University of Wyoming
Department of Geology & Geophysics
Fall 2009

PROfile

Inside

PROfile

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From the Department Head Art Snoke

By the time that you read this issue of the *PROfile*, classes for the fall 2009 semester will have ended, finals week will be over, and many G&G faculty and students will be at the AGU Annual Meeting in San Francisco. The past six months have brought some surprises—both good and bad—and one of the most intense semesters that I have experienced as the Head of the Department. The first and most unexpected surprise happened on June 4th when I learned that University-wide budget cuts had eliminated the positions of Curator and Museum Secretary as well as the support budget for the UW Geological Museum. The early history of the Geological Museum goes back to the beginning of the University and is one of S.H. Knight's great legacies to the people of the State of Wyoming. Needless to say this announcement was a shock to the Laramie, State of Wyoming, and scientific communities and led to an immediate outcry from the public and scientists across the nation. The Geological Museum closed on June 30th; however, it was reopened on August 25th, but without a Curator or support budget. Near the end of summer the University administration allowed the formation of the "Committee to Reinvent the UW Geological Museum," and I presently Chair that committee. I do not have sufficient space to tell you of the various activities of this committee, but clearly a high priority is to develop a plan to make the Geological Museum financially self-sustaining. We have been successful in developing such a plan, and we are presently in the midst a major fund-raising campaign to reach the goal of a self-sustaining Geological Museum (see articles later in the *PROfile*).

The other surprises have all been good. This fall semester the largest class ever of new graduate students (26!) enrolled in our M.S. or Ph.D. programs. Our extramural funding is at the highest level in the history of the Department. With the addition of Associate Professor **Ken Sims** (see article later in the *PROfile*), our new isotope geochemist, we now have 25 faculty members. It is fair to say that our Department is academically stronger than it has ever been. In the past several years, we have experienced unprecedented growth, and we have hired outstanding scholars who are also dedicated classroom teachers. Our students are highly sought after for graduate school, professional positions in geology/geophysics, or as faculty members at colleges and universities. Despite these great successes, the State and University face a budget crisis that does affect the experiences that we can provide our students, such as the fall semester Rocky Mountain and Spring Break field trips, funding for student attendance at professional meetings and conferences, support for undergraduate research, and other educational opportunities. We greatly appreciate your past support; it has been a key factor in our success as an outstanding department for undergraduate and graduate studies in the Earth sciences. If you pass through Laramie on your travels, please stop by the Department—walk the halls and look at the displays, explore our outstanding Brinkerhoff Geology Library, visit with faculty, and see the Geological Museum.

I wish you an enjoyable upcoming holiday season as well as a productive, healthy, and Happy New Year! ❖

Art Snoke

Faculty & Department News

New Funding from DOE Boosts Carbon Capture and Storage Research and Development at UW

In September, the United States Department of Energy (DOE) awarded a combined total of $17.2 million for two active research projects at the University of Wyoming (UW) Department of Geology and Geophysics related to the capture and storage of CO_2.

Professor and Associate Vice President for Research and Economic Development **Carol Frost** is the PI on the project titled, *Site Characterization of the highest-priority geologic formations for CO_2 storage in Wyoming*. Professors **Subhashis Mallick**, **Jimm Myers**, Associate Professor **John Kaszuba**, and Associate Lecturer **Erin Campbell-Stone**, are coPIs, along with scientists at the Wyoming State Geological Survey (WSGS). This $16.9 million project funded by the DOE will entail UW researchers undertaking the necessary work to move from preliminary characterization to commercial development of two CO_2 storage sites (the Rock Springs uplift and the Moxa arch) in the Rocky Mountain region.

Objectives of the project include: the design and acquisition of 3-D/3-C seismic data and other geophysical surveys of the Rock Springs Uplift; design and complete a stratigraphic test well on the Rock Springs Uplift to obtain wire line logs, core, and cuttings to complement similar information from the Moxa arch; and complete detailed risk assessments and design commercial-scale storage projects for both sites.

"Wyoming supplies 10 percent of the nation's energy. 70 percent of this energy comes from coal, which emits a greater amount of CO_2 per unit of energy than oil or gas," says Frost. "Geologic sequestration of that CO_2 is essential to continued use of this major domestic source of energy while making progress towards meeting President Obama's Energy Goals of reducing greenhouse gas emissions by 80 percent by 2050."

Another project titled, Measurements of *222 Rn, 220Rn, and CO_2 emissions in natural CO_2 fields in Wyoming: MVA techniques for determining gas transport and caprock integrity*, also received $274,958 in funding from the DOE. This project, lead by Associate Professors **John Kaszuba** and **Kenneth W. W. Sims**, will help to determine whether quantitative measurement techniques for Rn activity and CO_2 flux, already established for natural volcanic systems can be applied to natural and laboratory CO_2 analogues as a means of assessing caprock integrity. This project will provide training opportunities for two graduate students and one undergraduate student in geologic and geochemical skills required for implementing and deploying this technology. The three students will perform fundamental research to advance the science of Monitoring, Verification, and Accounting (MVA).

