Department of

GEOSCIENCES

College of Earth and Mineral Sciences

Newsletter 2014

PENNSTATE

From the Department Head

This year's newsletter reflects the balancing act we face as geoscientists at a research university with significant funding from the oil and gas industry. Our faculty and students benefit in many ways from our close affiliation with this industry; it supports scholarships, field trips, laboratory improvements, and research. It is the leading employer of our students. And industry benefits from us. We prepare their future employees with the knowledge and skill set needed to excel in their careers. Through these activities and by promoting earth science education in Pennsylvania through our leadership and support of the Pennsylvania Earth Science Teachers Association, we do our part in meeting the increasing demand for trained geoscientists in the coming decades. We conduct basic research that guides resource exploitation: Penn State Geosciences faculty have been instrumental in the growth of the natural gas industry in Pennsylvania, providing compelling arguments that the natural gas resource residing in the Marcellus Shale had been vastly underestimated, and advancing our understanding of the depositional, diagenetic, and structural history of the source and reservoir rock.

On the other hand, we recognize the importance of developing this natural resource in an environmentally sensitive way. Thus we conduct research on the pre-fracking water quality and seismicity of the Commonwealth. We investigate the possibility of contamination of surface and groundwaters from natural gas and drilling and extraction processes. We assess the risk from climate change induced by the buildup of greenhouse gases. And we reach out to the citizenry through our leadership in the Marcellus Center for Outreach and Research.

We trust that our sponsors from industry have the same high expectations of us as do our other stakeholders, including our students, non-profit organizations, government funding agencies and the citizens of Pennsylvania and beyond. They expect that we conduct and communicate the results of our research clearly and completely, from an informed and unbiased perspective. They want us to tell it as it is. We strive to meet these expectations, and as a result, not only our support from industry, but also are credibility are ensured.

Sincerely,

Lee Kump
Professor and Department Head

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How to reach us:

Department of Geosciences
The Pennsylvania State University
503 Deike Building
University Park, PA 16802
(Tel) 814-865-6711
(Fax) 814-867-2378
www.geosc.psu.edu

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Editorial Director: Lee Kump
Editor/Designer: Karen Liddick
Contributing Authors: Lee Kump, Donald Fisher, Michael Arthur, Tanya Furman, Laura Guertin and Sue Lauver.

Cover Picture: *Peter Wilf's 2014 Geobiology Geosc 204 class on top of Castle Rock, Colorado.*

Faculty Awards

Richard Alley was elected as a Foreign Member of the Royal Society (UK).
Was given the Arthur L. Day Prize and Lectureship of the US National Academy of Sciences.
With Michael Mann, was presented the first-ever Friend of the Planet award from the National Center for Science Education (NCSE).
Was presented with an honorary degree (Doctor of Humane Letters Honoris Causa) from Albion College.

Timothy Bralower has been elected by the general membership as Councilor to the Geological Society of America.

Lee Kump was elected Fellow of the American Geophysical Union, along with Chris Marone. To be elected a Fellow is a special tribute for those who have made exceptional scientific contributions.

Michael Mann was named Highly Cited Researcher, Institute for Scientific Information (ISI).
With Richard Alley, was presented the first-ever Friend of the Planet award from the National Center for Science Education (NCSE).
Profiled in Contemporary Authors (Gale Publishing).

Chris Marone was elected Fellow of the American Geophysical Union, along with Lee Kump. To be elected a Fellow is a special tribute for those who have made exceptional scientific contributions.

Peter Wilf was inducted as a Distinguished Member of the National Society of Collegiate Scholars.

Graduate Scholarships and Awards

2014 Graduate Colloquium Awards

Oral Presentation by a Ph.D. Student (Post-Comprehensive Exam)
First: Ashlee Dere
Second: Katelyn Huffman

Oral Presentations by a Ph.D. Student (Pre-Comprehensive Exam)
First: Kiya Riverman
Second: John Leeman

Oral Presentation by an M.S. Student
First: Lisa Merkhofer
Second: Nathan Stevens

Poster Presentation
First: Lauren Milideo
Second: Peter Miller

Energy Related
First: Ellen Chamberlin
Second: Jiuyuan Wang

These candidates were selected from an impressive group of participants. We want to thank Shell Corporation for the continued support of Colloquium with prize funds and general support.

2015 Graduate Colloquium

February 20 & 21, 2015

Krynine Memorial Award:
Fall 2013: Jason Boettger, Ellen Chamberlin, Piyali Chanda, Max Christie, Ashlee Dere, Michael Donovan, John Fegyveresi, Halldor Geirsson, Matthew Herman, Katelyn Huffman, Marsella Kachingwe, John Leeman, Florence Ling, Muammar Mansor, Amanda Martino, Rebecca McCauley, Nooreen Meghani, Lisa Merkhofer, Beth Meyers, Lauren Milideo, Rosemary Oakes, David Oakley, Cristo Ramirez, Marco Scuderi, Xuhua Shi, Heather Tollerud, Jiuyuan Wang, Kiya Riverman and Yipeng Zhang.

Spring 2014: Leah Brandt, Max Christie, Angela Chung, Elizabeth Denis, Matthew Gonzales, Christen Grettenberger, Khadouja Harouaka, Laura Herren, Katelyn Huffman, John Leeman, Florence Ling, Caitlin Livsey, Nooreen Meghani, Uyen Nguyen, Judith Sclafani, Robert Valdez and Anna Wendt.

Shell Geoscience Energy Research Facilitation Award: Laurence Bird, James Cederberg, Ellen Chamberlin, Katelyn Huffman, John Leeman, Mitchell Modlich, David Oakley, Yunhui Tan, Sheila Trampush and Anna Wendt.

Chesapeake Energy Scholarship in Geosciences: Ellen Chamberlin, Xin Gu, Thomas Johnston, Uyen Nguyen, Jiuyuan Wang.

