



FALL 2010

PROFILE

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FROM THE DEPARTMENT HEAD

The Fall 2010 semester for the Department of Geology & Geophysics (G&G) began with our annual Rocky Mountain field trip which included visits to the southern and northern Bighorn Mountains, Yellowstone National Park, Grand Teton National Park, western Wyoming fold-and-thrust belt, and Fossil Butte National Monument (see group photograph on the back page of the *PROfile*). Wow, do we have some great geology in Wyoming! This field trip is partially supported by ConocoPhillips and was initially developed to introduce our new graduate students to the geology of Wyoming. However, the trip has grown over the years, and it is now a favorite event for both our undergraduate and graduate students.

This Fall semester (2010) we matriculated 23 new graduate students (MS- and PhD-degree candidates), and for the Fall 2009 semester, we matriculated 27 new graduate students. In other words, we have added 50 new graduate students to our program in the past two years. These students come from some of the best colleges and universities in the nation and also include some international students. Traditional strengths in structural geology/tectonics, seismology, isotope geology, petrology, and low-temperature geochemistry are well represented among the new graduate students, but we are now also attracting students with interests in paleoclimatology/paleoecology, computational geosciences, and environmental geology. Presently, in our geology and geophysics program we have a student population of ~170 undergraduate students and ~70 graduate students.

As usual, the Fall semester has been busy with a variety of activities, including the 9th Annual Rocky Mountain Rendezvous job fair, which attracted a record number of students from the Rocky Mountain region and beyond. Details about this year's Rendezvous are summarized later in this issue of the *PROfile*. After Rendezvous weekend, we held our annual alumni party associated with Homecoming Weekend. Then many were off to Denver for the Annual Meeting of the Geological Society of America, where we had another very successful alumni reception. It has been great to see and reconnect with our alumni at all these events. At the Society of Exploration Geophysicists (SEG), two of our geophysics graduate students, **Jordon Hayes** and **Amit Padhi** won first place in the international Challenge Bowl. Again an article in this issue *PROfile* provides details on this outstanding achievement by these graduate students. As we approach mid-December, many of our faculty, students, and post-doctoral scientists will be making presentations at the AGU Fall Meeting in San Francisco—the most recent tally indicates nearly 40 presentations! Again, I hope our faculty and students have opportunities to visit alumni at this enormous professional meeting.


During the past academic year, and continuing into the present, many positive developments have occurred with regard to the future of the UW Geological Museum (See past issues of the *PROfile*). In early June we had a site visit by a Museum Assessment Program surveyor, a national expert on natural history museums, and the surveyor's report was submitted to the American Association of Museums and subsequently to the Geological Museum Task Force in August. This report will serve as an important guide as the Task Force develops a strategic plan for the Geological Museum during the present academic year.

Finally, I wish all of you an enjoyable upcoming holiday season as well as a productive, healthy, and Happy New Year! ♦

Art Snoke

FACULTY AND DEPARTMENT NEWS

International Geologic Research Project Yields Abundant Results

 early 100 scientific publications have resulted from a six-year international geological research project co-
led by University of Wyoming Professor **Carol Frost**.

From 2005–2010, Frost helped lead an international team of scientists from 42 nations on six continents that focused its research on the origins, age, distribution, physical properties and other aspects of A-type granites. In August Frost and co-leaders Tapani Rämö (Finland) and Roberto Dall'Agnol (Brazil) held the final technical meeting and field trip for the United Nations Educational, Scientific and Cultural Organization's International Geoscience Programme on "A-type Granites and Related Rocks through Time."

"A-type granites are iron-rich granites found within tectonic plates, as opposed to most other granites that are intruded along plate margins, such as the Cascades and California's Sierra Nevada," says Frost. Field research studies were conducted in different crustal realms and tectonic settings in North America, South America, Africa, and Europe.

Wyoming hosts excellent examples of A-type granites, Frost says. Among them are the 1.4 billion year-old Sherman Granite that is exposed at Veedauwoo east of Laramie. She says A-type magma also is present in Yellowstone, where some it erupted and deposited huge volumes of volcanic ash, most recently 600,000 years ago.