"Wyoming is home to a wide variety of unique geologic features that allow us to study how carbon dioxide behaves in the subsurface," says Kaszuba. "Students on this exciting project will have the opportunity to perform fundamental and applied research on natural carbon dioxide accumulations from Yellowstone to the Moxa arch. Their work will allow us to address important questions critical to the success of geologic carbon sequestration." ❖

Notes

A total of 19 faculty, researchers, and students from the Department of Geology and Geophysics attended and gave presentations at the annual Geological Society of America Meeting held in Portland, Oregon from October 18th–24th.

In June, Assistant Professor **Barbara Carrapa** published the first triple dating study of detrital minerals revealing multi-phase Andean tectonic evolution in *Geology*. The same article received a special comment in the journal *Science* by Editor Brooks Hanson as part of the "Editor's Choice: Highlights of the Recent Literature" series in the June issue of *Science* (Andean Origins).

Carrapa's article and its special comment in *Science* are available on the web at, http://geology.geoscienceworld.org/cgi/content/abstract/37/5/407 and http://www.sciencemag.org/cgi/search?src=hw&site_area=sci&fulltext=carrapa, respectively.

In July, Assistant Professors **Barbara Carrapa** and **Mark Clementz** received a $326,140 grant from the National Science Foundation (NSF) to fund their research project entitled, "Collaborative Research: In Pursuit of Missing Andean Lithosphere: Constraining Late Cenozoic Crust-mantle Processes in the Puna Plateau, Central Andes."

In September, Research Professor **Kevin Chamberlain**, Associate Professors **Ken Sims**, **John Kaszuba**, and Emeritus Professor **Tim Drever** attended the UW SER-sponsored Uranium Extraction Workshop titled, "Identifying the Challenges and Opportunities for Research" held in Cheyenne, Wyo. The workshop drew 92 attendees, including representatives of the uranium industry, state and federal regulatory agencies, and UW. Chamberlain, Kaszuba, and Sims served as panel members; Chamberlain presented on "Potential applications of isotope geochemistry to In-situ Uranium Recovery." The workshop garnered ideas for SER's effort to develop a research program for uranium that focuses on optimizing the economic recovery of the resource, as authorized by the State of Wyoming Legislature in 2009. For more information about the workshop, visit www.uwyo.edu/ser/info.asp?p=15511.

Assistant Professor **Po Chen** recently received a $74,101 NSF grant. The grant will help to upgrade the Department's geophysics cluster into a GPU-CPU hybrid cluster.

Graphic Processing Units (GPUs) **are** specifically designed to provide high

throughput on parallel computations using many-core chips, they are especially well suited to address problems that can be expressed as data-parallel computations. Recent efforts by GPU vendors, in particular, NVIDIA's CUDA (Compute Unified Device Architecture) framework, have significantly increased the programmability of commodity GPUs, making them ideal co-processors for significantly accelerating data-parallel scientific computations.

The GPU upgrade will be used for three major purposes: (1) to improve the efficiency of high-performance geoscience computing research at University of Wyoming; (2) to explore parallelism and scalability of scientific computing on heterogeneous clusters composed of hardware with very different processing capability, speed and throughput and (3) to develop a set of open-source, GPU-accelerated modeling and inversion codes for geoscience research and to teach General-Purpose computation on GPUs (GPGPU) to graduate students at the Geology & Geophysics, Computer Science, and Mathematics Departments at UW.

Assistant Professor **Mark Clementz** recently received a Honorable Mention Paper for 2008 award from the journal *Palaios* and the Society for Sedimentary Geology (SEPM) for his paper titled, "Identifying aquatic habits of herbivorous mammals through stable isotope analysis."

The sixty station CREST broad-**band** seismic array in the Colorado Rocky Mountains was removed at the end of October by Associate Professor **Ken Dueker** and four G&G graduate students. This NSF Continental Dynamics project has nine Principle Investigators who are seeking to constrain the dynamic origin of the last 15 Ma uplift of the Colorado Rockies. This array was deployed in September, 2008 and has been continuously recording seismic waves from around the planet for the last 15 months. Preliminary analysis of the data shows the crustal thickness is not correlated with the topography of the Colorado Rocky Mountains and a very low velocity zone resides in the lower crust beneath the 12-Ma-old Yarmony basaltic field. A paper in draft suggests that an N–S-trending upper mantle velocity anomaly extending from the San Juan Mountains to Meeker, Co. is related to observed exhumation and river incision rates.

