



Geology News

A Report to Alumni and Friends

Department of Geology, The University of Montana
2004

Fall

MESSAGE FROM THE CHAIR

Steven D. Sheriff

Big news first. Last spring Loreene, our Administrative Associate, won UM's Outstanding Staff Award. Brian Boer, one of Bill Woessner's Ph.D. students, visited Washington D.C. with UM President George Dennison to talk to congressional representatives about DOE's Science of the Shallow Subsurface multidisciplinary doctoral program. Finally, Bill Woessner was awarded the title "Regents Professor." That is a university's acknowledgment of the highest standards of excellence in teaching, research, and public service. Prior to Bill's award, only two faculty members at UM held the title. Things are going well for staff, students, and faculty.

The Department of Geology is changing fast. Don Hyndman and Don Winston retired last spring. Most of you must have participated in a course from one or both of them. For many, a field trip with Don Winston might be among the most memorable educational activities at UM. The instigation of such memories will continue for a while, as Don Winston will still be leading Spring Break field trips. Don Hyndman will also maintain some well-appreciated contact with students by teaching a Geologic Hazards, Catastrophes, and Earthquakes course for the next few years. Drop them a note--I am sure they would appreciate hearing from you.

My search required an old time algorithm. Yellowed paper crinkled, dust curled, our archives relinquished a well-set grip--I'd found it. Dated November, 1960, Don Winston's letter of application for an open position in the Department of Geology expresses his fundamental belief in field-based teaching

and scholarship. Don's exuberance for teaching and learning at the outcrop has held steadfast for over four decades of excellence in teaching and scholarship. Don's field trips are among the top departmental attributes for generating camaraderie among students, alumnus allegiance to the department, and our students' feeling that they belong to something special. During those four decades Don has also had a tremendous impact on, and earned an international reputation for, the understanding of Precambrian environmental conditions and processes as recorded in the Precambrian Belt Supergroup. An international and renowned contingent of scientists regularly host a conference on recent results and ideas gleaned from Belt rocks. Those scientists dedicated their most recent book, *The Precambrian Belt Symposium Volume IV*, to Professor Winston. That's a nice, fitting, and well-deserved tribute.

Don Hyndman came to UM directly from grad school at Berkeley in 1964. During the subsequent 40 years, Don directed senior theses for innumerable students and advised more than 80 M.S. and Ph.D. students. That effort, along with his undergraduate and graduate classroom teaching, lead to Don's receiving UM's Distinguished Teacher Award. Don was also awarded UM's Distinguished Scholar award--the combination of the two puts him in a select group of UM professors. Of course there are also the books on Don's vita. Those include *The Petrology of Igneous and Metamorphic Rocks*, six titles in the *Roadside Geology* series which Don coauthored with Dave Alt, another with Rick Haslett, and *Northwest Exposures*, again with Dave Alt. Others outside of UM have also recognized Don's achievements: he is a Fellow of the Geological Society of America, the Mineralogical Society of America, and the Geological Association of Canada. Clearly, Professor Hyndman has been busy, and I am sure he will stay busy--Don is currently is putting the finishing touches on

Natural Hazards and Disasters, a textbook authored with his son, David Hyndman.

A tour around our halls results in many different, and/or missing, faces this year. Nancy Hinman is off to New Zealand on a sabbatical assignment for the year, and Gray Thompson has a fall semester sabbatical assignment. Johnnie Moore left UM for three years to be the lead scientist for the California Bay-Delta Authority (CALFED); Johnnie is more than knee deep in a prestigious position associated with a huge project.

Joel Harper is a new professor in the department--he started this fall. Joel's interests are in glaciology and surficial processes and his research is directed at understanding the connections between the cryosphere and climate. Next fall two new faculty will join our department. Julie Baldwin's research and teaching interests are in high grade metamorphism and deep crustal processes. Rebecca Bendick's expertise includes active tectonics, landscape, and deformation mechanics. It is exceedingly exciting and rewarding to interact with, and learn from, our new colleagues.

In the spring of 2004 we held our third Rocky Mountain GeoDays. This month we will hold our fourth annual conference; check it out at: <http://www.umt.edu/Geology/GeoDays/default.htm> This is an undergraduate organized and operated research conference and it has been a huge success. It happens in April, there is a lot of student involvement, and we think it is an outstanding way to get and keep undergraduates involved in research. Watch the calendar and stop by if you are around town for the 2004 conference. I think you'll be impressed.

Getting students to professional meetings to present graduate or senior theses is something we believe in and strive for. And, using a portion of your donations we are regularly helping to defray student expenses so they can attend GSA, AGU, NGWA, ACS, and AAPG meetings. Last fall a van of students went to the annual GSA meeting in Denver and a few more presented at the AGU meeting in San Francisco. Someday, when somebody is feeling particularly generous, we hope to have an endowment to support field trips, student trips to meetings, and student field work.

My hand is out - your donations support students. We use your donations for supporting student research, field trips, small scholarships, educational, and instructional materials. If your pockets are really deep, think about endowing a field trip fund or a lecture series. You keep helping us and we'll help the students.

