Greetings from the Department Head

Thanks to Dana Johnston for his twelve years of leadership (1995-2007)... Kathy Cashman and Becky Dorsey have now assumed the roles of Head and Associate Head of the DoGS

It’s been a busy year, as Becky and I have learned the ropes (while Dana wisely went on sabbatical!). But with the help of our excellent office staff and lots of patience all around, we’ve managed to keep things running. A lot has happened since Dana’s last newsletter, including the addition of not one but two vertebrate paleontologists to the department, Samantha Hopkins and Edward Davis (both introduced below), and the transfer of our electron beam instruments (two electron probes and one scanning electron microscope) to the new Integrated Science Complex, a state-of-the-art underground facility shared with Materials Science. With a full complement of faculty (18, including Edward Davis), a thriving graduate student population, and a growing list of declared undergraduate majors, the department is going strong.

Welcome to our newest faculty family

Vertebrate paleontology returns to the UO

Meet our newest additions to the department, Samantha Hopkins and Edward Davis (see next page), plus little Rowan. Sam is a vertebrate paleontologist who has homes in both the Honors College and DoGS. She studies the role of the physical and biotic environment in driving evolutionary changes in mammalian ecology and morphology. Sam works primarily on small Oligocene and Miocene mammal fossils, combining phylogenetic analysis, descriptive paleontology, isotope geochemistry, and microwear studies. Sam’s current field focus is the evolution of burrowing behavior in mammals during the last 45 million years and the evolution of omnivory in mammals. She also studies the evolution of mammalian locomotor habit, changes in latitudinal body size gradients through time, and competition among fossil small mammals. This summer she initiated a field research project that extends work begun in the 1960’s by J. Arnold Shotwell (UO) on paleoecological changes in faunas from the Juntura Basin of southeast Oregon through the mid- to late Miocene. Preliminary surveys of old localities show that the deposits are still productive - she’s looking forward to reviving a U of O presence in the Neogene of southeast Oregon!
New collections manager for the Condon Collection
Edward Davis provides a bridge to the Museum of Natural and Cultural History

Edward Davis is employed part-time by the Museum of Natural and Cultural History (MNCH) to manage the Condon fossil collection. This is an exciting development and promises increased interaction between MNCH and the DoGS in the future. It also gives us the opportunity to say “Thank You” to Bill and Liz Orr, who have kept the collection going all these years. During his first year, Edward has focused primarily on (1) an NSF Collections Improvement Proposal to outfit our collections space with new cabinets, and (2) work with the volunteers who help to curate the collection. To improve both security and access to the collection, Edward has installed an alarm system and is planning to move the collection to new fireproof locking metal cabinets. He has also helped dedicated volunteers and DoGS students to add ~800 specimens to the electronic catalog, curate ~100 rediscovered Thomas Condon specimens, and clean calcite-cemented sediment from important fossil whale bones from the Oregon coast. The collection still holds surprises: Edward and graduate student John Orcutt have discovered a giant cat from the McKay Reservoir fauna, a discovery they plan to publish in the coming year. Edward is also working to increase the paleontology component of the MNCH outreach activities, to develop an online catalog for the museum, and to help create a locally based K-12 geology curriculum for E. Oregon.

It’s the bugs in the water
Qusheng Jin links microbial biology to geochemistry in his studies of Oregon water chemistry

Assistant Professor Qusheng Jin studies groundwater geochemistry and microbiology, including the role of bacteria in natural arsenic contamination in groundwater – a worldwide public health hazard - and the impact of microbial diversity on the chemistry of the environment. He has recently initiated two projects in Oregon. First, Jin’s group is testing aquifers of the Willamette Basin to determine whether and how microorganisms control the distribution of arsenic in groundwater. Preliminary results suggest that microorganisms convert arsenate to arsenite, thereby exerting a significant control on groundwater arsenic concentrations. Second, Jin and his students are analyzing community structures and in situ activities of microorganisms in Upper Klamath Lake, OR, to test a theory that will allow them to predict nutrient cycling in the lake under the impact of increasing anthropogenic organic input. Results of these studies will shed new light on the significance of microbial activities in environmental chemistry and provide critical information regarding the protection and management of water resources in Oregon and similar areas worldwide.
**Other Faculty News in Brief**