This past summer Professor **Carrick Eggleston** taught a course to ninth graders in the School of Energy Resources (SER) Energy Summer Institute. Eggleston also served on a review panel for the U.S. Department of Energy Environmental Remediation Science Program during fall 2009 and has been appointed as an adjunct faculty member in the SER.

In September, Professor **Carol Frost** completed her four-year term as Secretary-Treasurer for the Wyoming Board of Professional Geologists.

In October, Frost also gave the **keynote** address at the fifth annual meeting of the UNESCO's IGCP-510 project titled, "A-type granites and related rocks through time," in Tunceli, Turkey.

Two of the top-ten most downloaded articles from the *Journal of Petrology* were authored by Professor **Ron Frost** and co-authored by Professor **Carol Frost**.

In 2008, the most-frequently downloaded article from this high-impact journal, published by Oxford University Press, was Frost, B.R., Barnes, C.G., Collins, W.J., Arculus, R.J., Ellis, D.J., and Frost, C.D., 2001, A geochemical classification of granitic rock suites. *Journal of Petrology*, v. 42, 2033-2048.

The *Journal of Petrology*, which has published key papers in the field of petrology for fifty years and which has the second highest impact factor among journals in the Earth Sciences, reported on its web site this fall that this article was also the third most cited article ever published in the journal.

In 2008, the fifth most-frequently downloaded article from the journal was Frost, B.R., and Frost, C.D., 2008, A geochemical classification for feldspathic rocks. *Journal of Petrology*, v. 49 no. 11, 1955-1969. Doi:10.1093/petrology/egn054.

Professor **Ron Frost**, as part of the Alexander von Humboldt (AvH) Foundation Research Award—which he initially received in 1992—spent the summer at the University of Tübingen's Institut für Geowissenschaften, where he worked with faculty and students on the petrology of alkaline rocks.

*Graduate Student **Zhu Zhang** and Associate Professor **Ken Dueker** visiting a broad-band seismic site near Gunnison, Colo. that is deployed as part of a 60-element seismic array to study the uplift history of the Colorado Rocky Mountains.*

During his stay in Europe he presented a talk at the Goldschmidt conference, an international conference on geochemistry, attended the annual meeting of the AvH Foundation in Berlin, and presented talks at the Universities of Bonn and Bremen.

In August, he joined an expedition of faculty and students from the University of Tübingen to study the Ilimaussaq igneous intrusion in South Greenland. The Ilimaussaq—with exceptional concentrations of rare metals such as zirconium, niobium, tantalum, lithium, beryllium, and the lanthanide elements—is one of the most unusual igneous bodies on Earth. Frost participated in the research conducted by the petrologists at University of Tübingen to understand the processes that caused the unusual concentration of these elements.

In November, Frost, along with Dr. Katy Evans of Curtin University of Technology in Perth, Australia, received a grant of $155,000 Australian dollars from the Australian Research Council to conduct research on fluid flow through the oceanic crust. Frost spent the end of November in New Caledonian—where a huge slab of oceanic crust is exposed on land—conducting research on this project.

In September, Professor **Neil Humphrey** received two $500,000 grants: One, from the NSF; and the second, from a consortium of northern countries (Canada, Sweden and Finland) to fund research in Greenland that will help investigate basal conditions on the ice sheet. This will be the first ever major drilling effort to directly measure water flow and ice sliding underneath the Greenland ice sheet.

In June, Associate Professor **John Kaszuba** received a Petroleum Research Fund grant from the American Chemical Society (ACS) in the amount of $100,000 for his project titled, "A Geochemical and Experimental Evaluation of Geologic CO_2-SO_2 Co-Sequestration."

Kaszuba also recently received funding in the amount of $348,640 for his research project that will explore fundamental aspects of supercritical carbon dioxide-water-rock interactions in Enhanced Geothermal Systems. Kaszuba received $278,911 from the Department of Energy and a $69,729 match from the UW School of Energy Resources. The project is a collaborative effort that focuses on experimental geochemistry at UW and the development of computer models at the University of Utah.

In September, Professor **Subhashis Mallick** was awarded $1,046,917 from the Department of Energy (DOE) and a matching contribution of $470,646 from Schlumberger and the University of Wyoming to help fund his work on CO_2 sequestration. Mallick, along with Professor Vladimir Avlarado from the Chemical and Petroleum Engineering Department, will be combining multiphase flow simulations with multi-component seismic waveform modeling and inversion to determine if seismic waveform inversion can accurately predict CO_2 plume movements within storage reservoirs in post-injection scenarios involving rewetting and trapping of CO_2 by bypassing and snap-off mechanisms. This work will complement other ongoing CO_2 sequestration research being carried out in various Departments within the UW campus.

