

PENNSTATE



Geosciences

Newsletter / 2012-13 /



UPDATE: read about the summer field school on page 9

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DEPARTMENT OF
GEOSCIENCES

COLLEGE OF EARTH AND
MINERAL SCIENCES

Greetings from the Department Head



It's been a busy year, ending on nothing but positive notes; a nice contrast to last year! In this highly competitive world, we've lost two of our star faculty to other institutions: hydrogeologist Kamini Singha to

Colorado School of Mines, and tectonic geomorphologist Eric Kirby to Oregon State. Recognizing the key role these two people played in the Department, the Dean has authorized faculty searches in both cases. Presently we have a search underway for a hydrogeologist, and, after the standard 1-year moratorium on hiring, we'll fill the vacancy left by Kirby. Moreover, we've just launched a search for a "cyber-enabled" geoscientist, part of Penn State's exciting new CyberScience initiative. The search is broad, allowing us to satisfy core needs while building strengths in data- and computation-intensive geosciences. On top of that, the University is funding the establishment of a shale energy research institute (the name of which is still being negotiated), including up to 12 new faculty hires. Geosciences is slated to be a key

participant in that effort, with likely new faculty positions in petroleum geosystems (including crustal seismology, sedimentary basin research, and stratigraphy, petrophysics). So, there's lots of potential for strategic growth in faculty capacity for the Department.

Another exciting development is the construction of a high-tech active-learning classroom and Pulse of the Earth student visualization laboratory on the second floor. The classroom will allow faculty to transform classes into project- and problem-based learning experiences by providing flexible seating to promote teamwork, multiple projectors that can be controlled by individual groups, and plenty of space for project materials, maps, and yes, even rocks. The POE is an undergraduate engagement project much like the Joel N. Myers Weather Center in Meteorology. Undergraduate interns will be working with faculty and staff to create the go-to website for learning about what's happening on Earth today: earthquakes, volcanic eruptions, ice-sheet calving, even Marcellus fracking. The Dean's office has graciously provided the up-front funding for the renovation, but we are launching a major campaign to provide a \$2.5M endowment (with naming opportunities) to sustain the classroom and POE into the future. If the spirit moves you, please contribute to this project by writing in "Pulse of the Earth" next to "Other" on the enclosed envelope.

As you'll see in the pages that follow, our students, faculty and alumni continue to achieve at the highest levels. Our inaugural AAPG Imperial Barrel Team, expertly mentored by faculty member Liz Hajek, won the Eastern Section competition

and received honorable mention in the national competition. Several faculty won prestigious awards, including Jim Kasting who was named Evan Pugh Professor, and Sue Brantley, who was inducted into the National Academy of Sciences. Among our successful alumni are Jamie Connelly, who was awarded the N.L. Bowen Award of AGU, and Steve Holbrook, elected fellow of the AGU. We've just learned that Gavin Hayes has been awarded the 2013 University Alumni Achievement Award. Rudy Slingerland led successful expeditions to Labrador and Wallops Island, using our expanding fleet of research vessels purchased with gift funds from alumni Roland Sauermann and Kent Newsham. The boats are afloat, and so are we! We look forward to seeing you the next time you're in State College, and in the meantime, stay in touch.

Sincerely,

Lee Kump
Professor and Department Head



Professor Lee Kump, Emeritus Professor Art Rose, and students from Lee's Geosc 202 field trip to "Death Valley", the Moshannon Valley outside Philipsburg, looking at the effects of acid mine drainage

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Faculty Awards



Richard Alley, Evan Pugh Professor, was one of the inaugural recipients of the U.S. News STEM Leadership Hall of Fame

Awards. Honorees were selected from an impressive field of nominees by a distinguished committee of industry, academic, and nonprofit leaders in the science, technology, engineering, and math fields (STEM).



Susan Brantley, Distinguished Professor of Geosciences and Director of the Earth and Environmental Systems Institute,

was elected to the National Academy of Sciences as one of 84 new members and 21 foreign associates from 15 countries. The Soil Science Society of America also awarded Sue the Presidential Award, one of the highest recognitions given by the association. Finally, Sue received the honor of a 2012 Geochemical Fellow from the Geochemical Society and European Association of Geochemistry. The honorary title of Geochemistry Fellow is bestowed upon outstanding scientists who have, over some years, made a major contribution to the field of geochemistry.



