A New Age of Satellite Remote Sensing in Geosciences

Humans are blind in nearly all parts of the electromagnetic spectrum. We can see only in a narrow range of wavelengths from 0.4—0.7 microns, the so-called “visible” region. Yet with remote sensing, we have fundamentally altered how we view our planet. New sensors such as multispectral and multiangular radiometers, thermal sensors, interferometric synthetic aperture radar (InSAR) and laser radar mapping (LiDAR) allow us to greatly extend our senses, making it possible to “see” subtle or sudden changes in the Earth system. We can map the daily extent of snow cover on a global basis and can characterize snow grain size down to 50 microns. Whether it is hot lava cascading down a mountainside or a cold spring bubbling into an Oregon trout stream, surface temperatures can be measured to two-tenths of a degree Kelvin. Earth deformation less than 3 cm can be mapped anywhere on the planet using InSAR and ASTER (see below). Changes in forest cover, oceans, and atmosphere can all be mapped with relative ease. Digital elevation models based on LiDAR are now very accurate and can be produced in forested areas to detect subtle features that previously could not have been seen beneath the forest canopy.

In the Department of Geosciences, remote sensing activities span the Geography and Geology programs with strong emphases in both teaching and research. Dr. Anne Nolin’s students are using multispectral sensors such as the Advanced Spaceborne Thermal Emission and Reflectance Radiometer (ASTER) (http://asterweb.jpl.nasa.gov) to map changes in glacier extent on the volcanoes of the Cascades (Figure 1).

Figure 1. Mount Hood, Oregon from space. Acquired on September 10, 2006 from NASA’s Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER). Areas shown in white are the glaciers and permanent snowfields. Areas of red are vegetation. Areas of brown/gray are bare ground.

These contribute to a glacier melt model to estimate the impacts of glacier recession on meltwater contributions to the Hood River. In addition, her students are using a 30+ year time series of glacier coverage over Mt. Rainier and Mt. Hood to relate glacier recession episodes to periglacial debris flows. Airborne LiDAR data and high-resolution satellite imagery provide further insights into these debris flows. Farther afield, Nolin and grad student Meredith Payne created the first digital mosaic of the...
surface roughness of the Greenland ice sheet. This new approach uses reflected light recorded at multiple angles to characterize areas of crevasses, smooth snow, and intermediate roughness features related to melt and drifting snow. Nolin is a member of the science team for a NASA-funded instrument known as the Multi-angle Imaging Spectro- Radiometer (MISR; http://www-misr.jpl.nasa.gov/).

Dr. Andrew Meigs and his research group have been using photographs from the Corona spy satellites of the 1960’s to map active tectonic features in Pakistan, where conventional aerial photography is difficult to obtain and is of lower quality. Massive prehistoric earthquakes leave their fingerprints on the landscape, and the high spatial resolution (~6–25 ft.) available from these photographs allow accurate mapping of earthquake sources that threaten populations in northern Pakistan.

In their Earth and Martian endeavors, Dr. Shan de Silva and Ph.D. student Robert Peckyno have been modeling lava flow morphology as a means of better understanding relationships between flow rheology/composition and surface features such as wrinkle ridges and margin lobation. Their goal is to create a remote sensing and GIS-based model to assist in the analysis of lava flows on Mars, including satellite imagery of lava flows in the Central Andes and Oregon. One of the lessons of this initial investigation was the impact of spatial resolution, the subject of a poster presentation at the upcoming American Geophysical Union Fall Meeting in San Francisco: "Assessing the Impact of Data Resolution for Remote Sensing Based Models of Planetary Lava Flow Rheology". Most current terrestrial topographic imaging doesn’t provide sufficient vertical resolution, and de Silva and Peckyno have received a grant for airborne LiDAR data acquisition from the Cascades Volcano Association. Robert has also been working closely with Dr. Rosaly Lopes at the Jet Propulsion Laboratory in Pasadena, California. Lopes and Peckyno explored the interplay of geologic processes on Saturn’s moon Titan, using radar data acquired from the CASSINI spacecraft.

The Department of Geosciences is training students in the use of satellite imagery. In GEO 444/544, “Remote Sensing,” students learn the physical principles of remote sensing and then work through a wide range of applications. Graduate students develop a research project and present the results in a conference-style poster session at the end of the term. This learning approach has been highly successful and has culminated in journal articles and professional presentations. In GEO 466/566, “Digital Image Processing,” students learn to download and process their own satellite imagery. Graduate students wanting to engage in research-level remote sensing take GEO 585, “Advanced Techniques in Remote Sensing and Digital Image Processing” in which they do field-based measurements with a portable field spectrometer and work on projects to enhance their own research interests. Our Digital Earth Lab in Wilkinson 210, supervised by Mark Meyers, has state of the art computing resources to serve this course. This summer, the lab was again updated with new computers and software.

Working in the policy realm of satellite remote sensing of our home planet, Nolin was heavily involved in two efforts with the National Academy of Sciences. The first was a much-anticipated “Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond” (http://www.nap.edu/catalog.php?record_id=11820) about the next generation of earth observing satellites for NASA and NOAA. This report, for

(continued on page 5 )
Life can take strange turns, and one of the most unexpected changes in my life was becoming interim chair of the Geosciences Department this last June. This appointment brought my sabbatical leave at the University of Redlands and ESRI to an abrupt halt, and promises to make my 33rd and final year at Oregon State University most interesting.

This has been a banner year for Geosciences faculty awards and recognition. We are very proud of Peter Clark for being selected as the 2008 recipient of the F.A. Gilfillan Memorial Award for Distinguished Scholarship, the highest honor that the College of Science awards to a member of its faculty. Peter is a remarkable scholar and Geosciences colleague, and this award was given for his continuous research over two decades that has had a major impact on our understanding of global climate change. Peter’s recent work has looked at how melting of Antarctic ice is linked to rapid rises in sea level, and on how climate records from cave deposits help us understand how regional climate change is tied to global change.