In September, Professor **James D. Myers** was awarded $995,000 from the DOE to develop the Wyoming CCS Technology Institute (WCTI) at UW. This institute will implement training and technology transfer in the Wyoming and Rocky Mountain regions. The WCTI will utilize an industry-wide model to train a professional workforce; provide pathways for graduates and professionals from allied fields; and create a vehicle for communicating regional CCS knowledge and technology within the growing industry. His award is matched by $990,000 in AML funds allocated by the Wyoming state legislature for carbon sequestration research.

Professor Myers' award is one of seven selected by the DOE to advance the United States in its position as the leader in technology for addressing climate change and for developing near-zero emission technologies to significantly reduce carbon dioxide (CO_2) emissions from power plants. Other institutions receiving funding include the University of Illinois, Environmental Outreach and Stewardship Alliance (Seattle, WA), New Mexico Institute of Mining and Technology, Petroleum Technology Transfer Council (Tulsa, OK), Southern States Energy Board (SSEB), and The University of Texas at Austin.

In August, Assistant Professor **Cliff Riebe** received two NSF grants. The first grant, totaling $331,508, is from a subcontract from a National Science Foundation-supported study entitled "Critical Zone Observatory: Snowline processes in the southern Sierra Nevada." Riebe's part of the work will focus on quantifying rates, patterns, and timescales of weathering and erosion in the Sierra Nevada batholith.

Riebe's second NSF grant, in the amount of $67,467, is for a Rapid Response Research proposal entitled "RAPID: Systematic Quantification of the Upper Particle-Size Limits of Salmon Spawning Gravel." The work examines the dynamics of nest building by Pacific salmon in rivers of the Puget Sound and northern California coast.

In September and October, Riebe gave presentations at the Colorado University Geography Department Colloquium and the Northern Colorado University Earth Sciences Program Seminar. In December, he also presented his work at the AGU Fall Meeting at a session called "Processes in the Critical Zone: Interaction of Rock, Water, and Life."

Riebe also participated in a workshop titled "The Critical Zone: An NSF-Sponsored Workshop on the Biological Aspects of Weathering" in Washington D.C. from October 5th–7th.

Professor and Department Head **Art Snoke** was the co-editor of a recently published book by the Geological Society of America titled, "Crustal cross-sections from the western North American Cordillera and elsewhere: Implications for tectonic and petrologic processes." Snoke also co-authored two chapters that appeared in the book. For more information, visit www.geosociety.org/bookstore.

Assistant Professor **Ye Zhang** recently received a NSF grant in the amount of $262,416 to help fund her research project titled, "Evaluation of Uncertainty in CO2 Sequestration Modeling: a Flow Relevance Study using Experimental Stratigraphy and Field Verification (Teapot Dome, Wyoming).

Zhang has also been invited to give a talk at the 2010 Ground Water Summit, hosted by the National Groundwater Association, to be held in Denver, Colo., from April 11th–15th. ❖

Faculty Profile: Ken W. W. Sims

As an Associate Professor at the University of Wyoming, Dr. **Ken Sims** uses isotopic and chemical tracers to study geologic processes in the Earth and other planetary bodies. His current research interests focus on the study of melt generation and transport of basaltic magmas in mid-ocean ridge and ocean island basalts, volcanology, isotope hydrology, and paleo-oceanography. Sims earned his B.A. in geology from Colorado College, his M.S.c from the Institute of Meteoritics at the University of New Mexico, and his Ph.D. in geochemistry from the University of California, Berkeley. Sims' field experience ranges from ocean floor geology, using submersibles and remote sensing techniques, to geological studies of active volcanoes at high altitudes in difficult, technical terrain.

Throughout his career, Sims has been the recipient of several awards including: the Estwing Outstanding Senior Award at Colorado College, an Outstanding Student Instructor Award from the UC, Berkeley, the Woods Hole Oceanographic Institution (WHOI) Postdoctoral Scholar Fellowship, and three Mellon Awards for innovative exploratory research. His research has been profiled in several popular science publications and books including National Geographic, New Scientist, Popular Mechanics, Oceanus, and the Children's Book *Lava Scientist.*

In addition to his academic career, Sims has been a mountain guide and climbing instructor for over 25 years and has extensive experience in technical, high altitude, and cold weather mountaineering. Sims has spent eight seasons guiding for scientific parties in Antarctica and has successfully guided Mt. McKinley (20,320 feet), and several 5,000 and 6,000-meter peaks in the Andes of Peru. Sims has also instructed Leadership Training Programs for Outward Bound; and directed wilderness programs for adjudicated youth and other special populations through the Santa Fe Mountain Center. Some of Sims' significant climbing accomplishments include: an ascent of South Face of Nevado Chacraraju (6112 meters); the first ascent of the West Face (V, 5.10) of Nevado Wamsharaju (5434 meters); solo ascents of the Shield on Nevado Huascaran Sur (6768 meters) and the SW face of Nevado Artesonraju (6025 meters); three El Capitan Routes, including an early ascent of the Pacific Ocean Wall (VI, 5.10 A5); a late November ascent of the Diamond of Longs Peak (14,100 ft) in winter conditions, a six hour, almost all free ascent of the NW Face of Half-dome (VI, 5.11+, A.0); and several notable first ascents including the first free ascent of the "Air Voyage" (V 5.12) in the Black Canyon of Gunnison, Colo.