"The remaining magma that is still underground beneath Yellowstone will eventually cool and crystallize as A-type granite," Frost says. "For that reason I call Veedauwoo 'Yellowstone Underground' because we can see at Veedauwoo what is forming below Yellowstone's geysers and thermal features."

In addition to the field research, the project included seven technical meetings in the United States, Brazil, South Africa, Canada, Norway, Turkey, and Finland.

The UNESCO project was very rewarding, Frost says, because it brought together geologists who had studied iron-rich granites from all parts of the globe. The scientists had many arguments about how these rocks formed, and divergent hypotheses resulted.

"Through our annual meetings and field trips to some of these different locations we came to realize that much of the controversy stemmed from the fact that we were comparing apples and oranges, so to speak," she says. "By the end of the project we all realized that it is possible to make compositionally similar, but not identical granites by melting different kinds of rocks in the crust and mantle."


Frost says the participants developed many collaborations and points of contact among developed and developing countries and among scientists with different but complementary expertise.

"It was a wonderful, broadening, international experience for all," Frost says.

Further information and update on publications (and other pertinent issues related to the project) can be retrieved from the project website at www.IGCP-510.org.

Frost also recently completed a three-year term as Councilor for the Mineralogical Society of America. ♦

UW Professors' Work Offers New Insights Into Glacier Hydrology

 or years now, **Neil Humphrey** and Joel T. Harper have made a living atop mountain glaciers, decked out in cold weather or rain gear, drilling and instrumenting boreholes in sheer ice and working to make sense of the data.

One of their latest experiments, on Bench Glacier in coastal Alaska, produced an unexpected result that could change scientists' view of basal water drainage and glacial sliding. Their findings were published in *Nature*, the world's foremost weekly scientific journal and the flagship journal for Nature Publishing Group (NPG).

While researchers have long known that the manner in which waters moves inside a glacier will control how the ice slides down its valley, Humphrey says the *Nature* report illustrates a differing picture of glacier hydrology.

"In the past, the mental picture that people have of glaciers is that you had ice flowing over bedrock and that there was a thin sheet of water and dirt between the ice and the bedrock. The glacier slid over this layer of dirt and water and this layer was thought of as a simple 2-dimensional surface," says Humphrey, a professor in the University of Wyoming Department of Geology and Geophysics. "But what we discovered when we started looking in great detail was that the bed of the glacier is not just a simple 2D surface. The ice actually has enough cracks in it that the water is not flowing through just a little gap, it's actually flowing through a complex 3-dimensional zone."

"Our observations show that considerable water is stored englacially, in other words, away from the bed, in a 3D flow system. That changes the picture completely."

Through their work, Humphrey and Harper, a geoscientist at the University of Montana in Missoula, hope to make progress on one of the fundamental problems of glacier motion, namely the poorly understood link between glacial water drainage and bulk sliding of the ice.

"We can currently predict how fast glaciers will melt but not how fast they can slide, and the sliding of ice from the big ice sheets of the world will be what controls sea-level rise resulting from global warming," Humphrey says.

In their report, titled "Vertical extension of the subglacial drainage system into basal crevasses," Humphrey and Harper detail findings from field experiments in 2003 and 2006 in which they first drilled and instrumented 28 boreholes in the temperate valley glacier near Valdez and then studied detailed video inspections and water pressure records from the holes.

Each hole, about 600 feet deep, was drilled with a piece of equipment designed and built at UW, which boasts the “fastest and deepest portable drill in the world,” Humphrey says. Researchers were able to drill about 300 feet per hour, sometimes making up to five holes in a single day.

“The equipment was totally a key to the project,” Harper says. “Without the drill, we would have had no way of making measurements at the bottom of the glacier and this discovery simply would not have been made.”

Their findings in Alaska served as motivation for the researchers’ current project in Greenland, a country whose surface is covered primarily by the appropriately-named Greenland ice sheet, the second largest ice body in the world.

The researchers’ work in Greenland focuses primarily on how the ice sheet “might react to global warming,” says Humphrey.