Charles E. Knopf, Sr., Memorial Scholarship: Michael Hudak, Amanda Labrado, Caitlin Livsey and Kerry Ryan.

Hiroshi and Koya Ohmoto Graduate Fellowship: Piyali Chanda, Elizabeth Denis, Michael Hudak, Muammar Mansor, Rosie Oakes and Kiya Riverman.

Barton B. and Mary E. Tait Scholarship in Microbial Biogeochemistry: Leah Brandt, Laurence Bird and Muammar Mansor.

John C. and Nancy Griffiths Scholarship: Katelyn Huffman.

Richard R. Parizek Graduate Fellowship: Jacob Hagedorn and Kiya Riverman.

ConocoPhillips Graduate Fellowship: Uyen Nguyen.

Barry Voight Endowment: Halldor Giersson.

Scholten-Williams-Wright Scholarship in Field Geology: David Oakley and Halldor Giersson.

Teaching Assistant Award: Nooreen Meghani.

EMS Marathon Alumni Centennial Award: Max Christie.

NASA Earth and Space Science Fellowship: Matthew Herman.

NSF Fellowship Recipient: John Leeman.

Undergraduate Scholarships and Awards

Baker-Hughes Scholarship Award: Casper Hui and Nicholas Riqueros.

Barton P. Cahir Award: Caitlin Kupp.

Benjamin F. Howell, Jr., Award: David Blank, Timothy Harper and Raleigh Koeberle.

Chevron Corporation Award: Evan Onuskanych, Miles Ridgway and John Salinkas.

David M. Demshur Undergraduate Research Endowment: Arvy Adira, Elizabeth Andrews, Raleigh Koeberle, Sirui Ma and Jacob Marten.

David P. "Duff" Gold Undergraduate Scholarship Fund: Audrey Dunham, Nicholas Riqueros and William Rosenow.

Dr. David E. Vaughan and Mrs. Julianne Vaughan Field Camp Fund: Alexander Shaub.

Earle S. Lenker Fund for Field Studies in Geology: Nathan Meier, Max Shultz and Mohammad Arif Zulkhan.

Edwin L. Drake Memorial Scholarship: Logan Adams, Nathan Bachik, David Blank, Anna Byers, Jacob Germanoski, Stewart Joran, Michael Lacroce, Rochelle Linsenbigler, Sean Mooney, Zachary Santangelo, Erik Schlenker, Trey Stoner, Alexander Strohl, Tyler Treser, Eric Wang and Kenneth Weiss.

Frank Dachille Memorial Award in Geochemistry: Sirui Ma.

General Scholarship Endowment in Geosciences: Angela Bertagni, Craig Perak and Elizabeth Roddy.

James and Nancy Hedberg Scholarship: Elizabeth Andrews, Samuel Collitt, Jacob Marten and William Rosenow.

Joseph Berg Award for Undergraduate Research in Geosciences: Caitlin Kupp, James Lamarca and Ethan Mussomeli.

Kappmeyer-Isaacs Field Camp Award: Emma Babcock and Aiman Mohd Zuhali.

Newfield Exploration Scholarship Award: Audrey Dunham.

Reif Undergraduate Summer Field Camp Award: Emma Babcock, Jesse Billingsley, Daniel Snyder and Muhamad Zahin Abdul Taib.

Robert F. Schmalz Award: Molly Cain, Chelsea Eyer, Sara Macdonald and Mohammed Arif Zulkhan.

Scholarship from the Arthur P. Honess Memorial Fund: Arvy Adira, Jordan Chapman, Evan Onuskanych, Erin Peeling, Peter Vigilante, Michaeline Yates and Aiman Mohd Zuhali.

Scholarship from the Ronald L. Landon Endowment in Hydrogeology: Zachary Richard and Michael Tenteromano.

Thomas F. Bates Undergraduate Research Enhancement Fund: Mohammed Arif Zulkhan.

Teen Network / Teen Shale

The impact of natural gas drilling on waterways, the best direction for future water quality monitoring and efforts by a high school volunteer group are a few of the topics the Shale Network tackled in 2014.

The Shale Network is a collaborative effort by faculty and researchers at Penn State, the University of Pittsburgh, Dickinson College and the Consortium of Universities for the Advancement of Hydrologic Science Inc. (CUAHSI). The network works with state agencies, volunteer groups, representatives of private companies and CUAHSI, an NSF-funded consortium that provides services to the academic community. The focus is on collecting and analyzing data on water quality in the Marcellus Shale drilling region.

"A key focus of the Shale Network continues to be sharing as much water quality data as possible," said Susan Brantley, distinguished professor of geosciences and director of the Earth and Environmental Systems Institute (ESSI).

Hydraulic fracturing or fracking involves drilling thousands of feet into the ground, first vertically and then horizontally. Water and chemicals are then pushed into the earth to release the natural gas trapped in the shale. The process has raised concerns about the potential pollution of nearby waterways from spills or improperly sealed pipes.

Data that the Shale Network collects include concentrations of elements such as bromide, strontium or barium – potential indicators of natural gas drilling having an impact on water quality. The software CUAHSI designed allows that information to be tracked over time to assess whether gas drilling is having any impact on water quality.

"Fortunately, this issue has been getting more attention," Brantley said. For example, this year was the first year the Shale Network workshop attracted representatives from natural gas companies to our workshop. We're hopeful that by addressing this issue collectively, we'll be more effective at establishing baseline data and catching problems early on as well as documenting cumulative problems."

Radisav Vidic, chairman of the Department of Civil and Environmental Engineering at the University of Pittsburgh, said that so far what researchers in the network have found is a lack of systematic data collection that could be used to detect problems if and when they do happen.

"There is almost no methane concentration data for much of Pennsylvania. That is troubling," Vidic said. "Of course, data are available, but generally not in the public domain, making it difficult for evaluation by the public."