A great way to contribute, besides sending me all your money, is to work in a stop at UM during one of your trips. Visit the department and give us a seminar on your recent career work or research. We do not get nearly enough speakers from the commercial/industry end of Geology. We do not have a speakers' budget and visiting speakers is one of the best ways our students learn about what really goes on when they go to work in Geology. As it turns out, this request is slowly becoming more successful. Check out our seminars list (http://www2.umt.edu/geology/News_Information/guest_speak.htm) and you'll see several alumni among the speakers. This works great for us, particularly when we get speakers from industry as they are generally harder to attract and yet give our students a great taste of what really goes on behind the desk and/or workstation. This fall Peter Dea, M.S. '81, from Western Gas Resources, Incorporated stopped by with a great presentation on Giant Gas Discoveries of the Rockies. We will schedule you when you can make it--stop by when you can.

Finally, if you need a temporary lab, field or office assistant think about hiring one from UM. And if you have an appropriate, isolated problem that needs to be solved maybe it would make a good senior or M.S. thesis. Have fun, we are.

What are the Faculty and Staff up to?

Brian Collins

The past year has been very exciting and eventful for me both professionally and personally. On the professional side, I was the co-instructor of our first ever GIS in Geology course. The class was a success, and we're looking forward to the second iteration during spring semester 2006. In addition to teaching, I've also been developing some preliminary GIS web services. Within the next year, we hope to have a series of interactive online maps that allow users to investigate some of our research areas and datasets through a map-driven website. Check out WWW.SPATIAL.UMT.EDU if you're interested in this sort of thing.

On the personal side, my wife and I welcomed our second child (baby boy) on October 1, 2004. Despite the fact that the workload on all fronts seems to have been multiplied tenfold, we are thoroughly enjoying parenthood. Aside from family life, I have furthered my ambitions of "aspiring cartographer" and have had two maps published for sale in the last year.

Manny Gabet

This year, my second year here at the U of M, I have a number of different projects beginning to take shape. Although nobody likes a smokey summer, recent fires around Missoula have provided me and my graduate students with some great research opportunities. Specifically, I have initiated a project (funded by the USDA) to investigate the role of wood ash in generating debris flows. Another student is trying to understand how rivers cope with the large pulses of sediment coming from burnt hillslopes. To study this latter problem under more controlled conditions, a student and I will be traveling to exotic Minnesota to do some flume studies at the St. Anthony Falls Laboratory. At the other temperature extreme, a third student is comparing the erosional efficiency of glaciers to that of rivers in the Bitterroot Range.

Joel Harper

I am a new addition to the department--I just started this fall. I arrive in Missoula having spent my life pushing north along the Rockies: I was born in northern New Mexico; I grew up in southern Colorado; I did postdoc and graduate work in northern Colorado (Boulder) and Wyoming (Laramie); and, I now have a job in Montana. Since I have come up against the Canadian border, perhaps its time to settle down. And, I think I could not ask for a better place than Missoula to do that. In most circles, the Geology faculty position at the University of Montana was considered to be the plum job of the year--if not past several years--so I am feeling pretty lucky and happy to be here.

I am a glaciologist, and my research is mainly directed toward mountain glaciers. My current work is looking at the role water plays in the dynamics of glacier sliding. I have a project, funded by the National Science Foundation that involves instrumenting the bed of an 8 km long valley glacier in the Chugach Mountains of Alaska. Water pressure and flow velocity are being measured in 47 boreholes drilled 150-200 meters to the bed of the glacier. The drilling phase of the project is complete (yahoo) so now it is time to pour through the numbers that are streaming in (the instruments are designed to collect data every 5 minutes for two years). I have one student working on the Alaska project, and another student modeling glacier-climate interactions here in Montana. I am also trying to get some work going related to local snow hydrology issues.

In my spare time I like to windsurf in the summer and ski (one of the benefits of working on glaciers in Alaska is that you get to ski year-round).

My wife and I have a one year old, so it seems we spend a lot of our time trying to keep him from banging one thing against another.

Marc Hendrix

Greetings to all alums and other friends! It's been another fine year at the university; though it's hard sometimes for me to believe we've been here for over a decade! This past year, my students and I have continued to move ahead with our work on Pleistocene and Holocene sedimentation in and around Flathead Lake. Last summer, a bunch of my students and I managed to recover something like 70 m of core from the lake bottom--enough to keep us occupied for another ten years! Some of our early results are pretty exciting. We'd expected to find a pretty good record of deglaciation within the Flathead Lake sediment stack and that is indeed what we're finding. The oldest sediment in our cores is a series of textbook glacial rhythmites that likely represent annually deposited layers of sediment. These rhythmites become finer and thinner upsection, consistent with slow retreat of the Flathead ice lobe northward away from our coring sites. The top of the rhythmite section is abruptly overlain by a series of anomalously coarse-grained beds of silt and fine sand that we interpret as representing deposition by large magnitude meltwater discharge events. Within the limits of our ability to date these beds, they appear to correlate temporally with a set of coarse conglomeratic flood deposits further downstream on the lower Flathead River, just below a major confining canyon system. At any rate, we're starting to put some of the pieces of this surprisingly complicated system together.

