

FROM THE DEPARTMENT HEAD

Art Snoke



I am delighted to report that the Department continues unprecedented growth in regard to new Faculty members. As many of you are aware, the Department hired three new Assistant Professors in AY2006–07: **Barbara Carrapa**, **Bryan Shuman**, and **Ye Zhang**. This robust growth trend continued in AY2007–08 when the Department hired four more Faculty members. Three of the new Faculty members have joint appointments in the new School of Energy Resources (SER). These new Faculty members strengthen our commitment to cutting-edge energy research as well as environmental studies—topics that are fundamental to the State of Wyoming and the country. The new Faculty includes two computational seismologists: **Subhashis Mallick** and **Po Chen**. Subhashis brings over 20 years of experience in the oil and gas industry to the Department and SER, and Po Chen, a recent Ph.D. graduate from the University of Southern California, is breaking new ground in methodology for the inversion of seismic waveforms. Subhashis and Po will provide the SER a sound basis for cutting-edge research in energy-related geophysics. The third hire who shares a joint appointment in Geology & Geophysics and the SER is **John P. Kaszuba**, a geochemist from Los Alamos National Laboratory, who is a specialist in fluid-rock interactions and will play an important role in an evolving carbon sequestration project in the SER. Finally, our fourth new Faculty member is **Clifford S. Riebe**, an environmental geochemist, who uses cosmogenic nuclide techniques for measuring long-term rates of physical erosion and chemical weathering. Cliff will also provide new expertise in applied geomorphology, watershed geochemistry, and landscape evolution.

Although continual growth of the G&G Faculty has been a highlight of the past academic year, one of our most distinguished Faculty members, **Carol D. Frost**, is moving into the upper administration of the University. Carol, a member of the G&G Faculty since 1983, will become the new Associate Vice President of Research and Economic Development beginning in fall semester 2008. Although this is a huge loss to our students in regard to Carol's excellent teaching and mentoring, this new position brings an internationally recognized researcher into the upper administration of the University. In support of this conclusion, Carol was chosen for the George Duke Humphrey Distinguished Faculty Award for 2008. A summary of prior Humphrey Awardees from the Department is included later in this newsletter. Also, one of Carol's recent M.S. graduate students, **Kelsey McArthur**, was the recipient of the Outstanding Master's Thesis Award for 2008.

I am happy to report numerous other awards during the past semester. The following graduate students were recognized by the Association for Women Geoscientists (Laramide Chapter) as outstanding graduate students: **Kay Achenbach** (Ph.D.), **Liz Hajek** (Ph.D.), and **Sharon Bywater** (M.S.). Also, **Brandon Bishop**, an undergraduate G&G major from Imperial, Nebraska, was inducted into Phi Beta Kappa, the oldest and most prestigious scholastic honor society in the U.S.

I hope that you can surmise from the above commentary that the Department is experiencing an exceptional time in its history. Your support is critical to our success as a Department of Geology and Geophysics whose mission is to educate geoscientists to face the great challenges of the 21st Century in the form of energy and environmental solutions. We greatly appreciate your strong and continual support of the Department. ❖

PROFILE

Inside

PROfile

- growth
- traditions
- students
- research
- outreach
- alumni
- field work
- faculty
- awards

history



a
CROSS SECTION
of
PEOPLE
and
EVENTS
at
the



UNIVERSITY OF WYOMING

SPRING 2008



Department of
GEOLOGY & GEOPHYSICS
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Last November, Lecturer **Erin Campbell-Stone** received the UW College of Arts & Sciences' Extraordinary Merit in Teaching award for 2007. Ten of the awards are given out every year.

This spring, Assistant Professor **Barbara Carrapa** was awarded an A&S Basic Research Grant in support of her project titled: "Exploring Indo-Asia Collision, the rise of the Pamir and dynamics of foreland basin formation: a record from Tajikistan."

In March, Carrapa also received a grant in the amount of \$25K from National Geographic to help fund fieldwork in Tajikistan from June 15 through July 7 in support of her project: "Indo-Asia collision and the rise of the Pamir: New insights from Tajikistan." While out in the field, she will be collaborating with Peter Molnar (University of Colorado) and Rebecca Bendick (University of Montana).

In addition, Carrapa also received a grant from Shell Oil in the amount of \$200K. The grant will provide academic and field funding for one Ph.D. student and one M.S. student to work on the Sego Formation in northern Colorado, an area that closely resembles the Canadian heavy oil sands. The current depositional analog for most interpretations of the Canadian heavy oil sand stratigraphy is based upon the incised valley model. Incised valleys form when there is a drop in relative sea level. This project aims at reconstructing the basin architecture at the time of Sego deposition and at proposing an alternative stratigraphic model for the investigated units, which seems to be different from classic incised valley deposits.

Ultimately this study will lead to a new understanding of cores and subsurface models for the Canadian heavy oil sands. The new models could have a very significant impact on the way we model production from these reservoirs.