**Congratulations** to Gene Humphreys, recipient of this year’s George P. Woollard Award from GSA’s Geophysics Division; to Becky Dorsey and Marli Miller, who were elected GSA Fellows in 2007; and to Kathy Cashman who has been named a Philip H. Knight Professor of Natural Sciences at UO and who received an Honorary Doctorate of Science from Middlebury College, her alma mater.

**Research activity** in the department is illustrated by our success in obtaining > $1,550,000 in external research funding over the past year. The wide array of DoGS research targets spans from the mantle to the surface, at time scales from geologic to human.

**American Chemical Society:** *Hydrate Distribution, Dissociation and Growth in Sediments* [A. Rempel]

**Department of Energy:** *Geochemical Modeling of Carbonation Reactions* [M. Reed]

**NASA:** *Quantifying landslide movement over seasonal to millenial timescales* [J. Roering & D. Schmidt]

**National Science Foundation:** *Causes & Consequences of Holocene Mafic Explosive Volcanism in Central Oregon* [K. Cashman, P. Wallace & A. Rempel]; *Crystal and Lithic rich Fallout at Quilotoa Volcano, Ecuador* [K. Cashman]; *Closing the Loop on Lava Flow Models* [K. Cashman]; *Timing & Controls on Plio-Pleistocene Erosion in the Eastern Peninsular Ranges* [R. Dorsey]; *Testing the Role of Transtension in Continental Rupture: An Integrative Study* [R. Dorsey]; *Imaging the Upper Crust at Newberry Volcano Using Large-Offset Reflections* [E. Hooft]; *Making the San Andreas Fault at the Mendocino Triple Junction* [G. Humphreys]; *Control of Arsenic in Groundwater by Microbial Arsenate Reduction* [Q. Jin]; *Beyond the Monod equation: Developing a new theory of geomicrobial kinetics* [Q. Jin]; *Interfacial Premelting and Geophysical Implications* [A. Rempel]; *Experimental Investigation of Magma Generation in Subduction Zones* [P. Wallace & A.D. Johnston]

**USGS:** *Age Control for Slip Rate & Paleoeartquakes on Active Thrust Faults in the Northern Foothills Fold* [R. Weldon]

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**Fault lines**

Professor Ray Weldon spent last year working on a new California earthquake hazard map

Ray Weldon was one of the five member Executive Committee for the Working Group on California Earthquake Probabilities, responsible for developing the first statewide comprehensive earthquake forecast. The forecast model combines information from seismology, earthquake geology and geodesy to estimate the location and frequency of “all possible” California earthquakes larger than M5. The official earthquake forecast, known as the “Uniform California Earthquake Rupture Forecast (UCERF),” was sponsored by the California Earthquake Authority, the U.S. Geological Survey, the California Geological Survey, and the Southern California Earthquake Center and reviewed by an independent scientific panel, as well as by the California and National Earthquake Prediction Evaluation Councils. The new information is being provided to decision makers who establish local building codes and earthquake insurance rates, and will assist in more accurate planning for inevitable future large earthquakes. Subsequent studies will determine the vulnerability of manmade structures to estimate expected losses, which will help to increase public safety and community resilience to earthquake hazards.

This figure shows that the probability of California experiencing an earthquake of M>6.7 over the next 30 years is >99%!
Departmental visitors
An introduction to some of our postdocs and visiting faculty members...