As you've read in Steve's letter, there's been quite a bit of turn-over in the Geology Department this past year. Most of the students who were working with me last year are still here, finishing up their theses and dissertations. The one notable exception is Matt Affolter, who finished up a nice thesis on the relationship between microtexture and composition in sand-sized pieces of volcanic rock. Matt's moved on to greener pastures and is starting a Ph.D. down at the University of Utah. I'm delighted to report that he spent a month in Mongolia this past summer as part of his dissertation research at Utah.

I continue to teach many of the classes I've taught now for a few years: Field Methods, Architectures of Sedimentary Deposits, and Sedimentary Basin Analysis. This semester, I'm teaching Don Winston's sophomore-level sed-strat class as well. It's keeping me quite busy.

All in all, life's been pretty good. Brigitte is still teaching down at Woodman School in Lolo; we still have a decent sized garden out at our place; and I still manage

to get out once in a while on fall weekends to exercise the local elk and deer. Please drop a line sometime when you have a minute. Remember, the door's always open here. If your schedule permits, feel free to pay us a visit. We'd love to hear what sorts of things you've been doing over the past few years.

Jim Sears

Jim went international this year with a big NSF-funded expedition to eastern Siberia. The trip was the culmination of a quest Jim began in 1976 with the idea that Siberia rifted from western North America to open the ancestral Pacific Ocean basin. The test narrowed down to comparing Precambrian sedimentary rocks exposed in Death Valley with correlative ones exposed in a giant anticline in the remote Verkhoyansk Mountains of Siberia. Quite a contrast in settings - the harsh desert of Death Valley vs. the permafrost of Siberia - but the rocks do indeed match, down to the details of a 10-cm conglomerate bed! After returning from the 6-week expedition to Siberia, Jim brought over his two Russian colleagues who had led the raft trip down the Belaya River. They visited Death Valley to look at the comparative sections. Now they are arguing about whether Russia used to be part of North America or the other way around!

George Stanley

During the past year, I've been active in teaching and research at UM and I am pleased to report that paleontology is alive and prospering in the Geology Department. In addition to teaching my regular paleo courses, I organized an internship called "Curation Techniques" on management of our growing paleontology collections. Last spring, I helped fund and organize the third "Rocky Mountain GeoDays," a venue for our undergraduate students as well as other Montana students to showcase results of their Geology projects. This symposium helped increase undergraduate interactions in the Geology Department. I also have been active in working with our paleontology collections, supervising undergraduate interns and developing a Geology web site on our important fossil holdings.

In addition to campus service, I've been active on several GSA committees and on NSF panels in Washington, D.C. I also continue to serve on the advisory board of the Geology Department at the University of Kansas. Two new NSF grants have helped support me and my students in research focused on early Mesozoic rocks of Alaska. Some of my most

recent students, Erik Katvala (MS. 2004), Andrew Caruthers (thesis in progress), and an undergraduate student, took part in field work in remote areas of Alaska. Working by boat and helicopter, we helped unravel problems dealing with tectonic displaced terranes of western North America. Terranes are pieces of fault-bound real estate that have been moving around relative to the more stable core of the North American continent. Fossils from some key terranes have proven useful for dating and establishing paleogeography during the Mesozoic era. In my paleo lab, students have been busy preparing fossils by dissolving limestone blocks in acid. In this manner we have retrieved delicate and previously unknown fossils. Last summer, a complete ichthyosaur, a swimming marine reptile that lived during the time of the dinosaurs, was excavated on an island in southeastern Alaska.

Last summer I took part in field work in the Wallowa Mountains, northeastern Oregon. I also organized a symposium for the International Coral Reef Symposium in Okinawa and lectured at Kyushu University, Japan. Continuing a cooperative program between UM and Yunnan University, China, I returned to China to collaborate with paleontologists at Yunnan University, Kunming. The research deals with one of the most famous fossil deposits in the world, the Chengjiang biota of Early Cambrian age, located in southwestern China. This deposit preserves three-dimensional fossils, including many soft-bodied forms of life. Nancy Hinman is collaborating with me on the project to help understand the geochemical perspectives on how these remarkable fossils were preserved.

With a sabbatical coming up in 2005, I expect to have time to do more travels and research in paleontology.

Gray Thompson

I was on sabbatical last semester (Fall 04) working with Michelle Foster, one of my grad students, on an exciting project. About two years ago while thinking about the tectonic environment in which the Belt Supergroup accumulated, we developed the hypothesis that bentonites (volcanic ash beds) should be abundant in Belt rocks despite the fact that very few descriptions of Belt bentonites can be found in publications. Working with Don Winston, Jim Sears, and Pete Ryan of Middlebury College, we began examining Belt rocks in the field and found numerous beds that seemed to resemble what bentonites might look like after being subjected to a billion years of tectonic and metamorphic vagaries. Since then, we've collected more than 25 such beds ranging from less than a centimeter to a half-meter in thickness,

from the Newland Limestone in the lower Belt to the Garnet Range Formation in the Missoula Group. We have analyzed the samples by quantitative X-ray diffraction with Dougal McCarty of Chevron-Texaco in Houston, and by standard X-ray diffraction methods and petrography in our labs here in the department. Friends in Poland and Wyoming are separating and analyzing zircons from some of our samples.