A 2004 study by the University of Reading in England showed that if the Greenland ice sheet were to completely melt away, the world’s sea level would rise by more than 23 feet and threaten to swamp low-lying cities such as Los Angeles and London.

“We found out (in Alaska) that water not only flows along the contact between bedrock and the overlying ice, but that water can sometimes also move way up into the ice. We found basal crevasses at Bench Glacier, and there is reason to believe that they can sometimes exist on other glaciers,” says Harper. “We need figure out how common they are in other places and, this is, in part, our motivation for drilling boreholes in Greenland.”

For their work in Greenland, where temperatures remain below freezing for nine months of the year, Humphrey has designed a new drill, also built in the UW machine shop, capable of penetrating up to 2,000 meters, or nearly 2,200 yards, of ice.

Humphrey and Harper have worked together, oftentimes atop mountain glaciers, since the early 1990s. They have spent considerable time in Alaska, as well as the Rocky Mountains, Himalayas in Asia, Greenland, and Antarctica.

John Bradford, of the Center for Geophysical Investigation of the Shallow Subsurface at Boise State University in Idaho, and Toby W. Meierbachtol, a senior graduate student from the University of Montana, were co-authors on the *Nature* paper. ❖

Other Faculty News

In May, Research Professor **Kevin Chamberlain** received a \$177,000 NSF grant for his research project titled, “Collaborative Research: Integrated geochronology and paleomagnetism of Neoproterozoic-Paleoproterozoic dikes in Wyoming, a keystone of North American cratons.” The project combines high-precision U-Pb geochronology produced at UW by Chamberlain, with paleomagnetic pole determinations measured at Yale University, from mafic dikes exposed in the crystalline basement rocks throughout Wyoming. The results will be used to determine the Wyoming craton’s position relative to other cratons from 2.7 to 2.1 billion years ago, testing supercontinent reconstructions, and improving exploration for mineral deposits.

Chamberlain also recently published an article in *Geology* titled, “Eocene Clocks Agree: Coeval $^{40}\text{Ar}/^{39}\text{Ar}$, U-Pb, and Astronomical Ages from the Green River Formation.” In the article, Chamberlain and three co-authors from the University of Wisconsin refine depositional rates in ancient lake deposits from southwestern Wyoming to test links between climate change and variations in solar insolation due to orbital eccentricity cycles. The results impact present-day climate models and predictions of future climate change. The Green River Formation contains large trona deposits and is host to Wyoming’s state fossil (*knighitia*).

Chamberlain and colleagues from the Chinese Academy of Sciences (CAS) also recently published a paper in the journal *Geostandards and Geoanalytical Research*, titled “Penglai zircon megacrysts: a potential new working reference for microbeam analysis of Hf-O isotopes and U-Pb age.” The collaboration between Chamberlain and the CAS is an outgrowth of support from UW’s Departments of International Programs and Geology and Geophysics.

In August, Associate Professor **Mike Cheadle** and Professor **Barbara John** received a two-year NSF award for \$99,899 to study the growth of oceanic lower crust using an integrated high-precision geochronologic and trace-element approach.

The research is in collaboration with Matt Rioux and Sam Bowring at the Massachusetts Institute of Technology and Joe Wooden at Stanford University.

As a result of discussions at the May American Geophysical Union Chapman Conference on “Detachments in the Oceanic Lithosphere,” a new mode of seafloor spreading has been proposed. In the July, 2010 issue of *Nature Geoscience*, Associate Professor **Michael Cheadle** and UW G&G alumnus **Craig Grimes** (Mississippi State University) reported that geoscientists and biologists who attended the Chapman conference concluded that slow spreading ridges featuring long-lived detachment faults “should be recognized as a fundamentally distinct mode of seafloor spreading.”

Although Cheadle and Grimes stated “the Chapman conference raised as many questions as answers,” they concluded that detachment faults warrant continued research and should be considered a distinct mode of seafloor spreading. The May Chapman conference was co-funded by the Integrated Ocean Drilling Program.

Associate Professor **Ken Dueker** recently received the UW College of Arts and Sciences Extraordinary Merit in Research Award.