***Ken Sims** ascending out of the crater of Nyirangongo volcano in the DR Congo. Nyirangongo is an active volcano of very unusual composition that poses a significant threat to the City of Goma and nearby refugee camps.*

Sims has also demonstrated a strong commitment to public service related to youth mentoring, and the preservation/restoration of wilderness. He served two terms on the Board of Directors of Big Brothers and Big Sisters of Cape Cod and currently serves on the board of directors of the Rocky Mountain Field Institute and the Ritt Kellogg Memorial Fund at Colorado College.

"UW has a very strong and growing Geology and Geophysics program and is the place to take my research to the next level. I also must admit that my family and I are enjoying living out West again."

Before arriving at UW, Sims was a Tenured Associate Scientist at the Woods Hole Oceanographic Institution (WHOI). Sims started at WHOI as a post-doctoral scholar fellow in 1996 and was hired onto their scientific staff in 1998. While at WHOI Sims studied the construction of mid-ocean ridges using a combination of isotopic measurements and geologic constraints from high resolution imaging of the ocean floor. Another major focus of Sims' research program is to use U-series measurements and other chemical and physical constraints to determine the timescales of magmatic processes at active volcanoes around the globe. This timescale information is essential for understanding the genesis, impact and predictability of volcanic systems. Recently Sims has also been using U-series and 14_C measurements to date carbonates in the Samail ophiolite of Oman to look at the weathering rates of ultramafic rocks and their significance in the global carbon cycle. If the formation of carbonate in ultramafic rocks is as fast as early data suggest, then this process has great potential for sequestering CO_2.

Sims is excited about his move to Wyoming and working with his new colleagues to expand his program into various aspects of Quaternary studies and to also start working in the Yellowstone Volcanic System. In Sims' words, "UW has a very strong and growing Geology and Geophysics program and is the place to take my research to the next level. I also must admit that my family and I are enjoying living out West again." ❖

UW Geological Museum Update

UW Announces Donation to S.H. Knight Memorial Fund

An endowment fund to support the UW Geological Museum has been created, and a generous gift to that fund has been announced.

The $8,000 gift of The Friends of the S.H. Knight Geological Museum, founded in the wake of the museum's closure on June 30th, is the latest donation to the fund, bringing the total to $18,000. The nonprofit community benefit organization raised money last summer to raise awareness and funds to reopen the Geological Museum.

"The Friends are excited to be working with the university to reopen a fully operational museum," says UW alumna **Kelli Trujillo**, one of the Friends of the S.H. Knight Museum.

Through the creation of the S.H. Knight Memorial Fund, all donations to this fund will be doubled by the State of Wyoming match. UW President Tom Buchanan and the UW Board of Trustees have committed to match all donations to the Knight Memorial Fund up to $750,000. The matching starts when the Knight Memorial Fund reaches $50,000.

An additional gift of $10,000 to the S.H. Knight Memorial Fund was made by John and Susan Masterson, both UW alumni and longtime supporters in memory of his parents, James A. and Mary W. Masterson.

"We're delighted with these initial gifts, and what they will help us accomplish for the museum and the university," Ben Blalock, UW Foundation president, says. "With this fund, anyone can donate to support the museum."

The fund will be used to cover a range of costs for the museum, including staff, operations, maintenance and renovations to the museum as a whole as well as to individual exhibits, equipment and supplies related to the museum's missions of teaching, research, display and public outreach.

"We're grateful to those who took the time to let us know how they felt," Chuck Brown, president of the UW Board of Trustees, says. "Without them, we wouldn't have the resources we now have to find the best potential uses of the museum facility."

The establishment of the S.H. Knight Memorial Fund follows the generous gift of Brainerd "Nip" and Anne Mears earlier this year through the Anne C. and Brainerd Mears, Jr. Excellence Fund for University of Wyoming Geological Museum. They donated $570,000, matched by Wyoming state funds for a total of $1.14 million.

The Mears' referred to their gift as a tribute to the work of "Doc" Knight, who was instrumental in building UW's geology department and who gave his time and work to create the Geological Museum. Upon the designation of their gift the Mearses spoke of the museum's influence on the thousands of people who have visited and enjoyed what it has to offer.

Blalock says the Knight Fund and the Mears' gift are the foundation of a major fundraising campaign to support the Geological Museum with private funds.