Assistant Professor **Mark Clementz** was recently featured in an article in UWYO magazine about a play that he wrote entitled: *The Prince of Whales*:

A Whimsical Story about the Evolution of Whales. To read the story on-line, visit <http://uwadmnweb.uwyo.edu/UWYO/vol9/03/whaletales.asp>.

In January, Professor **Carol Frost** began her duties as associate vice president for research and economic development at the University of Wyoming.

A member of the faculty since 1983, Frost is the associate head of the Department of Geology and Geophysics and recently served as the interim director of the School for Energy Resources. She will work primarily in the area of interdisciplinary program development, articulating research with academic planning and with the graduate school.

She has been the principal investigator on more than 30 external awards and has trained both M.S. and Ph.D. students. Frost is internationally known for her work on the formation and evolution of the Earth's continental crust and the ancient rocks of the Wyoming province in particular. She received her Ph.D. in earth sciences from the University of Cambridge.

Last November, Frost received the UW College of Arts & Sciences' Extraordinary Merit in Research award for 2007. Ten of the awards are given out every year.

This spring, Frost was also chosen to receive the George Duke Humphrey Distinguished Faculty Award for 2008. The award is given to a faculty member who has demonstrated outstanding teaching, research, and service, and is the highest award given to a faculty member at the University of Wyoming. This is a great honor for both Frost and our Department. Carol's award this year continues a long tradition of demonstrated excellence by the Faculty of the Department of Geology & Geophysics.

During the summer and fall of 2007, Associate Professor **Robert Howell** worked with the "Discovery Box" project of Laramie County School District One. The project was a part of the state-funded program to develop teacher-training opportunities for junior high science teachers, and also develop

materials or activities which they can then use in their classes. As part of this, Howell led a group of teachers on a geology field trip to sites between Cheyenne and Laramie, and the teachers and their students visited those sites later in the fall. He is currently in the process of preparing additional field trips, which they plan to conduct in the spring.

Senior Lecturer **Randi Martinsen** was recently appointed to the Board of the Petroleum Technology Transfer Council (PTTC). The PTTC is a national not-for-profit organization established in 1994 by petroleum producers, state organizations and the Department of Energy, and is designed to provide petroleum producers (especially independent producers), consultants, service and supply companies and other industry participants with low cost workshops and information on engineering, geology and geophysics, and operations.

This spring, Professor **Barbara "Bobbie" John** shifted focus—and coasts—on her sabbatical from Stanford (CA) to Lamont Doherty Earth Institute (NY) where she was named one of four 2007-2008 Marie Tharp Fellows by the Earth Institute at Columbia University.

As part of her fellowship, John spent four months working at the Earth Institute and received \$30,000 to support her project. Launched in 2004, the Fellowship is named after Marie Tharp, a former Columbia University scientist who left an indelible mark on the study of oceanography by being the first to map the ocean floor on a global scale. Tharp, who joined the University in 1948, published the pivotal interpretations of mid-ocean ridges that led to the eventual acceptance of the theories of plate tectonics and continental drift.

The Marie Tharp Fellowship is sponsored by the Earth Institute ADVANCE Program, a program funded by the National Science Foundation. The mission of ADVANCE is to increase the recruitment, retention and advance-

ment of women scientists and engineers at Columbia University. The Fellowship is open to emerging and established women scholars whose research covers one or more of the core scientific fields in the Earth Institute, including the Earth sciences, engineering, the social sciences, and the environmental health sciences.

John has devoted much of her career to understanding processes associated with rifting, and crustal extension in particular. She was the first to apply chronometric techniques originally used in continental settings to document the rate of crustal growth, fault slip, and the thermal/mechanical history of oceanic lithosphere. During her fellowship, John collaborated with scientists from the Lamont-Doherty Earth Observatory on a project that addresses integrated growth, cooling, and deformation of oceanic lithosphere in slow and ultra-slow spreading ridge environments. She received her Ph.D. in geology from the University of California, Santa Barbara.

UW's Clementz Helps Bridge Gap in Whale Evolution

The mysterious missing link between marine mammals known as cetaceans—a group that includes whales, dolphins and porpoises—and their land-based mammal ancestors has been found.

And an assistant professor in the University of Wyoming's Department of Geology and Geophysics helped find it.

Bridging a 10-million-year gap in the fossil record, UW's **Mark Clementz** and a team of researchers have found evidence that cetaceans evolved from *Indohyus*, a raccoon-sized raellid from India. Their findings were published Dec. 20 in *Nature*, the world's foremost weekly scientific journal and flagship journal for Nature Publishing Group (NPG).

"There's two big things that make this a significant discovery," says Clementz. "The first is that, for a long time, there's been a debate over the closest living relative to whales.

"The general idea has been that it's hippos, based mainly on molecular evidence. The problem is that the hippo fossil record only goes back 10 million

years and the fossil record for whales goes back 50 million years."

"But now we've finally found evidence of an artiodactyl group, and artiodactyls are the group that includes hippos and camels and cows, the even-toed hoofed mammals, that is a sister group to whales in the fossil record. That's pretty big. It helps to cinch the argument that whales are within artiodactyla."