At Penn State, researchers from EESI have been working with a group of State College Area High School students and teachers to collect and analyze water samples from Black Moshannon State Park. Called Teen Shale Network, the ongoing initiative is giving the students the opportunity to collect water samples, analyze data and write about their work.

The students and their teachers at State High have been receiving hands-on training during field trips. In fall 2013, the Teen Shale team picked out the spot in Black Moshannon State Park for background water quality monitoring. In January 2014, EESI researchers installed a sensor that continuously collects data at that location. Since then, with training from those researchers, the team of students has begun collecting water samples and measuring the flow of the stream water. The data being collected include temperature, pH, dissolved oxygen and turbidity. This fall the group is establishing sites along Moshannon creek that runs beneath ridgetops that host shale gas well pads.

"The only way for people to monitor the water they drink is to go out and sample streams and ground water, which allows us to look for contaminants downstream," Brantley said. "The sampling the high school students are doing will help with those ongoing data assessments."

STUDENTS IN THE SPOTLIGHT

UNDERGRADUATE STUDENT

Nate Meier

I'm a fifth-semester senior majoring in Geosciences with a minor in Geophysics. I grew up about 50 miles west of State College in the small city of DuBois, PA. Throughout my childhood and into my high school years, I enjoyed hiking and camping, playing soccer, tinkering with computers, and playing bass guitar in the then-locally recognizable garage band: "Garage Sale". Unfortunately, my hobbies at the time didn't leave time for my high school coursework and I was never much of a student. Regardless, I applied to a few local universities and ended up at Penn State's Behrend campus in Erie, PA for the fall 2005 term. After two semesters of floundering over my choice of major, I decided to enlist in the military to buy some time until I figured out what I wanted to do with my education.

I served six years in the Air Force as a Korean Language Analyst, studying Korean in California and Texas, and working as an intelligence analyst in South Korea and Maryland. I was particularly successful in my language studies and through that experience I grew to better appreciate the value of education. By the end of my enlistment I was (very) ready for a change of pace and to get back to school, so I left the Air Force and returned to Penn State.

My choice to return to Penn State was an easy one; it's a widely known university and I had already been a PSU student once. It was only a matter of filling out a form and paying a small fee before I was ready to go. I chose to study geoscience because I have always been interested in natural processes and I wanted to understand them scientifically. Not to mention, the department is world-class.

I began my coursework in the fall of 2012. I liked what I was learning in my introductory geology course, so I contacted my professor, Dr. Pete La Femina, to inquire about research opportunities within the Geosciences Department. I ended up working on a project in his Geodesy Lab looking at surface deformation on Sierra Negra volcano in the Galápagos. That project has turned into my senior thesis, and over the next two semesters I'm going to further develop a model for magma flux that will aim to explain the changing deformation signals measured there.

I enjoy my research because it allows me to use skills from multiple fields of science in an attempt to increase our understanding of how the world works. I intend to present my research this December at the annual fall meeting of the American Geophysical Union (AGU). I plan to graduate in the spring of 2015 and continue on to graduate school to pursue a master's degree in geophysics and/or computer science.

M.S. STUDENT

Mitch Modlich

I was raised in Dublin, Ohio around a fourth-generation family business that relies on rocks for a living. My father would bring me along to work in the monument business, and he was eager to provide his son the opportunity to build a good work-ethic. I discovered that carting around a black monument of the same size as a grey one was more arduous, and I wondered why. Why do rocks have these patterns, colors, and fabrics? Although I was proud of my connection to the enduring family business, my curiosity led to a strong desire to explore the wider world.

While at Ohio State, I had been an economics major. I became drawn to geologic studies later, and I decided to pursue a dual degree. Most people outside of the earth sciences found this to be a strange combination, but I had the sense that geology could open new doors for me. I was continuously challenged with interesting ideas and surprising experiences – especially field camp in central Utah.

I interned at the Ohio Geological Survey, where I worked on projects that involved karst mapping, geothermal energy, abandoned coal mines, and exposure to core analysis. During my time there, commercial interest was rapidly increasing in the Utica Shale/Point Pleasant Formation in eastern Ohio. I gained valuable skills at the survey and became much more interested in energy.

Here at Penn State, I have had the pleasure to work as a graduate student in the Appalachian Basin Black Shales Group (ABBSG) with Rudy Slingerland as my adviser. As a student in the Petroleum GeoSystems program, I have enjoyed the financial support of Chevron Corporation and Shell Oil Company. In addition to the strong curriculum offered in the department, where I have focused on petroleum geology, sedimentary processes, and stratigraphy, I have taken complementary coursework in petroleum engineering.

Last summer, I was a geology intern at Noble Energy in Houston, Texas. The following spring, I put some of that experience to the test as my teammates and I competed in the Imperial Barrel Award (IBA). We won the regional competition with our presentation on oil plays in the Norwegian North Sea. I am now looking forward to an exciting career in the petroleum industry, where I can apply my geologic knowledge and make interpretations that have real-world outcomes!

Ph.D. STUDENT

Nick Holschuh

What my undergraduate studies taught me is that not all of the natural sciences are created equal. I would tell my parents about the reaction kinetics lab I was doing in chemistry and feel their eyes glazing over. It wasn't until I discovered geology that I found common ground between society and science, because everyone who has grown up on Earth has a visceral connection to the geosciences. There are no features of the planet that are arbitrary, so when I stick my feet in the sand and look up at the night sky, I'm enjoying the most recent chapter in a 4.5 billion year long story that can be traced process by process back to when the man in the moon first locked his gaze to the surface of Earth. Or a 13.8 billion year long chain of events that can explain every star, every mountain, and every grain of sand we've ever known.

