

E E S N E W S L E T T E R



Happy Holidays and welcome to the 2013 Earth and Environmental Sciences Newsletter. You will note a number of changes to EES in the following pages, not the least of which is the newsletter author (me) and editor (Nancy). Professor Frank Pazzaglia stepped down at the end of June after 6 successful years as the EES chair. We are very grateful for the excellent service Frank provided to the department and the university during his two terms as chair. The front office had other changes in 2013 as well. Longtime Academic Coordinator Laura Cambiotti retired (see story on page 2) after 39 years with the department and Nancy Roman, a 28+-year EES veteran, is now sole Department Coordinator. The new EES Office Assistant is Leigh Anne Fernandes.

The 2013 newsletter provides me with a forum to boast about the recent accomplishments and recognition of several of my colleagues. Professor and Iacocca chair Peter Zeitler was elected as a Fellow of the American Geophysical Union in the class of 2013, an outstanding achievement.

Associate Professor Robert Booth was the recipient of both the Libsch Early Career Research Award and the Class of 1961 Professorship in 2013, both highly selective Lehigh University awards. And finally, Professor Anne Meltzer was chosen as the first Francis J. Trembley Chair in Earth and Environmental Sciences. The Trembley chair is the first endowed professorship dedicated to the department, congratulations Anne. Read more on page 6.

Through the generosity of our alumni, EES was able to award a total of \$13,500 in field camp scholarships in 2013 and make \$18,000 in undergraduate research grants to support Baccalaureate research over the past year. In 2013, EES committed a total of \$35,000 to our graduate students in support of their scholarly activities including funds to advance their thesis and dissertation research, so that they could attend workshops and short courses and promote their attendance at the Geological Society of America meeting in Denver CO, the American Geophysical Meeting in San Francisco, CA. or the Goldschmidt Conference in Florence, Italy. These scientific meetings are important for student professional development and the research findings presented at these conferences enhances the prestige of the department and the reputation of all those who hold Lehigh University degrees.

Anyone who pays attention to the news knows that science budgets supported by government agencies are flat or in decline. Research funding to Lehigh from federal agencies pays for everything from graduate student and research scientist salaries, to laboratory equipment in EES. The number of bright students we can support and the opportunities we can provide is limited by the support the faculty and department can generate. Whether you are hiring for your company's future or planning your own philanthropic giving, I hope you consider EES and our talented graduates. Tax-deductible gifts to EES make the undergraduate and graduate educational experiences we provide richer and our graduates more successful. It does not take a lot to make a big difference to one of our students.

I invite you to share your news or to join us at one of the EES student research symposiums or at our weekly seminars. We would love to hear from you.

Let us know (nr00@lehigh.edu) if you plan on attending the 2014 AAPG meeting in Houston, TX (April 6-9), the GSA meeting in Vancouver, Canada (October 19-22) or the 2014 AGU meeting in San Francisco, CA (December 15-19). I will arrange an alumni gathering if there is enough interest for a get together.

Best wishes for a happy and successful 2014.

Sincerely yours,

David Anastasio, Ph.D., P.G.
Professor and Chairman
Department of Earth and Environmental Sciences



STEPS Building, home of the EES Department

EES NEWS

Laura Cambiotti retires!

August 30th was Laura's final day in the EES department. It was a long time coming after a 39-year stint that began in Williams Hall, home of the Geology Department, way back in May of 1974. Laura began her Lehigh career when she was hired by then Geology Department chair, J.D. Ryan, as front-desk secretary. Subsequently, she moved into the Department Coordinator role in 1982. Laura has certainly left her mark here in the EES Department and Lehigh has also impacted Laura's life in many ways.



Bruce Idleman, P.B. Myers, Jr., Dave Anastasio and Ken Kodama enjoy the celebration!

She has made many lasting friendships and, of course, the most lasting

relationship that was forged, while at Lehigh, is her marriage to Professor Ed Evenson, when they tied the knot in Alaska in October, 1996. And, as they say, the rest is history.

Laura's retirement celebration was held at Jenny's Kualu Restaurant, on a very balmy August 22nd. Many from the department gathered for the party to wish Laura a fond farewell, including fellow EES retiree, Paul Myers, Jr.! All enjoyed the fantastic assortment of Malaysian cuisine as well as the delightful company!

Laura has been spending her well-deserved leisure time enjoying her family, including spending more quality time with her granddaughters as well as practicing yoga. There will also be more free time that will allow her and Ed more visits to their homestead in Idaho!

But, there is a twist to this retirement story because...Laura is again employed... by Lehigh University! That's right. Since receiving teaching certification in Yoga a couple of years ago, she is now teaching a noon Yoga

class each Thursday in the Lehigh Fitness Center!



Laura, about to have her cake... and eat it too!

Laura is very happy with her new-found freedom and appears to be very relaxed by the huge smile she was sporting the last time we had lunch (which, by the way, was awesome, homemade gnocchi that she made herself and prepared for me and a couple of other friends, *thanks again, LJ!*). As her office mate for 28+ years, I have to say that, I thoroughly enjoyed working with her and very much miss seeing her every day. All of us in EES wish her extreme happiness in her retirement! Enjoy Laura!

—Romanesque

The changing face of the EES office

As Laura Cambiotti now departs EES, **Nancy Roman** has moved into her old office space and remains as Department Coordinator, taking on some new responsibilities. Additionally, **Leigh Anne Fernandes**, has joined the department as the new friendly face of the front office. Leigh Anne joined EES in August 2013, as office assistant, just in time for classes to begin! She hit the ground running and has been a wonderful addition to the office staff. She is always very pleasant and eager to help faculty, staff, and students alike. Leigh Anne

resides with her husband, in Reading, PA.

Recently moved on....

Claudio Berti first came to EES from Rome, Italy in 2007, one of a group of five students invited to come to Lehigh by Frank Pazzaglia. In 2008, Claudio accepted a position as a postdoctoral research associate and was also an instructor for the Geology Summer Field Camp from 2008-2013.

This past September, Claudio began a position as Assistant Professor of Geological Sciences at the University of Delaware and is now teaching several geology courses as well as

working on developing field programs. In bocca al lupo, Claudio!
(*Best of luck Claudio!*).

Kim Genareau, arrived at Lehigh, from Arizona State, in 2010. In the EES Department, Kim was a postdoctoral research associate, working with Dork Sahagian.

Kim is an Assistant Professor with the Geological Sciences department at the University of Alabama in Tuscaloosa. She is now teaching Volcanology and Igneous and Metamorphic Petrology while continuing her research on volcanoes.

Best wishes Kim!

EES GRAFFITI

Dave Anastasio does not know how Frank did it! Dave hosted Visiting Professor **Joesp Parés** from Centro Nacional de Investigación sobre la Evolución Humana, Spain, for five months in 2013. Together with graduate student **James Carrigan** and EES undergraduate **Marisa Repasch** they started a new project on the syntectonic conglomerates of the Alto Cardener Valley, Spain.