Kate Freeman, Professor, has been awarded the 2012 Science Innovation Award in Biogeochemistry. This award is given

to scientists who have recently made a particularly important and innovative breakthrough in geochemistry.



Tanya Furman, Professor and Asst Vice President and Assoc Dean for UG Education, received the Penn State Commission for

Women "Achieving Woman Award," given to a woman who has shown

notable leadership, is accomplished in their field, and has supported University efforts in diversity and equal opportunity.



James Kasting, newly awarded Evan Pugh Professor, specializes in the evolution of Earth's climate and atmosphere.

The Evan Pugh Professorships, named for Penn State's first president, are awarded to faculty members who are nationally or internationally acknowledged leaders in their fields of research or creative activity; have demonstrated significant leadership in raising the standards of the University with respect to teaching, research or creativity, and service; and demonstrate excellent teaching skills with undergraduate and graduate students who have subsequently achieved distinction in their field.



Lee Kump, Professor and Department Head, received the honor of being named a 2012 Geochemical

Fellow from the Geochemical Society and European Association of Geochemistry. The honorary title of Geochemistry Fellow is bestowed upon outstanding scientists who have, over some years, made a major contribution to the field of geochemistry.



Jenn Macalady, Associate Professor, received a Fellowship to the Hanse-Wissenschaftskolleg

Institute for Advanced Study by the Scientific Advisory Board of the HWK. Jenn also has been named a Kavli fellow of the National Academy of Sciences. The Kavli program recognizes young scientists who are leaders in their fields and brings them together in the Frontiers of Science program,

which is a collaborative symposium between the academy and the leading scientific academy of a foreign country.



Michael Mann, Professor, will be inducted as a Fellow of the American Meteorological Society, was inducted as a

Fellow of the American Geophysical Union, and was awarded the Hans Oeschger Medal of the European Geosciences Union. The medal was established in 2001 in recognition of the scientific achievements of Hans Oeschger to honor outstanding scientists whose work is related to climate: past, present and future.



Andy Nyblade, Professor, has been selected as the 2012 winner of the Paul G. Silver Award from the American Geophysical

Union for outstanding scientific service. Andy is the first recipient of this award, which will now be given annually to recognize a scientist who has made outstanding contributions to the fields of geodesy, seismology, or tectonophysics through mentoring of junior colleagues, leadership of community research initiatives, or other forms of unselfish collaboration in research.



Rudy Slingerland, Professor, has been presented the G. K. Gilbert Award for Geomorphology by AGU's Earth and Planetary

Surface Processes Focus Group. The Gilbert Award given to a scientist who has either made a single significant advance or sustained significant contributions to the field of earth and planetary surface processes, and who has in addition promoted an environment of unselfish cooperation in research and the inclusion of young scientists into the field.

2012 GRADUATE COLLOQUIUM

Fifty students participated in this year's Colloquium and the following awards are based on 138 Judging score sheets.

Oral Presentation by a Ph.D. Student (Post-Comprehensive Exam) 2012/2013 Peter Deines Lectureship

First Prize



Elizabeth Herndon

"Quantifying the influence of vegetation of manganese mobilization and residence time in soils"

Second Prize



Clayton Magill

"High-resolution reconstruction of early human habitats at FLK Zinjanthropus (Olduvai Gorge) using lipid biomarker and isotope signatures"

Oral Presentation by a Ph.D. Student (Pre-Comprehensive Exam)

First Prize



Halldor Geirsson

"Deep magma accumulation at a rift – transform intersection: geodetic constraints on the magma plumbing system at Hekla volcano, Iceland"

Second Prize



Jon Schueth

"First-come, First-served: The Role of Survivor Incumbency in the Evolution of Calcareous Nannoplankton after the Cretaceous/Paleogene (K/Pg) Mass Extinction"

Oral Presentation by an M.S. Student

First Prize



Matthew Herman

"Constraining Earthquake Processes During the 2010-2012 Canterbury Earthquake Sequence"

Second Prize



Daniel Kohl

"Sequence Stratigraphy and Depositional Environments of the Shamokin (Union Springs) Mbr., Marcellus Fm. And Associated Strata in the Middle Appalachian Basin"