Jim Sears and Ray Price, Don Winston, and others, argue persuasively that the Belt Supergroup in western North America is only a fragment of a much larger intracontinental basin that filled with sediment during a 70 million year interval in Middle Proterozoic time when Siberia, Australia, and perhaps other landmasses were joined to western North America before the ultimate assembly of Rodinia. The subsequent breakup of the supercontinent tore the basin into several parts, each of which now resides on a different modern continent.

Because the Belt Supergroup contains few if any fossils and few previously recognized igneous rocks, dating and correlating Belt rocks in western North America has been arduous. Correlation of Belt rocks with equivalents now on other continents has been even more difficult. However, studies of younger bentonites show that they have two properties useful for correlation and radiometric dating. Several studies show that each bentonite is geochemically distinct from other bentonites, and thus a single bentonite bed can be recognized throughout its entire geographic extent, making each bentonite a key or marker bed for correlation. Bentonites commonly are deposited over vast regions commonly throughout an entire sedimentary basin and thus should be a Rosetta Stone (Marc Hendrix's term, but I've adopted it) for intra- and inter-continental correlations of Belt rocks and their equivalents on other continents. In addition, bentonites commonly contain zircons and other minerals useful for radiometric dating. Consequently, numerous bentonites in Belt-age rocks should provide a basis for identifying the timing of Belt sedimentation.

We are currently testing the hypothesis that the beds that we are studying really ARE bentonites. At present our data all support the conclusion that the hypothesis is valid. In addition to this research project, the third edition of *Earth Science and the Environment* by Jon Turk and me just came out. The text has become a standard in introductory Geology, Earth Science, and Environmental Geoscience courses throughout the country.

My wife Eloise continues to teach Study Skills courses at the University. Our daughter Lili and her

husband Sam are both attorneys in Portland, Oregon, and have two daughters; and Jeremiah, the chameleon, runs a hedge fund in Chicago.

Don Winston

After 42 years around here I finally pulled the plug and done retired -well sort of. I still have three graduate students and on Friday I leave with Jim Sears on the annual student spring break field trip, this year to the Kingston Range southeast of Death Valley. Since I have taken leave in fall semesters for several years, this fall wasn't much different, but not teaching three courses this semester is really nice. I have time to work at a reasonable and fun rate.

At the 2003 GSA convention in Seattle, I met a Russian Geologist, Dmitri Gladkochub, who studies Proterozoic rocks in Siberia. I allowed that I knew something about Belt sedimentology, and he encouraged me to join his "team" in Siberia in the summer of 2004. Well, I heard nothing until April, when I got an email from Dmitri asking if I remembered our conversation and inviting me to join them in the Udzh basin of northern Siberia. Jim Sears maintains that the Udzh basin is the Siberian side of the Belt basin, so I replied hell yes! On the way to Siberia I spent some time in Denmark with Bente and some of our friends and met Dmitri before meeting the "team" in Irkutsk on Lake Baikal. We then flew to Aikhal, a city of 15,000 people in Stalinesque apartments well north of the Arctic Circle in the heart of the Russian diamond mining terrane. The expedition was funded by Alrosa, the diamond mining company, and at that point I was informed we were not going to Udzh, but to the head waters of the Anabar River instead. We helicoptered several hours still farther north and on July 6, the seven of us set out with three rubber rafts and provisions for two weeks to float down the rivers. The terrane was a rather level dolomite plateau of frost-wedged blocks covered with reindeer moss and low larch trees. The meandering river channels cut down into the plateau a couple of hundred feet. Outcrops in the talus-strewn slopes were rare, but when we found them, I measured sections and the Russians collected samples for zircon dating, paleomag analysis, etc. The Russians turned out to be a great group of people, and although only two spoke much English we had a great time. Despite not getting to Udzh, the carbonate rocks were very interesting, and I learned quite a bit about the Proterozoic of Siberia. Maybe we will get to Udzh in 2006 or 2007, that is if I can still eat every meal sitting cross legged on the ground.

In August and September I took part in field trips; most were focused on how to map Belt rocks on the

forthcoming Montana Geologic Map. We also packed llamas up to Scotchman Peak, where Beau Pallister is studying sedimentology of the Revett Formation for his Masters Thesis. We raised substantial funding for the Belt Core and Research Center at Fort Missoula. Having brought research on the Helena and Wallace formations to a publication point, I am planning to revisit sheet flood deposition in the Revett, using cores from the fort.

The duck and goose season struck in October. I was joined by Bente, Gray and Eloise Thompson, and Tim Wheeler, all of whom are equally afflicted by the damn duck disease. After the spring break field trip I plan to hunt North Dakota and Saskatchewan during the spring snow goose season. In June I shall go to Australia for a field trip and meeting of the IGCP project on Proterozoic molartooth structure - more Belt field geology this summer. So, things haven't changed that much since my retirement. Everyone is invited to the Belt Bash in early September.