He adds, "The other big thing is that this helps refine our idea of whale evolution. For a long time, it was just assumed that whales were unique because they were a group of artiodactyls that went in the water and then evolved. But now we know that the sister group to whales were also in the water."

While studying *Indohyus* fossils discovered in Pakistan by Hans Thewissen, of the Northeastern Ohio Universities College of Medicine, researchers found a striking similarity to cetaceans in the middle-ear space, or involucrum, which had never been found in other raellids or artiodactyls.

The fossils show a thick covering over the involucrum, a feature that had only ever been seen in cetaceans.

"That ear bone is key," says Clementz. "That makes it pretty clear that they're closely related to each other."

Also, Clementz determined that levels of carbon and oxygen isotopes in the tooth enamel of *Indohyus* suggested that the animal spent considerable time in the water.

There was further proof in the limb bones of *Indohyus*, which were thick and dense, a characteristic that suggests the animal was a wader.



"I feel very fortunate to have been invited to participate in this research, and I'm excited that there's so much interest in the results," Clementz says. "I think this discovery will open a lot of doors and raise a lot of questions that we can continue to explore."

To view Nature's video about whale evolution, go to the Web site www.nature.com/nature/videoarchive/index.html.

In March, as part of his continuing research related to *Indohyus*—the little whale relative that was the focus of the recent research that was published in the journal *Nature*—Assistant Professor **Mark Clementz** traveled to India where he visited fossil collections in Roorkee and collected material deposits from the field near Mumbai in an effort to reconstruct the environment in which the animal lived.

Clementz then traveled to New Zealand to visit fossil collections at the University of Otago, where he sampled specimens that represent the early radiation of modern whales. According to Clementz, the center of whale evolution shifts from low latitude tropical sites to the colder, productive waters of the southern hemisphere in the Oligocene, making New Zealand the best place to find fossils of this age. ❖

Above: Assistant Professor **Mark Clementz**. (UW photo)

The Department of Geology and Geophysics: A Tradition of George Duke Humphrey Award Winners

The George Duke Humphrey Distinguished Faculty Award is given annually to the faculty member who, in addition to acclaim as a teacher, has achieved distinction as a scholar in research, and has given distinguished service to the University. Clearly it is difficult each year to choose a single person for this award from among the many accomplished faculty at UW. Nevertheless, it is a point of pride for the Department of Geology and Geophysics that seven of our Faculty have been awarded this recognition, more than any other department on campus.

Donald L. Blackstone, Jr. (1909–2004) was the Department's first Humphrey Award winner. Blackstone, who joined the faculty in 1946, was awarded the prize in 1971. His work on the structural geology of the Rocky Mountains spanned more than six decades. He was a demanding and engaging teacher who took great pride in the accomplishments of his students. He directed the summer field course, was Head of the Department after S.H. Knight retired, and served as State Geologist and Director of the Geological Survey of Wyoming. His former students have recently initiated a drive to endow the Donald L. Blackstone, Jr. Chair in Geology in his memory.

E. Leon Borgman (1928–2007) was awarded the Humphrey medal in 1981. Borgman came to the University of Wyoming in 1970 as Professor of Geology and Statistics. He was well known as the founder of modern ocean wave statistical analysis. Leon produced widely used computer programs for ocean wave and ground water analysis and simulation. In 1999 he became the first UW faculty member to be inducted into the National Academy of Engineering. He mentored many students both within

the university setting as well as in the greater engineering community.

In 1984 **Robert S. Houston** was named the Humphrey Award winner. Houston joined the faculty in 1952. He is an expert on the geologic evolution of Precambrian rocks, particularly of southern Wyoming. His geologic mapping in the Medicine Bow Mountains and Sierra Madre led to the concept of a fundamental suture, the Cheyenne belt, which marks the southern boundary of the Wyoming province. He taught hundreds of undergraduates at the Geology Field Camp, which he directed for more than a decade. Bob served as Department Head from 1968 to 1986, and in addition was Provost and Vice President for Academic Affairs (1986–1988) and Interim President of the University in 1987.

Jason A. Lillegraven was the 1987 recipient of the Humphrey Award. Lillegraven's research focuses on vertebrate paleontology, particularly of Jurassic mammals, and the geological applications of the fossil record. His recent work in the Hanna Basin has led to greatly improved understanding of the timing and structural evolution of this basin and the Laramide orogeny. Lillegraven introduced interdisciplinary approaches to his teaching long before it was fashionable, has served the University, State, and profession with vigor, and now as Emeritus Professor continues to serve as Editor of *Rocky Mountain Geology*.

In 2001, **Arthur W. Snoke** was named the Humphrey Awardee. Snoke, who came to UW in 1984, works in structural geology, tectonics, and petrology in settings as varied as the oceanic island arc exposed on Tobago (West Indies), the accreted terranes of Klamath Mountains of California and Oregon, the Ruby Mountains of northeast Nevada, the Wyoming foreland, and the Ivrea-Verbano Zone of the Southern Alps, northern Italy. He is a dedicated teacher in the classroom and the field, and the founder of the annual Labor Day weekend "Rocky Mountain Field Trip"

that introduces new graduate students to Wyoming and Rocky Mountain geology. Along with Jay Lillegraven, he is Editor of *Rocky Mountain Geology*, and as current Department Head has expanded our faculty with seven successful hires in the past three years.