Dima Grazhdankin

This year’s Meierjurgen professor was Dmitry ("Dima") Grazhdankin, an expert on late Precambrian fossils from the Petroleum Institute in Novosibirsk, Siberia. Dima has promoted microbial interpretations of enigmatic fossils from the Russian Vendian and Australian Ediacaran. Working with Greg Retallack on comparable fossils from Fishtrap Lake Montana, Dima established that they were a globally distributed microbial fossil known as Arumberia. During fieldwork in Montana, Dima found additional trace fossils that placed these fossils close to the Precambrian-Cambrian boundary, at the ‘Kotlin crisis’ that ushered in the Cambrian explosion of life. Dima also contributed to a spring term seminar that introduced a theme of Precambrian Paleobiology; In this way, Dima provided an invaluable introduction to a field of science that still has many more questions than answers.

Laura Pioli

Laura Pioli, a postdoctoral student from Pisa, Italy, was in the department for one-and-a-half years to work with Kathy and Paul’s groups on a study of Paricutin Volcano in Mexico. Paricutin is famously known as the volcano that grew up in a cornfield in the 1940s... it is the type locality for a style of eruption known as ‘violent Strombolian’, a style that we now believe to have produced many of the young cinder cone and lava flow flow fields in the central Oregon Cascades. Laura brought an Italian flare to the department that is greatly missed now that she has returned to Italy, en route to starting a research position at the University of Geneva, Switzerland.

Erwan Martin

Erwan Martin arrived as a postdoc in January 2007 to work on stable isotope projects in Ilya Bindeman’s lab. Erwan’s PhD from the University of Clermont-Ferrand focused on the geochemistry and volcanology of silicic rocks from Iceland and implications for their genesis and the geodynamical evolution of Iceland. Now Erwan is working on two projects: (1) using oxygen isotopes in olivine from the South Cascades basalts (Mt. Shasta and Medicine Lake volcanoes) to understand subduction-zone magmatism in this fascinating area; and (2) a study of mass-independent isotope signatures of oxygen preserved in volcanic sulfates from Yellowstone and Long Valley super-eruption deposits collected in Lake Tecopa (SE Death Valley, CA). The goal of the second project is to constrain the climatic impact of these cataclysmic events. Erwan enjoys Oregon very much and will be with us for another year; he is using every opportunity to visit most geologically-interesting areas.
Undergraduate news

We have awarded undergraduate degrees to 11 majors and 9 minors in the past year. Benjamin Byerly took top honors and received the Brunton compass award. Ben is now a graduate student at University of Texas Austin studying igneous petrology. Rock hammers were awarded to Jonathan Caledon (a French exchange student who has decided to stay with us to do a Masters degree with Sam Hopkins), Hannah Grist (who has spent the summer in Dana’s lab trying to make synthetic fluid inclusions for Mark Reed), and Ruth Price (an exchange student from the University of Bristol, UK, who will be returning for another year with us). Both Colgan Smith and Amberlee Darold received Stovall awards to pursue research for their senior theses (in geomorphology and geophysics, respectively); Cole Smith also received an award for being the Outstanding Student Employee. And finally, Colby Munson received a departmental Good Citizen Award for his hard work with the Geology Club, which is thriving!

UCORE (Undergraduate Catalytic Outreach & Research Experiences) is a UO summer research internship that targets community college students in the state who are potentially interested in science careers. This NSF-funded program provides these undergraduates with a unique research experience by placing them in UO science departments where they assist faculty and graduate students with research. DoGS faculty have mentored 8 UCORE participants over the past two summers. These undergraduate researchers have participated in a diverse range of projects, including GPS field work on the Oregon coast to measure crustal strain, landslide mapping with aerial photographs, and lab experiments of bubble migration in magmas. The program is designed to provide an experience that would otherwise not be available to community college students and to encourage them to pursue careers in science.