Our department was doubly honored by Aaron Wolf winning the 2008 College of Science Milton Harris Award in Basic Research. This award is given for a particular insight or accomplishment that has redirected efforts in a discipline. Aaron’s insight is that disputes over water across national boundaries are more often sources of cooperation than conflict, and that we can quantify the level of cooperation and identify factors that promote cooperation and lessen conflict over water. This insight led Aaron to create the Transboundary Freshwater Dispute Database, which is housed in our department and contains historical notes and decisions from hundreds of water negotiations as a resource for the international community for water conflict resolution.

If two major research awards to Geosciences faculty weren’t enough, Adam Kent was selected for the 2008 Lloyd Carter Award for excellence in graduate-level teaching. This recognition is particularly impressive since you may remember that it is based on ballots and comments submitted by students in graduate courses throughout the College of Science. Adam joins the long list of Geosciences faculty who has won the Carter Award for either undergraduate or graduate teaching.

We are also very proud of the high quality research conducted by our graduate students this year. Two outstanding examples come to mind. Kyle Hogrefe won the Association of American Geographers 2008 Honors Competition for student papers on Geographic Information Science. His paper summarized his research on the derivation of near-shore bathymetry from multispectral satellite imagery. Kyle is the first Masters Degree student to win the award in its 17 year history. We are also especially proud of Masters Degree student Jeff Phillippe for winning the 2008 OSU WAGS/UMI Distinguished Thesis Award in recognition of his research on glacial meltwater contributions to streamflow in the Upper Middle Fork Hood River, Oregon.

Please read Kaplan Yalcin’s article to learn more about the breadth and depth of our distance and education offerings through the OSU Extended Campus. We encourage you to look at the listing of courses and consider taking one or more of them that may help you in your professional advancement, or simply to satisfy further your yearning to learn more about human culture and our physical and natural world.

Our graduate students continue to be involved in important and interesting research projects. As an example, go to your web browser and enter: oregonstate.edu/osu360. You will enter a new way to explore the OSU campus through a geovisualization project managed by Scott Waggoner, one of our geography Masters degree students. You can read more about this virtual tour project on page 12.

Some of you may have been involved in Geo Club activities, or in events sponsored by the geography and geology undergraduate clubs that preceded the Geo Club. The major event last year was a week-long trip to Death Valley, led by Anita Grunder. We invite you to read the student account of the trip on page 6, written by undergraduate Sara Alsbury. This year the Geo Club trip will be to Israel and Palestine over spring break under the able leadership of Aaron Wolf. The club will be busy raising funds for the trip throughout the school year, and your much
appreciated donations to the department will help us cover part of the cost of the trip.

The Geosciences Department remains strong and vibrant, but we and you are well aware of the financial uncertainty and belt tightening that OSU will face in the near future. Your continued financial support during these rough times is truly appreciated by our students and faculty, and we are counting on your assistance in the coming year. Please contact me if there are particular facets of our department to which you would like to contribute. As always, please feel free to stop by the department and chat with your former professors when you are in Corvallis, or contact us at any time via the email addresses listed on our departmental website. You may have graduated from our department long ago, but you are still part of our Geosciences family.

Jon Kimerling

Geosciences Board of Advisors
November 2008 Update
By Brittain Hill, Board Member

Greetings from your Geosciences Board of Advisors! Twice a year, this all-volunteer group of Geosciences alumni and friends meets at the Department to discuss a wide range of issues that affect the Department, and provide advice to the faculty, staff, and students on subjects within the Board’s collective expertise. Board members have a broad range of professional and business experience in government, industry, academic, non-profit, and consulting, which provides an independent perspective on current and emerging issues. Our overarching goals are to support the efforts of the faculty in continuously improving the Geosciences Department and to provide students with exposure to professional opportunities and insights.

Board of Advisors Participation. Current members of the Board are: Steven Anderson (Owner, operator and founder of Cascade Planning Association, Mosier, OR); Xan Augerot, (Co-Director, State of the Salmon Consortium, Portland, OR); Ken Barrow (President, T-Bar-X, LP, Houston, TX); John Bubb (Retired, Exxon Mobil Corp., Houston, TX); Dru Hobbs Butler (Washington State Department of Ecology, Richland, WA); Brian Butler (Principal Geologist, Landau Associates, Seattle, WA, and Board of Advisors Chair); Janine Castro, (Geomorphologist, U.S. Fish & Wildlife Service, Portland, OR); Steven Dole (Environmental Scientist, Felsburg, Holt & Ullevig, Centennial, CO); Mike Gerstenberger (General Manager, Tiger Deck, Spirit Lake, ID); Brittain Hill (Sr. Advisor for Repository Science, U.S. Nuclear Regulatory Commission, Washington, DC); Sharon Kelly (Transportation Project Manager, Portland, OR); Tim Lauer (Retired, Managing Director of Unocal of Indonesia, Houston, TX); Dick Marston (Professor & Department Head, Kansas State University, Manhattan, KS); Vicki McConnell (Oregon State Geologist, Dept. Geology and Mineral Industries, Portland, OR); George Sharp (Retired, Weyerhaeuser, Lakewood, WA); and Denny Tower (Foothills Resources, Black Butte Ranch, OR). More details about the Board members, including contact information, are on the Department’s website under the “Alumni & Philanthropy” heading. We try to maintain 16 members on the Board of Advisors. Please contact the Geosciences Department Chair if you are interested in participating.

Strategic Recommendations. In the past year, the Board also has been able to provide a collective view on several strategic initiatives in the Department. Strategic planning is intrinsic to many Board members’ positions, and we have provided recommendations and considerations on a broad spectrum of issues including the Department’s long-range plan, approaches for the Department’s Earth Systems Science initiative, and options to enhance the Geosciences Department within current funding limitations.