Gray Bebout spent the fall semester on sabbatical including a long sojourn to the Pheasant Memorial Lab at Okayama University, Japan. He is the recipient of a New Directions grant from CAS to redirect his research program to investigate Martian life!

Bob Booth authors the blog *Among the Stately Trees* and regularly tweets with his students. Follow him @Stately Trees. Erin So...@soooowell wrote in September... Walking up the hill with a leaf press and a bag of samples. What more could a girl ask for.#ees152.

Zicheng Yu held a synthesis and training workshop on Holocene circum-Arctic peatland carbon dynamics in Bethlehem. 25 peatland researchers from eight countries attended. Strategies for further analyzing and synthesizing peat carbon datasets along with other peatland data and bioclimate records were discussed over three days in October.

Ed Evenson asks, which way did it go? Ed and graduate student Nate Hopkins traveled through Sweden this fall in an RV collecting sediment samples from glacial deposits. The samples will be analyzed in Kodama's lab to determine the magnetic fabric, which has been shown by their previous work in the drumlin fields of New York state to align with glacial flow directions.

Ben Felzer has a new baby....a new high performing computing cluster that allows his research group to develop and investigate terrestrial ecosystem models and climate interactions with even greater speed.

Bruce Hargreaves attended the annual meeting of GLEON (Global Lake Ecological Observatory Network) which was held in Bahia Blanca, Argentina. There he chaired a workshop and also presented a

poster on his collaborative project to design, test, and improve an autonomous profiling instrument buoy to track changes in small lakes that serve as sentinels of climate change.

Ken Kodama continues to have the writing bug. He and collaborator **Linda Hinnov**, from Johns Hopkins, completed a new book, "Rock Magnetic Cyclostratigraphy". He also began work with graduate student **Daniel Minguez** down under on a new project to determine the details of the Neoproterozoic Shuram excursion.

Anne Meltzer developed a new course in professional development for EES seniors to help them succeed in life after Lehigh armed with a portfolio and greater understanding of the grand challenges facing the Earth sciences.

Don Morris had 93 students take his introductory online course in conservation biology this summer while leading another group of Lehigh students on service learning conservation projects in Costa Rica.

Steve Peters mentored a group of EES undergraduates in research over the summer, the results will be presented at the Northeastern GSA meeting in March 2014. He spearheaded a successful proposal to acquire a stable isotope analyzer for water, methane, and carbon dioxide measurements. The instruments will have applications to biogeochemistry, hydrogeology, and paleoclimate across the natural sciences.

Frank Pazzaglia has reappeared in STEPS. With no meetings to go to he is in his office, or classroom, or lab enjoying the simple pleasures of an academic-teaching, learning and generating knowledge.

Joan Ramage is working with Lehigh social scientists to understand community impacts of Marcellus exploration and production in Pennsylvania. She is the new Director of Lehigh's South Mountain College.

Dork Sahagian spends each Monday in the wind tunnel at the University of New Hampshire trying to understand explosive volcanic eruptions. He also authored a book, published in 2013, entitled "A Users

Guide for Planet Earth" which focuses on the fundamental components of Earth's environmental systems, their interactions, and the way society affects and is affected by alterations in climate, ecosystems, hydrology, and many other factors that determine our environment.

Peter Zeitler If you look through the looking glass of STEPS 221 you will see the juicy Argus VI multicollector noble-gas mass spectrometer with perhaps **Kalin, Jen, Lenny, Bruce,** or **Peter** picking grains, modeling thermal histories, or most probably wrapping something in aluminum foil.

Graduate Internships and Training

Jen Schmidt and **Kalin McDannell** spent the summer interning at Chevron in Houston, while newly minted PhD **Kate Semmens** was across town at ExxonMobil. All have returned to the northeast, Kate to a USDA postdoc in Maryland and Jen and Kalin to the thermochronology lab in STEPS 221.

James Carrigan, Anastasio's new graduate student spent 2 weeks in June 2013 at the Institute of Rock Magnetism, University of Minnesota getting a crash course in rock and paleomagnetism.

Mingkai Jiang, Jien Zhang, and **Travis Andrews** all passed their PhD qualifying exams this fall and all include ecological modeling in their research plans. Feltzer's new baby will be well used.

First we had to leave.

Williams Hall.... is now being renovated. Construction began on December 20, 2013, and is expected to be completed in Spring 2015. The 110-year old building originally housed mining and geology laboratories, some classrooms, and offices. The new Williams Hall, designed by Beyer Blinder Belle, is centered around a global theme, will provide a dynamic mix of renovated space for several academic departments, student affairs, and a number of shared programs, and will improve campus circulation around and into the building. One of the defining features will be the Global Commons, an innovative attractor space for student, faculty, staff, and visitor interaction on global issues.

SYNERGY

The EES Department is composed of 15 faculty engaged in a diverse array of research and education covering a breadth of Earth science, including geology, geophysics, earth surface processes, climate science, and paleoecology. There are many ways to categorize and eclectic group such as ours. In this year's newsletter I chose to emphasize what our collaborative synergy allows by presenting areas of faculty overlap.

Solid Earth Sciences

Active Tectonics. EES has a group of eight faculty (Meltzer, Zeitler, Kodama, Bebout, Anastasio, Ramage, Sahagian, Pazzaglia) who conduct research on the crustal processes that build mountains, the surficial processes that tear them down by erosion, and the stratigraphy that archives these processes and Earth history. This research is being conducted along plate boundary and intraplate settings of China, Tibet, Mongolia, Spain, Italy, and the U.S. in mountains that harbor numerous natural hazards, among them great earthquakes and erupting volcanoes. EES has deep expertise in petrology, the study of biogeochemical cycling at plate boundaries; seismology, the passive and active source documentation of crustal structure; tectonics, the characterization of the processes and rates driving crustal deformation; structural geology, the field characterization of deformation kinematics; and geomorphology, the long-time scale documentation of landscape change in response to tectonics. We have recently incorporated InSAR remote sensing capability document real-time crustal deformation using satellite-derived imagery. We have complementary capabilities to instrument and monitor regions for long-term data characterization of active tectonic and geomorphic processes. The research projects of the Solid Earth Group are mainly sponsored by the National Science Foundation (NSF) and the National Aeronautics and Space Administration (NASA).

Environmental Change

Hydrology and Climate Science: EES has eight faculty members (Felzer, Sahagian, Evenson, Yu, Booth, Ramage, Peters, Pazzaglia) who conduct research directly or indirectly related to Earth's hydrosphere, climate science and related disciplines. Some members of this group are engaged in the documentation of Earth's climate using high-resolution geologic and biologic proxies stored in sediments and peat. Other members of the group are dedicated to regional data collection at shorter time scales through remote sensing. The most recent addition to this group Professor Ben Felzer is a computational modeler who is able to model ecosystem responses to changes in climate. Ecosystem services such as support of the food chain, flood mitigation, and water quality are directly related to changes in the hydrosphere and round out the research interests of this broad group. Research projects of the Hydrology and Climate Science Group are sponsored by the NSF, NASA, and the Environmental Protection Agency (EPA).