Penn State is great because it brings together geoscientists working on all different facets of the Earth system. I can step outside my office and talk about gas extraction in the Marcellus with Rudy Slingerland, and walk down stairs and hear about the recent string of great earthquakes with Chuck Ammon. By bringing together the best in their field, Penn State has made this a department that earth scientists want to be a part of. I have been working with Richard Alley and Sridhar Anandakrishnan to characterize the West Antarctic Ice Sheet. Using modern geophysical techniques, we provide a 3D picture of the ice on the continent, and help to determine what it looked like in the past and what it is likely to become in the face of modern climate change. It has taken me to amazing places, provided me with opportunities to do science with real human impact, and has given me some pretty good conversation topics in a pinch at parties.

I hope to bring a little bit of my excitement to future generations of geoscientists when I am finished with my Ph.D. When people realize that the Earth is not just a static rock floating through space, but a dynamic system that is constantly evolving according to the laws of physics, it becomes a lot more interesting to look at the world around us and wonder about its past and future. Now I'm just waiting for the chapter in this 13.8 billion year long story where someone decides they want to pay me to talk about it.

Alumna Spotlight

Janet Kappmeyer

('79 B.S. with Honor in Geology)

Jan Kappmeyer is the Napa Valley Grower Relations Manager for Constellation Brands, the world's leading premium wine producer with brands including Robert Mondavi Winery, Franciscan Estates, Simi, Clos du Bois, Ravenswood and a host of others. Her career path from geology to wine production is a fascinating example of how a rigorous training in a discipline like geology can prepare one for a diversity of careers.

Jan's training as a geologist began at Penn State, where she earned a B.S. in geology with a marine science minor. She recalls that the 10-week marine science "immersion" program at Wallops Island, Virginia, was one of the most rewarding experiences of her life. Classes with Al Guber, Bob Schmalz, Gene Williams, and Barry Voight were among the many very positive experiences she had at Penn State. From PSU Jan went on to the University of Michigan where she received her M.S. in structural geology, studying quartz deformation in the Marquette and Republic troughs of the Upper Peninsula of Michigan with David Wiltschko and Bill Kelly. She also met her future husband, Drew Isaacs, in the geology department at Michigan. Following graduate school, Jan moved to Houston to work for Exxon as an exploration geologist, spending much of her time on oil rigs in the Gulf of Mexico and offshore California. She found the job to be exciting and challenging, and a great way to start a career. In 1984, after two years at Exxon, Jan moved to the San Francisco Bay Area and launched a new career in environmental consulting, managing the geological characterization of hazardous waste disposal sites, landfills and industrial sites contaminated with organic solvents, pesticides, petroleum products and metals. She spent 20 years in that industry, the first eight with two larger firms where she gained broad exposure to not only the science but also the business side of environmental work, and the last 12 as an independent practitioner, launching her own company, Cypress Environmental, Inc., where she managed the investigation and cleanup of over 30 industrial sites.

In 2000, Jan and Drew moved to Napa Valley, planted their own small vineyard, and began making wine in their garage. Jan left the environmental field in 2004 to pursue a degree in winemaking and graduated from UC Davis in 2006 with a B.S. in Viticulture and Enology. Grape growing and winemaking present interdisciplinary problems similar to those that Jan was used to solving as a geologist and environmental consultant. Considering herself a generalist, Jan's broad knowledge of chemistry, geology, biology, business, finance, and project management were again to pay off. After graduating from Davis, she worked making wine for Franciscan Estate, Miner Family, and Peju. In 2009, Jan received a call from Franciscan's Director of Winemaking recruiting her for Constellation's position as Grower Relations Manager for Napa Valley. Jan's first response was "what the heck is grower relations?" She soon found herself in a dream job. She is now responsible for sourcing the majority of grapes used in Franciscan's and

The Wallops Island class of 1977. **Janet Kappmeyer:** *3rd row, 2nd to the right;* **Jay Tanski:** *4th row, 3rd to the right;* **Dr. William (Brian) Dade***: 4th row, 4th to the right;* **Marty Wouch***: 4th row, 5th to the right;* **Kent Newsham***: top row, 2nd to the right;* **Dave Zukakus:** *top row, 3rd to the right.*

Alumni News

Robert Mondavi's Napa wine programs, negotiating contracts with grape growers, ensuring that the company's high standards are met, and acting as the liaison between the winemakers and outside growers. During the growing season she makes daily visits to the vineyards to assess the quality of the fruit and works with her growers assessing disease and pest issues, determining whether irrigation is being effectively employed, and deciding when it is time to harvest the fruit based on flavor, sugar content, pH, and titratable acidity of the grapes (now that sounds like geochemistry!).

So Jan has taken an unexpected path to an unanticipated career, and she couldn't be happier. She credits her undergraduate education at Penn State with preparing her in the foundations of geology, providing her with the skill set to acquire and analyze many types of data to inform critical decisions, and helping her succeed as a professional geologist, consultant, and now viticulturalist. Her advice to today's students: the secret to success is being able to communicate technical findings in accurate, understandable terms to one's stakeholders.

Jan and Drew have established two endowments in the Department: the Kappmeyer Isaacs Field Camp Award and the Kappmeyer Isaacs Experiential Learning Fund in Marine Science in the Department of Geosciences.

Hello to all from John Hubert, Ph.D. 1958 from Penn State. I was a graduate student in the then Department of Mineralogy and Petrology back in what the alumni office at Penn State calls the "Pioneer days." I have particularly fond memories of interacting with faculty members PD Krynine, John Griffiths, Tom Bates, and Frank Tuttle. Krynine founded the field of sedimentary petrology and, as many people know, he had a singular personality, both inspiring and difficult. Krynine supervised my Ph.D. dissertation on the petrology of the Fountain and Lyons formations along the Colorado Front Range, which also had a strong influence of "Griff" in statistical analysis.

In the fall of 1954, I met my deceased wife Mary Alice at a graduate mixer at Penn State and we had 56 happy years together. A preschool teacher and field companion away from home for 27 field seasons and four sabbatical leaves, Mary Alice jointly raised our three children and kept the field work moving forward while making it all fun.