Alumni Outreach. The Board of Advisors supports the Department’s efforts to communicate with alumni. We are impressed by the faculty’s involvement with efforts of the OSU Foundation to acknowledge the generous support given by OSU alumni to the Department. We recognize the large amount of time such communication efforts require.
To help the Department with alumni outreach, this year the Board members decided to fund a part-time student assistant position. The student assistant will help the Department communicate more effectively with alumni and help plan for future alumni and Board events. Gordon Matzke, Professor Emeritus has generously offered to be the Faculty Contact for the assistant, and will help coordinate day-to-day activities with the Board.

**October 2009 Geological Society of America Annual Meeting in Portland.** We are beginning to plan for alumni activities during the October 2009 Geological Society of America Annual Meeting in Portland. GSA-09 is a great opportunity for alumni to reconnect with the OSU Geosciences Department especially since we recognize that many alumni may be visiting Oregon for the first time in years. We hope to help showcase many of the recent achievements by the faculty, students, and staff (such as those in this newsletter), and remind our alumni of the many financial and non-financial ways that they can contribute to the Department’s success. If you have any suggestions for a special alumni event, a prime field trip theme, an interactive webpage, or a great microbrewery near the Convention Center, please contact one of the Board members directly.

**Student Communication.** One of the best parts of our semi-annual meetings is our interactions with the Department’s students. We enjoy meeting over lunch and having the chance to hear a bit about the things that are going on in the Department from the student’s perspective. We serve as an informal sounding board for issues that are on many people’s minds, such as recent challenges with class availability and academic advising. Some issues raised by the students, such as lab safety and information regarding intern positions are tractable and we have provided recommendations that allowed the Department to quickly resolve potential problems. Other issues, such as building space, role of e-courses in the curriculum, and unfilled faculty positions require longer term solutions. These issues are a substantive part of the feedback we provide to the Department Chair and Faculty at the end of each meeting.

We invite you to contact the Board of Advisors and Department with your ideas, suggestions, offers of support, and questions. Your contributions and opinions make a difference. Our email and mailing addresses are available on the Department of Geosciences website under the “Alumni & Philanthropy” heading.

**Remote Sensing** *(continued from page 2)*

which Nolin served as vice-chair for the water resources panel, resulted in a major reallocation of NASA’s budget toward NASA’s capabilities in Earth observations. The second report focused on major cutbacks in two key climate-monitoring satellite missions: NPOESS and GOES-R. Upon release of this report, Congress insisted that climate monitoring capabilities be restored, and the agencies have responded by replacing most of the instruments.

Faculty and students in the Department of Geosciences play a key role in applications of remote sensing for societal benefits as well as basic research and national policy. Stay tuned for new perspectives on Earth and planetary processes over the next few years as we continue to engage more students in a wide range of applications with current and future satellite remote sensing instruments.

**Geosciences Club Field Trip to Death Valley** By Sara Alsbury

Our group left early on a Saturday morning on our journey to the Spirit Mountain Batholith and Death Valley. After only about three hours on the road, we decided it was lunch time and we stopped in Medford to find a burrito shack. We didn’t expect to
see crowds of people just standing in blocked off streets of Medford, but then we remembered that Barack Obama was on the campaign trail through Oregon and was expected to stop in the small southern Oregon town. So, being the politically-aware young college students that we are, we decided to join the crowds to see if we too could meet Obama. Morgan Salisbury, a Ph.D. candidate in Geology, decided to carry his stuffed animal “Beavy,” (a Beaver) to see Obama as well. As we stood around, waiting for a glimpse of the Illinois Senator, Secret Service agents started to move in. They wanted to check Beavy; I suppose a Beaver stuffed animal could be slightly suspicious. But Beavy was, after being inspected by the Secret Service, just a stuffed animal. After seeing Obama leave a building and get into a car, our mission to find burritos resumed and before we knew it, bellies full, we were back on the road.

The felsic dikes of the Spirit Mountain Batholith are, in areas, covered with petroglyphs, providing a cultural respite from the intense geo-brainslam the group received throughout the day.

After a camping near the SM Batholith, and a planned stop at In-and-Out Burger, we hit the road toward our main destination: Death Valley National Park. We couldn’t have entered Death Valley from a better place; Zabriskie Point, the site of the southeast entrance to the park, had an epic view of the valley. The point is on Pliocene-age mudstones of the Furnace Creek Formation which are mostly lakebed sediments. Their golden yellow-brown hills look soft enough to cut with a butter knife, and have been gently carved into their desolate-looking drainage pattern over the last three million years.

We spent enough time here to take some amazing photos and talk a little bit about the history of the formation, but the sun was starting to set after a long day of driving. Dropping further into the valley with thousands of other National-Park goers (Spring Break is the busiest time for Death Valley), we set out to find a place to camp. As a group, we decided to stay at Stovepipe Wells campground and maintain the same central camping location so we could utilize all our time in the valley. The park was packed, and we had arrived on a Tuesday evening. Over campfire, we discussed the plan for our first full day in Death Valley; we decided to see what we all felt was the most interesting part first- Racetrack Playa.

Petroglyphs on Spirit Mountain.