Professor **Ron Frost** recently published a book titled, *Religion versus Science: Where Both Sides go Wrong in the Great Evolution Debate*. In the book, which was published by O-Books, Frost argues that much of the vitriol in the debate comes from the fact that both sides, the Creationists and the materialistic scientists overstate their cases. Creationists go wrong when they take literal interpretation of the Bible, something that Saint Augustine, one of the fathers of the Christian Church advised against 1500 years ago. Scientists go wrong when they say that science (particularly evolution) proves that there is no spiritual dimension to life. They seem to

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ignore the fact that science is the study of the objective universe and can say nothing about whether non-physical aspects of the universe exist or not.

For more information about Frost's book, visit www.ronfrost.com/Home-religion_vs._science.html.

Associate professor **Bryan Shuman** recently published an article in the *Annals of the Association of American Geographers* (AAG), the flagship journal of the AAG, on drought history in the North Platte River drainage. The paper is the result of collaboration with lead author, J. J. Shinker (UW Geography), co-author, T. Minckley (UW Botany), and Shuman's recent Ph.D. student, Anna Henderson. The title of the article was, "Climatic Shifts in the Availability of Contested Waters: A Long-Term Perspective from the Headwaters of the North Platte River."

Shuman also travelled to the Netherlands to give a presentation on North American hydroclimatic changes over the past 15,000 years at Vrije University in Amsterdam. He also spoke to the Wyoming Water Forum at the State Engineer's Office in Cheyenne and gave an invited keynote address at the Wyoming Water Association conference. Both talks focused on prolonged drought episodes in Wyoming.

Associate Professor **Kenneth W.W. Sims** recently received a \$109,513 NSF grant from the Earth Sciences Division titled, "Collaborative Research: Rear-arc magmatism in the Northern Volcanic Zone of the Andes: Processes and timescales in a continental rear-arc setting." This grant is for a collaborative project with California State University, Los Angeles, the University of South Carolina, the Instituto Geofísico of the Escuela Politécnica Nacional (the state engineering school) in Quito, Ecuador (total grant is for \$286,380). The funds will support field studies and isotopic and petrological research on the active volcanoes Reventador and Sumaco in Ecuador, South America. An important aspect of this project is the outreach, which will connect students from Laramie High School with students in Los Angeles, California and Quito, Ecuador. Laramie students will also follow the December expedition with live satellite link up. This research will be the focus of University of Wyoming graduate student Tim Mathews M.Sc. thesis.

Sims also received a National Geographic Expeditions Council Grant in the amount of \$10,290. The grant, titled "Timescales of magmatic processes and eruption ages of the Nyiragongo volcanic," paid the expenses of Sims' expedition to Nyiragongo volcano in the Democratic Republic of the Congo, Africa. Both National Geographic Magazine and National Geographic Television will feature Sims' expedition in the future.

Sims also gave an invited talk at the University of Iowa on November 19th titled, "Determining the timescales of magma genesis, melt evolution, crystal growth rates and magma degassing in the Mt Erebus magmatic system."

An article published by Sims in 2008 in the journal *Geostandards and Geoanalytical Research* has been one of

the most highly cited papers in the past two years for the journal. The article, titled "An Inter-Laboratory Assessment of the Thorium Isotopic Composition of Synthetic and Rock Reference Materials," can be read at <http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291751-908X>.

In August, Assistant Professor **Ye Zhang** received a three-year \$300,300 grant from the UW Center for Fundamentals of Subsurface Flow to help fund her research project titled, "An Integrated Well Location Optimization Study for Commercial-Scale CO₂ Storage in A Deep Saline Aquifer." This project will be conducted in collaboration with Co-PIs KJ Reddy (UW Renewable Resources) and Phil Stauffer (Los Alamos National Lab).

Zhang also served as corresponding author on two articles that were recently published in the *Journal of Hydrology* and *Journal of Hazardous, Toxic, and Radioactive Waste*, titled "Acid Gas Storage in a Deep Saline Aquifer: A Study on Parameter and Model Uncertainty" and "Equivalent Hydraulic Conductivity Of Three-Dimensional Heterogeneous Porous Media: An Upscaling Study Base on An Experimental Stratigraphy," respectively.