The Department's next George Duke Humphrey winner was **James I. "Tim" Drever**, who won the prize in 2004. Drever, now Emeritus, is one of the most internationally respected scientists at UW. He has inspired a generation of geochemists through his widely used textbook, "The Geochemistry of Natural Waters." His research in low-temperature and environmental geochemistry includes work on issues of societal relevance including acid rain, mine waste drainage, and the role of chemical weathering in the atmospheric carbon dioxide budget. He is a former Department Head, has been editor of both journals and books, and is a recent President of the Geochemical Society.

This year the Humphrey Award goes to **Carol D. Frost**, who has been on the faculty since 1983. Her research focuses on the formation and evolution of the Earth's continental crust, particularly the Precambrian rocks of the Wyoming province. She applies natural isotopic tracers to problems ranging from origin of magmas, the provenance of sediments, and the source of ground waters and mechanisms for tracing the fate of these waters once discharged on the surface. Frost was named CASE Wyoming Professor of the Year in 2001, served the University as the founding Director of the School for Energy Resources, and currently is Associate Head of the Department and newly-named Associate Vice President for Research and Economic Development for UW.

With many other, equally distinguished faculty in the Department, Geology and Geophysics can look forward to maintaining its position of eminence at the University of Wyoming with future George Duke Humphrey Award winners. ❖



Alumni News

Alumnus **Skye Cooley** (M.S. '04) is custom building Sam Maloof-stylen rocking chairs and teaching as an adjunct faculty member for the Department of Natural Resources at Spokane Community College, Washington.

Alumna **Elena Miranda** (Ph.D. '06) was recently named Cal State Northridge's Jerome Richfield Scholar for 2007–2008. Miranda is currently working as an assistant professor at California State University at Northridge.

JUSTIN BURRIS MOSES 1927–2005

*Adapted from a tribute written by
Fae Moses Bell.*

Justin Burris Moses died December 22, 2005, at Kaiser Medical Center in Sacramento, California. His surviving family are: Liz Ginsburg, son Sean Daniel True, grandsons Sam and Willie True, sister Fae Bell, and numerous nieces and nephews. Justin Moses was born in Ten Sleep, Wyoming, to Millard and Fae Moses on December 6, 1927. He was valedictorian of his high school class and then joined the U.S. Army near the end of World War II.

Continued on page 7...

Student News

Graduate student **Kay Achenbach** (Ph.D.) recently accepted an offer to work as a Postdoctoral Research Associate in the Department of Earth Sciences at Durham University, U.K. The 32-month position—which is set to begin after Achenbach defends her thesis in August—will involve the use

of sidescan sonar data to understand the spatial and temporal evolution of axial volcanic ridges—the fissure volcanoes at mid-ocean ridges which are responsible for constructing the oceanic crust.

Before starting her job, Achenbach will be going on a cruise in May–June, 2008 to collect data that she will use for the research project involved with the position.

“I’m pretty excited about this job! It will be a big change of direction for me,” says Achenbach.

“I’ll be working on a geophysical dataset designed to study seafloor lava eruptions, whereas my Ph.D. research has focused entirely on geological studies of rocks from the Earth’s mantle. I am really looking forward to starting because this new work will use a completely different set of observations to answer the same questions that I have already been working on, i.e., how does magma make its way up to the seafloor through 60km of solid rock? Furthermore, I am looking forward to working at Durham University with Professor Searle, who was the chief scientist on the cruise I participated in last spring (2007). And, of course, living in England for three years will be a big adventure!”

This spring, graduate students **Sharon Bywater** and **John Trimble**, along with Assistant Professor **Barbara Carrapa**, spent seven weeks conducting fieldwork in northwest Argentina as part of two NSF-funded projects in collaboration with the University of Arizona, University of Texas at Austin, and Ohio State University. The fieldwork was meant to analyze the structural and sedimentary evolution of Tertiary basins along the margin of the

Puna-Altiplano Plateau in order to better understand processes, their timing and rates, and the overall relationships between tectonics and climate during the process of mountain building.

Undergraduate student **Dan Eakin** was featured in an article in UWYO magazine for his involvement with Professor Steve Holbrook’s research expedition aboard a research vessel in the waters surrounding Costa Rica. You can read the full story on-line by visiting, <http://uwadmnweb.uwyo.edu/UWYO/vol9/03/explorations.asp>.

The 2008 annual UW Graduate Student Symposium was well represented by twelve graduate students from the Department of Geology and Geophysics. **Kay Achenbach, Phil Bottrell, Morgan Churchill, Lee Finley-Blasi, Liz Hajek, Steve Hansen, John Jasbinsek, Dan Jones, Jennifer McHarge, Ryan Morgan, Clayton Painter, and Angela Shankle** each gave either oral or poster presentations at the symposium.