Ecosystem Ecology: EES has five faculty (Yu, Booth, Felzer, Hargreaves, Morris) who conduct research in ecology, paleoecology, and biodiversity. These researchers are working in the Arctic, Antarctic, Patagonia, China, and the U.S. Among other research interests, the group characterizes peatlands in terms of productivity and sustainability in the rapidly warming high latitudes. The latter topic is of particular interest as peatlands emerge as a potentially crucial player in land use management strategies geared to sequestering and storing atmospheric carbon in biomass. The research of the Ecosystem Ecology Group is sponsored primarily by NSF.

Education Research: EES have two faculty (Anastasio, Sahagian) who regularly engage in STEM education initiatives. They and College of Education colleagues have developed curriculum and teacher educative materials, which use geospatial technologies (e.g. ArcGIS) and inquiry to enhance energy, tectonics, and climate change learning in grade 7-12 curriculum. Research in urban school districts like the Bethlehem Area School District can foster a more diverse pipeline of future scientists and engineers for the global workplace. The Education Research is currently sponsored by the NSF.

Environmental Policy: The EES Department works closely with social science faculty in Lehigh University's Environmental Initiative (EI) in porting scientific and sociological research to environmental policy. Ongoing Lehigh efforts include EES's Joan Ramage on a project to examine communities that are currently transforming as a result of shale gas development and will be scalable to national priorities and planning strategies. The Marcellus research is sponsored a by Lehigh University CORE grant.

RESEARCH GROUP MEETINGS

Graduate students have always formed the heart and soul of the research and scholarship of the department. For decades, our graduate student numbers have been stable and financial aid limited to ~25, but recently the proportion of PhD candidates have increased so that presently three-quarters of our graduate students are pursuing doctoral degrees. We are pleased to introduce our incoming class of graduate students to you on page 9. This year the graduate students have been very active in promoting multi- and interdisciplinary conversations amongst us. They have self-organized weekly meetings to promote dialogue, share proposal ideas, practice talks, to consider new data or discuss a recent paper they found exciting. Most members of the department attend one group meeting, however, there are a few hardcore students and faculty that regularly attend two. The groups foster intellectual curiosity and engagement and help the faculty mentor professionalism. This year's discussion groups are described by the students as follows:

Paleoecology and Ecosystems Dynamics Group

We are an open group of EES graduate students, faculty, post docs, research scientists and undergraduate researchers that act as a think tank of sorts to flesh-out in-progress research and proposals. As Earth and environmental scientists we are concerned with the past, present and implications for future climate and ecosystem change. Each week during the semester one group member leads an informal discussion of their research. Major themes during my tenure include 1) drought, fire, forest composition change and carbon accumulation during the Holocene using peatland records, 2) biogeochemical cycles using field measurements combined with the Terrestrial Ecosystem Model and, 3) modern forest ecology utilizing extensive measurements at the Lehigh Experimental Forest and US Forest Service big data analysis. Our goal is to use the diversity of our backgrounds as a strength to provide broad developmental feedback with the potential to find new application, direction and funding for our work. Meeting times are set at the start of each semester, so check with the front office and stop by sometime!

Travis Andrews, PhD candidate
tda210@lehigh.edu

"The contribution of agricultural irrigation to an epic pluvial and the consequence to forest growth in the Eastern US."

Paleoecology and Ecosystem Dynamics Group Coordinator

Solid Earth Group

The Solid Earth Group is comprised of scientists studying a broad range of geological phenomena. These include lithospheric and crustal dynamics, deformation at the Earth's surface, landscape evolution, tectonic and climatologic forcings of the sedimentary record, and petrogenesis. Our diverse collection of expertise fosters an environment of interdisciplinary and thoughtful research. Generally 15 or so members of the department are in attendance. All participants take turns in leading a meeting each semester and in providing thought-provoking baked goods.

Daniel Minguez, PhD candidate
daniel@thumos.org
 Solid Earth Research Group Coordinator

Water Group

I think the scope of the "Water Group" is redefined every time it meets. We always talk about something new and the faculty and graduate students who attend are constantly in flux. We try to avoid planning too far in advance, assigning homework, and pressuring people to present, which engenders the flexibility to discuss topics of interest as they come up. For example, this fall we had two discussions around the research potential that purchasing a cavity ring-down isotope spectrometer could offer to our department and the university, discussions that were timely for a successful grant proposal. In general we attract faculty and graduate students

with interests in hydrology, biogeochemistry, aquatic ecology, and ecosystem processes. Meetings are very small, rarely with more than 7 people in attendance. This fall the "regulars" included the research groups of Bruce Hargreaves and Steve Peters, with occasional appearances from Ben Felzer and his group. We also got to know Tara Troy, new faculty in the Civil and Environmental engineering department, who joined us at many of our meetings and introduced us one week to her research on modeling climate variability and water supply in India. The variety, flexibility, and casual attitude of the Water Group makes it an excellent forum for imagining new possibilities, asking questions, and learning from colleagues.

Eric Ellison, MS candidate
ete212@lehigh.edu
 Water Research Group Coordinator



EES 334, Geosphere Structure and Evolution class visiting Dinosaur State Park in Connecticut

FACULTY RECOGNITION

Anne Meltzer to be named the first Trembley Chair in the Department of Earth and Environmental Sciences



Francis J. Trembley Chair was established by Lehigh alumna **Marjorie M. Nemes**, who received her MS in 1951 and PhD in 1955 in bacteriology. In addition to establishing the Trembley Chair, Nemes also created the Nemes Fellowship in the Department of Biological Sciences that supports

graduate student research. The position is named in honor of Francis Trembley, who was a former chair of biological sciences at Lehigh and a pioneer ecologist. He began his career at Lehigh in the biology department in 1928 and became Lehigh's first professor of ecology in 1949.

Dean of College of Arts & Sciences, Donald Hall, reports that the pool of EES nominees for the Trembley Chair was extraordinary. "We are lucky to have among us so many high achieving researchers. Anne Meltzer was recognized for her long and distinguished career of outstanding contributions in geological research. Her work has had tremendous impact and it has also enabled countless others to develop successful research agendas. Her research has thus been exponentially significant." *Congratulations Anne!*

Bob Booth receives recognition from Lehigh University

Eleanor and Joseph F. Libsch Early Career Research Award 2013.

–Awarded to a faculty member of the university who is early in their research career and has demonstrated the potential for high-quality research and scholarship.

Class of 1961 Professorship 2013-2015.

– Lehigh recognizes an associate professor for distinction in scholarly activities, teaching and service.

Peter K. Zeitler selected as a Fellow of the American Geophysical Union

American Geophysical Union (AGU), an international scientific society, was formed in 1919 by the National Research Council to promote discovery in Earth and Space science for the benefit of humanity. Peter Zeitler's fellowship recognizes his eminence and "for his pioneering contributions to the field of thermochronology and its application to a new understanding of orogeny". The AGU is comprised of greater than 62,000 members from 144 countries and sponsors the largest annual scientific conference with more than 20,000 attendees. Selection as a Fellow is a great honor as AGU Fellows are restricted to less than 1% of the membership.