Graduate Scholarships and Awards

Chesapeake Energy Scholarships in Geosciences -Jennifer Alpern, Alexander Burpee, Ying Cui, Courtney Swanson & Nathaniel Wysocki

EMS Centennial Travel Award - Ashlee Dere

Geological Society of America, Graduate Student Research Grants - Matthew Travis, Brian Culp, Michael Donovan, Ellen Chamberlin, Alicia Cruz-Uribe, Matthew Gonzales, Lauren Milideo, Christen Miller, Claire Mondro, David Oakley & Max Christie

Geological Society of America Grants-in-aid Program – Ellen Chamberlin

GeoPRISMS 2011 AGU Talk 1st Place – Christine Regalla

GeoPRISMS 2011 AGU Poster Honorable Mention – Brett Carpenter

Goldschmidt Conference of the Geochemical Society & European Association of Geochemistry, Student Presentation Award - Ashlee Dere & TJ Deane

Richard Standish Good Graduate Scholarship - Brian Culp & Jennifer Alpern

John Meacham Hunt Award in Petroleum Geochemistry - Laurence Bird

Charles E. Knopf, Sr., Memorial Scholarship - Elizabeth Denis, Matthew Gonzales & Noreen Meghani

Krynine Memorial Fund - Jennifer Alpern, Laurence Bird, Jason Boettger, Jamie Brainard, Leah Brandt, James Cederberg, Max Christie, Mike Cleveland, Elizabeth Denis, Ashlee Dere, Michael Donovan, William Either Colon, John Fegyveresi, Halldor Geirsson, Matthew Gonzales, Heather Graham, Paul Grieve, Khadouja Harouaka, Matthew Herman, Rachel Lauer, Robert Letchworth, Florence Ling, Clay Magill, Amanda Martino, Nooreen Meghani, Beth Meyers, Lauren Milideo, Claire Mondro, Rosemary Oakes, Katelyn Olcott, Cristo Ramirez, Christine Regalla, Marco Scuderi, Heather Tollerud & Yipeng Zhang

NASA Earth and Space Science Fellowship - Karen Smith

NSF Fellowship Recipients - Nick Hoschuh & Elizabeth Denis

Hiroshi and Koya Ohmoto Graduate Fellowship - Piyali Chanda, Ying Cui & TJ Deane

Paleontological Society, Student Research Grants - Max Christie & Michael Donovan

Richard R. Parizek Graduate Fellowship - Katelyn Olcott & Roman Olson

Scholten-Williams-Wright Scholarship in Field Geology - Ashlee Dere

Shell Geoscience Energy Research Facilitation Awards - Jennifer Alpern, Laurence Bird, Travis Call, Colin Carney, Ellen Chamberlin, Katelyn Gerech, Daniel Kohl, Katelyn Olcott, Yunhui Tan & Anna Wendt

Smithsonian Institution Predoctoral Fellowship - Heather Graham

Poster Presentation

First Prize



Amanda Martino

"Microbial community composition of marine subsurface samples for equatorial Pacific and Peru margin locations after multiple whole genome amplification methods"

Second Prize



Matthew Travis

"Strain Partitioning in a Propagating Ridge System: Inter and Intra-Ridge Strain Accumulation in South Iceland"

We want to thank **Shell Corporation** for their continued support of Colloquium with prize money and general support.

SAVE THE DATE



Undergraduate Scholarships and Awards

The Joseph Berg Award for Undergraduate Research in Geosciences - Timothy Gould

The Barton P. Cahir Award Endowment in Earth and Mineral Sciences - Stephanie Cook

The Frank and Lillie Mae Dachille Memorial Award in Geochemistry - Matthew Schon & Eugene Trowbridge

David M. Demshur Undergraduate Research Endowment in Geosciences - Logan Adams, Ryan Creitz, Rebekah Hoffner, Gregory Stanek & Ziran Wei

David P. "Duff" Gold Undergraduate Scholarship Fund in Geosciences - Martin Ackley, Lindsey Anderson, Carla Duran, Timothy Gould, Thomas Robillard, Andrew Ryan, Devin Tierney & Devin Wolf

John and Nancy Griffiths Scholarship in Geosciences - Brianna McClure & Sarah Sharkey