In late 2007, graduate student **Craig Grimes** (Ph.D.), received the U.S. Congress Antarctic Service Medal in recognition of his contribution to research with the U.S. Antarctic Program. The United State Congress established the Antarctic Service Medal in 1961 to honor service personnel and deserving civilians, such as scientists and polar experts who make an outstanding contribution to U.S. Antarctic expeditions. Officially the medal is a U.S. military decoration. Although Grimes holds the medal, as a civilian, he is not permitted to wear it at official events, except as a small lapel badge.

Grimes was a member of an expedition to the Trans-Antarctic Mountains in eastern Antarctica led by Professor David Elliott (Ohio State) in 2002–2003 and another expedition led by Dr. Jeff Gee (Scripps) and Associate Professor Mike Cheadle (UW) to the Dufek Massif in West Antarctica in 2006–07. His research in Antarctica will form part of his Ph.D. dissertation. (See student profile of Grimes on pages 10–11 of this newsletter). ❖

GATHERING NEWS!

Please take a minute to fill out the Alumni News Form insert and let your fellow UW Geology and Geophysics grads know what you’re up to. Where you are. Who you’ve become.



You may also e-mail updates to editor@gg.uwyo.edu or borr@uwyo.edu

MALCOLM C. MCKENNA 1930–2008

Malcolm Carnegie McKenna, 77, Paleontologist

Malcolm Carnegie McKenna, Frick Curator Emeritus of Vertebrate Paleontology at the American Museum of Natural History, and Professor Emeritus of Earth and Environmental Sciences at Columbia University, died on March 3 in Boulder, Colorado. He was 77.

The author of hundreds of research papers collected in over a dozen volumes, Dr. McKenna was a world-renowned and influential paleontologist. He specialized in the history of mammalian evolution, but also published interdisciplinary work in cosmology, astrophysics, geology and molecular biology. He worked throughout his 41-year career at the American Museum of Natural History in New York City. After retirement, he held adjunct appointments at the University of Colorado and the University of Wyoming.

A Fellow of New York's Explorers Club, Dr. McKenna organized annual American Museum field expeditions to the western United States, Patagonia, the Andes, China, Mongolia, Greenland, and the Canadian Arctic. He taught and mentored over 30 Ph.D. students in paleontology. The prominent evolutionary theorist and writer Stephen Jay Gould once remarked that everything he ever learned about mammals, he learned from Malcolm McKenna.

In recognition of his lifetime achievements, McKenna was awarded the top honors in his profession. He received the Paleontological Society Medal in 1992 and the Romer-Simpson Medal of the Society of Vertebrate Paleontology in 2001.

McKenna was a proponent of a new paradigm in classification, called cladistics, that was



introduced in the 1960s. Through his affiliation with Columbia's Lamont-Doherty Lab, he was also an early supporter of continental drift, before magnetic data from the ocean floors led to development of the modern concept of plate tectonics. He delighted most in interdisciplinary studies, exhorting his students and colleagues to

synthesize knowledge drawn from a variety of disciplines.

In 1964, at the height of the Cold War, McKenna visited Mongolia as a tourist. His objective was to arrange for the resumption of field work in the Gobi Desert, initiated by the American Museum's expeditions of the 1920s led by Roy Chapman Andrews. These

expeditions were finally resumed in the 1990s, resulting in remarkable new fossil discoveries.

McKenna's life's work led to a new Classification of Mammals Above the Species Level — living and extinct — published in collaboration with Susan Bell of the American Museum of Natural History in 1997. This appeared in both book and database form, superseding the 1945 classification of G. G. Simpson, his predecessor at the museum.

McKenna's most recent research focused on the survival of small mammals and other animals that lived through the infrared 'baking event' thought to have been caused by sub-orbital debris, in the first few hours after an asteroid impact exterminated the dinosaurs and many other groups of organisms at the end of the Cretaceous.

Malcolm McKenna was born in Pomona, California, in 1930, the son of Donald and Bernice McKenna. He grew up in Claremont, California, where he attended the Webb School.

The founder of Webb School's paleontological museum, Raymond Alf, inspired McKenna to become a paleontologist. At age 17, McKenna discovered his first fossil titanotherium skull, nicknamed "Betsy," in Nebraska. McKenna initially attended Caltech and Pomona College. He received his Ph.D. from the University of California at Berkeley.

In addition to his scientific research, Dr. McKenna was a board member of numerous educational institutions, including the Flat Rock Brook Nature Center, the Elizabeth Morrow School and Dwight-Englewood Schools, all in Englewood, New Jersey; the Raymond M. Alf Museum at the Webb School; the Museum of

Northern Arizona in Flagstaff; and the Lemur Conservation Foundation in Myakka City, Florida.

Dr. McKenna is survived by his wife of 55 years, Priscilla McKenna, of Boulder, Colorado; four children and their spouses: Douglas McKenna and Judith Houlding, of Boulder; Andrew and Jacquie McKenna, also of Boulder; Katharine McKenna and Mark Braunstein, of Woodstock, New York; Bruce and Maureen McKenna, of Santa Fe, New Mexico; and nine grandchildren, Caitlin, Alison, Madeleine, Ian, Conor, Eliza, Dónal, Alexandra and Juliana McKenna.

