager and later gained the title of Manager, Geological Exploration Staff. In 1987, he joined the University of Texas at Austin as the associate director of the Bureau of Economic Geology where he coordinated their oil and gas industry consortia programs. In 1992, Marcus left the Bureau to become the Executive Director of the American Geological Institute (AGI). Bureau director Scott Tinker recalled some of Marcus' enduring contributions to the geological community: "Marcus had a lasting impact on so many things that he touched—data preservation, geoscience education, Earth Science Week, the health and vision of AGI, and the list goes on. He was a friend to geology and geologists and will be greatly missed." Throughout his career

Dr. Milling has received numerous honors and awards including the American Institute of Professional Geologists Ben H. Parker Memorial Medal (1997), the Association of American State Geologists Pick & Gavel Award (2005), and the American Association of Petroleum Geologists Special Award (2007). He was actively involved with issues in the geoscience community and served on many society committees. He was known for his exceptional work in advancing both the Institute and the geoscience community.

Ronit Nativ, professor in the Department of Soil and Water Sciences and part of the faculty of Agricultural, Food and Environmental Quality Sciences of the Hebrew University in Jerusalem, passed away October 30, 2006. Ronit was hired by the Bureau of Economic Geology in 1984 as a postdoctoral fellow under Charlie Kreitler. When she left the Bureau in 1987, she had been promoted to research associate. Ronit went on to become an associate professor at the University of Tennessee at Knoxville and a researcher at the U.S. Department of Energy, Oak Ridge National Laboratory, Tennessee, from 1991 to 1992. But she was destined to return to Israel, where she eventually rose through the ranks of lecturer, senior lecturer, and associate professor, to professor in 2004. Through the years, Ronit served as a member on many committees dealing with the environment and as a consultant on projects concerning her beloved Negev Desert. Bureau postdoctoral fellow Daniel Kurtzman carries on Ronit's work at the Bureau in hydrological research. An advisee of Ronit's, Kurtzman remembers her as "a great hydrologist and a great person. She was an excellent Ph.D. advisor (she never let me refer to her as a supervisor). I owe a great deal of my short academic career to this outstanding woman."

The staff and members of the Jackson School of Geosciences would like to convey our respect to the families of the following alumni:

Arthur Lee Carroll (B.S., 1949)

William H. Davis (B.S., 1941) passed away March 3, 2005

Charles B. John (B.S., 1951)

Philip Kay Sampler (B.S., 1951) passed away December 22, 2005

Robert G. Schuehle (B.S., 1940) passed away January 26, 2006

Paul H. Summers (B.S., 1949)

Arthur Branch "Bo" Williams (B.S., 1953) passed away December 15, 2006

# **Strengthen Your Network**

#### JSG Will Be There

Look for the Jackson School booth and join us for special alumni events. For details, visit www.jsg.utexas.edu/alumni/.

#### 10th International Symposium on Antarctic Earth Sciences

Aug. 26 - Aug. 31, 2007 University of California, Santa Barbara, California

#### SEG Annual Meeting

Sept. 23-28, 2007 San Antonio, Texas Alumni Reception, Sept. 25

#### Society for Vertebrate Paleontology

Oct. 17-20, 2007 Austin, Texas Alumni Reception, Oct. 16

#### **GCAGS** Meeting

Oct. 21-23, 2007 Corpus Christi, Texas Alumni Reception, Oct. 22

#### **GSA Annual Meeting**

Oct. 28-31, 2007 Denver, Colorado Alumni Reception, Oct. 29



Nov. 17-20, 2007

#### **Conference for the Advancement** of Science Teaching - CAST Nov. 15-17, 2007

AGU Fall Meeting

Dec. 10-14, 2007 San Francisco, California Alumni Reception, Dec. 12

#### Fall 2007 Alumni & Friends Events

**Houston JSG Reception** Sept. 12, 2007

# **Tailgate Party**

Oct. 24, 2007

**AAPG International Conference & Exhibition** Athens, Greece

Austin, Texas

#### 2nd Annual JSG Alumni & Friends

Sept. 22 (Texas vs. Rice) UT Austin, lawn in front of Geology Building, two hours before kick off

#### **Dallas JSG Reception**

#### Midland JSG Reception Jan. 2007 (Date TBD)

#### We Want to Hear from You!

Tell us what's new in your life and update your contact information at: www.jsg.utexas. edu/alumni/

#### Early 2008

#### IGCP 524 Arc-Continent Collision **Conference and Field Trip in Taiwan**

Jan. 12-21, 2008 Department of Earth Sciences, National Cheng Kung University, Taiwan

#### Save the Date

#### **1970s Reunion**

June 6-8, 2008 If you received an undergraduate or graduate degree in the geosciences at The University of Texas at Austin at ANY time during the

decade of the 1970s, you are cordially invited to the University of Texas Geosciences 70s Reunion. Get hooked on Texas again!

THE UNIVERSITY OF TEXAS AT AUSTIN



SCHOOL OF GEOSCIENCES