Record Number of Students Participate in 9th Annual Rocky Mountain Rendezvous Job Fair

The 9th Annual Rocky Mountain Rendezvous of Geoscience Students and Employers (RMR) was held on the University of Wyoming (UW) Campus from Oct 8–11.

The RMR is one of five regional job fairs sponsored by the American Association of Petroleum Geologists (AAPG) and the Society of Exploration Geophysicists (SEG) and hosted by UW's Department of Geology and Geophysics. The largest of the five fairs is held in Houston, Texas, the U.S. oil and gas "capital." The RMR is a close second in terms of company and student participation, and is often cited by both recruiters and students as "simply a great experience." Many of the recruiters are either UW G & G alumni, and/or people who actually got their jobs via the RMR and look forward each year to returning to UW for the job fair. This year 17 companies came to campus for the RMR. Approximately 225 geoscience students from across the country participated in the event, which is about 100 more than in previous years.

Generous sponsorship (up to \$3000 per company) supports a number of activities in addition to formal interviews including field trips, short courses, resume and interviewing workshops, technical poster presentations, receptions and dinners. These activities allow students and recruiters to spend informal, but quality time together outside of formal interviewing which allows both students and recruiters to find the best match for student and job. According to **Randi Martinsen**, RMR Chairman, "High tech companies, such as petroleum companies, strongly support this job fair concept because young, new-hire geoscientists

require additional on-the-job training, which means companies invest significant resources into training new hires and therefore want to make sure they have the right person for the job. Also, because of a national shortage of geoscience students, from the student's perspective, it is no longer about finding a job, it is about finding their ideal job."

Several companies provided extra support in addition to their sponsorships. Chevron provided several thousand dollars in cash awards for the top technical presentations as judged by recruiters from each of the companies. Anadarko offered a visit to an actively drilling rig and an overview of drilling technology. Marathon sponsored a geologic field trip, lead this year by Mark Tomasso, Senior Research Scientists of EORI, to some world famous outcrops south of Laramie. Exxonmobil offered a short course that introduces students to various strategies useful for investigating the hydrocarbon prospectiveness of basins.

For more information and to learn how to participate, visit the RMR website at <http://aapg.org.uwyo.edu/RockyMtnRendezvous/home.html>. ❖



Graduate students Amit Padhi (left) and Jorden Hayes (right).

Students News

Graduate students from the University of Wyoming (UW) Department of Geology and Geophysics (G&G) recently won first place at the Society of Exploration Geophysicists (SEG) international Challenge Bowl in Denver, Colo. **Jorden Hayes** (Ph.D.) and **Amit Padhi** (Ph.D.) represented team UW in a competition that included 11 other teams from across the globe who were all champions from their respective regional competitions. Hayes and Padhi defeated teams from Stanford and Colorado School of Mines in their regional contest to advance to the international competition and win the first place which also earned them a \$1,000 award.

"Professors Mallick and Holbrook, by their encouragement, teaching, and advising, have been integral to this achievement," says Hayes, of Richland Center, Wisconsin. "We were very confident and successful in the seismology portion of the competition in large part due to the coursework taught by the geophysics faculty."

Says Padhi, of Bhubaneswar, India, "I am elated that I could contribute to the fame of the prestigious geoscience department here at UW."

"I am really proud of Jorden and Amit's first place finish," says G&G Professor and Padhi's advisor **Subhashis Mallick**. "This is really a prestigious achievement bringing UW among the top institutions for geosciences education."

Professor **Steve Holbrook**, Hayes' advisor, adds, "Jorden and Amit have really done UW proud with this achievement. Their accomplishment shows that our geophysics students stand among the best in the world." ❖

New Issue of Rocky Mountain Geology Focuses on Geologic Carbon Dioxide Sequestration

More than 75 percent of the human-induced emissions of carbon dioxide to the atmosphere come from the combustion of fossil fuels. While long-term energy strategies may seek to reduce our reliance on fossil fuels, in the near term, coal and other fossil energy sources will likely remain in the fuel mix, especially considering that coal currently supplies nearly 50 percent of electricity generation in the U.S. and 25 percent of the energy supply worldwide. For this reason, the capture and geologic storage of carbon dioxide is increasingly recognized as a crucial pathway to mitigating harmful greenhouse gas emissions.