Now emeritus professor at the University of Massachusetts at Amherst, I have written *Listening to the Rocks: a Geologist's Life with Mary Alice* that includes teaching at the Universities of Missouri and Massachusetts. Anyone who would like to read anecdotes and adventures in the field and classroom and at home can obtain the 235-page, 8 by 10-inch paperback or eBook at Amazon.com.

I am Mark P. Fischer, a Ph.D. graduate from 1994, and worked with Terry Engelder and Richard Alley for my dissertation. The news I would like to share is that in July of 2014 I was appointed Chair of the Department of Geology and Environmental Geosciences at Northern Illinois University, in DeKalb, IL, where I have been a faculty member since 1995.

If you would like your news published in the next newsletter, please email your story to Karen Liddick at klb50@psu.edu.

Alumni Passings

Mr. Joseph C. Knight	BS	1949	8/15/2014
Mr. Richard R Young	BS	1953	2/23/2014
Dr. Robert C. Newman	PhD	1955	4/26/2014
Mr. Frank F. Ross	BS	1955	2/28/2014
Dr. Bert Phillips	PhD	1959	4/4/2014
Mr. Emil Onuschak, Jr.	BS	1958	6/24/2014
Mr. Joseph Pasini, III	BS	1958	1/17/2014
Mr. Gary M. Iversen	MS	1976	1/8/2014
Mrs. Patrice Melcher Reiche	BS	1981	6/21/2014

Alumni News

Dan Leppold

'93 B.S. in Earth Science

High School Science Teacher

We often do not feature our students who take on alternative careers outside of industry, environmental science, or academia, and many times, we lose track of them because they have pursued these alternative careers. In this case, the subject of this profile, though pursuing such an alternative, is quite visible at Penn State, as you will see.

Many years ago, about 1990 or so, an earnest young undergraduate Earth Science Major with a buzz cut (he still has it) came to ask if I had any work that he could do in my lab. It happened that I needed someone to prep samples for geochemical analysis, so I hired him. His enthusiasm was infectious, his sense of humor outrageous, and his work ethic outstanding. Thus, Dan Leppold worked out well in my lab for the next three years while he completed his Bachelor's Degree in Earth Science (1993). Dan was also a member of Acacia Fraternity (originally Delta Phi Omega) at Penn State and an avid spelunker. He continued in the Geosciences graduate program and, after leaving to take on gainful employment in 1996 with all his research completed for his M.S. thesis, earned his M.S. in Geology (2005) at Penn State. I supervised his thesis work, which involved using oxygen isotopes in carbonate from mid-to-late Cretaceous rudist bivalves (reef formers) to document paleotemperatures in, what were thought to be, anomalously warm tropical regions of the Caribbean and Gulf of Mexico. So, where did he end up with his geoknowledge?

For the past fourteen years Dan has been a high school science teacher at Spring-Ford High School—a suburban school district mostly in Montgomery County about 20 miles northwest of Philadelphia. Dan is a very popular teacher, known for his jokes, puns and "awesome" demonstrations in class, as well as his caring and concern for his students in and outside of class. Dan comes up with interesting projects for his classes. One of the more recent was a plan to construct a few small (cheap!) ocean buoys and place them into the Gulf Stream so that his students could track the velocity and trajectory of that current; the buoys were to be deployed during a planned deep-sea fishing trip. While at Spring-Ford, Dan has been recognized for his teaching excellence by the Governor of Pennsylvania. He has also received 24 "Senior Impact Awards" (nominations by students) and holds the science department chair position at Spring-Ford High School. But that's not all! First of all, Dan is married (Kim) and they live on an historic 15-acre horse farm just south of Reading. But, read on…

I recently found out something that I did not know about Dan Leppold. It turns out that he was a member of the boy's volleyball team at Penn Hills High School in Pittsburgh, PA. In his last year there, the team was Section and WPIAL Champions and State Semifinalists. Dan recently assisted with the Wyomissing High School boy's volleyball team from 2011-13, and spent a season as the coach of the Wyomissing High School girl's volleyball team in 2011. This is significant because Dan just completed his second season as Assistant Coach of the Penn State University Berks Womens Volleyball Team, which was 20-10 this year! How cool is that?

Dan's story is not completed, of course. I recently saw a plea for support to hire him as the next PSU Men's Basketball Coach; that seems somewhat unlikely, but more likely is that he advances in his volleyball coaching career, while continuing his passion for teaching earth science and inspiring students to pursue careers in science fields. And, this year, one of his former students is majoring in Geosciences at Penn State. Thanks Dan for your support of all things Penn State and your achievements in teaching and mentoring.

Michael Arthur
Professor of Geosciences

Introducing PAESTA

Serving Pennsylvania's K-12 Earth Science Teachers

Some of the most pressing societal and political issues of our day – from natural disasters to water resources to global climate – involve interactions among and between Earth's systems. Modern citizens both need and crave insights into these interactions, as well as an understanding of their own role and impact on the planet. Earth science also provides a promising pathway for employment, as federal workforce estimates predict a national shortage of some 135,000 geoscientists by the end of this decade.

In Pennsylvania, as in much of the nation, earth science instruction in the K-12 setting faces many challenges. Earth science is a required high school course in only a handful of districts, which means that specialized instructors with baccalaureate preparation in the discipline are rare. Most teachers must balance classroom time and their own content knowledge across all of the physical and life sciences. Teachers are also working to address the Pennsylvania state standards of learning (which have evolved towards the strong Next Generation Science Standards) at a time when school districts face great financial challenges, providing limited opportunities for teacher professional development or place-based curricular resources. Currently, the need could not be greater to have a professional community of educators connected around quality resources and opportunities to strengthen earth science instruction.