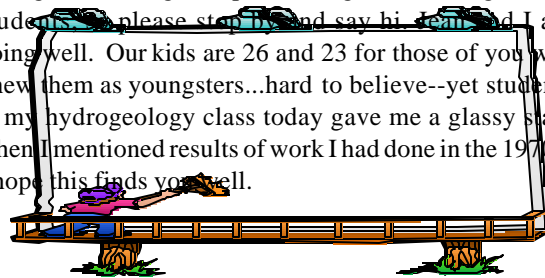
Bill Woessner

I continue to work on groundwater and stream issues as well as a smattering of other interesting projects. My work and the work of my students with interdisciplinary research teams continues to grow as I am a co PI on the successful Division of Biological Sciences NSF Microbial Observatory proposal. The observatory will examine microbial habitat and transformations at the stream/groundwater interface and down flowpaths in the floodplain systems of the Nyak research site (middle fork or the Flathead River). In addition, we are continuing research on river-floodplain exchange as part of the NSF Biocomplexity Project and with the Confederated Umatilla Tribes on a NASA supported remote sensing effort. I am currently "herding" four Ph.D. and nine MS students. Hopefully, a few will finish in the next year! Our research topics include examining nitrate transport in fractured Belt rocks, characterizing the occurrence and fate of pharmaceuticals in septic systems and groundwater, examining the physical setting of an MTBE plume near Ronan, assessing how hyporheic exchange impacts groundwater and surface water temperatures and bar and floodplain residence times, characterizing of the sources of recharge to large production wells adjacent to the Clark Fork River, examining the Missoula Aquifer north of the Clark Fork River, establishing pre-restoration groundwater conditions in a wetland and the Jocko River floodplain, developing a groundwater-shed classification system, and testing the use of hydrologic landscape models to

forecast mountain recharge.

The last year was quite eventful professionally for me. I continued as a member of the Board of Directors of the Association of Groundwater Scientists and Engineers (National Ground Water Association), and I was reappointed as Acting Director of the Center for Riverine Science and Stream Re-naturalization. I was appointed to a National Academy of Science Committee on River Science at the USGS, a couple of year's commitment to assist the USGS in focusing multidisciplinary efforts on river science. In the summer of 2004 I was invited and accepted an invitation by the Geological Society of America-Hydrogeology Division to serve as the 2005 Birdsall-Dreiss Distinguished Lecturer. With generous support from the Geology Department, Dean of the College of Arts and Sciences, and the Vice President for Research and Development, I will begin in January to lecture at over 30 colleges and universities across the country. Finally, I was nominated by the chair and committee of faculty and administrators to be considered for the rank of Regents' Professor, a recognition I received in July.

So as you might guess, the work of teaching, research and service goes on! I always look forward to seeing and visiting with past undergraduate and graduate students. ~~please stop by and say hi~~ and I are doing well. Our kids are 26 and 23 for those of you who knew them as youngsters...hard to believe--yet students in my hydrogeology class today gave me a glassy stare when I mentioned results of work I had done in the 1970's! I hope this finds you well.



ALUMNI NEWS

David McGee (B.A. 1983) and Wendy McGee (B.A. 1984) They are currently living near Houston, Texas. Dave got his MS from the University of Oklahoma in 1985 and went to work for Shell Oil in New Orleans. In 1996, they moved to Houston where Dave worked at the Shell Technology Center building reservoir models and applying deepwater outcrops as analogs. In 1997, Dave left Shell and went to work for Unocal in Sugarland, Texas. In 2000, he was transferred to Belikpapan, Indonesia, to work on the West

Seno Field. In late 2000, Dave started work for Conoco in Houston in the Technology Center Stratigraphy Group and still does for ConocoPhillips. Wendy got a BS in secondary science education at the University of New Orleans. She has taught science in grades six through twelve at schools in Marrero (Louisiana), Cy-Fair and Katy, Texas. Their oldest son is going into ninth grade and he has shown quite an interest in attending UM in business or pre-law (even though it is still a few years away). They look forward to walking halls again.

Brad Wolfinger (B.A. 2000) Brad is still working full-time at TRC Environmental Corporation in Denver, Colorado, and he is also attending the Colorado School of Mines to obtain a Masters in environmental science and engineering.

Ronald Wells (B.A. 1974) Ronald has not been employed in any geology related fields for several years but has a strong interest in Mars Rover Geology Data.

D. D. LaPointe (M.S. 1977) She still enjoys working at the Nevada Bureau of Mines and Geology, mainly in geologic education and outreach to the public and K-12 teachers. She is also working as a scholarship coordinator and working on other projects in minerals and geothermal education. She still hunts (deer, elk, and antelope--whatever cooks up well!), raises vegetables and a twelve year old, and quilts. Retirement in Montana draws ever closer--July 2006 is the current projected date. When that happens, she may have to move her base of operations back to Missoula.

Paul Kuhn (M.S. 1983) He and his family spent the 2003-2004 Christmas/New Year holidays moving out of their apartment and his office in Spokane and into storage! Consolidated in Ankara, Turkey, where his consulting business is extremely busy. He expects to be there for a year. They have been splitting time between Spokane and Ankara since April 2002. Precious metals exploration is feeding them this time around!

Gregory Budd (B.A. 1997) Greg is a Project Geologist on the Chevron-Texaco team for SECOR International in Birmingham. He has two sons, ages 9 and 7, and his wife is expecting another baby. The family recently enjoyed a camping and geology field trip in the Sipsey Wilderness in northwest Alabama.