Graduate student news

Our graduate students also had a good year. Adam Booth (geomorphology) received a prestigious National Science Foundation graduate fellowship for his PhD work with Josh Roering on landslides and landscape evolution. Beth Wisely received an award from the Northern California Geological Society to characterize the surface deformation of the Klamath aquifer basin. Reed Burgette (tectonics) received an AGU Outstanding Student Paper Award for his presentation on the locked portion of the Cascadia subduction zone. Both Todd Lamaskin (sedimentology) and Dan Ruscitto (petrology) received awards from the College of Arts and Sciences for summer research, while Troy Durant (geophysics) received an award from the Graduate School. Finally, Nick Deardorff received a departmental Good Citizen Award for his work as graduate student representative. Nick also took the lead on a proposal to the USGS Cascades Volcano Observatory for a Jack Kleinman research award to conduct work on recent mafic volcanism in the central Oregon Cascades. This project involved five volcanology/petrology students and continued a trend toward collaborative work that started last summer, when six current graduate students worked with Adam Soule (PhD 2003) on a ground-based LiDAR (Light Detection and Ranging) study of Four Craters, OR.
**Graduate student degrees**

Graduate students who have completed degrees in the past year:

**Sara Auer** (MS, Bindeman) “Diverse Oxygen isotopic values and high magmatic water contents within the volcanic record of Klyuchvskoy volcano, Kamchatka, Russia”

**Reed Burgette** (PhD, Weldon) “Uplift in Response to Tectonic Convergence: The Kyrgyz Tien Shan and Cascadia Subduction zone”

**Max Calabro** (MS, Schmidt) “An Examination of Surface Displacement at the Portuguese Bend Landslide, Southern California, Using Radar Interferometry”

**Beth Erlund** (MS, Cashman) “Tephra Studies at Paricutin Volcano, Mexico: A New Look at a Classical Violent Strombolian Cinder Cone”

**Emily Gottesfeld** (MS, Cashman) “Crystal Control on Pore Pathways and Degassing of Mafic Volcanic Rocks”

**Emily Johnson** (PhD, Wallace) “Volatile in Basaltic Magmas from Central Mexico: from Subduction to Eruption”

**Belle Philibosian** (MS, Weldon) “Paleoseismology of the Southern San Andreas Fault at Coachella, California”

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**Alumni News**

What do DoGS alumni do in Iceland? Drink beer in hot springs, of course! Dana took this photo of current and former DoGS graduate students during a recent international volcanology meeting in Reykjavik. The DoGS were well represented there, with 4 current faculty, 6 current graduate students, and 10 recent graduates. **Bryndis Brandsdottir**, a Courtesy Research Associate in our Department and collaborator of Prof. Emilie Hooft’s, led this evening adventure and supplied the food and beverages!

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**Congratulations to our alumni!**

**Diana Roman** (PhD 2004, shown at the right with PhD supervisor Kathy Cashman) received the **George PL Walker Award** at the 2008 meeting of the International Association for Volcanology and Chemistry of the Earth’s Interior. This award is given to a young scientist (≤ 3 years out of their PhD) for research excellence.

**Colleen Donegan** (BS, 2006) is a graduate student at Northern Arizona University. This year she received a **USGS Kleinmann Award** for her thesis work on Dendrochronological responses to the eruption of Mount St. Helens.
Tribute to Jay M. McMurray (Aug 24, 1938 - May 1, 2008)

Jay McMurray earned his Bachelor of Science degree in Geology from Wichita University in 1960 and his Masters of Science degree in Geology from the University of Oregon in 1962. Mr. McMurray had 46 years of experience in natural resource exploration and development, including 37 years in the uranium industry. He worked on uranium exploration programs in the U.S. (Arizona Strip breccia pipes and Wyoming Basin sandstone deposits), Kazakhstan (sandstone deposits), Kyrgyzstan (sandstone environments and vein-intrusive deposits) and Gobi Desert, Mongolia (sandstone deposits). His clients included NAC International, Energy Metals Corporation, Cameco Corporation, Newmont Mining Corporation, Taiwan Power Company, the International Atomic Energy Agency and the OECD Nuclear Energy Agency. Jay McMurray also worked as a consultant to the International Atomic Agency (IAEA) on a broad range of assignments including uranium supply and demand, uranium geology and worldwide resource evaluation. He was the lead author for the IAEA publication “Analysis of Uranium Supply to 2050” and served as the IAEA Secretariat for preparing the 2001 and 2005 Red Books. Jay’s family has generously endowed a McMurray Scholarship Fund to provide scholarship support to graduate students in the Department of Geological Sciences.