Donations in memory of Malcolm McKenna may be sent to: The Malcolm C. McKenna Goler Research Fund, Raymond M. Alf Museum of Paleontology, 1175 West Baseline Road, Claremont, CA 91711. ❖

Justin B. Moses continued from page 5...

He was assigned to Army Intelligence and was part of the occupied forces of Germany (1945–1949). After his service in the U.S. Army, the GI Bill of Rights provided educational opportunities, and Justin enrolled at the University of Wyoming in Fall 1950. He graduated from the University of Wyoming in 1954 with a B.S. degree in geology.

In 1955 Justin worked for the Atomic Energy Commission (AEC) in the Four Corners area. Subsequently, while still employed by the AEC, he spent two years working in the Peruvian Andes near Lima. Justin returned to the U.S. in 1958 and was employed by the AEC in Jeffrey City, Wyoming. At that time, Jeffrey City was a booming uranium mining town with a population of ~5,000.

Beginning in 1963, Justin worked for the U.S. Army Corps

of Engineers in Sacramento, California, and he remained a member of the Corps until his retirement. Justin worked on numerous projects for the Army Corps of Engineers, but perhaps his most challenging project was as chief engineer of the New Melones Dam, a controversial reclamation project. The dam is the second largest earth-filled dam in California. Justin, as its chief engineer, was required to testify in regard to its structural safety and value to the community and State.

A memorial was held for Justin Moses on July 8, 2006, at the Ginsburg residence in Gold River, California. Colleagues and family gathered to remember Justin and to pay tribute to his character and remarkable capabilities. ❖

Coming up!

**AAPG
ROCKY MOUNTAIN
RENDEZVOUS**

September 19–22, 2008
aapg.gg.uwyo.edu/rockymtnrendezvous/index.htm

GSA

2008 Joint Meeting & Exhibition
Celebrating the International Year
of Planet Earth
October 5–9
Houston, Texas
www.geosociety.org

AGU

2008 Fall Meeting
December 15–19
San Francisco, California
www.agu.org

STUDENT INTERNSHIPS

::: Students Share Their Internship Experiences :::

Phil Bottrell: Master's candidate (expected graduation, Summer 2008)
Departmental Webpage: <http://home.gg.uwyo.edu/Person.aspx?ID=211>
Internship: BP America, May–August, 2007.
Faculty Advisor: Mark Clementz

After interviewing with company representatives from BP during the 2006 Rocky Mountain Rendezvous (RMR), I was offered an internship position in BP America's North American Gas unit out of the Houston Westlake office. I was assigned to the Anadarko Basin team and worked principally on the Douglas sands in Hemphill County, TX. My role was to map the sands in an area that was set to be drilled as part of a joint project with Cordillera. The goal of this project was to generate these maps and determine what could be expected of the wells that Cordillera wished to drill on BP acreage.

After correlating well logs around the area, I began mapping individual facies within the sands based on log character, dividing them into point bars, channel sands, etc. Upon completion of these maps, I attempted to correlate

hydrocarbon production with particular facies types or sand body thickness. This information was then presented both to the team in Houston as well as to the office in Amarillo that oversees the field.

When I interviewed with BP during the 2006 RMR, I stressed that it was important to me that my project would be meaningful for the company. I wanted something that would add value for them as well as increase my experience in the oil and gas industry, and I felt like this project really fit the bill. I think working for BP America really gave me a deeper understanding of the oil industry, given that I was working for one of the major companies as opposed to an independent. Also, I had never done a facies mapping project quite like this before, so this internship exposed me to another tool that I will be able to use later on in my career.



Working for BP America was a great experience and I have accepted a full-time position with the North American Gas unit, which will begin after I finish my research on the isotope paleoecology of Eocene and Oligocene ungulates and receive my Master's degree at the University of Wyoming. ❖

Ryan Morgan: Master's candidate (expected graduation, Spring/Summer 2008)
Departmental Webpage: <http://home.gg.uwyo.edu/Person.aspx?ID=216>
Internship: Anadarko, May–August, 2007
Faculty Advisor: Bob Howell

In the summer of 2007, I was selected as a geophysics intern for Anadarko Petroleum Corp. located in The Woodlands, Texas, a suburb of Houston. I worked with the EGOM (Eastern Golf of Mexico) group for about 10 weeks on a couple offshore deepwater projects. For my main project, I was given the opportunity to work up a prospect, present the prospect to my team, and finally with help of the rest of the team recommend the prospect for drilling.

Prior to the internship I had very little knowledge of the oil industry. I had never really considered going into that sector of industry before, so I had a lot of learning

to do over the course of the summer. Thankfully, I was appointed to work with a very helpful group of people. However, I was still given the full reigns to my summer project. One of the most enjoyable aspects of the work experience this past summer was working with different people in my group—geologists, engineers, geophysicists, and my supervisors—from each of which I picked up some valuable information.