STUDENT AWARDS

AISES 2004 NATIONAL CONFERENCE GRADUATE SCHOOL POSTER PRESENTATION AWARD OF EXCELLENCE - Shandin Pete

BERTHA MORTON SCHOLARSHIP - Robyn Cook, Michael Hofmann

AMERICAN WATER WORKS ASSOCIATION DON WILLEMS SCHOLARSHIP - Dan Hoffman

NSF CLTW DOCTORAL FELLOWSHIP - Emily Geraghty, Matt Zunker

NSF EPSCoR Ph.D. Fellowship - Seth Makepeace, Sheetal Patel, Emily Geraghty

Edmap Grant - Amy Bondurant, Garrett Timmerman

ESTWING PICK AWARD - Louise Laughlin

FRED HONKALA SCHOLARSHIP - Kelly Bedell, Matthew Hertz, Rachel McCool

GEOLOGY ALUMNI SCHOLARSHIP - Matt Affolter, Eric Katvala, Jeremy Stalker, Michael Sperazza, Matt Hurst, Tanya Abela, Ryan Porter, Michael Hofmann, Noel Philip, Amy Bondurant, Garrett Timmerman, Ed Salmon, Ryan Portner, Ian Magruder, Craig Christiansen, Amelia Tallman, Sheetal Patel, Jonathan Reeve, Jessica Bleha, Michelle Foster, Jose Garcia, Danielle Hughes, Deborah Bush, Edward Reeve, Shandin Pete, Kendall Beene-Crowder, Daniel Hoffman

GEOLOGICAL SOCIETY OF AMERICA RESEARCH GRANT FOR GRADUATE STUDENT RESEARCH - Andrew Caruthers, Emily Geraghty

INRA SCHOLARSHIP - Christopher Hawkins, Brian Boer, Michelle Kotler, Eric Miller, Dale Engstrom

McNAIR SCHOLARSHIP - Jennifer Butler, Aaron Tenesch

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY INTERNSHIP - Mary Sutherland

Montana Space Grant Consortium Scholarship - Shandin Pete

PATRICK McDONOUGH MEMORIAL SCHOLARSHIP - Matthew Affolter, Jeremy Stalker, Ryan Portner

ROCKY MOUNTAIN GEODAYS AWARD - Donovan Power, Curtis Caton, Matthew Hertz, Aaron Tenesch

SOCIETY OF EXPLORATION GEOPHYSICISTS SCHOLARSHIP -
Justin Milliard

UM GRADUATE STUDENT ASSOCIATION TRAVEL AWARDS -
Matthew Affolter, Erik Katvala

UM MORTARBOARD OUTSTANDING SENIORS - Kelly Bedell
(Environmental Option), Matthew Hertz (Professional
Option), Rachel McCool (General Option)

UM COLLEGE OF ARTS AND SCIENCES GRADUATE STUDENT
AND FACULTY RESEARCH CONFERENCE OUTSTANDING
GRADUATE STUDENT PRESENTATION AWARD - Emily
Geraghty

UM COLLEGE OF ARTS AND SCIENCES TRAVEL GRANT AWARD
- Emily Geraghty

ROBERT AND ELEANOR WEIDMAN SCHOLARSHIP - Donovan
Power, Kurt Wikel

TOBACCO ROOT GEOLOGICAL SOCIETY "NORTHERN ROCKIES
PROSPECTOR SCHOLARSHIP" - Emily Geraghty

GEOLOGY SENIOR THESES

Payton Gardner, *Seasonal Chemical Cycling in the
Rabbit Creek Drainage, Yellowstone National Park,
USA* - Directed by Nancy Hinman

Daniel Hughes, *Comparison of Trace and Major
Elements of a Contained Stream Before and During
Remediation* - Directed by Johnnie Moore

Laura Potter, *Hydrogeologic Investigation of the
Miller Creek Drainage, T12N R19W, Section 19* -
Directed by William Woessner

2003-2004

GEOLOGY GRADUATE THESES

Hawkins, Christopher, M.S. 2003 - *Imaging the Shallow
Subsurface Using Ground Penetrating Radar at the
Nyack Floodplain, Montana*

Adam Johnson, M.S. 2003 - *Preliminary
Hydrogeological and Ground Penetrating Radar
Investigation of Preferential Flow Zones in a Gravel-
Dominated Floodplain, Northwest Montana*

Kunz, Rebecca, M.S. 2003 - *The Alkalic Intrusions of
Garrison, Montana: A Possible Extension of the Central
Montana Alkalic Province*

Burtis, Erik, M.S. 2004 - *Structure and Petrology of
Windermere Age Intrusions in the Northern Rocky
Mountains*

Affolter, Matthew, M.S. 2004 - *On the Nature of Volcanic
Lithic Fragments: Definition, Source, and Evolution*

Godfrey, Emily, M.S. 2004 - *Screening Level Study of
Pharmaceuticals in Septic Tanks, Ground Water, and
Surface Water in Missoula, Montana*

Harrison, Nathan, M.S. 2004 - *Gravity, Radar, and
Seismic Investigations to Help Determine geologic,
Hydrologic, and Biologic Relations in the Nyack Valley,
Northwestern Montana*