The James and Nancy Hedberg Scholarship in Geosciences - Muhammad Syazwan Adzhar, Michael Cappos, Austin Green, Caitlin Hartig, Matthew Schon, Nathan Stevens, Eugene Trowbridge & Molly Witter

Arthur P. Honess Memorial Award - Logan Adams, Cody Bomberger, Michael Cappos, Irena Gorski, Caitlin Hartig, Justine McCann & Bryan Tan

The Benjamin F. Howell, Jr. Award in Geosciences - Molly Cain & Bryan Tan

Kappmeyer-Isaacs Field Camp Award - Neil Abdalla & Gregory Drelich

Ronald A. Landon Endowment in Hydrogeology - Irena Gorski & Alexander Neely

Earle S. Lenker Fund for Field Studies in Geology - Caitlin Hartig, Kelleen Lanagan & Matthew Potako

Reif Undergraduate Summer Field Camp Endowment Awards - Eric Pedersen, Nathan Stevens & Anne Tamalavage

The Robert F. Schmalz Award in the Department of Geosciences - Emma Babcock, Sandra Cannon, Timothy Gould, Rachel Kronyak, Alexandra Pearce & Gregory Stanek

Donald B. and Mary E. Tait Scholarship in Microbial Biogeochemistry - Nina Bingham, Rachel Kronyak, Kali McLaughlin, Alexandra Pearce & Joanna Peth

Edwin L. Drake Memorial Scholarship - Nina Bingham, Daniel Bissot, Cody Bombeger, Loren Bongirno, Daniel Bower, Michael Cappos, Alexandra Carone, Robert Drewicz, Irena Gorski, Paul Hill, Andrew McGuffin, Shane McWilliams, Anthony Moscatello, Sarah Sharkey, Mark Shelleman, Gregory Stanek, Tyler Tonitis, Eugene Trowbridge, Samuel Weaver, Molly Witter & Scott Wright

ALUMNI PASSINGS

Richard H. Lowright (Ph.D., '71) passed away on March 13 after a long illness. Richard was born in 1940 in Bethlehem, Pennsylvania, and was raised in the Hershey area. He received a B.A. in geology from Franklin and Marshall College in 1962. After a brief career as a science teacher at Horace Greely High School, Chappaqua, N.Y., he came to Penn State in 1966. I met Richard that year as we both began graduate studies in the Department of Geology and Geophysics. We both had spouses and all became close friends, a friendship which endured all these years. Richard is survived by his wife, Margie, who resides at Shamokin Dam near Selinsgrove, and a brother, Jim Lowright of Chicago. He accomplished a fine doctoral thesis, submitted in 1971: An analysis of factors controlling deviation in hydraulic equivalence in some modern sands. His Thesis Advisor was Eugene Williams. A paper based on this thesis in the Journal of Sedimentary Petrology won wide acclaim. I have fond memories of assisting Richard in the field, ca. 1968, sampling sand laminae from various modern depositional settings along Presque Isle. Some days we donned SCUBA gear to sample offshore environments. But every evening would find us deep in a Gin Rummy game—his favorite card game next to Bridge. Back in the lab he could be found separating sand grains and sedimenting thousands of them in his tall glass settling tube. In 1971 Richa Geology at Susquehanna University, where he remained until illness forced him to retire in 1998. Besides teaching sedimentary geology, Richard developed courses in environmental geology and did research in limnology. Richard had a great love of life, the outdoors of his home state, of teaching and of Penn State. He had a great sense of humor, somewhat tempered by a love of awful puns. He was passionate about geology. I am proud to have called him "friend", and he will be deeply missed by all who knew him.

Michael T. Roberts (Ph.D. '74)



Please remember to send us your news!! Email it to Lisa at alumni@geosc.psu.edu. We will share it in the next Geosciences newsletter.

Alumni Awards



James A. Connolly, Institute of Geochemistry and Petrology, Swiss Federal Institute of Technology (ETH) Zurich, Zurich,

Switzerland is the 2011 N.L. Bowen awardee of the Volcanology, Geochemistry and Petrology program of the American Geophysical Union. The award is given annually for outstanding contributions to volcanology, geochemistry or petrology in a paper or a series of papers.

Jamie was a student of Derrill Kerrick's and graduated from PSU with his PhD in 1988. Jamie's lecture at the Fall AGU meeting was entitled "Hydromechanical Modeling of Fluid Flow in the Lower Crust."