Congratulations Peter!



Carol Finn, president of AGU, congratulates Zeitler

Earth and Planetary Science Letters and Elsevier recognize Zeitler

Each year the *EPSL* Editors and Elsevier review the contribution of all Editorial Advisory Board members. Based on this, Peter Zeitler was acknowledged for his exceptional contribution to the journal, and support to the Editors, with one of this year's *EPSL* awards.

As a sign of appreciation, Peter was presented a certificate, and a reprint of Galileo Galilei's last work "*Discorsi e Dimostrazioni Matematiche*" at the *EPSL* meeting and dinner on the 9th of December at the AGU. *Once again, congratulations Peter!*



ENDOWED FUNDS FOR EES STUDENTS

This page highlights three of the most important EES endowment funds that help to support our graduate and undergraduate students. EES students are extremely grateful for the generosity of these alumni. In this issue, we have chosen to highlight Palmer, Ryan, and Bertolet endowments and, in future newsletters, plan to highlight other endowments and the positive impact the gifts from these endowments provide to EES students.

Palmer Field Studies Endowment Fund for Graduate Student Research and Travel Support

Dr. Richard B. Palmer received his BS degree at Lehigh University in geology in 1943 and went on to earn his PhD from Johns Hopkins. He was chief explorationist for Texaco, with a 32-year career in the oil business. The Palmer Field Studies Endowment Fund was established in 1999 to support graduate geology field studies in 2013. In 2013, the fund has supported such student projects as:

Kellen Gunderson's PhD research focused on reconstructing the slip histories of active thrust faults in the Northern Apennines, Italy (*advisors: Anastasio & Pazzaglia*).

PhD candidate Jill Burrows' research on geochemical and geomorphic factors controlling iron transport in surface water.

Johanna Blake's PhD research on geologic, tectonic, and geochemical signatures leading to arsenic in groundwater in the Gettysburg Basin.

Kalin McDannell's PhD research on lithospheric evolution in continental interiors.

PhD student Nathan Hopkins' paleomagnetism measurements and supplies purchased for field and laboratory research (*advisor: Evenson*).

Nathan Hopkins (*advisor: Evenson*), Johanna Blake (*advisor: Peters*), and Jill Burrows (*advisor: Peters*) travel to the Geological Society of America Meeting; Michael Clifford (*advisor: Booth*), Leonard Ancuta (*advisor: Zeitler*), Daniel Minguez (*advisor: Kodama*) travel to the American Geophysical Union Meeting, all to present their research.

James Carrigan attended a summer workshop at the Institute of Rock Magnetism at the University of Minnesota (*advisor: Anastasio*).

These are just some students who have benefited from Palmer Field Studies funding.

J. Donald Ryan '43 Memorial Endowment Fund Undergraduate Student Research Support

Dr. J. Donald Ryan was a specialist in the study of sedimentary rocks and the geology of the Rocky Mountains, Ryan was head, then subsequently chairman of the department of geological sciences at Lehigh University, from 1961 to 1976. During his career he conducted research on the geology of the moon as part of the Apollo program, working with the astrogeology branch of U.S. Geological Survey. He also conducted research on the geology of Bucks County, and uranium deposits of the Colorado Plateau, the Black Hills, and the Rocky Mountains of Wyoming. Dr. Ryan received his bachelor's and master's degrees from Lehigh University, and his doctorate in 1952 from Johns Hopkins. The J. D. Ryan '43 Memorial Endowment Fund was established in 1995 to support undergraduate studies in Earth & Environmental Sciences to support field trips, undergraduate student research, faculty-student intern studies, and other department activities that specifically introduce students to the real world and it's complexities. In the years since it was established, alumni donations to the fund have greatly helped to support many EES majors in their studies.

A list of the 2014 student research projects that were funded can be found on page 10.

Robert C. Bertolet Fund

Robert C. Bertolet attended Lehigh University and graduated with the Class of 1955 with a BA degree in Geological Sciences. Bertolet worked in the oil industry for years after graduating and eventually formed his own oil exploration company in Natchez, Mississippi.

The Bertolet fund was established in 1983 when Robert Bertolet made a donation to support a program of lectures and/or short courses by prominent visiting scientists, designed to keep Lehigh students and faculty abreast of current and new research developments. Since that time, the Bertolet fund has supported many visiting speakers to our department. Our weekly seminar series is held each Friday at noon during each spring and fall semester. The fund covers travel and lodging for our speakers. You can find a listing of all 2013 seminars on the following page as well as on our website at: <http://www.ees.lehigh.edu/EESdocs/seminars.html> You are welcome to join us for these weekly seminars. In addition to current faculty, graduate students, research scientists, outstanding undergraduates, and members from other departments, you are likely to see Bobb Carson or P.B. Myers, Jr.

Thank you to our alumni whose endowed bequests allow us to sustain our quality educational program.

EES SEMINARS

Semester Seminar Series

supported by the endowed Bertolet Fund

—EES seminars are scheduled every Friday at 12 noon in STEPS Rm. 101—

Please join us!

Spring

January 18th David Rowley, University of Chicago, "Mantle Contributions to Driving Plates, Topography, and Sea Level."

January 25th Donald Fisher, Penn State University, "Anatomy and Evolution of an Arc-Continent Collision, Taiwan."

February 1st Steve Frokling, University of New Hampshire, "Peatlands in the 21st Century Climate System"

February 8th Adam Maloof, Princeton University, "Did Earth lose it's balance before global glaciation and the evolution of the first animals?"

February 15th Pete La Femina, Penn State, "Deformation of the Western Caribbean"

February 22nd Patrick Belmont, PhD, Lehigh '07, Quinney College of Natural Resources, Utah State University, "Recent Shift in Sources of Mud Challenges Upper Mississippi River Cleanup Efforts"

March 1st Gilles Brocard, University of Pennsylvania, "Tectonic Defeat of River Drainages by Stream Piracy in the Caribbean."

March 29th Rebecca Fox, Hornpoint Laboratory, "The Search for the Missing N: Quantifying Denitrification at the Watershed Scale"

April 5th Jennifer Wollenberg, PhD Lehigh '08, The Elm Group, "Using Multiple Lines of Evidence to Evaluate Long-term System Stability in a New Jersey Estuary."

April 12th Cindy Shellito, University of Northern Colorado, "Hothouse or Icehouse: Reconstructing Climate of the Cambrian in a Low Resolution Climate Model."