We spent the first non-driving day of the field trip, led by Barry Walker Jr., a Ph.D. student, in the Spirit Mountain Batholith in southernmost Nevada (west of Laughlin) which is where his field area was for his Masters’ thesis. The SM batholith is a ~18-15 Ma granite intrusion that was tilted ~45 degrees during basin and range extension. This tilting allows for a nice ~9 km cross-sectional exposure of the batholith. There, we observed frozen magmatic processes such as crystal compaction/melt segregation, mafic/felsic magma mingling, and a variety of intrusive contacts. There is also 1.4 billion-year-old megacrystic granite country rock that the Spirit Mountain Batholith intruded that we studied up-close. This old granite is part of the widespread 1.4 Ga "anorogenic" suite of alkalic granites that crop out from the southwestern US to Canada to Scandinavia. For the last stop of the day, our group visited an incredible petroglyph site blackened by desert varnish from thousands of years of exposure.
But when we got there, it was amazing. Racetrack Playa is known for its “racing rocks” which have left behind dried tracks in the playa mud after mysteriously moving – it is still unclear how the rocks are moved. There are a few different theories on how the rocks, some of which weigh hundreds of pounds, are moved and leave behind very prominent tracks on an empty playa. One considers just the right combination of frost, dampness and very strong winds. We were able to walk around the Racetrack for a couple hours, thinking up our own theories on how this could be possible (and posing for some funny pictures).

Driving up to the Racetrack took up most of a day, but the gravel road in and out of the Racetrack let out right at the turn off for Ubehebe Crater, a deep maar at the northern end of Death Valley. The crater, which is at the northern foot of the Panamint Mountain Range (big normal fault), erupted about 4,000 years ago when basaltic lava rose through the weakness created by the Panamint Fault, and came in contact with the water table, thus creating a very explosive reaction of hot magma to cold water and formed the 500 foot-deep crater (maar) we see today. It was very, very windy at the Ubehebe Crater rim; group members all walked around the rim, and a few of us walked down to the bottom, only to realize we also had to walk back up! Ubehebe, which comes from the Panamint Indians’ word for “basket” is about 1000 feet across at the top of the crater. From inside the crater we could see hundreds of layers of strata from previous Ubehebe crater eruptions which are neatly displayed in the crater walls.

At night, we were treated to our own personal air shows as Death Valley is in between China Lake Air Naval Weapons Center and Nellis Air Force Base. Evenings were spent making dinner together, sitting around the campfire, and listening to the banjo and guitar talents of BJ Walker under the clear, starry nights of the valley.

Day two in Death Valley took us to the southern end of the park. We started at Mosaic Canyon in the morning, which was right next to our camping area. The aptly-named canyon became a favorite stop to all of us as we hiked up inside the smoothed-out dolomite/marble walls of the Noonday Dolomite Formation. Faulting has allowed the crevasse to be nearly polished by water moving out of Tucki Mountain via Mosaic Canyon. Breccia, consisting of all sorts of rock fragments, has been cemented together and “slapped” on the side of the canyon, creating some amazing natural mosaics, hence the name. We continued south after our hike up Mosaic Canyon. The rest of the day consisted of multiple stops at the Turtlebacks, Badwater, and Artist’s Palette as we drove through world-class alluvial fans.

The Turtlebacks are antiformally-shaped topographic expressions of the Turtleback fault zone at the west base of the Amargosa Range. The Turtlebacks are part of the detachment surface in this Turtleback faulting zone. They take the shape of a turtle’s shell (but HUGE).
no cell phone service in Death Valley. After about 20 minutes of fumbling around their van and conversing with the father of the family while the mother videotaped all this, we helped them get back on the road. They waved goodbye to us, and we continued on our journey to the lowest point in North America.

Badwater Basin was the busiest part of the park; there were hundreds of people from all over the world walking out on the vast salt pan. Looking back toward the road where our van was parked, there was a big sign posted on the mountain face above us which said “Sea Level;” it was quite a ways above us! The basin sits at 282 feet below sea level.

Our day also took us to more salt as we visited Devil’s Golf Course, a very thick salt deposit further toward the center of the valley. We ended the day in the beautiful Artist’s Palette, a drive through canyons made up of pinks, greens, blues, and yellows, part of a 5,000-foot-thick deposit of gravels, lake sediments and volcanic debris. Magnesium, iron oxides, and copper are responsible for making the colorful landscape of the aptly-named Artist Drive Formation. As we drove out of the colorful landscape, the sun began to set.

On the third morning of our stay in Death Valley, we broke camp and packed up the van. Our final stop was a trip up to Telescope Peak where we got the best view of the valley. The Peak itself has a summit of over 11,000 feet, but the spring sun had not melted enough snow for us to make it up to the top. From about 8,000 feet, we had an awesome view of where we had spent all of the previous day at the lowest point in North America. With that early morning view, we jumped back in the vans and hit the road back to Oregon and made it back in time to start our Spring Term.

Trips like this make it possible for students to learn things up close and personal, and to cohesively apply concepts we’ve learned and discussed in the classroom into a real-world setting. These trips also help create camaraderie between classmates. Without the support of alums, friends, family and faculty, we wouldn’t be able to experience such wonderful learning opportunities.

Next stop for the GeoClub: Israel & Palestine in March 2009!

EarthScope National Office Brings Ongoing Science to the Public in Parks and Museums

Oregon State University is in the second year of a four-year, 1.6 million dollar grant from the National Science Foundation to host the EarthScope National Office (ESNO). EarthScope is a nationwide program deploying thousands of seismometers, GPS receivers, and other geophysical instruments to investigate the structure of the North American continent and the processes that cause earthquakes and volcanic eruptions (www.earthscope.org). Dr. Anne Tréhu from the OSU College of Oceanographic and Atmospheric Sciences is the ESNO Director, and Dr. Bob Lillie from the OSU Department of Geosciences is the EarthScope Education and Outreach Manager.