*Museum Friends—University of Wyoming officials met recently with the Friends of the S.H. Knight Geological Museum to accept an $8,000 gift to support the museum. From left are Geology Department Head **Art Snoke**; museum friends UW G&G alumna **Kelli Trujillo** and Lisa Cox; UW Foundation President Ben Blalock; and museum friend Beth Southwell.*

Hand-in-hand with the two funds is the work that's now under way, supervised by Geology and Geophysics Department Head **Art Snoke**. He leads a committee of UW faculty and administrators that is evaluating the museum and its potential. The result will be a long-term plan for the museum that supports UW's academic mission.

Snoke says the Knight Memorial Fund and the Friends' gift are important steps in achieving self-sustaining private funds for the museum.

"If we are able to raise funds to use all the matching money, we will have $1.5 million in the S.H. Knight Memorial Fund. When this sum is combined with the Mears' gift, the endowment funds to support the UW Geological Museum will have reached $2.6 million," Snoke says. "In the long term, we hope that even a larger endowment can be built through continued donations from the public and corporations that support the Geological Museum's mission. Such funds could facilitate developing museum displays, renovating the adjacent museum space, and hiring additional staff to carry out the mission of the museum."

These additional goals are now being considered by the task force that's studying the Geological Museum and developing a plan for its future, Snoke says.

The roots of the Geological Museum reach back to 1887, the year the University of Wyoming opened; it was a small natural history museum that consisted of the personal collection of J.D. Conley, a professor who taught a range of courses including geology, astronomy, physics, commercial arithmetic and bookkeeping, among other things.

As UW grew and expanded, so did the museum, its collections and its displays. Wilbur Knight, hired in 1893 as a professor of mining and geology, succeeded Conley as curator of the museum. It was for Knight that the small fossil fish Knightia was named.

Eventually, the collection outgrew its home in the Hall of Language (now Old Main), and most of it found a new one in a wing of the Mechanical Building. When the Hall of Science was completed in 1902, the museum moved there. It stayed there until 1956, when the current structure was built on the east wing of what is now the S.H. Knight Geology Building.

Museum Heroes—Anne C. and Brainerd Mears, Jr. in front of the UW Geological Museum. The Mearses generous gift of $570,000, matched by Wyoming state funds for a total of $1.14 million, was meant as a tribute to the legacy of "Doc" Knight, who was instrumental in building UW's geology department and who gave his time and work to create the Geological Museum. Upon the designation of their gift the Mearses spoke of the museum's influence on the thousands of people who have visited and enjoyed what it has to offer.

By that time, Knight's son, Samuel Howell Knight, had worked at the university for more than four decades. In that time, he had developed the UW Geology Department into one of the nation's best, and he started the nationally renowned Summer Science Camp—the camp that brought Nip and Anne Mears to Wyoming. Knight designed the terra cotta bas-relief Stegosaurus and Triceratops panels on the front of the museum, built the copper Tyrannosaurus rex that guards the museum's entrance, and even painted several of the displays inside the museum. He was also responsible for the initial mounting of the Apatosaurus skeleton that is the centerpiece of the museum.

S.H. Knight was celebrated as Wyoming's "Citizen of the Century" in 1999, and his legacy will live on in the fully funded and operational museum that will result from donations to the S. H. Knight Memorial Fund.

To help reach the matching threshold, visit www.uwyo.edu/giveonline, click on Online Gift Form, and choose Geological Museum Samuel H. Knight Memorial Endowment. ❖

Alumni News

Notes

Alumnus **Thomas L. Adams** (B.S. '04) is currently a doctoral student at Southern Methodist University in Dallas, Texas, where he is studying long bone remodeling and growth strategies in basal ornithopod dinosaurs, as well as describing two new crocodiles, from the Early Cretaceous of Texas.

Alumnus **C.S. "Nick" Ferris"** (Ph.D. '65) is currently working as a geologist for UR-Energy in the field of uranium exploration in the areas of Wyoming and Saskatchewan. He also scuba dives a couple of times a year and still participates in rifle matches.

Alumna **Sarah R. Garlick** (M.S., 2007) won the 2009 Banff Mountain Book Award in the category of mountain exposition for her recent book titled: "Flakes, Jugs & Splitters: A Rock Climber's Guide to Geology." This book is a unique contribution, because it provides accurate descriptions and interpretations of geologic formations and features through the eyes of an experienced rock climber.

The jurors who chose Garlick's book wrote: "This innovative new book sheds light on the science behind the stone that supports [rock climbers'] fingertips. Informative, fascinating, and useful, *Flakes, Jugs & Splitters* brings the rock alive, giving us a new perspective on the dramatic mountain landscape around us."

Alumnus **Mark W. John** (B.S. '82) is currently working as the Vice President of Marketing for Petro Star Inc. in Anchorage, Alaska.

Alumnus **Ragnar Rasmussen** (M.S. '98) is currently working as a senior geophysicicist for Chevron Inc. in Houston, Texas and is happy to announce that he and his wife, Megan, recently had their first child. Their daughter, Tracy Helen Rasmussen, was born on February 11, 2009. The Rasmussens report that they are all doing well and hope everyone else is too.