April 19th Paul Kapp, University of Arizona, "Wind Erosion in Central Asia: Implications for Tectonics, Paleoclimate, and the Source of the Loess Plateau"

April 26th Christine Regalla, Penn State University, "New Perspectives on Tectonic Processes at the Northeast Japan Erosive Subduction Zone"

Fall

September 13th Ben Horton, Institute of Marine and Coastal Sciences, Rutgers University "Sea-level Change Along the Atlantic Coast of the United States"

September 20th Joseph Pares, Spanish National Research Centre for Human Evolution, "Pleistocene human migrations: The first settlements in Europe"

September 27th Ben Felzer, EES Department, Lehigh University "How Environmental Stresses Affect Ecosystem Services in the U.S."

October 4th Joshua Pepper, Department of Physics, Lehigh University "The Coming of Comparative Exoplanetology"

October 18th Kira Lawrence, Geology and Environmental Geosciences, Lafayette College "Back to the Future: Insights into Modern Climate Change from Earth's Last Interval of Sustained Warmth"

November 8th Karen Fisher, Geological Sciences, Brown University, "North American Plate Boundaries Old and New"

November 15th Yongsong Huang, Geological Sciences, Brown University "Progress in Applying Lacustrine Alkenones as a Quantitative Continental Paleotemperature Proxy"

November 22nd John Tarduno, Earth and Environmental Sciences, University of Rochester "Onset of the Geodynamo and Planetary Habitability"

The Annual Donnel Foster Hewett Lecture Series is sponsored by the Department of Earth & Environmental Sciences and is supported by a bequest which was made to the department by one of its most distinguished alumni, Donnel Foster Hewett.

Hewett matriculated at Lehigh University in September 1898. Following graduation in 1902, he spent another year at Lehigh as an assistant in metallurgy and mineralogy under the direction of Joseph Barrell. After Joseph Barrell moved to the Department of Geology at Yale in 1907, Hewett went there in 1909 to study geology and received his Ph.D.

2013 D. Foster Hewett Seminar Series

Order and Emergence in a Non-Linear World

-The anthropogenic Earth is a difficult, highly complex, tightly integrated system that challenges society to rapidly develop tools, methods, and understandings that enable reasoned responses.-

This year's program was held on Friday, March 22nd. Featured speakers were, **Tom Jordan**, University of Southern California, "Earthquake forecasting as a system-science problem", **Taylor Perron**, Massachusetts Institute of Technology, "Of Rivers and Ripples: Reading the Patterns in Landscapes", **Carla Staver**, Columbia University, "Positive Feedbacks and the Global Distribution of Biomes", and **Brad Allenby**, Arizona State University, "Earth Systems Engineering and Management: Responding to the Complexity of the Anthropocene"

The topic of the 2014 D. Foster Hewett Seminar Series is "Origin of Life" and is scheduled for September 2014. Please check back to our seminar website for further information.

<http://www.ees.lehigh.edu/DFH/DFHmain.html>

GRAD STUDENTS

2013 Graduate Symposium

This year's **Graduate Symposium** was held on February 22nd. The symposium occurs annually to showcase graduate student research and bring together EES scientists past, present, and future. EES graduate students in residence present either an oral talk or poster accompanied by an abstract in professional meeting format. This year, nine students presented their research during two talk sessions. There was an open poster session during which fifteen students presented their research. The program also included talks by Lehigh alumni, **Patrick Belmont**, PhD '07, Assistant Professor in the Department of Watershed Sciences at Utah State University and, **Kenneth Wiles**, MS '10, environmental scientist, Hatch Mott McDonald. After this year's talks and poster session came to a close, a reception, in the STEPS building, was followed by a banquet dinner in the Asa Packer Dining Room of the University Center. As always, alumni are invited to attend the Graduate Symposium. This year, alumni attendees included **Bob Bond**, MS '85, **Brent Zaprowski**, PhD '01, and **Alan Blanchard**, MS '86. The 2014 Graduate Symposium is scheduled for February 21.

Graduate STUDENT AWARDS

Best talk award: **Kellen Gunderson**

"Unraveling Tectonic and Climatic Controls on Synorogenic Growth Strata, Northern Apennines, Italy"

—Runners up: **Jill Burrows**

"Geochemical and Hydrologic Controls on Mine Drainage: Pennsylvania Anthracite Coal Region 1975-2012"

Michael Clifford

"Drought and Fire Altered Late-Holocene Forest Composition in New England"

Best poster award: **Kate Semmens**

Determining Melt Regime Patterns and Changing Melt Dynamics for Alaskan Glaciers and Icefields using Passive Microwave Brightness Temperatures

—Runners up: **Jennifer Schmidt**

Assessing Thermochronometer Systematics in a Natural Geologic Setting, Little Devil's Postpile, Yosemite National Park

Mingkai Jiang

A Snapshot of Local Grassland Productivity—Role of Orchard Grass in the Eastern U.S.

• **Jill E. Burrows**, Paul B. Myers, Jr. Distinguished Teaching Assistant Award. *The award recipient is chosen by the EES faculty and carries a monetary award funded by the EES operating budget.*

The accomplishments of some of the university's most remarkable students were recognized at a ceremony that is held each year to honor students who shape the campus culture in positive and productive ways. Our own **Jill E. Burrows**, current President of the Graduate Student Senate, was the recipient of two Student Life Leadership Awards this year including the **Alumni Association Graduate Merit Award** and the **Graduate Student Life Leadership Award**.

Congratulations Jill!

Graduate Student Funding

Each year the *Graduate Instruction Committee (GIC)* awards graduate students funding for research and travel to professional meetings. In 2013, the following students received additional funding:

Palmer funding:

Johanna Blake
James Carrigan
Michael Clifford
Nathan Collins
Jill Burrows
Jennifer Schmidt

Agocs funding:

Daniel Miguez
Philip Martin
Kate Cleary

Farney funding:

Eric Ellison
Jien Zhang
Nathan Collins

Our newest graduate students!

James Carrigan, BS, University of Massachusetts (*Advisor: Anastasio*)
Kathleen Cleary, BS, Lehigh University (*Advisor: Yu*)
Zhongxiong Cui, MS, King Abdullah University of Science & Technology (*Advisor: Meltzer*)
Helen Malenda, BS, Kutztown University (*Advisor: Pazzaglia*)
Philip Martin, MS, North Carolina Central University (*Advisor: Meltzer*)

UNDERGRADUATES

ANNUAL Undergraduate AWARDS, 2013

Students are recognized at the annual EES Undergraduate Symposium each spring

🏆 **J. Robert Munford Award. Kimberly E. Baldwin** This award is given to the senior major who *Demonstrates Substantive Improvement over the Course of their Program of Study, and Attain, in the Senior Year, a Clear Record of Excellence.* Kim is now a graduate student at Rutgers University.

🏆 **Donnel Foster Hewett Award. Chase M. Slavin** This award goes to a senior in Geological Sciences *Who Best Demonstrates the Potential for Professional Excellence.* Chase earned dual BS degrees in EES and Civil Engineering.

🏆 **Handwerk Prize. Danielle C. Gendron** This prize is presented to a student for *Outstanding Achievement in the Fields of Chemistry, Materials Science and Engineering, or Earth and Environmental Sciences.* Danielle just finished an internship at the New England Aquarium conducting whale research and has now applied to graduate school.