W. Steven Holbrook, BS '82, was elected as a fellow of the American Geophysical Union. This honor is given to individual AGU

members who have made exceptional scientific contributions and attained acknowledged eminence in the fields of Earth and space sciences. Steven's specific citation was for advancing the understanding of Earth's lithosphere and hydrosphere through creative use of seismic imaging techniques.

Steven is currently at the University of Wyoming, Laramie in the Department of Geology and Geophysics.

EARTH SCIENCE AND POLICY HAS ITS FIRST GRADUATE!

Summer 2012 also saw our first graduate, Joshua ("Josh") Bumjoon Sung, in the new Earth Science and Policy B.S. program.

As a freshman in fall 2008, Josh planned to major in Meteorology, but soon found his interests lying not only in the science of climate change, but also in environmental policy.

How is the risk assessment of climate change determined? How do economic and political factors play a role in formulating environmental policy? These questions piqued Josh's curiosity.

Not sure exactly what program to enroll in, he knew he wanted to learn more about geology and environmental scienc-

es, so he switched his major to the B.S. program in Geosciences. It was Professor David Bice, Josh's academic adviser, who shared the news of a brand new program that was still in the proposal stages called Earth Science and Policy.

Pouring over all of the information provided by Dr. Bice, Josh knew this was the perfect fit for him, and he enrolled in EARSP at his earliest opportunity, in spring 2012. As described in the online Bulletin, the EARSP program "bridges the gap between the physical, natural sciences (the earth sciences) and the social sciences, with the understanding that intelligent, effective solutions to environmental problems will require people who grasp the scientific and social dimensions of environmental problems."

Many of Josh's credits transferred to the new degree, so it only took him two semesters and 24 additional credits to finish the degree program.

While an undergraduate, Josh took advantage of the many opportunities available to EMS students, such as active

participation in the interest house, Irvin Hall, as well as the EMS Student Council, and the Geological Sciences Club. He also held several leadership roles in the Asian American Christian Fellowship.

Josh is now pursuing his Master's degree studying geology, environmental science and policy. He is particularly interested in ice formation, glaciers and climate change. Other research interests include paleoclimatology, as well as the predictions for the future of earth's climate.



Joshua Sung caps off his non-traditional degree with an age-old custom atop the Nittany Lion.

Ph.D. Student Spotlight

Anna Wendt

Like most students who end up in Geology, I had no real intentions of ever being a geologist, or had ever given the science two thoughts before I attended college at the University of Rochester. One of my friends convinced me to drop introductory chemistry and enroll in the Introduction to Geological Sciences class. I thought it was a very interesting course, but I was hooked when I took a field course where I was able to travel and learn about the geology of California. I loved the concept of being able to do science that incorporated the outdoors and had the opportunities to do field work in the High Canadian Arctic and Southern Africa. Unsure of what to do after graduation, I remained at Rochester to complete a M.S. degree in paleomagnetism and upon completion, took a job within the environmental consulting field.

While I was working, I realized I missed conducting research and started thinking about returning to school to work on a Ph.D. I was very impressed with the program at Penn State, and returned to school in the fall of 2010. I ended up switching research interests from my undergraduate and M.S. work to geochemistry and paleoceanography. As a member of the Appalachian Basin Black Shale Group, I am currently working under the supervision of Mike Arthur looking at the geochemistry of the Marcellus formation. I have also been working with scientists in the Nuclear Engineering Department to analyze produced water samples for naturally occurring radionuclides.

My experiences at Penn State have given me the opportunity to spend last summer

working as a research scientist intern with Baker Hughes, Inc. I am looking forward to working on my research this year, and returning to Houston, TX this summer to work as an intern with Newfield Exploration.



Anna at the Yelverton Inlet, Ellesmere Island in the High Canadian Arctic



Masters Student Spotlight

Jennifer Alpern

On my first day as a new graduate student at Penn State I had an overwhelming fear that I was the most unintelligent person in the department. It wasn't that I felt ill prepared by my undergraduate studies or that I doubted my own accomplishments; it was that I was suddenly surrounded by the most knowledgeable and accomplished experts in the geosciences who handpicked students to work beside them. But talk to any graduate student; it's a challenge to find someone who didn't feel the same way at first. This initial sense of ineptitude, coupled with learning that I wasn't the only new student with this self-inflicted judgment, was the final convincing factor that I had chosen the perfect graduate program. It made me confident that for the dura-

tion of my Master's education I would be challenged constantly through research, coursework, and discussion that would prepare me for a career as a future scientist.