Bob Lillie at the EarthScope Workshop for Interpretive Professionals in the Basin and Range Province in Reno.
As EarthScope transitions from facilities installation to science research, it becomes important to highlight scientific discoveries of EarthScope and their impacts on science and society. The ESNO has initiated a series of training workshops for interpretive professionals who engage the public in parks and museums. The inaugural workshop was held April 7-10, 2008, at the Mt. Rainier National Park Education Center in Tahoma Woods, Washington. It brought together individuals from the scientific and informal educational communities to learn about EarthScope and develop interpretive programs to engage park and museum visitors on how advanced geophysical instrumentation enhances our understanding of landscape formation and geological hazards in the Pacific Northwest. There were 28 participants representing parks, museums, and other informal education centers in Oregon, Washington, California, Idaho, British Columbia, and Alaska. The workshop combined presentations by EarthScope scientists with interpretive methods to convey the story of the ongoing deformation of the edge of the North American continent. Participants learned how to use EarthScope data and science results, and developed and presented interpretive programs on the evolving landscape and earthquake, tsunami, and volcanic hazards of the Pacific Northwest.

A second workshop, held October 19-22, 2008 in Reno, Nevada, drew 32 participants from parks and museums throughout the Basin and Range Province. More EarthScope interpretive workshops are planned for the next three years to focus on the San Andreas Fault; Colorado Plateau – Rio Grande Rift; Yellowstone Hotspot; and Rocky Mountains (www.earthscope.org/eno/parks). The EarthScope National Office is also developing workshops aimed in the other direction. That is, scientists will be trained in interpretive methods so that they can present EarthScope science results more effectively to a variety of audiences. The first such workshop for scientists will be part of the May, 2009 EarthScope National Meeting in Boise, Idaho.

Let your computer be your classroom: Going back to school in the digital age

By Kaplan Yalcin,
Program Coordinator
Undergraduate Research and Extended Campus
yalcink@geo.oregonstate.edu

Oregon State University has emerged as a national leader in distance and online education, and the Department of Geosciences is a major part of that effort. We currently offer 25 courses online from introductory geology for non-science majors (GEO 101) to Advanced GIS Applications in the Geosciences (GEO 580). Our online course offerings target three major audiences:

- Life-long learners interested in specific subject areas in Geosciences of general public interest such as earthquakes or climate change,
- Working professionals or students who want to gain expertise in new subject areas such as geographic information science or water resources management for career development, and
- Undergraduate students needing to meet OSU general education requirements in areas such as physical science, science and society, western culture, cultural diversity, and contemporary global issues that can be fulfilled by taking online Geosciences courses.

Online courses differ from traditional classrooms in that there are no physical walls. You don’t have to ever come to the campus, and the instructor interacts with you through your computer rather than questions in the classroom. In fact, you can take the course from anywhere in the world! At OSU, all online courses are delivered using Blackboard, a course management program. Students access the course by logging into Blackboard, rather than questions in the classroom. Course materials, such as lectures and assignments, are supplied through Blackboard for students to view or download to their own computer. Some instructors use videotaped lectures, others provide annotated PowerPoint slides or lecture notes to accompany textbook reading.

To promote successful learning, online courses generally include frequent quizzes or other written assignments. One instructor in the Living with Earthquakes baccalaureate core course requires each student to respond in a Blackboard “chat room” to a
question of societal relevance, responses in which other students are encouraged to join the conversation. This helps the instructor make sure that each student is on track to complete the course at the end of the term and provides feedback on student learning. One faculty member refers to these techniques as “herding sheep in the dark.” You don’t actually meet the students face to face, and you want to be sure that each one is really “out there.” Some online courses include labs, in which instructions for the labs are provided through Blackboard. Students work independently on the labs, and turn in their work by uploading it to Blackboard. Help on labs is available by posting questions to the discussion forum, emailing the instructor, or during pre-scheduled online “chat rooms”.

Exams are taken online in Blackboard during a time period specified by the instructor and are usually proctored. For a proctored exam, a student goes to a pre-arranged testing center, such as a public library or community college. The proctor will have been sent the password needed to open the exam, and supervises the exam by verifying the student’s identify and ensuring that the student does not access unauthorized materials while taking the exam. Some testing centers charge the student a nominal fee ($15-$25) for this service.

If you have never taken an online course before, you will be pleasantly surprised by the level of personal engagement an online course provides, both with the instructor and with other students. Because online courses draw students from a wide range of places with a wide range of backgrounds and experiences, the breadth of an online classroom facilitates classroom discussion. This is accomplished through the course discussion board, which functions much like a blog where students post, read, and respond to messages. The instructor poses questions or topics for discussion to the class about the current material, often using case studies that may not have a “correct” answer. These discussion topics force students to engage the material they are learning and think critically. A written record of the class discussion facilitates grading of class participation, a grade that can be difficult to quantify in a traditional classroom.

Class participation comes naturally to students in online classes, often more so than in traditional classrooms, because college students today have grown up with the Internet and text messaging. The diversity of students in online courses also becomes a major strength in class discussions. For example, students in National Park Geology often find themselves talking about park issues on the discussion board with real park rangers who are taking the class. In Introduction to Water Science and Policy, students from water-rich east coast states get firsthand experiences on water shortages and rationing from students living in more arid parts of the country.

From the Klamath basin in the Pacific Northwest to the Jordan River in the arid and hostile Middle East, water conflicts are inherent and increasingly disruptive.

Our online course sections are equivalent in scope and rigor to our traditional face to face courses while offering the flexibility to attract place-bound learners. For example, students who take an introductory geology course online, such as GEO 101 or GEO 221, are required to purchase a rock and mineral sample set ($45) prepared specifically for use in these courses. This enables our online students to do the rock and mineral identification labs that we require in introductory geology. Online students enjoy having their own rock and mineral sample sets for learning and study. In fact, only one student in the last two years has asked us to buy the rock and mineral set back at the end of the term! The student response has been a pleasant surprise, because we were initially concerned that the additional expense of purchasing a sample set would discourage students from taking introductory geology online.