🏆 **David Hellekjaer Memorial Award, no 2013 recipient**
The award is presented to a senior *who best exemplifies characteristics of David Hellekjaer.* The awardee is dedicated to the study of science, participates vigorously in sports, and demonstrates loyalty and contributes to a fraternity or sorority.

2013 Undergraduate Symposium

The EES **Undergraduate Symposium** is held annually on the last Friday of the spring semester, this year on April 26th. It is a forum for the presentation of undergraduate thesis research and awarding of undergraduate prizes. Honors thesis presentations follow a keynote talk by an EES undergraduate alumnus. The event is followed by the EES department picnic and the awarding of the P. B. Myers, Jr. Distinguished Teaching Assistant award.

This year's symposium began with an outstanding presentation by Lehigh alumnus, **Christine Regalla, '05.** Christine completed her PhD in geoscience at Penn State University in 2013 and is currently a visiting assistant professor at Hobart William Smith College in Geneva, NY. She spoke on "*New perspectives on tectonic processes at the Northeast Japan erosive subduction zone*".

There were two oral presentations by seniors **Amanda Casteel**, "*Validation and Application of In-Situ Iron-Manganese Oxide Coated Stream Pebbles as Sensors for Arsenic Source Monitoring*" and **Kayla Virgone**, "*Natural Attenuation in Pennsylvania Abandoned Coal Mine Discharges*". Both advised by Peters.

Posters were presented by the following students:

Kim Baldwin, *Geology and geomorphology of the Centennial accommodation zone along the Price Creek seismic line, SW Montana.* Advisor, Pazzaglia.

Kate Cleary, *Climate Change Affects Vegetation and Carbon Accumulation in a Peatland (Kamchatka, Russia) over Last Millennia.* Advisor, Yu.

Katie Kimball, *Vegetative Effects of Water Level in LGNC Streams* Advisor, Hargreaves.

Amber Lutey, *Determining Optimal Growing Conditions for the Oil-Producing Micro-algae, Nannochloropsis.* Advisor, Peters.

Pooja Potti, *Sediment Discharge in the Monocacy Creek.* Advisor, Pazzaglia.

Brian Rodriguez, *Carbon Subduction in the Sunda-Banda Arc: A geochemical analyses of carbon variations along the convergence zone.* Advisor, Bebout.

Undergraduate research awards for 2013-14

FUNDED BY THE RYAN ENDOWMENT FUND:

Breanne Ensor, Influence of overstorey vegetation on the abundance of red-backed salamanders (*Plethodon cinereus*) in the forests of South Mountain.

Joseph Solly, Stream influences on abandoned mine drainage remediation.

Marybeth Lyons, Changes to DOC through the Terrestrial Hydrologic Cycle.

Joseph Solly, Stream influences on abandoned mine drainage remediation.

Marybeth Lyons, Changes to DOC through the Terrestrial Hydrologic Cycle.

Elizabeth Odren, Transition in Fiasco Lake Bog peat core (Yukon Flats, Alaska) corresponds to the Medieval Warm Period and the Little Ice Age.

Bob Mason, The influence of white-tailed deer (*Odocoileus virginianus*) on tree recruitment in forest canopy gaps created by Hurricane Sandy.

Brionna O'Connor, Maintaining pH by CO₂ exchange in abandoned mine drainage treatment systems.

Chandler Navara, Effects of hybridization and habitat choice on fitness of black-capped chickadees (*Poecile atricapillus*).

Erin Lau, Design, construction, and utilization of a sandbox deformation table.

FUNDED BY ANNUAL GIVING OF MARK & KRISTEN KOELMEL:

Marisa Repasch, Determination of fault-propagation fold kinematics using AMS fabrics, Sant Llorenç de Morunys, Pyrenees Mountains, Spain.

Cody Raup, Geologic Mapping at Mineral, Virginia.

Geophysical Data Acquisition at the Mineral Seismic Zone project. Graduate students working on the project include: Philip Martin, Lillian Soto-Cordero, Zhongxiong Cui, & Stephanie Souza. Undergraduates include: J. W. Ryan, Joseph Solly, and Marisa Suarez.

CORE GRANTS

EES FACULTY AWARDED COLLABORATIVE RESEARCH OPPORTUNITY (CORE) GRANTS BY LEHIGH UNIVERSITY

Impacts of Marcellus Shale Gas Development on Quality of Life in Pennsylvania

Lehigh Faculty: David Casagrande, Sociology & Anthropology, Thomas Hyclak Economics, Kelly Austin Sociology & Anthropology, Scott Rutzmoser, Library Technology, Sharon Friedman, Journalism & Communication
Joan Ramage, Earth & Environmental Sciences, Al Wurth, Political Science, Alec Bodzin, Teaching, Learning & Technology

Unconventional extraction of natural gas from the Marcellus Shale in Pennsylvania provides an opportunity for interdisciplinary study of the effects of rapid economic development and environmental impacts on human quality-of-life. We will develop a quality-of-life index specific to our study population and the issue of gas extraction. Residents of impacted communities will express perceptions of quality-of-life through focus groups and in-depth interviews. We will develop questions for a survey to measure quality-of-life in households distributed evenly among four townships that are similar in socio-economic characteristics, but differ in economic development amenities and are either experiencing gas extraction or not. We will compile data describing township socio-economic characteristics, economic development amenities and drilling activity impacts from US Census data, geographic information

This research will result in a quality-of-life index databases, township and county records, and satellite imagery that is meaningful to the research subjects, an estimation of which aspects of extraction most affect quality-of-life, and insights into why some communities experience more improvement in quality of life than others.

Cities in the Fall Zone: Earthquake Hazard, Vulnerability, and Resiliency in the U.S. Mid-Atlantic Region

Lehigh Faculty: **Anne Meltzer**, Earth and Environmental Sciences (Corresponding PI), Sharon Friedman, Journalism and Communication, Jeremy Littau, Journalism and Communication, **Frank Pazzaglia**, Earth and Environmental Sciences, James Ricles, Civil and Environmental Engineering, Richard Sause, Civil and Environmental Engineering

Lehigh Research Staff:

Josh Stachnik, Earth & Environmental Sciences

Lehigh Students:

Lillian Soto-Cordero Earth & Environmental Sciences

Helen Malenda Earth & Environmental Sciences

Xin Chu Civil & Environmental Engineering

In the wake of the Mineral VA earthquake in 2011, we are looking to better understand the causes, characteristics, and consequences of earthquakes within geologic plate interiors like the eastern U.S. The occurrence of a large earthquake on the east coast is a low-probability, but potentially high-impact event. There is a growing recognition of governments, development agencies, NGOs, and emergency management professionals in the importance of building resilience in advance of a significant event as a critical component to mitigate the risks associated with hazards. By bringing together a multidisciplinary research team of earth scientists, structural engineers, and social scientists we seek to demonstrate the power of a collaborative interdisciplinary approach to disaster reduction and building resilient communities.