Leaders of the NSF-funded Earth and Space Science Partnership (ESSP) have taken important steps to address the challenges and celebrate the successes of Pennsylvania's K-12 earth science educators. We recognize that positive K-12 earth science experiences will help prepare students to face significant global challenges and may encourage them to explore the discipline in college. With financial support from the National Science Foundation (awards DUE-0962792 and GEO-0631377), ESSP personnel established in 2011 a state affiliate of the National Earth Science Teachers Association. PAESTA (the Pennsylvania Earth Science Teachers Association, www.paesta.org) is committed to facilitating and advancing excellence in earth and space science education across the state. There are currently over 450 individual members, most of whom reside in Pennsylvania and New Jersey, but others represent every corner and provide curricular resources and materials that advocate for the teaching and learning of earth and space sciences at the local, state and national level.

PAESTA teachers in the field, carrying out an activity in which tombstone geology is used to document socioeconomic changes in Pennsylvania communities over several hundred years.

PAESTA provides a forum for teachers to network, collaborate and share curricular resources and geoscience career information. In addition, there are many opportunities for teachers to become leaders in their schools and districts. Teachers partner with ESSP faculty members in governance of PAESTA, in organizing the annual conference (hosted in State College in 2014) and in selecting members for monthly recognition in the eNewsletter. Each year an Award for Teaching Excellence is presented to honor a particularly innovative teacher. Membership in PAESTA is free, and educators and friends of K-12 earth science education are invited to join and participate in all activities. We are eager to engage new members who will contribute to developing and strengthening the organization. We particularly welcome input from alumni of the Department of Geosciences who are in a position to provide information on workshops, curricular and career resources or funding opportunities for classroom teachers.

Financial contributions to PAESTA will help sustain its work on behalf of Pennsylvania's K-12 community past the end of the Earth and Space Science Partnership funding period. Specific areas targeted for contributions in 2014 include regional networking meetings across the state, field trips at conferences, support for teachers who attend STEM professional development workshops, and the dissemination of high-quality instructional materials. If you are able to make a gift towards PAESTA, your contribution will further strengthen the opportunities and resources for classroom teachers. To contribute you may use the envelope in this newsletter. Be sure to check the appropriate gift area. For additional information on the organization, its leadership and its mission, please contact the authors of this article.

Tanya Furman
Department of Geosciences
furman@psu.edu

Laura Guertin
Penn State Brandywine
guertin@psu.edu

Susan Lauver
Earth and Space Science Partnership
sel114@psu.edu

INTRODUCING...

The GONG Show (Grow Our Network of Graduates)

Welcome to the GONG Show (Grow Our Network of Graduates). Sadly, we have lost touch with some of our graduates. Many of you receive department information and updates as well as invitations to events and gatherings. We would like to be able to do the same for all alumni, but we need your help. To make this entertaining, we have come up with a fun way to reward you for your efforts.

On the following pages is a list of missing graduates. If you see someone whom you know and have contact information for, send the information to Karen Liddick at klb50@psu.edu. They will be contacted to confirm that they would like to receive mailings from the department. For every alumnus or alumna who approves being added to our mailing list, you will earn a "gong."

The winners will be determined by the number of gongs received. The top 10 will receive a genuine Penn State Geosciences hat.

All entries must be received no later than midnight, January 31, 2015, EST.

For alumni who may want to enter their own contact information, please forward the Alumni Association link below to them to update their information. Then simply send us their name so we can credit you with the "find."

http://alumni.psu.edu/about_us/contact_us/update_info

MISSING ALUMNI

1921
BS: Mr. Thomas G. Taylor

1930
BS: Mr. Rex W. Woods

1936
BS: Mr. Quentin L. Wilcox

1939
BS: Mr. Alexander M. Dinsmore

1940
BS: Mr. Fred Keller, Jr.
Mr. William F. Beuch

1942
BS: Dr. E. Jean Lowry
Mr. Lawrence E. Smith
MS: Mr. Chester R. Pelto

1943
BS: Mr. Merald E. Rhoades

1947
BS: Mr. Charles M. Meier
MS: Mr. Aluizio D. Barbosa
Mrs. Helen Shaffer Egolf

1948
BS: Mr. David J. Stuart
Mr. Earle R. Creesman
Mr. Roland C. Smith, III

1949
BS: Dr. George V. Keller
Mr. John D. Moredock
Mrs. Emma Cutler Wilson

1950
BS: Mr. John A. Shakely
MS: Dr. Paul Tasch
Miss Margaret F. Eister

1951
BS: Mr. Donald R. Smith
MS: Mr. Vincent G. Hill

1952
BS: Mr. Joseph Omelchuck, Jr.
MS: Mr. George R. Macaulay

1953
PhD: Mr. Lynn Jacobsen

1954
BS: Mr. Robert H. Fendick
MS: Mr. John R. Emery

1955
MS: Mr. Eugene N. Silverman

1956
BS: Mr. Leonard S. Dembinski
Mr. Walter J. Hendricks
Mrs. Ruth G. Deike
MS: Mr. Surendra P. Mathur
PhD: Dr. Lois A. Luedemann

1957
MS: Mr. Hugh B. Montgomery

1958
PhD: Dr. Frederick P. Glasser

1959
BS: Mr. William Andrake
MS: Miss Carmen M. Ruiz-Menacho
PhD: Dr. George B. Mellon
Dr. Prasenjit K. Saha

1960
BS: Mr. Basri Sezer
Mr. Thomas L. Miller
MS: Mr. James A. Wells
PhD: Dr. George R. Rapp, Jr.
Dr. Peter L. Roeder

1961
MS: Mr. Bruce D. Middleton
Mr. Roland Eichler
Mrs. Roslyn Berman Book
PhD: Dr. Ferol F. Fish
Dr. Robert W. Taylor

1962
BS: Mr. Malcolm G. Stewart
PhD: Dr. Allan M. Taylor

1963
MS: Dr. Hassan Modarresi-Ghava
Mr. Harold E. Miller, Jr.
Mr. Samuel W. Crawford
PhD: Dr. William C. Luth

1964
BS: Mr. George R. Arrington
PhD: Dr. James P. Hea

1965
BS: Mr. Ali A. Al-Rubaiyi
Mr. Sadik B. Jawad
MS: Dr. William M. Turner
Mr. R. Earl Cassel
Mr. Roger W. Gedde
Mr. Victor G. Colvin
PhD: Dr. David H. Watkinson
Dr. John Keith Frye