Hewitt, Tobias, M.S. 2004 - *Characterization of Impacts to
Water Resources of Upper Miller Creek from Septic
System Effluent, Missoula County, Montana*

Hughes, Danielle, M.S. 2004 - *Spatial Distribution and
Temporal Variation of Trace Metals in Sediments of a
Mine Impacted River Basin: Clear Creek, California*

Mann, Layaka, M.S. 2004 - *An Examination of the Contact
Metamorphic Auerole of the Garnet Stock, Garnet-
Coloma Area, Montana*

Mocko, John, M.S. 2004 - *Spatial and Temporal Variation
of Mercury and Other Heavy Metals in a Stream
Contaminated by Historic Mining: Silver Bow Creek,
Silver Bow County, Montana*

Philip, Noel, M.S. 2004 - *Ground Penetrating Radar and
Seismic Refraction as Tools to Characterize Shallow
Subsurface Conditions on Tongass National Forest,
Alaska*

Smeltzer, Jerda, M.S. 2004 - *Ammonia Release from
Organic Decomposition of Alkaline Thermal Spring
Cyanobacterial Mats: Implications for Early Diagenetic
Solution Chemistry and Silica Phase Transformations*

Stalker, Jeremy, M.S. 2004 - *Seismic and Gravity
Investigation of Sediment Depth, Bedrock Topography,
and Faulting in the Tertiary Flint Creek Basin, Western
Montana*

VISITING SPEAKERS

March 11, 2003, Derek Sjoström, Visiting Assistant

Professor, The University of Montana, *Cenozoic Rocky Mountain High: Evidence from Oxygen Isotopes of Authigenic Smectite*.

March 12, 2003, Chris McRoberts, Suny Cortland, *Triassic Bivalves and the Mesozoic Marine Revolution: A Role for Predators?*

March 17, 2003, Noah Snyder, U.S. Geological Survey Pacific Science Center, University of California, Santa Cruz, *Linking Erosion and deposition with Flood events: Case Studies from New York, Alaska, and California*.

March 18, 2003, Noah Snyder, U.S. Geological Survey Pacific Science Center, University of California, Santa Cruz, *Bedrock Channel Response to Tectonic Climatic, and Eustatic Forcings*

April 3, 2003, Simon Brocklehurst, Cooperative Institute for Research in Environmental Science, University of Colorado at Boulder, *Digital elevation Models in Geomorphology*.

April 4, 2003, Simon Brocklehurst, Cooperative Institute for Research in Environmental Science, University of Colorado at Boulder, *Rivers and Glaciers, Tectonics, and the Heights of Mountains*.

April 10, 2003, Manny Gabet, Department of Geological Sciences, U.C. Santa Barbara, *Sediment and Nutrient Loading to Rivers in a Semi-Arid Landscape*.

April 11, 2003, Manny Gabet, Department of Geological Sciences, U.C. Santa Barbara, *A Bug's-Eye View of Sediment Transport on Semi-Arid Hillslopes*.

April 15, 2003, Derek Sjoström, Visiting Assistant Professor, The University of Montana, *Arsenic in the Bedrock of New Hampshire: Turbidites, Henry David Thoreau, and Drinking Water*.

April 28, 2003, Mickey Gunter, Distinguished Lecturer, Mineralogical Society of America, Department of Geological Sciences, University of Idaho, *Health Effects of Inhaled Dust: Idaho Farmers, Libby Miners, and New York Firefighters*.

May 6, 2003, Jean Bahr, Department of Geology and Geophysics, University of Wisconsin Madison, The Geological Society of America Hydrogeology Division Bidsall-Dreiss Lectures, *Groundwater as an Ecosystem Resource*.

September 4, 2003, Richelle Allen-King, University at Buffalo (SUNY), National Ground Water Association and the Association of Ground Water Engineers Darcy

Lecture, *Ground and Surface Water Contributions to Chemical Mass Discharge: Considering the Problem at Field and Basin Scales*.

September 4, 2003, Richelle Allen-King, University at Buffalo (SUNY), National Groundwater Association and the Association of Ground Water Engineers Darcy Lecture, *A Hydrogeochemist's Perspective on Organic Contaminant Transport in Groundwater*.

September 16, 2003, James Sears, The University of Montana, *The Siberian Connection and the Cambrian Explosion*.

October 16, 2003, Larry Smith, Ground-Water Characterization Program, Montana Bureau of Mines, *Late Pleistocene Deglaciation and Subglacial Processes of the Flathead Lobe, Flathead Valley, Montana*.

October 29, 2003, Stan Riggs, East Carolina University, *The Carolina Outer Banks: Their Evolution Through Quaternary Sea Level Changes and Their Collision with Human Activity*.

November 17, 2003, Marc Hendrix, The University of Montana, *Late Pleistocene and Holocene Sedimentation in the Flathead Lake Basin, Northwest Montana: A Dynamic Record of Tectonics and Paleoclimate*.

February 26, 2004, Traugott Scheytt, Institute of Applied geoscience - Hydrogeology Group, Technical Institute of Berlin, Germany, *Pharmaceuticals in Groundwater: Contaminants and Tracers*.