GRADUATION

CONGRATULATIONS EES GRADUATES, MAY, 2013

PhD	<p>Christopher Dempsey "The Use of Headwater Catchments to Understand the Age, Availability, and Fate of Organic Matter Exported from Terrestrial to Fluvial Systems" (<i>advisors</i>, Donald Morris, Frank Pazzaglia). Chris is now a visiting assistant professor at Wilkes University, Wilkes-Barre, PA, in the Environmental Engineering and Environmental Science Department. Wilkes is focused on providing a liberal arts education to undergraduate students. Chris' department works to prepare students for graduate or professional careers. He is currently teaching Global Climate Change, Freshwater Ecology, Marine Science, and Biogeochemistry. Chris says "while I have been busy, I am having a blast and look forward to the spring semester and working on research projects".</p>		
	<p>Kellen Gunderson "Spatial and Temporal Variability of Deformation in the Northern Apennines, Italy" (<i>advisors</i>, David Anastasio, Frank Pazzaglia). After graduation, Kellen spent the summer at Lehigh working on several papers related to his dissertation research, three of which were published or accepted for publication in 2013. Kellen is now a geologist at New Ventures, Chevron Energy Technology Company, in Houston, Texas.</p>		
	<p>Eric Klein "Differential Response of Alaska Peatlands to Climate Changes of the Last Millennium" (<i>advisor</i>, Robert Booth). Eric began a postdoctoral fellowship at the University of Alaska Anchorage Environment and Natural Resource Institute last spring after completing his PhD. He spent the summer at an Arctic research site in northern Alaska. Eric's research uses isotopes from water vapor and precipitation to better understand Arctic hydrology and climate. These modern Arctic hydroclimate isotope data are also applied to ice core isotopic data collected from a northern Alaska glacier to develop paleoclimatic reconstructions. All is going well and Eric is enjoying being back home in Alaska.</p>		
	<p>Kathryn Semmens "Passive Microwave Derived Snowmelt Timing: Significance, Spatial and Temporal Variability, and Potential Applications" (<i>advisor</i>, Joan Ramage). Since graduating from Lehigh, Kate completed a summer internship with ExxonMobil Upstream Research Company in Houston, Texas, applying her spatial analysis skills to seafloor morphology. Since August, she has been working as a postdoctoral research associate with the USDA Agricultural Research Service, Hydrology and Remote Sensing Lab in Beltsville, Maryland. In her research she is using Landsat and MODIS data to create daily, field-scale evapotranspiration estimates to inform drought detection and monitoring, water resource management, and crop health.</p>		
MS	<p>Meng Zhao "Recent glacier surface snowpack melt in the Novaya Zemlya and Severnaya Zemlya derived from active and passive microwave remote sensing data" (<i>advisor</i>, Joan Ramage). Meng worked with Prof. Joan Ramage on remote sensing of Russian High Arctic glaciers. He is now a Ph.D. student in the Department of Earth System Science, University of California Irvine and is currently researching climatic change influence on Arctic terrestrial water storage.</p>		
BS	<p>Kimberly Baldwin John Breiner Amanda Casteel Lauren Craven</p>	<p>Danielle Gendron Isabella Lindgren Amber Lutey Haley Rodack</p>	<p>Brian Rodriguez Chase Slavin Kayla Virgone</p>
BA	<p>Devon Acevedo</p>	<p>Kathleen Cleary</p>	<p>Elizabeth Lucas</p>

LEHIGH FIELD CAMP

Lehigh Field Camp, the past decade and hopes for a bright future



The summer of 2014 marks the first time in 40 years that EES will not be able to offer a summer geology field camp so it is appropriate that the Department take this opportunity to reflect upon the camp over the past decade and report on some of the activities dedicated to building a new sustainable program for the foreseeable future. Ten years ago Lehigh field camp was facing several significant challenges, some unique to Lehigh, others symptomatic of national trends. The past decade focused on meeting those challenges and trying to position the program for long-term success. Among the largest challenges was the lack of Lehigh student interest. In 2004, only two students from Lehigh attended the camp. In 2005, no Lehigh students attended. We were successful in reversing that lack of interest in geology and the camp and since 2010, we have seen Lehigh students making up between one third and one half of all participants. Accordingly, we also worked very hard to raise the curricular rigor and acceptance criteria that helped the camp earn a national reputation as a leader in field geology education. Application pressure has been so strong that we have had to typically close registration in the middle of the Fall semester. The past decade also saw rapid changes in the infrastructure and budget, such as Lehigh not allowing 15-passenger vans,

and rising fixed costs, such as gas at \$5.00/gallon in 2006, that needed to be met. The ongoing digital revolution in computers, tablets, and electronic collection of field data had camp instructors repeatedly experimenting with equipment and strategies for what will ultimately have to be a full migration to electronic, GIS-based field mapping. The venue for teaching field camp was expanded from our long-time traditional base camps in Pinedale, the Red Hills, and the Wildhorse Valley, Idaho to include the Pioneer Mountains and Big Hole River valley near Dillon Montana. Furthermore, we developed and executed a camp in 2010 that followed a southern route across the country establishing base stations in New Mexico and southern Colorado. In summary, all of our efforts have been ever mindful of the overarching goal of using field camp as a physically and mentally challenging capstone experience designed to help students mature into professional geologists and environmental scientists. Proof of our success is the regular inclusion of Lehigh field camp graduates as summer interns in the highly competitive USGS-NAGT internship program.

We have much to be proud of in meeting these challenges over the past decade, but work remains that can benefit significantly from broader collaboration with our alumni network. Field camp, particularly the kind of cross-country traveling camp that distinguishes Lehigh's program, requires the attention of a full-time director who can devote not less than 8 weeks of effort annually. Ideally, this is a commitment that should rotate among several faculty so that other service, research, and educational obligations of one faculty member are not compromised. Alternatively, EES could hire a full-time staff member to

function as camp director, a strategy exercised by many other camps nationwide. Broader interest from universities that traditionally funneled students to Lehigh's program also offers options for contributing teaching and infrastructural resources to help keep the camp viable. All of these options are currently being explored by stakeholders in EES and partner departments. EES faculty agree that field camp is a crucial part of undergraduate geoscientist training and continue to strongly support a field requirement for all B.S. students. Re-establishing the camp for the summer of 2015 as one option in meeting that requirement will require faculty commitment and additional resources. EES alumni have been traditionally generous with donations to the Vic Johnson Fund, earmarked for deserving students (all gifts to the Vic Johnson Fund will continue to be used for undergraduate geological field camp scholarships). Similar commitment to secure staff support, either full- or part-time, will have a very positive impact on re-establishing the camp for 2015.

Directing field camp over the past decade has been the most challenging and rewarding thing I have done in my faculty career at Lehigh. I will continue to lend my experience and insights to the next generation of Lehigh faculty and staff who are planning to lead it into the future. I hope that our broader alumni network can be as supportive of the next director and the camp in the future as they have been of me and the camp over the past decade.