In March, alumni **Joshua & Kalyca Spinler** (B.S. '06) welcomed a new member to their family, Sierra Noreen Spinler. Sierra was the "littlest geoscientist" at the Geology Department's Student Research Symposium, GeoDaze. She helped her dad present his poster at only nine days old!

Josh will be starting his second year pursuing a Ph.D. in Geology & Geophysics at the University of Arizona. His main research has been on the Southern San Andreas fault. He also has been part of setting up a continuous GPS network in the Andes of Argentina.

Kalyca will be starting her second year of teaching eighth grade general science for the Tucson Unified School District. This year she will also be teaching seventh grade earth science. ❖

Obituaries

Edward Fleming Durkee (B.S. '52, M.A. '53) passed away on June 1, 2009 in Manila, Philippines. He was born Nov. 1928, in Kirby, Wyo. He graduated from Casper High School in 1946 and served in the U.S. Marines until 1948 when he enrolled at UW. Following graduation, his initial

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❑ Yes, UW is named in my will.
❑ Yes, my company matches my gifts. I have included a form from my company.
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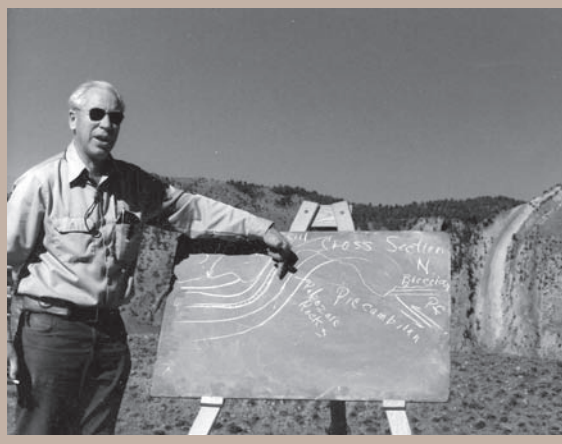
employment was with Gulf Oil Corp and he then joined American Overseas Petroleum Inc., in 1956. He was able to travel all over the world with his job and worked in the Philippines, Africa, Turkey and Australia. He and his family returned to Colorado in 1967 and joined Basic Earth Sciences, Inc. In 1975 he and a partner formed Worldwide Exploration Consultants, Inc. He acted as an advisor on drilling projects around the world and opened an office in Manila in 1994. He was very involved in all areas of petroleum exploration and had a great enthusiasm for his work.

Alumnus **James J. Harak** (attended UW '88–'03) passed away on July 15th in Laramie, Wyo. He had an active life and worked in many different areas from exploration geologist, gold panning and mining, diamond exploration, to teaching as a secondary education Earth Science instructor. A memorial gift was made to the Department of Geology and Geophysics to support undergraduates in field studies and for field camp.

Clifford Eugene "Jerry" Hollon (B.S. '42), passed away Feb. 28th in Laramie, Wyo. He was born May 2, 1920, in Lusk, Wyo. He graduated from Lusk High School in 1938. After graduating from UW he served in World War II in Japan and retired from the military in 1946 at the rank of major. He married Donnabelle Hoblit in 1944 in Denver and they had four children. After the war was over, he and his brother Eddie started the Frontier Lumber Company which had stores in Lusk, Douglas, Wyo., and Edgemont, S.D. He and his family made their home in Lusk until 1974, but moved to Laramie when the University of Wyoming asked him to create the University of Wyoming Foundation for the purpose of raising money for the university. He retired from the university in 1990 as vice president of development. He served as president of the UW Alumni Association in 1956 and was a member of the Board of Trustees from 1965 to 1977. He was recipient of the UW Medallion Service Award in 1986. He was a 60-year season ticket holder to both Cowboy football and basketball. He was a tireless volunteer for the Service Corp of Retired Executives (SCORE) in Colorado and Wyoming. He was preceded in death by his parents and infant son. He is survived by his wife, three children, grandchildren, great-grandchildren, and other relatives.

Elizabeth "Betty" Faith Knight (B.A. '41, English), wife of **Wilbur H. Knight** (B.A. '40, M.S. '45) passed away on May 11, 2009. Wyoming became Knight's adopted home when her family moved to the state when she was young. She married a Wyoming native, Wilbur Knight, and she and Will moved to Jackson in 1941. She had a lifelong passion for learning, was an avid reader and took great pleasure in world travel, traveling to every continent but Antarctica. She had a particular love for England and traveled there often. In 1979 at the age of 60, she studied modern English literature at Oxford University in Oxford, England. She was preceded in death by her husband Wilbur and is survived by her son, Ernest Emery Knight and his wife Sandra and a granddaughter, Emily. Memorials may be made to the Wilbur Hall Knight Student Excellence Fund, the University of Wyoming Foundation, Laramie, WY 82070.