During the first week or so, I spent a lot of time reading and learning how to use software as well as sitting in on meetings to learn jargon and acronyms. After a couple of weeks I had gotten pretty comfortable with the software and much of what was



going on around me, so by this time I had really dug into my project. Each intern was required to give an informal midterm

presentation to team members, as well as a formal final presentation to team members, intern committee members, as well as hiring committee members. As the time for my midterm presentation rolled around I was more-or-less finished with my project, so I presented the results and received positive feedback on the work I had done. Shortly after the midterm presentation I was given a second, more informal project to work on identifying prospect leads. I then gave a final presentation to my team, intern committee, and hiring committee members primarily focusing on my first project, but also noting some of the extra work I had gotten done. After the presentation I learned that I

might have the opportunity to present my work to the company vice presidents to seek approval for drilling. Before I left for the summer I was able to present my work to the vice presidents and I received approval to drill my prospect, something that I was very proud of.

In order to make the internship more comfortable and enjoyable a number of activities were planned by our intern committee, including: a public speaking seminar in order to help give presentations; picnics and get-togethers to meet the committee and other interns; well-logging/Mud-logging courses; operations field trips to learn about production and well

drilling; and an off-shore trip with a full tour of a drill ship leased by Anadarko.

After my internship, I accepted a full-time offer from Anadarko to work as a geophysicist. The position will start after I receive my Master's degree this summer from UW.

The Department certainly had a role in my internship experience. I participated in many interviews during the Fall '07 semester and interviewed with Anadarko at the 2007 Rocky Mountain Rendezvous. Without the opportunities provided to me by the Department, it is highly unlikely that any of this would have been possible. ❖

Josh Sigler: Master's candidate (expected graduation, Summer 2008)

Departmental Webpage: <http://home.gg.uwyo.edu/Person.aspx?ID=206>

Internship: Exxon Mobil, May–August, 2007

Faculty Advisor: Art Snoke

During the spring and summer of 2007, I had the pleasure of working for Exxon Mobil in Houston, TX as a Cross Discipline Technology intern. My primary projects during this time involved the support and development of mapping tools for use with Environmental Systems Research Institute (ESRI) ArcGIS, a suite of software designed to display, analyze and manage spatial data such as well locations and production data. I also had the opportunity to visit many of the Exxon Mobil facilities in the Houston area, and interact with geoscientists, engineers, programmers, and various other support staff to help understand the careful coordination required to take on the world's toughest energy challenges.

Over the past 150 years, advances in technology have resulted in great strides forward in the science of hydrocarbon exploration. The advent of computers has particularly aided in the ability to process, interpret and visualize massive amounts of data. The sheer quantity of data produced and stored by corporations such as Exxon Mobil present unique challenges regarding the development and implementation of new software to fully

utilize this data. Exxon Mobil employs teams of geoscientists and programmers to develop new methods of manipulating data as required by the company. The focus of my internship was to develop several products for ESRI ArcGIS suite for use in the geoscience community. Over the course of several months I had the opportunity to work with Exxon Mobil employees from Houston, to London, to Kuala Lumpur, producing a variety of add-ons.

My experience with Exxon Mobil provided me with an excellent environment to utilize and learn new technical skills while observing the procedure involved in moving a project from a conceptual stage to a final product. I was given several projects that required me to contact multiple business units, schedule meetings with different technical groups, and ultimately develop and test a final product. This required me to understand not only the products I was working with, but also the users and the process by which my products would be approved and released. Working with this type of development cycle was a new experience for me and required me to learn new interpersonal skills at the same



Josh Sigler in front of Davis Peak at Buffalo Ridge in the northern Park Range of Colorado.

time that I was learning new uses for ArcGIS.

My internship was a great experience that taught me about a part of the energy industry I had never thought about before but have come to love. This fall I will be taking a full time position with Exxon Mobil as a User Support Geoscientist. My experience with Exxon Mobil has led to an exciting career opportunity that may not have been possible without the University of Wyoming. Exxon Mobil's active involvement with the Department, coupled with my interest in mapping, computers, and the geosciences, made their User Support Geoscientist position a perfect fit for me. ❖

STUDENT PROFILE – CRAIG GRIMES

::: Doctoral Studies and Fatherhood :::

by Brendon Orr, editor, Department of Geology and Geophysics

On December 23rd, 2007, graduate student **Craig Grimes** and his wife Kristi received an early Christmas present in the birth of their son, Landon. As Grimes describes it, that day was quite the roller coaster ride.

“That whole experience is still, in some ways, such a blur to me,” says Grimes. “The whole experience of childbirth is just so intense. I had to focus so much on helping Kristi through her contractions, while doing my best to not freak out at how helpless I felt during the entire process.”

At one point during labor, in an effort to help each of them relax, Grimes and his wife talked about a wonderful 12-day vacation they had shared on the southern island of New Zealand following Grimes’s research field trip in Antarctica in January of 2007.

“That whole experience was so much fun,” says Grimes. “We would reminisce about what we did, whether it was when we camped on white-sand beaches or the kayak trips that we took, thinking and talking about those memories really helped her relax.”