March 2, 2004, Jack Schmidt, Utah State University, *Channel Change of the Colorado River Caused by Water Development: A Mandate for Restoration?*

March 10, 2004, Judith Zachariasen, U.S. Geological Survey, Menlo Park, California, California Institute of Technology, *Late Holocene Rupture History of the Wairau Fault, Marlborough, New Zealand*.

March 11, 2004, Judith Zachariasen, U.S. Geological Survey, Menlo Park California, California Institute of Technology, *Coral Records of Sumatran Paleearthquakes*.

March 17, 2004, Joel Harper, Department of Geology and Geophysics, University of Wyoming, *In Search of the Link Between Hydrology and Glacier Motion*.

March 18, 2004, Joel Harper, Department of Geology and Geophysics, University of Wyoming, *Modeling Mountain Glaciers and Climate: Challenges to Understanding the Present and Forecasting the Future*.

March 24, 2004, Greg Balco, Quaternary Research Center and Dept. of Earth and Space Sciences, University of Washington, *The History of Rock Surfaces in West Antarctica*.

March 25, 2004, Greg Balco, Quaternary Research Center and Dept. of Earth and Space Sciences, University of Washington, *Neotectonics and Paleoclimate from Cosmogenic-Nuclide Geochronology of Plio-Pleistocene Sediments*.

April 5, 2004, JoAnn Holloway, U.S. Geological Survey, Crustal Imaging and Characterization Team, Denver, Colorado, *Mineralogy and Petrology of Nitrogen*.

April 6, 2004, JoAnn Holloway, U.S. Geological Survey, Crustal Imaging and Characterization Team, Denver, Colorado, *Bedrock Weathering: A Biogeochemical Perspective*

April 7, 2004, Rebecca Bendick, University of Cambridge, *Using Scaling Rules to Decipher Landscape*.

April 8, 2004, Rebecca Bendick, University of Cambridge, *Continuous Deformation of the Tibetan Plateau*.

April 12, 2004, Helge Gonnerman, University of California, Berkeley, *How Old Is Earth's Inner Core?*

April 24, 2004, Helge Gonnerman, University of California, Berkeley, *Magma Fragmentation: Necessary but not Sufficient for Explosive Volcanism*.

April 13, 2004, Jeffrey Mount, University of California, Davis, *Passive-Aggressive Restoration in Lowland Floodplains: Consumnes River, California*.

April 19, 2004, Julia Baldwin, University of Maryland, *Monazite, Microstructures, and Metamorphism*.

April 20, 2004, Julia Baldwin, University of Maryland, *The Snowbird Tectonic Zone: A Window into the Deep Crust*.

May 13, 2004, Ian Magruder, The University of Montana, Graduate Student, *Route Finding Through Complex Terrain Using GIS and the Other Side of the Nyack Province*.

September 17, 2004, David McConchie, Professor of Geochemical Engineering, Director, and Chief Scientist for Virotec International, *Applications of Bauxolite Technology in the Management of Sulfidic Sediment, Waste Rock and Tailings, and in the Treatment of ARD and Other Acidic Metal Contaminated Waters*.

September 28, 2004, James Sears, The University of Montana, *The Siberian Connection*.

October 1, 2004, Erick Burns, *The Effects of Salt on Flow of Fluids in Variably Saturated Porous Media*.

October 11, 2004, Peter Dea, President and Chief Executive Officer, Western Gas Resources, Denver, Colorado, *Giant Gas Discoveries of the Rockies*.

October 19, 2004, Arthur Green, AAPG Distinguished Lecturer, *Dynamics of the Sun/Earth Climate System*.

November 9, 2004, Neil Pederson, Lamont-Doherty Earth Observatory, Columbia University, *Evidence of Accelerated Growth of Old Trees in Temperate Forests.*"

November 15, 2004, Doug Martin, Montana Department of Justice, Natural Resource Damage Program, *Stream Restoration Plans at Milltown*.

November 16, 2004, Andrei Khudoley, St. Petersburg State University, Russia, *Siberia-North American Connections: The View from Russia*.

November 18, 2004, Garrett Timmerman, The University of Montana, Graduate Student, *Paleomagnetic Age Correlation of Lacustrine Sediments, Flathead Lake, Northwestern Montana*.

November 30, 2004, James Constantz, U.S.G.S., *Modeling Field Scale Surface Ground Water Exchange*.

December 6, 2004, Anna Klene, *Climate and Urbanization in Barrow, Alaska*.

December 7, 2004, Kevin Vranes, The University of Montana, Visiting Assistant Professor, *Where the Facts Go to Die: A Scientist's Year in Constituent Politics*.

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Generous donations from alumni and friends have greatly helped the Geology Department and our students attend professional meetings and field trips, purchase computers, and conduct their research through scholarship support over the past two years. Your gifts have really helped to continue to make this a dynamic and fun place to study geology, and we thank you kindly for your support. If we've missed anyone, we apologize. If you would like to make a donation, please send it to the Geology Department, The University of Montana, 32 Campus

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Well, that's our news for this year. Please feel free to drop by any time, either in person or in cyberspace--it's always good to hear from our alums. Also, please let us know what you've been up to so we can include it in the next newsletter.

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