1966
BS: Dr. Frederick J. Swanson
Dr. Robert H. Leeper, Jr.
Mr. Fathel J. Abadie
MS: Mr. Robert F. Martin
PhD: Dr. Carl H. Bates

1968
BS: Dr. Terry Engelder
PhD: Dr. Arthur D. Cohen
Dr. Shigeyuki Kimura
Dr. William G. Smith
Mr. James M. Erickson

1969
BS: Mr. Richard K. Yoder
MS: Miss Candace Campbell

1970
BS: Mr. Jay A. Rosen
Mr. William A. Fuchs

1971
BS: Mrs. Sonja J. Walawender
MS: Miss Garnet L. Coleman
Mrs. Mary Alice Elwang Moffitt

1972
MS: Dr. Ali Y. Al-Temeemi
Mr. David J. Warner
Mr. Mark Voultsos
PhD: Dr. Michael J. Walawender

1973
BS: Mr. Fred E. Schriefer
Mr. Gary D. Rogers
Mr. Theodore F. Eichhorn, III
MS: Mr. Fu-Tzu Hsu
PhD: Dr. Kadri Ercin Kasapoglu

1974
BS: Mr. Archie M. Richardson, III
Mr. George B. Vargulich
Mr. Michael G. Kazemka
Mr. Warren R. Cox

1975
BS: Mrs. Deborah L. Richardson
Ms. Arlene G. Weiner
MS: Mr. Charles T. Bolt
Mrs. Susan R. Shuart
Mr. George R. Namie
PhD: Dr. Harold C. Fry, Jr.

1976
BS: Mr. David L Kraus
Mr. Randy M. Wood
MS: Mr. Abubaker J. Nashnosh
Mr. Frank D. Fillo
Mr. Melvyn D. Krohn

1977
BS: Mr. Christiaan F. Staargaard
Mr. Leonard C. Weltman
Ms. Anne P. Hynes
MS: Mr. Amos O. Quaah
Mr. Thomas C. Holmes
PhD: Dr. Rudy Slingerland

1978
BS: Mr. Mark G. Wallace
Mr. Pierre A. Zippi
Mr. Thomas A. Catherwood
MS: Mr. George C. Solomon
Mr. Roberto J. Arnstein

1979
BS: Miss Ruth A. Mazzella
Mr. Ronald S. Mazzei
MS: Mr. Craig R. Gander
Mr. Kenneth W. Kuehn
Mr. Syed M. Famy

1980
BS: Dr. Stephen R. Jurewicz
Mr. Kenneth Young
Mr. Michael U. Ricci
MS: Mr. Lawrence P. Karasevich
Mrs. Ellen Richter Karasevich

1981
BS: Mr. Edward R. Telatovich, Jr.
Mr. Peter T. Lonstrup
Mr. Seth A. Mogk

1982
BS: Mr. Donald J. Cernansky
Mr. Glen L. Jenkins
Mr. Joseph M. Sadlik
Mr. Thomas J. Neefe
MS: Mr. Leslie E. Erwin

1983
MS: Mr. Jesse A. Nachlas
Mr. George K. Clevenger
Mrs. Alison M. Satterfield
PhD: Mr. Randolph C. Arthur

1984
BS: ENS Bruce A. Stoneback
Mr. Gil Oudijk
Mrs. Jane Peters Poole
Mrs. Lorie Downing Moffat
Ms. Carolyn S. Coho
MS: Mr. Audubon L. Bakewell IV

1985
BS: Mr. Douglas J. Richwine
Mr. James R. Burke
Mr. Jerry A. Griffith
Mr. Kenneth C. Bower, Jr.
MS: Mr. Thomas H. Filley
PhD: Mr. Don R. Baker