Entering graduate school with a B.S. in Geomechanics from the University of Rochester was a risky endeavor, as I was not fully a geologist nor a mechanical engineer. However, my integrated research and experience provided me with a unique way for thinking about geological problems. I came to Penn State to work under Dr. Chris Marone in the Rock and Sediment Mechanics Lab, and closely with Dr. Derek Elsworth in the Dept. of Energy and Mineral Engineering, on a project focused on the physical and chemical mechanisms that augment hydraulic fracture complexity in a variety of synthetic and natural materials. On

this project I am fortunate enough to collaborate with Chevron ETC, the funders of my research, on enhancing hydrocarbon recovery in ways that are both efficient and safe for field execution. After receiving my Master's degree I hope to pursue a career in the energy industry.



Jenn conducting an experiment earlier this fall in the Rock Mechanics Laboratory.

Undergraduate Student Spotlight

Nathan Stevens

I am a senior in Geosciences born and raised in Glenside, PA. I began my college search knowing that I wanted to study the Geosciences because it combined my interest in studying the natural sciences with my desire to have field work as a component of my education and career. Knowing this, I applied to universities with top ranked Geosciences programs in the northeast US, which to my surprise included Penn State. I had felt that Penn State was too big of a school but in my first two visits, somewhere between the school's setting in the Appalachians, the small school feel of the College of EMS, and the personable faculty and staff, I changed my mind.

It was also in these first few visits that I was presented with an opportunity that has come to define a major component of my undergraduate career. During my first

year advising visit in the summer of 2009 I was introduced to Dr. Richard Alley, who told me about some of the ice and climate research done at Penn State and invited me to visit him again to discuss the topic more in the near future. At the time I was unaware of Dr. Alley's prestige



Nathan preparing an ice thin section at the National Ice Core Lab (NICL) in Denver, CO

in this field of study, and it was not until midway through my first semester that I became informed of it, at which point I took Dr. Alley up on his offer of another discussion. Our second meeting resulted in an offer for a research assistant posi-

tion, the studies from which have become the topic of my senior thesis. Since November 2010, I have been conducting physical properties and paleoclimate research with the Penn State Ice and Climate Exploration Group, working with ice cores from West Antarctica. Projects include studies on gas bubble populations in ice, investigation into the relationships between gas bubbles and ice grain boundary migration, and investigation into the influence of impurity chemistry on grain growth trends with depth. These studies provide data useful in producing temperature and accumulation records for West Antarctica and help refine paleoclimate proxies based upon the physical properties of polar ice.

I enjoy my research because it applies a wide range of skills acquired through the Geosciences curriculum; applying facets of petrology, geochemistry, and structural geology, and the skills of remote sensing and statistical analysis. I also take pride knowing that this research helps the scientific community better understand the past climate, which helps to improve projections of future climate change. I hope to continue my research at Penn State through the integrated master's program in the coming two years.



the Petroleum GeoSystems Initiative

Mike Arthur, Rudy Slingerland, Liz Hajek, And Terry Engelder
(With Help From Other Geosciences Faculty)

The Department of Geosciences is pleased to announce a new Petroleum GeoSystems Initiative (PGI) focused on the hydrocarbon energy industry. This interdisciplinary initiative is founded on the premise that interdisciplinary scientists and engineers trained in problem-based collaborative research will be tomorrow's industry leaders. Novel aspects of the program include: 1) organization of the students into a four-member team consisting of geologists, geophysicists, and geochemists, supported primarily by industry fellowships; 2) a required curriculum consisting of common courses, cross-training courses, and disciplinary depth courses; 3) team participation during the spring of their second year in AAPG's Imperial Barrel Award Program (IBA), the annual basin/prospect evaluation competition for geoscience graduate students from universities around the world; 4) depth-training with Geosciences faculty in a standard MS disciplinary track, and 5) supervision by both department faculty and industry mentors. The program builds on an earlier successful program started in the late 1990s by Dr. Peter Flemings, now at UT Austin. Presently PGI is administered by a committee consisting of Michael Arthur, Rudy Slingerland, Liz Hajek, and Terry Engelder. Students accepted for graduate study in the Department of Geosciences apply to the committee for admittance into the PGI program by writing a one-page letter of intent.