The Fall 2010 issue of *Rocky Mountain Geology* (RMG) contributes to the knowledge base required to deploy successful projects for geologic carbon storage using new research and analyses by University of Wyoming (UW) faculty and colleagues.

This special issue includes seven research articles relating to geologic carbon dioxide sequestration in Wyoming. With contributing authors from five different units at UW, including the Departments of Agriculture and Applied Economics, Mathematics, Geology and Geophysics, Enhanced Oil Recovery Institute, and Wyoming Geographic Information Science Center, the issue covers a broad range of topics relating to carbon capture and sequestration (CCS) technology, including:

- The impetus for research into geologic carbon sequestration, including the state and national legislative and regulatory environments;

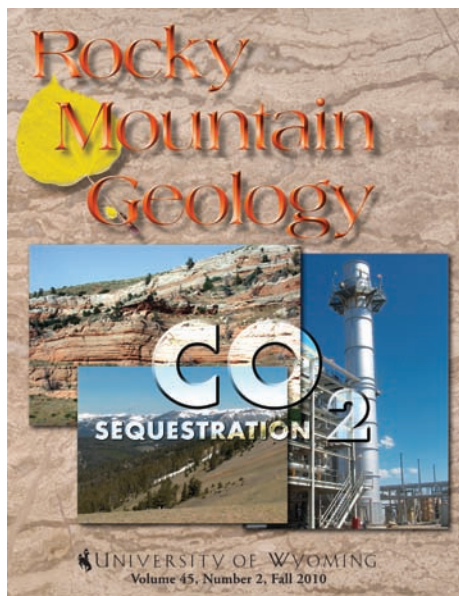
- Studies of the geologic properties of potential carbon dioxide reservoirs in southwest Wyoming and their overlying sealing cap rocks;
- Groundwater chemistry contained in targeted sandstone and carbonate reservoirs in southwest Wyoming;
- Development of a numerical simulation code that can be used to predict the migration and trapping of injected carbon dioxide plumes;
- Development of cyberinfrastructure to support interdisciplinary research associated with geologic carbon sequestration; and
- An assessment of the impacts of federal carbon legislation on Wyoming's coal, oil, gas, and wind energy sectors

Research presented in this special issue will contribute importantly to advancements of CCS technologies in lowering greenhouse gas emissions and constructing commercial geologic-sequestration projects in the Rocky Mountain West. "As one of the nation's leading suppliers of fossil-fuel energy, Wyoming has an incentive to contribute to solutions for managing anthropogenic carbon-dioxide emissions," says Guest Editor, Professor **Carol Frost**. "The legislature and state government have provided legal and regulatory frameworks, and the university is characterizing promising sites for underground storage of carbon dioxide. This special issue includes some of UW's first results from support by the Department of Energy to study carbon sequestration in Wyoming."

"There is clearly an appetite for information relating to this topic," says Managing Editor **Brendon Orr**. "This information is relevant for academics, researchers, students, and members of government and industry. RMG's editorial board is grateful to Guest Editors Carol Frost and Anne Jakle for helping us with this endeavor."

More information about the issue, including purchasing instructions, is available on the journal's website, pubs.gg.uwyo.edu/RMG. The issue is also available for download on GeoScienceWorld at rmg.geoscience-world.org.

The Editorial Board of RMG includes Professor and Department of Geology and Geophysics Department Head **Art Snoke**, Emeritus Professor **Jay Lillegraven**, and UW alumna **Sarah Garlick**. ❖



Cover to RMG Vol. 45, No. 2

ALUMNI NEWS

Notes

Summer visitors to the Department included **Jim Davis** (M.S. '63; Ph.D. '66) and **Bob Hoskovec** (B.S. '81). Jim is enjoying retirement in Washington (State) while Bob is Director of Recruitment at Yavapai College in Prescott, Arizona.