Geosciences online course enrollments have seen tremendous growth in recent years, from 1233 student credit hours in academic year 2004-2005 to 3216 student credit hours in academic year 2007-2008. This is an increase of 260% in only 4 years! Online tuition revenues represent a growing portion of the Geosciences department budget that is critical to maintaining our current on-campus undergraduate and graduate programs in this era of flat or declining state funding.

Online learning offers non-monetary benefits to the Department of Geosciences as well. By offering
courses online, we bring Geosciences to learners throughout Oregon, the United States, and the world. When Oregonians think about the geosciences, we want them to think OSU, and online courses are a major part of our outreach and engagement efforts.

By offering a sequence of introductory Geoscience courses online (GEO 101, 102, and 103) we expose hundreds of additional students to our discipline each year. We also offer a wide variety of general interest Geosciences courses online designed for non-Geoscience majors or lifelong learners. These courses include Environmental Conservation and Sustainability (GEO 300), National Park Geology (GEO 307), Global Change (GEO 308), Oregon Geology (GEO 352) and Earthquakes in the Pacific Northwest (GEO 380). By offering online sections of these courses, we expose more students to topics in Geosciences that matter to them, making our field relevant to the general public.

Some of our online courses are targeted to working, place-bound professionals interested in keeping current with developments in their field or obtaining training in new technologies. For example, we offer a full sequence of online courses in the use of Geographic Information Systems (GIS), including GEO 365, 465/565, and 580. GIS is a suite of software packages used in spatial data management, analysis, and cartography that has exploded in use within the last five to ten years. Consequently, graduates of geology or geography programs more than five or ten years ago may have received little exposure to GIS in their undergraduate education. The ability to take GIS courses online is critical for working professionals to stay current with new technologies in their field. As a result, our online GIS courses have been very popular with people working for land management agencies or municipalities.

Geoscience offers a variety of regional studies courses online, including Europe (GEO 326), Asia (GEO 327), and the U.S and Canada (GEO 329). These courses appeal to students in business, public relations, and marketing, particularly those with an international component to their careers. Our regional studies faculty, Cub Kahn, has been recognized as an innovator in distance education when he received the Vice-Provost and Director’s Award for Outstanding Achievement in On-Line Teaching Innovations in December 2007.

We are currently developing a new certificate program in water conflict management and transformation. Because agency professionals and international students are major target audiences of the program, the coursework will be offered online, while parallel sections will be offered on campus. The certificate program prepares students to address and facilitate hydrodiplomacy, conflict resolution, public participation, strategic planning, finance administration and public policy and law. The online format allows place-bound learners to access the curriculum wherever they are located, taking advantage of the water resource management expertise of internationally-renowned Geosciences faculty such as Aaron Wolf.

The Department of Geosciences continues to look for new ways to engage new types of students through online courses. Next summer Kaplan Yalcin of Geosciences will partner with Emily Van Zee of the Department of Science and Math Education to offer a course in earth history and global change for teachers. By offering such a course online, we will be able to bring this subject matter to teachers throughout Oregon, the nation, and the world, and hence into their K-12 classrooms. If we want teachers to educate our children about geology and geography, we must first educate teachers on these content areas, and online courses targeted to working teachers are an effective way to do so.

Feel free to browse the schedule of classes at http://ecampus.oregonstate.edu. Geosciences course descriptions, scheduled offerings, and syllabi can be accessed by viewing the course schedule by subject and scrolling down to Geosciences. Feel free to contact our distance education coordinator – Kaplan Yalcin- if you have any questions. A complete listing of our online course offerings is listed below:

GEO 101: The Solid Earth (4 cr. w/ lab).
GEO 102: The Surface of the Earth (4 cr. w/ lab).
GEO 103: Exploring the Deep: Geography of the World’s Oceans (4 cr. w/ lab).
GEO 105: Geography of the Non-Western World (3 cr.)
GEO 221: Environmental Geology (4 cr. w/ lab).
GEO 300: Environmental Conserv. & Sustainability (3 cr.).
GEO 301: Map and Image Interpretation (3 cr.).
GEO 305: Living with Active Cascade Volcanoes (3 cr. w/ field trip).
GEO 306: Minerals, Water, Energy, & the Environ. (3 cr.)
GEO 307: National Park Geology and Preservation (3 cr.).
GEO 308: Global Change and Earth Sciences (3 cr.).
GEO 309: Environmental Justice (3 cr.).
OSU campus tour from your computer

By Scott Waggoner, MS student in Geography

There is now a new way to explore Oregon State University’s Corvallis campus! As a collaborative project between Oregon State’s Departments of Geography, Central Web Services, Web Communications, Admissions, University Housing and Dining Services, a team managed by project leader Scott Waggoner, a Masters student in Geography, undertook a new way to image the campus using visual photography. Using a special mirrored lens, photography was taken across campus to create seamless 360-degree panoramas that were then processed through a Flash viewer to produce a new type of geo-visualization. The project is now on the Web and can be viewed at http://www.oregonstate.edu/osu360. Take the tour and let us know what you think!

The goal of the project is to offer visual learners a mapping interface that can utilize key photography and location details instead of standard spatial orientation through traditional maps. The new campus map uses Google Maps technology with custom datasets that are of interest to those unfamiliar with campus. Catering to visitors and new students alike, the OSU 360 system takes the map a step further by allowing web users to click on many of the important locations on campus to get a first person perspective of the environment. Once in the OSU 360 system, users can either navigate using orange hotlinks on the image itself by clicking on icons that appear as a data layer on the campus map, or by clicking on traditional web links that describe adjacent locations.

Another feature of OSU 360 is the ability to take a virtual campus tour, based on the tours people take when they come to the visitor center at Oregon State. Seventeen locations are on this self-guided tour, navigated using large ‘Next’ and ‘Previous’ arrows. The locations are designed to be a quick glimpse into the various elements of Oregon State, including the history, campus life, colleges, and resources located near the tour locations. The tour allows visitors to enter and leave the broader system whenever they wish, with tour points being presented as orange icons on the campus map.