CURRICULUM

SEMESTER	YEAR 1	YEAR 2
FALL	Petroleum GeoSystems (3)	Applied Reservoir Engineering (3)
SPRING	Multichannel Seismic Processing (4)	Play Evaluation (IBA Program) (3)

All students in the program take a common curriculum.

A three-credit course called Petroleum GeoSystems is taken the first semester to give the student an understanding of all phases of hydrocarbon exploration and production through a combination

of team-based problems, field trips, industry lectures and site-visits. Shale gas plays are a significant component. In their first Spring semester students take Multichannel Seismic Analysis, a course that covers the basics of seismic energy propagation in the earth; modern multichannel land- and marine seismic data acquisition terminology and field-methods; data processing including deconvolution, filtering, stacking, and time- and depth-migration; interpretation of the shot-records, the stacked sections, and the migrated sections. The interpretation component includes an introduction to mapping and visualization along with the resolution of seismic data; structural (extensional, salt-dome, etc) and stratigraphic interpretation. During the summer after their first year, we encourage PG Fellows to participate in industry internships. Applied Reservoir Engineering, taken in the Fall of their second year, trains the student to analyze and predict reservoir performance using material balance and steady and non-steady state flow equations. The capstone course in the curriculum, taken the next spring, is Play Evaluation. Teams of four students act as a New Ventures Group of an operating oil and gas company. They analyze industry data provided by AAPG's "Imperial Barrel Award" program to make a detailed assessment of the petroleum potential within the given area. The course culminates in the regional and if successful, in the national IBA competitions.

STUDENT RESEARCH

Just like other Geosciences graduate students, PGI students work with faculty to pursue original research projects across a broad range of disciplines including geophysics, geochemistry, sedimentol-

ogy, stratigraphy, structural geology, geodynamics, tectonics, Earth surface processes and paleobiology. Through the- sis research, PGI participants develop the deep technical, critical-thinking, and communication skills required for a successful industry career.



2012-13 Petroleum GeoSystems Initiative students in Geosciences: (l-4) Mitchell Modlich, Jiuyuan Wang, Nathan Wysocki, Courtney Swanson, and James Cederberg.

SPONSORS

PGI is financed through graduate research assistantships generously provided by industry sponsors. We are grateful to our present sponsors, Chevron Corporation and Shell Corporation. This support allows PGI students to pursue high-level research and make important connections with geoscientists actively working in industry. We anticipate recruiting additional teams, but this is contingent upon garnering further fellowship support from industry. If your company would like to sponsor a PGI Fellowship, please contact one of the faculty listed above.

Summer Field School 2012

The 2012 PSU Summer Field Geology School departed from the parking lots behind Deike Building on May 26th for our annual cross-country trip across the United States—a ritual that marks the beginning of a six-week problem-based course in the Rocky Mountains and Basin and Range. This year, there were 31 student participants, including 3 students from other universities.

The group arrived at the College of Eastern Utah, and the 2012 Field School

began with an exercise on sequence stratigraphy led by Dr. Rudy Slingerland in the Book Cliffs. Dr. Eric Kirby followed this with a Quaternary mapping project where students reconstruct past climate change from paleoshorelines of Lake Bonneville. Then the caravan headed north to YBRA in Red Lodge, Montana where Dr. Slingerland instructed the students in a mapping exercise familiar to many alumni—the faulted strata of the Laramide anticline in Elk Basin.

“Field camp is so much more than a class. I was amazed at the projects we were able to accomplish each week and you and your cohort will share a unique bond created by the whole experience. It was truly the best summer I have had in college.--
Nina Bingham, 2012 Field School Participant”



The students descend from Duff's Bench during a day of introduction to the stratigraphy of the Alta area and the mapping of ramps and flats in faulted rocks of the Sevier thrust belt.



Professor Emeritus David Egler came out of retirement to introduce the Alta Stock exercise with Dr. Maureen Feineman, and another year of PSU field camp was wrapped in the cirque at the head of Little Cottonwood Canyon.