However, recalling fond memories would prove difficult during the last agonizing 45 minutes of labor, as the baby was pushed out. Caught in a position of feeling helpless and stressed, Grimes continued to focus on consoling his wife until one final push brought their son into this world. Faced with the acute reality of the situation, Grimes recalls the thoughts racing through his head at the time.

“Out comes the baby and all of a sudden I am no longer thinking of just how my wife is doing, but now I have a son, I am a father,” explains Grimes. “I remember when the doctor handed me the scissors to cut the umbilical cord and I noticed how badly my hand was shaking. But when the delivery was over and the tests were completed, we had a chance to be together, just the three of us, and there was a tremendous sense of relief that everyone is okay. When you spend nine months worrying about every minute detail and everything that could go wrong, it is wonderful to know that everyone is okay.”

After a few months, Grimes is learning to manage his busy home life with completing his doctoral studies at the Department of Geology and Geophysics. No easy task, when one takes into consideration the demands of being a father, a husband, and a graduate student. A chaotic schedule, combined with a notable lack of R.E.M. sleep, made the first month very challenging, but now that his wife is able to go back to work, and his son is at daycare for three days a week, Grimes finds that he is much more efficient both on campus and at home. The somewhat regular schedule has also made it easier for him to enjoy the rewarding aspects of being a father while also dealing with the challenges as well.

“One thing that has been incredible to observe, is how fast

Landon has been changing,” says Grimes. “Every couple weeks there is some type of new behavior and it has been a real treat to witness that. There are still some sleepless nights, but it is all worth it. With that said, my wife and I often talk about how we have no idea how single parents accomplish raising children. It is certainly a challenge.”

On top of everything else, Grimes and his wife also have had to squeeze in time for the family dog, Gus, who initially had a hard time with the change in family dynamics.

“Initially Gus seemed unsure of Landon and would almost always avoid him,” says Grimes. “But Gus has now accepted Landon as a member of the family





magmatism at extensional plate boundaries, certain memories and experiences come to mind from his time at the Department. Specifically, Grimes fondly recalls the sense of comradery that he experienced with some of his fellow graduate students during the first couple years of graduate school.

“The further you go into graduate school the more you seem to share the same interests with your fellow graduate students and that can lead to some close friendships and memorable experiences both inside and outside of school,” explains Grimes. “But one thing that has been frustrating about transitioning from school to school in the past has been the loss of that core

group of friends, as everyone moves on to their next adventure.”

As Grimes looks back on his time as a graduate student, he finds himself appreciating the exciting fieldwork opportunities that were offered to him by his advisors Barbara John and Mike Cheadle.

Such opportunities included marine research that consisted of the drilling of rocks on the ocean’s seafloor, a trip to the Swiss Alps where he

and he will occasionally lick Landon’s face as a sign of affection. Gus is, for the most part, pretty self-sufficient these days and that has certainly made things easier, but Kristi and I still do try to make sure that he gets his daily walk so he doesn’t feel too left out. Gus has some border collie in him, so he does need regular entertainment and exercise, and I occasionally find myself bouncing Landon on my lap while at the same time kicking a ball for Gus to fetch.”

As Grimes works towards completing his dissertation on the topic of temporal and spatial studies of mafic

Left, facing page: Grimes takes a short break from a long hike after collecting samples from the Dufek Intrusion, Antarctica.

Left: Grimes’ wife Kristi w/ son Landon.

Below: Grimes and air national guard pilot prepare to fly from McMurdo Station, Antarctica to the South Pole on Christmas Eve, 2006.

studied on-land exposures of oceanic crust and mantle, and an expedition to Antarctica to study the Dufek Massif.

“I am thankful for the opportunity to have had such great research experiences during my time at UW,” says Grimes. “I don’t think I could have had these opportunities anywhere else. Being able to go on a research cruise was especially enjoyable as it gave me the opportunity to work in an international community with scientists from England, France, Germany, and Japan, which was great. Being a farm boy from Ohio, you don’t have many experiences with people from other countries, so to be a part of that was very gratifying.”

With his expected summer graduation growing closer and closer, Grimes finds himself pondering what career path he would like to take.

“I would really like to get into teaching,” says Grimes. “Education is very rewarding to me, and I would enjoy having a positive impact on society by teaching others.”

Sounds like something a good father would say. ❖



---If you are a student at the Department of Geology and Geophysics and would like to be featured in our PROFILE newsletter, please contact our editor Brendon Orr at editor@gg.uwyo.edu or borr@uwyo.edu.



Profile

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Participants of the 2008 Spring Field Trip at Devil's Golf Course in Death Valley, California. From left to right: **Brady Foreman** (UW), **Clay Painter** (UW); Martin Kennedy (University of California, Riverside); **Stefanie Roemer** (UW); Hugh Sinclair (University of Edinburgh); Dave Mrofka (University of California, Riverside); Jose Cuevas (University of Barcelona); **Barbara Carrapa** (UW), and **Sharon Bywater** (UW). The field trip was sponsored by EnCana Oil & Gas and the Don & Dorothy Bird Geology Field Program Fund.

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