The current system has 84 virtual tour points, and the goal is to expand over the coming months. This initial release only includes the core of campus, and another sixty locations will be added to better represent the greater campus to its edges. Future integration is being planned for the Hatfield and Cascades campuses, as well as for Extension services located statewide. The long-term goal of the project is to make the campus easy to navigate before people even come here, and offer a glimpse into the historic nature and broad scale of services presented by the University.
A message from Ed Taylor, Fall, 2008:

I have been closely associated with our Geosciences Department for 55 years and now that I am 75, it is time to completely retire. While I will not occupy an office within the department, I will frequently check the Department web site, and I will continue to receive geo-e-mail at home. In recent years, you have included me in many interesting activities and permitted me to volunteer in many rewarding ways. I anticipate long-continued vitality for our department and lasting recognition of its contributions in teaching, research, and service to the university. Thank you for allowing me to participate.

Over these years, I have taught a large number of different subjects; chief among them were topics related to mineralogy, especially when that was a principal focus of the geology curriculum. Consequently, I have been serving as curator-emeritus of the department display and research mineral collection. My purpose here is to insure that all faculty members are aware that this collection represents a significant departmental resource and that it should be maintained, enlarged, and used for the long-term benefit of the department. Although it would be difficult (and unreasonably expensive) to obtain a professional appraisal of the collection, I am confident that it represents a current market value between 200 and 300 K dollars. None of this has been obtained from state-supported or other departmental resources.

It has all been contributed by students, faculty, and alumni. When I joined the faculty and was assigned to teach undergraduate mineralogy, crystallography, lithology, optical mineralogy, and other topics, I found just three boxes of rocks and minerals in a back closet. So Bev and I sent over 600 handwritten letters to geology alumni explaining the situation and asking for their help. This was the first attempt to make broad contact with our graduates; they responded with enthusiasm and have been a source of support to this day.

Edward M. Taylor, Prof. Emeritus Geology
Department of Geosciences Oregon State University
Corvallis, Oregon 97331
p: (541) 737-8049  f: (541) 737-1200
e: taylore@geo.oregonstate.edu

Remembering Floyd H. Shellenberger

My father, Floyd H. Shellenberger, worked at Bear Mountain Lookout during the summer of 1934. Mount Jefferson shows in the background. His pay was $90.00 per month.

Floyd was a member of Sigma Gamma Epsilon (Geology Mining Metallurgy). In the 1937 Beaver, page 230, it shows he was the small group's president. Then there is the cover for the 1937 graduation program and the page listing Floyd Shellenberger as being from Aumsville, OR.

Here is a fun Rose Bowl decal. January 1st, 1942 was the only time in its history that the Rose Bowl was not played in Pasadena, CA. The bombing of Pearl Harbor on December 7th, 1941 caused the game to be canceled due to fear of another attack. Duke, who had already been invited to play, volunteered to host the game in Durham, N.C. On a cold, rainy January 1st, 1942, Duke lost to Oregon State, 20-16.

Floyd worked his entire way through college - - No help from anyone. I see he did take out a $100.00 student loan during his last year.

Keep up your good work - - I wish you success in your future.

Carole Pyles, San Antonio, TX
Editorial

The 2008 newsletter highlights two programs in the Department that have been developed recently, after most of you left OSU. The program in remote sensing bridges the gap between Geology and Geography and highlights new opportunities in mapping Earth from space. The article on online education highlights OSU Geosciences’ national leadership in learning from your home computer. The University presented e-campus to us as a business opportunity: If it is profitable as a new venture, we will keep it. At present, it is “making money” and contributing to the Departmental budget and to our goal in making education affordable and accessible to a worldwide audience in which learning takes place without moving to Corvallis.

For the past several years, we have developed field trips to faraway places to expose our students to classical geology around the world and to societal problems they otherwise would only read about. This year, we plan to go to Israel and Palestine, under the leadership of Aaron Wolf. If you believe, as we do, that these trips produce a more broadly educated graduate, we invite you to contribute to the field trip.

This year we have a change in leadership, as Roger Nielsen completes his term as chair and plans a sabbatical trip to Tasmania. Many good things happened on Roger’s watch, including the online education program, new ventures in geography and geology and in collaborative programs in water resources, and in a Board of Advisors that is a full partner in our educational team. We wish Roger well and offer him our thanks. Stepping into the breach is Jon Kimerling, an outstanding teacher, renowned cartographer, and free spirit. Considering the budget and space problems we face, we expect that Jon’s term will still be fun, and the office staff, at least, will laugh a lot.

Bob Yeats and Melinda Peterson

Awards to Geoscience students 2007-2008

UNDERGRADUATE AWARDS

Amanda Prewitt Award. Geosciences female sophomore or junior who has shown an enthusiasm for a career in the earth sciences: Sara Alsbury

Jess Johnson Student Writing Award. Geology undergraduate who has demonstrated excellence in the classroom and an aptitude for writing: Ginger Lofftus, Connor Burck

Samuel M Evans Jr Memorial Award. Geology undergraduate who has demonstrated excellence in the classroom and an aptitude for writing: Ginger Lofftus, Connor Burck

Earl L Packard Achievement Award. Geology junior who is scholarly and professionally motivated: Celene Christensen

Award for Excellence in Geology. Outstanding graduating senior in geology: Russell Rosenberg

Christian John Hunt Award. Geography undergraduate: Brad Hanson, Myrica McCune, Tyler Rockey, Arman Werth