By the end of the summer field school, Dr. Slingerland had made an indelible imprint on the students' intellectual and cosmetic development.



Overall, 2012 was a wonderful year with great weather, spectacular geology, and an enthusiastic group of students.



Dr. Slingerland passed the baton to Dr. Donald Fisher at YBRA, and the caravan crossed through Yellowstone and Grand Teton National parks en route to projects in the White Knob Mountains and Lost River Range of east-central Idaho. The students map a faulted syn-orogenic sequence of conglomerates, a mappable unconformity and post-orogenic series of volcanics, with the entire area dissected by normal faults. After stops at the Craters of the Moon National Monument and the Borah Fault Scarp, the class returns to Utah for mapping of the Alta Overthrust Belt.

Imperial Barrel Regional Competition

A team of Penn State Geosciences graduate students consisting of Alex Burpee, Travis Call, Dan Kohl, Yunhui Tan, and Anna Wendt and advised by Assistant Professor Liz Hajek, brought home first place medals from the Eastern Section of the American Association of Petroleum Geologists Imperial Barrel Award Program. At the end of January, the team received an industry-quality dataset including 3D seismic and well data. They had two months to complete a full evaluation of the dataset and produce a 25 minute presentation summarizing their recommendations for petroleum exploration in the study area, which they presented to a judging panel of indus-

try experts at the regional contest in Pittsburgh on March 24.

The Penn State team beat out teams from Indiana University, Indiana University –Purdue University at Indianapolis, University of Georgia, University of South Carolina (3rd place winner), University of Wisconsin, and West Virginia University (2nd place winner). The Penn State team went on to compete against 11 winning teams from regions across the world at the Imperial Barrel Award international



PSU's Geosciences Imperial Barrel team (l-r): Advisor, Assistant Professor Liz Hajek and Graduate Students: Yunhui Tan, Dan Kohl, Anna Wendt, Travis Call and Alex Burpee.

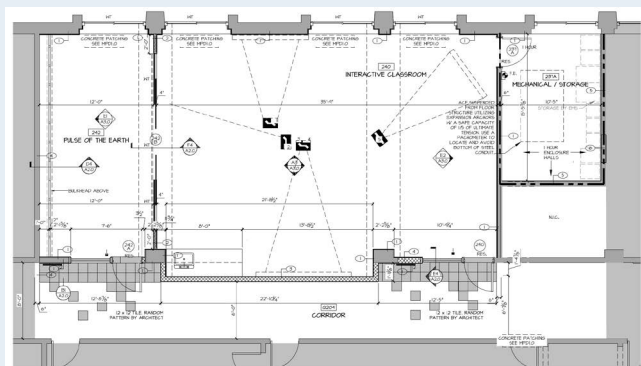
finals at the American Association of Petroleum Geologists Annual Convention and Exhibition in Long Beach, CA on April 20. The team made an excellent performance and earned honorable mention honors in the finals. This was a great showing for Penn States first ever IBA team.

The AAPG Imperial Barrel Award contest provides students the opportunity to gain real-world experience with data analysis, teamwork, decision making and professional communication. Teams have the chance to network with industry professionals and potential employers and also have the opportunity to win cash awards for their school.

Penn State's IBA team benefited tremendously from interaction with numerous industry mentors, including PSU Geosciences Alumni Rick Abegg, Spike Bohn, Dick Merkel, and Reggie Spiller. The team was also able to present their recommendations to the Advisory Board during their spring 2012 meeting. Feedback from these individuals and others was invaluable to the team and helped them prepare to answer questions from industry judges at the IBA finals.

Pulse of the Earth

A state-of-the-art facility including a high-tech active-learning classroom and a control center for providing the go-to website for what's happening on Earth! Here are a picture and a diagram to get an idea of how our new facility will look.



Pulse of the Earth active-learning classroom showing the projectors to be used by individuals or group projections



The Pulse of the Earth control room will resemble this state-of-the-art scientific visualization facility, using monitor walls and industry and research grade computer facilities.

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We want to take this opportunity to thank each of the people on this list for giving to the Department of Geosciences over the past year. With the enrollment in the department rising each year, the growth in our award and scholarship endowments are so important to our students. Your support also allows the department to maintain and upgrade our research labs and equipment.

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Hiroshi Hamasaki presenting his check to the department

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