1986
BS: Ms. Karen L. Zglobicki
Ms. Mary L. Griffith
MS: Dr. Davin Ramphall
Mrs. Kristin Sigridur Vogfjord

1987
BS: MAJ Paul G. Sichenzia
Mr. Robert J. Rickard Jr.
MS: Dr. Christopher A. Shuman
Ms. Michelle Lamberson

1988
MS: Mr. Habeeb I. Galadanchi
PhD: Ms. Karen A. Swanson

1991
PhD: Mr. Koen R. Vogel

1992
BS: Ms. Marina A. Ryabtseva
Ms. Mouza N. Al Marhoobi
PhD: Dr. Constantine S. Karytsas

1993
MS: Dr. Takeshi Kakegawa
Mr. Adonios Mussuridis
Ms. Christine Ecker
PhD: Dr. Sedat Inan

1994
BS: Mr. Christopher D. Schaefer
Mr. Paul Mc Colgan
PhD: Dr. Joao Batista G. Teixeira
Dr. Wolfgang Polster

1995
BS: Mr. David L. Harp
MS: Mr. Mohammed N. Al-Mugheiry
Mr. Tetsuya Kato
Ms. Staci L. Loewy

1996
BS: Mr. Dana M. Huntsinger
Mr. Jon J. Voortman
MS: Mr. Robert J. Last

1997
BS: Mr. Brian J. Bertoline
Mr. Kazuhiro Kawakita
Ms. Elba L. Horta

1998
BS: Mr. Michael S. Gass
Ms. Eileen A. Scott

1999
BS: Mr. Drew B. Stolar
Ms. Anna M. McNeal
MS: Ms. Simmy Yau

2000
BS: Mr. Mark T. Pitterle
Ms. Kimberly A. Jenkins

2001
BS: Mr. Michael L. Garner

2002
MS: Ms. Christie M. Rogers
PhD: Dr. Yumiko Watanabe

2003
BS: Mr. Brian P. Tittmann
MS: Mr. Benjamin J. Seldon

2004
MS: Ms. Laure M. Montandon
PhD: Dr. Nikolai Pedentchouk

2006
BS: Mr. Gregory M. Drelich
Ms. Sheri T. Shannon

2007
BS: Mr. Adam Woodward
MS: Mr. David C. Bevacqua
PhD: Dr. Yongcheol Park

2008
PhD: Dr. Patrick M. Fulton
Dr. Tsubasa Otake

2009
BS: Mr. Andrew J. Lloyd
MS: Dr. Lucas K. Zoet
PhD: Mr. Brian W. Alexander

2010
BS: Mr. Jesse E. Robertson
Mr. Joshua J. Snedden
Mr. Kevin M. Ward
Ms. Julianne Hagarty
MS: Mr. Chad A. Lieb

2011
BS: Mr. Abdul Haleem Arbi
Mr. Abdulrahman K. Albelushi
Mr. Jonathan T. Marin
Mr. Turki F. Alotaishan
Ms. Abrar A. Al-Abbad
Ms. Maggie N. Norton
Ms. Wan Nuhayati Abdul Rahman

2012
BS: Mr. Nasser Almosa

2013
BS: Mr. Omar A. Alghamdi
Mr. Thayne M. Ainsley
Mr. Wayne E. Mauthe
MS: Mr. Brendan W. Puls

2014
MS: Mr. Scott R. Oste
PhD: Mr. Ramses M. Ramirez

Geosciences Field Camp 2014

The 2015 Penn State Geology Field School after reaching the top of Flagstaff Mountain in Alta, Utah.

D. Fisher talks to the group during a field trip to the Borah Fault Scarp, Idaho (talus slope in immediate background).

The group takes in the view of the Snake River Plain from the top of Inferno Cone in Craters of the Moon National Monument.

The Penn State Geology Field School headed west in late May 2014 with 32 students as part of the annual six-week expedition to the intermontane Rocky Mountains of the Western US. The 2014 itinerary included six different geologic exercises in Utah, Wyoming, Montana, and Idaho led by Department of Geosciences Professors R. Slingerland, D. Fisher, and M. Feineman and assisted by graduate students N. Meghani, M. Christie, D. Oakley, R. Oakes, J. Hagedorn, and M. Hudak. The itinerary included areas that should be familiar to alumni (the Alta Overthrust, Duff's Bench, Elk Basin, the Book Cliffs, and Wildhorse) as well as a new exercise mapping surficial deposits in Grand Teton National Park.
—Professor Don Fisher

A student takes notes while constructing a stratigraphic column in the Book Cliffs, Utah.

A student investigates the geology of the Alta overthrust belt with Duff's Bench in the background.

Cover Photo Entry Runners-Up

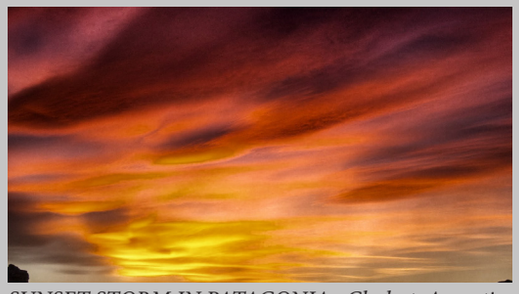
Peter Wilf's 2012 Geobiology class indicates the Great Unconformity near Manitou Springs, Colorado. Photo Credit: Peter Wilf

Grand Prismatic Spring at Yellowstone National Park. Photo credit: Tim Bralower

Torres del Paine, Chile. Photo Credit: Peter Wilf

Jenn Macalady (left) and a local volunteer prepare a water chemistry data logger that will be carried by cave diver Kenneth Broad (right). The geochemical data will shed light on microbial iron and nitrogen cycling in the terrestrial subsurface. Photo credit Dominican Republic Speleological Society. Photo credit: Jenn Macalady

The Wahana Baratama mine, southern Borneo, just before Peter Wilf and his US and Indonesian colleagues were the first paleontologists ever to inspect it. Near Satui, Kalimantan, Indonesia, August 2014. Photo credit: Peter Wilf



SUNSET STORM IN PATAGONIA, Chubut, Argentina. Photo Credit: Peter Wilf

Cave divers led by Phillip Lehman and Cristian Pittaro prepare to carry out a microbial biofilm and geochemistry sampling mission in collaboration with Jenn Macalady and members of her group seeking to understand iron and nitrogen cycling in the terrestrial subsurface. Photo credit: Jenn Macalady

Interior of Parker's Pit Cave, Black Hills of SD. Excavations of fossil mammals from the cave are providing a record of environmental change for the last 20,000 years or more. Photo credit: Russ Graham

Drilling the Cretaceous in the Escalante Grand Staircase National Monument, July 2014. Photo credit: by Tim Bralower

The Grand Canyon of Yellowstone National Park. Photo credit: Tim Bralower

CUERNOS DEL PAINE INTO THE SUNSET Torres del Paine National Park, Cretaceous marine rocks on top of Miocene granitic intrusion. Photo Credit: Peter Wilf

FRESH FOSSIL LEAF First moment in the sun in 64 million years. Chubut, Argentina. Photo credit: Peter Wilf

Corporate Friends of PSU Geosciences 2014

We want to take this opportunity to thank each of the companies on this list for giving to the Department of Geosciences over the past year through direct gifts and matching funds. Through our partnership with these companies, we are able to provide monies for student scholarships and fellowships, student travel funds, student research funds, special field trips and many other activities.

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Friends of PSU Geosciences 2014

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 is vitally important to our students. Your support also allows the department to maintain and upgrade our research labs and equipment.

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NOTE: This list includes contributions made July 1, 2013 through June 30, 2014.

PENNSTATE

Department of Geosciences
The Pennsylvania State University
503 Deike Building
University Park, PA 16802

www.geosc.psu.edu

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