Anslow, Faron Scheffer, Geology, PHD 08
Baxter, Sarah Elizabeth, Geology, BS 08
Belgam, Daniel R., Geology, MS 08
Bernard, Mark Arthur, Geography, MS 07
Braaten, Ryan Christopher, Earth Science, BS 08
Bradford, Davie Lee, Geography, MS 07
Cash, Jennifer Ann, Geology, BS 08
Cottrell, John-Henry, Geology, BA 08
Craig, Breanne Elizabeth, Earth Science, BS 08
Dailey, Michele Meadows, Geography, MS 08
Desaulniers, Theresa Andrea, Earth Science, BS 08
Dick, Isaac Kincaid, Geography, BS 07
Dunham, Sarah Eustice, Geology, MS 08
Graven, Shauna Michelle, Geography, BS 08
Hargrave, Samuel Isaac, Geography, BS 08
Hogrefe, Kyle R, Geography, MS 08
Johnson, Ajeet Kaur, Geology, BS 08
Karageorge, Keith J, Geography, BS 07
Lane, Dennis, Earth Science, BS 08
Lemke, Michael Dennis, Geography, BS 07
Lilja, Nicholas Patrick, Earth Science, BS 08
Lord-Castillo, Brett Kyrsten, Geography, MS 08
Loynes, Kathryn A, Geography, MS 08
Mason, Heather Jean, Geography, BS 08
Medley, Brooke C, Geography, MS 08
Parker, Elizabeth Kay, Geography, BA 08
Patzer, Jonathan Douglas, Geology, BS 08
Perry, Timothy Daniel, Geography, MS 08
Rivers, Melissa M, Geography, BS 07
Roberts, Jed Thomas, Geography, MS 08
Rosenberg, Russell Harris, Geology, BS 08
Soule, Brendan David, Geography, BS 07
Stemmerman, Erick Mario, Geography, MS 08
Straus, Emily T, Geography, MS 08
Sullivan, Deidre Ellen, Geography, MS 07
Thompson, Wiley Carl, Geograhy, Ph.D. 08
Vance, Tiffany Charlotte, Geography, Ph.D. 08
Warren, Daniel Jay, Geography, BS 07
Woody, Jennifer Lee, Geology, MS 08
Richard Chambers Award. Support for an undergraduate research project in Geology or Earth Science: Rachel Roberts, Sara Alsbury, Anthony Novak

AFMS Mineralogy Scholarship. Jennifer Cunningham

Andy Aikenhead Scholarship (COS Award). Jennifer Cunningham, Tyler Rockey

Merrill Family Foundation Scholarship (COS Award). Jennifer Cunningham, Matt Jager

GRADUATE AWARDS

Lance Forsythe Memorial Fellowship. Graduate student from Geology, Geography, or Marine Geology exhibiting breadth and independence of thought: Wiley Thompson

Jess Johnson Student Writing Award. Geology graduate student who has demonstrated excellence in the classroom and an aptitude for writing: Barry Walker, Steven Highland

Sharp Fellowship. Graduate student in structural geology or sedimentary geology: Justin Milliard

Keith Muckelston Fellowship in Water Resources. Outstanding student in water resources: Biniam Iyob, John Klock, Patrick MacQuarrie, Aimee Brown, Eva Lieberherr, Alina Lin

John Pine Award Support to students going to their first professional meeting, preferably older than average students: Jeff Phillippe

Outstanding Graduate Teaching Assistant Award - Geology. Jason Kenworthy, Abigail Stephens

Outstanding Graduate Teaching Assistant Award - Geography. Michele Lizon

Robert Lynn Patterson, Memorial Research Initiation Fellowship: Robert Lee, Shaun Marcott

Larry Anderson Student Travel Assistance Award: Kyle Hogrefe

OSU Distinguished Master’s Thesis Award: Jeff Phillippe

OUS SYLFF Graduate Fellowship for International Research: John Klock

Gordon Matzke Fellowship: Steven Highland

SIPES Foundation Earth Science Scholarship: Justin Milliard

WE NEED YOUR HELP !!

Dear friends, colleagues, alumni, and supporters,

Two student organizations, the GeoClub (geographers and geologists, mostly undergrad) and Hydrophiles (water resources, mostly grad) are cooperating to organize a field trip to Israel and Palestine next spring to investigate firsthand the inextricable link between the region’s geography, geology, and water resources.

To walk the Dead Sea Rift Valley is to experience the co-evolution of geographical, geological, and human histories first-hand. Lying astride the Israel-Jordan border and the African-Arabian plate boundaries, earthquakes and human civilizations have coexisted, and the rich history of each are intertwined along the Dead Sea Rift. On this trip we will explore the geomorphic expression of this plate boundary, the role of the plate boundary and its role in the development of aquifers and watersheds, the relationship between civilizations and catastrophism from the geological and archeological evidence for past earthquakes, and how all of these forces play out as subtext in Arab-Israeli politics.

All departments from which these 30 students come are charged up. Geosciences, which is taking the lead, has supported a trip abroad for GeoClub every two years since 2004, traveling to South Africa and the Spanish Pyrenees, and has seen firsthand the tremendous benefits that these produce for everyone connected with the experience. Adding Hydrophiles as a collaborator brings on board energy and support from across the campus, from anthropology and sociology to chemistry and bio-engineering. We’ll be hosted by both an Israeli and a Palestinian institution: the Geography Department at Hebrew University, and the Geology Program at Al-Quds University.

To allow for this unique experience, the students need your help. The overall cost for the two week adventure is about $3,000/student, or $90,000 total (all faculty pay their own way). We’re hoping to keep the student contribution to $500/student, and Geosciences is contributing several thousand dollars in support. That leaves at least $60,000 for the students to raise before March, 2009.

Preparing for these trips brings students together in a way few educational activities do, and the travel itself will build bonds and experiences that will last a lifetime. To contribute, a check can be sent and made out to the OSU Foundation, with the memo: Geo Field Trip Fund #4100-692500. We hope you will help – an envelope is enclosed for your convenience. Sincerely, Jon Kimerling