Jonathan Goodwin (Ph.D. '71) is currently serving his second term as secretary-treasurer of the Geology and Society Division of GSA. He is also serving as chair of the licensed professional geologist board in Illinois. Goodwin retired from ISGS in August 2007 after 31 years of service.

R. Scott Hoffman (B.S. '76) is currently working as an Environmental Specialist focusing on air and water at the Missouri Department of Natural Resources.

Don A. Lundy (M.S. '78) is currently working as a Hydrologist in Atlanta, Georgia. After living in the Atlanta metro area for 13 years, Lundy and his wife, Laura, miss the Rocky Mountain scenery and life style. Laura teaches math part-time at Agnes Scott College. Their oldest daughter plays French horn for the Tucson Symphony Orchestra and their youngest daughter is a graduate student in Japanese at University of Massachusetts-Amherst. Lundy is still gainfully employed and busy working on characterization and remediation of LNAPL sites nationwide and is two years into a part-time Ph.D. program at University of Georgia-Athens.

Don Mathews (B.S. '49) is retired and living in Ruidoso, New Mexico. His alumni news form summarized the career of Warren Hagist (B.S. '50) who died in June, 2010. Warren was a geologist with Superior Oil Co. with both domestic and foreign assignments from 1950 until 1982. After retirement from Superior, he was employed for four more years by HNG Oil and Gas Co.

After a 38 year career in oil exploration and development, primarily in the Rocky Mountain, **Albert L. Richardson** (M.A. '50) retired to central Florida in 1988. He currently lives in Westminster Towers, a residential community, where he recently gave a lecture and chaired discussion on the BP oil spill in the Gulf of Mexico.

Robert A. Wells (M.S. '75) continues to work as a mining geologist and engineer while operating his one-man-show company EV Technical Services Inc. Wells is currently working on hard-rock precious metals deposits in Argentina and Mexico, where he makes resource and reserve estimates and models, as well as long-term mine plans and designs. He lives with his family in Star Valley and after 10 years, he is confirmed in his belief that Wyoming is way more than a place to visit or dig holes in the ground.

Cairlyn Williams (B.S. '08) is currently working towards a M.S. in geology at University of Tennessee, Knoxville, with a focus on near-surface geophysics. Her current research is using ground-penetrating radar (GPR) to locate

sub-surface artifacts at a site on the Akrotiri Peninsula in Cyprus. She is currently being advised by Dr. Gregory Baker and expects to graduate in May 2011.

Jerry E. Zoble (B.S. '53; M.A. '57) is continuing to enjoy his retirement. After graduating from UW, he spent two years in Korea and Japan with the Army Corp of Engineers. After returning to the U.S., he worked for an oil and gas company in Billings, Montana, before being transferred to Jackson, Mississippi, and then to New Orleans, Louisiana. In 1962, Zoble took a position with Occidental Petroleum Co. in Lafayette, Louisiana. In 1971, he returned to Jackson and opened an office for Kilray Oil Co. of Texas. Later, he was retained by Southland Royalty and First Energy Co. of Mississippi before becoming an independent in 1978. During subsequent years, Zoble served as president of the Mississippi Geological Society 1975-76 and chairman of the Mississippi/Alabama Division of Mid-Continent Oil and Gas Association 1991-97. He married Ruth A. Irvin in 1952 and they have a son and two daughters, four grandchildren, and three great grandchildren. ❖

Obituaries

Warren Hagist (B.S. '50) passed away on June 9, 2010 in Morrison, Colorado. Upon graduating from UW, he was employed by the Superior Oil Company in Los Angeles, California. It was there that he met and married his wife, Marj in 1958 who was then employed as secretary to the president and CEO of Superior Oil. During his geological career with Superior, Warren was exploration manager in Anchorage, Alaska, and in London, U.K. Upon return to the U.S. he was exploration manager in Midland Texas and later in the International Division in Houston, Texas. In 1982, Warren took early retirement from Superior, moved to Lakewood, Colorado where he was employed by HNG Oil & Gas Co., a subsidiary of Houston Natural Gas. Warren and Marj were avid skiers and also maintained a home in Dillon, Colorado. Warren retired from HNG Oil in 1986. Warren is survived by his wife Marj and a son Peter and his wife Evie, three grandsons, Todd, Steven, and Christopher and a daughter, Jill and husband Mike and grandson Kyle.