John Merrill Montagne (M.A '52, Ph.D. '55), passed away June 15thHe was born April 17, 1920. As an undergraduate he attended Dartmouth College and the UW Geology Field Camp. He met his future wife Phoebe Corthell in Laramie. At the outbreak of World War II he joined the newly created U.S. Army 10th Mountain Division where he honed his mountaineering and alpine skiing skills. After serving in Italy he and his wife briefly made their home in Jackson, Wyo., before he returned to UW. Following the completion of his Ph.D. he briefly joined the faculty at the Colorado School of Mines before moving to Bozeman, Mont., to help build the Department of Earth Sciences at Montana State University. He spent many years at MSU and mapped the glacial landscape of Paradise Valley and studies the geology of Jackson Hole. He conducted pioneering research on the dynamics of alpine snow avalanches in the Bridger Range near Bozeman.



*Alumnus **John M. Montagne** (1920–2009)*

Walter Lee Olson (B.S. '58), passed away March 19th in Casper, Wyo. He was born Dec. 13, 1930, in Sheridan, Wyo., and graduated from high school there. He enlisted in the U.S. Marine Corp and was honorably discharged in 1959 at the rank of sergeant. After graduation from UW he moved to Casper to work for Kerr-McGee. He married Agnes Lipp in 1974. They had one daughter. He was highly regarded for his kindness, generosity, moral leadership and dedication to God and family. He is survived by his wife, daughter, grandchildren and two brothers. ❖

Gathering news!

We always enjoy hearing from our alumni! Please let us know where you are and who you've become!

You can e-mail updates to ggeditor@uwyo.edu

University of Wyoming
Department of Geology and Geophysics
Dept. 3006
1000 E. University Avenue
Laramie, Wyoming 82071-2000

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University of Wyoming
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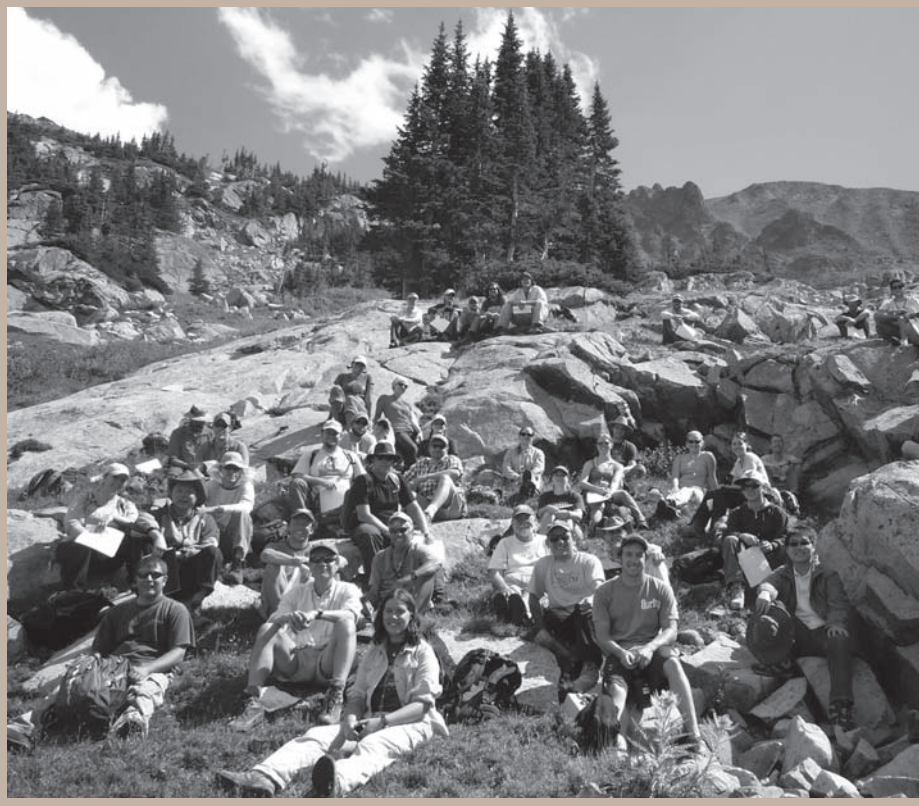
Dept. 3006
1000 E. University Ave.
Laramie, Wyoming 82071-2000

Phone: 307.766.3386
Fax: 307.766.6679

Web: geology.uwyo.edu

Arthur W. Snoke
Department Head
snoke@uwyo.edu

Brendon Orr
Editor
ggeditor@uwyo.edu



Participants of the annual fall semester ConocoPhillips-Rocky Mountain Field Trip at Lake Agnes near Mount Richthofen and Nokhu Crags, Colorado State Forest, Never Summer Mountains, Colo.