THANK YOU for your generous donations

During the past year, your donations to the Emeritus Faculty Fund assisted our undergraduates with field camp tuition. Stovall Scholarship Funds helped undergraduates Colgan Smith in his geomorphologic study of the Ben Ohau Range, New Zealand and Amerberlee Darold in her geophysics research imaging the mantle beneath NE Oregon. Thayer Scholarship Funds helped graduate students Beth Wisely to attend a hydrogeology field camp run by the University of Minnesota, Natalia Deligne to initiate a study of lava flow-river interactions at Cinder Cone, CA and Tom Peryam to carry out research in the Salton Trough. Baldwin Fund awards to graduate students Daniele McKay, John Orcutt, and Kathryn Watts recognized their research in environmental and biological geology, and the Staples Fund helped six petrology/volcanology graduate students to attend a meeting of the International Association of Volcanology and Chemistry of the Earth’s Interior (IAVCEI) in Reykjavik, Iceland. Finally, contributions to the Geology Department Fund help the department to support undergraduate field trips (including one organized by the Geology Club, under the guidance of Sam Hopkins), graduate student attendance at meetings and field workshops, and our seminar series. The Geology Department fund has also funded a special seminar for graduate students focused on career options in the Geological Sciences. The seminar has been run by Courtesy Professor John Logan and graduate student Isolde Belien; they intend to extend this seminar to include undergraduates in the coming year.

We would love to hear how you have used Geology in your career!

Our web page has been completely revised - check it out at http://geology.uoregon.edu. The new alumni page provides a form for you to tell us your whereabouts and your recent accomplishments. You can also find up-to-date information on teaching, research, and current events around the department, email contact information so that you can supply us with news, plus an easy interface for Alumni Donations.
**Honor Roll of Donors**

We’d like to offer special thanks to our **Kimberlite** class of donors, who have contributed $100 or more to the department during the past year:

**Baldwin Fund:** Mr. & Mrs. William C. Schetter

**Emeritus Fund:** Mr. & Mrs. Theodore L. Bezzerides, Mr. & Mrs. William E. Gandera, Dr. & Mrs. Chong K. Kim, Dr. & Mrs. Scott W. Petersen, Dr. Carolyn R. Rebbert

**Geology Department Fund:** Mr. & Mrs. Patrick D. Anderson, Dr. Calvin G. Banes & Dr. Melanie Weed Barnes, Mr. & Ms. W. Thomas Box, Jr., Dr. Richard D. Fusch & Ms. Lynne L. Schneider, Ms. Alicia M. Gesner, Mr. & Mrs. Paul D. Hess, Dr. Carole Stentz Hickman, Dr. Dorothy Tucker Kays & Dr. M. Alan Kays, Dr. & Ms. Robert L. Lent, Ms. Sandra P. Lilligren, Mrs. June Twitchell & Mr. Norman L. McAtee, Mr. & Mrs. Jay M. McMurray, Ms. Brooke J. Miller, Ms. Janet Burge & Dr. James B. Paces, Mr. David L. Pykonen & Ms. Jean M. Farris, Mr. & Mrs. Alan R. Ramer, Mr. & Mrs. William G. Sanders, Mrs. Rebecca Willis Sloan & Mr. Scott B. Sloan, Mr. Jason Spiller, Mr. & Mrs. George M. Thomas, Ms. Wha-Ching Wang

**Staples Fund:** Mr. E. Allen Merewether

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