He will be sorely missed by his many friends and geological associates.

Sherrill E. Drum (B.S. '50) of Hot Springs Village, Arkansas, died March 16, 2010 at his home. He was born August 3, 1917, in Yawkey, West Virginia, the oldest of three children of A.G. and Zella Drum. His father was a wildcat oil driller, and during Mr. Drum's youth, the family moved frequently from drilling camp to drilling camp throughout the West. He was an outstanding high school athlete and held Wyoming State running records.

During World War II, Mr. Drum trained as a pilot in the Army Air Corps and was stationed in Alaska as a weather specialist monitoring American Lend-Lease flights to Russia. After the war, he graduated from UW as a geologist. His career was spent searching for oil throughout the West, and he retired

after 43 years with the Ohio Oil Company (Marathon), the same company for which his father had worked. He moved to Hot Springs Village in the early 1980s.

Mr. Drum was a keen follower of baseball, an avid golfer, a faithful fan of University of Wyoming teams, and a generous donor to the University. He was a lifelong Presbyterian and a member of Kirk in the Pines in Hot Springs Village, as well as a Mason and Shriner.

Sherrill Drum was predeceased by his wife of 57 years, Anna-Margaret; his brother, Robert; and his sister, Lucille. He is survived by his loving friend, Fauline Frazier of Hot Springs Village; his nephew Fred Richards of Stratford, Connecticut, and his niece, Cheryl Sheldon of Arroyo Grande, California.

Richard "Dick" Welch Murphy (M.S. '58) died on September 8, 2010. He was a petroleum geologist of the old school, eschewing a career in management to indulge in his love for the science. He was born in St. Louis, Missouri, on September 3, 1929 and grew up in Washington D.C.

Murphy earned a Master's degree in geology at UW in 1958. His fieldwork earned him a reputation as an adventurous outdoors type, and his mountain skills were employed in helping to recover bodies from the October 1955 airplane crash on Medicine Bow Peak—America's worst airplane disaster at that time.

Murphy worked in the Rockies for Casper Oil Company and then Standard Oil in the late 1950's before being chosen to join Esso's elite "Rover Boys." In small groups they carried out reconnaissance surveys around the world, including the Sahara, Nigeria, Argentina, and various Alpine basins. He first went to SE Asia in 1962 and so began a lifelong love affair with the region. In 1965, after three years of fieldwork in the Philippines, he joined Esso's Far East Study Group based in Singapore. Fieldwork in Sabah in 1965 commenced as usual with an ascent of the region's highest mountain, in this case Mount Kinabalu.

In Singapore he met Kate who became his second wife in 1969. Fieldwork in Japan and Taiwan brought their share of adventures, and meanwhile invitations to explore in Vietnam, Thailand, Burma, West Malaysia, and Cambodia were investigated and recommendations telexed to New York. He was elected President of the Geological Society of Malaysia, and in 1973 co-founded the SE Asia Petroleum Exploration Society.

Later in life, Murphy was instrumental in establishing the oil-industry Consortium for Geological Research in Southeast Asia. That association also spawned an industry short course on 'Petroleum Geology of Southeast Asia,' which he taught around the world until the year he died. For over a quarter-century, an estimated 1400 young geologists benefited from Dick's encyclopedic knowledge of that region.

A highly-respected petroleum geologist and a lover of mountains, he is survived by his son Troy from his first marriage, by his second wife Kate and their daughters Rachael and Sarah, six grandchildren, and by his partner of several years, Christine Oxborrow.

Edited text derived from obituary written by Michael F. Ridd. ❖



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Participants of the 2010 ConocoPhillips Rocky Mountain Field Trip in front of the Teton Range near Jackson Hole, Wyoming. The field trip was led and organized by Professor Ron Frost with help from Adjunct Professor Eric Erslev and Department Head Art Snoke. *Photograph by alumna Barb Vietti.*