*Frank J. Pazzaglia
Professor of Earth &
Environmental Sciences*

DONATIONS & NEWS NOTES

All donations, no matter the size, contribute to the success of our program. We wish thank the following alumni who have generously donated to the EES Department in 2013.

A. Scott Andres '80	Anthony A. Imhof '69
George Banino	Kristen M. Koelmel '79
Beverly Banino	Mark H. Koelmel '77
Douglas Van Buskirk '62	Gary G. Lash '80
Jane Van Buskirk '62	Frank Luther '76
Amanda M. Casteel '13	Charles P. Miller '51
Chevron Corporation	Mary K. Miller
Kathleen G. Cleary '13	Richard B. Palmer '43
DiVinci Center of Science & Technology	Stephanie Souza '14
Louis Eni	Allison Teletzke '12
Nina Eni	Andrea J. Wagner '05
	Kyle C. Wagner '08

We apologize if we omitted your donation. If your donation check was cashed, you can be assured that your gift arrived safely at Lehigh. We are new at collating the annual list of contributors for the newsletter. If your name should have appeared on this list of donations for 2013, please bring it to our attention and we will include an acknowledgement in the next newsletter.

Please notify: Nancy Roman nr00@lehigh.edu

Top-10 list: Why choose EES as your major?*

- 1) STEPS-state-of-the-art laboratories, technologies, and classrooms
- 2) flexible BA, BS, and dual degree programs
- 3) abundant research, internship, and study abroad opportunities
- 4) growth and diversity of career opportunities
- 5) involvement with an effective learning community of students (graduate and undergraduate) professors, staff, and alumni
- 6) smaller class sizes
- 7) integrative and relevant science
- 8) abundant field trips and field experiences
- 9) provides global environmental understanding
- 10) satisfying and rewarding knowledge to benefit the planet

**Contributed by the 35 members of the EES 2014 senior class.*

ALUMNI NEWS!

Attention Alums!

We would really love to highlight your news or updates in the next annual EES Newsletter. Please send us information on your new promotion, change of job, or any exciting news you wish to share with other EES alumni! We are looking forward to hearing from you! Please send information to:

Nancy Roman
EES Department
Lehigh University
1 West Packer Avenue
Bethlehem, PA 18015-3001
nr00@lehigh.edu

Alumni News!

Diana Latta, PhD 2005, reports that she has transitioned into a new role at Exxon Mobil. She is now a commercial advisor for Asia Pacific and Middle East Assets.

Address change? Please send any change of address and/or an updated email address to Leigh Anne Fernandes @ lcf513@lehigh.edu

Click the newsletter link on our home page for an online color pdf of the newsletter.
www.ees.lehigh.edu

An invitation to get involved and support your department

The faculty and staff would like to extend an invitation to alumni to stay in contact with EES and to get involved with your Department. Contact us and let us know how you would like to be involved. Some activities and events open to all alumni include:

- The weekly Friday lunch and seminar (11 AM-1:00PM) in STEPS Rm. 101
- The Graduate Student Symposium, *February 21, 2014*
- Undergraduate Symposium, *April 25, 2014*
- Department picnic and awards presentations (following the Undergraduate Symposium)

Many of the programs we offer in EES that allow us to excel in education and research are made possible by endowed accounts and donations established by alumni. We are always looking to augment our resource base for graduate and undergraduate research, EES Field Camp, faculty development, and/or Departmental laboratory and educational facilities. If you are in a position to donate, please fill out the form below with your gift and send it to us. We will acknowledge receipt as soon as it arrives. Please make your check payable to Lehigh University and we thank you in advance for your consideration and support.

Name: _____

Address: _____

Email: _____

I would like to make a donation to support the EES graduate programs in the amount of \$ _____

I would like to make a donation to support the EES undergraduate programs in the amount of \$ _____

I would like to make a donation to support field camp students, the Vic Johnson Scholarship Fund in the amount of \$ _____

I would like to make a donation to support EES faculty development in the amount of \$ _____

I would like to make a donation to support Department facilities in the amount of \$ _____

I prefer to make an unrestricted gift of \$ _____

Total personal donation \$ _____

Employer matching gift (if applicable, include employers matching gift form) \$ _____

Grand Total \$ _____

Please send the completed form with your check payable to Lehigh University to:

Nancy Roman
Department of Earth and Environmental Sciences
Lehigh University,
1 W. Packer Ave., Bethlehem, PA 18015-3001

Address change? Please send any change of address and/or an updated email address to Leigh Anne Fernandes @ lef513@lehigh.edu

DEPARTMENT FIELD TRIP

In the STEPS of Hannibal,

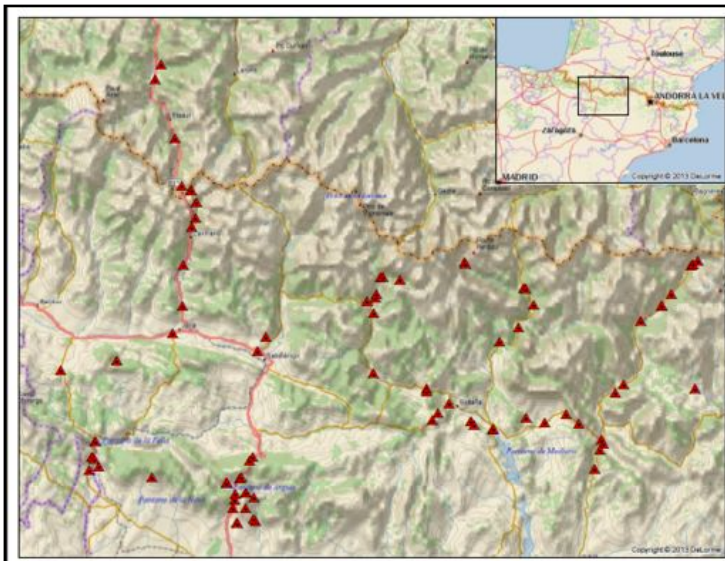
The Annual Departmental Field Trip was a 9-day geological excursion throughout the Pyrenees Mountains of Spain and a bit of France, at the conclusion of the spring semester. The trip, led by Professor David Anastasio and Research Scientist Claudio Berti included 10 EES graduate students. Four members of the group arrived early for a side trip to the famous caves of Atapuerca, discovery site of the fossil remains of the earliest Europeans and a visit to the Spanish National Laboratory for Human Evolution Research, hosted by Dr. Josep Parés. Following this 3-day sojourn, the EES group assembled in Barcelona. The trip proceeded to Ulle, a village on the outskirts of Jaca, which we used as a base to explore the External Sierras, and mountain basins. We then traversed the entire origin along the 2nd century B.C. route of Hannibal, crossing the high mountain pass at Somport then continuing our traverse northward towards Pau, France, visiting 11th and 12th century castles and monasteries along the way. The group then moved east to the medieval town of Ainsa to explore the syntectonic flysch and molasses of the central Pyrenees, Ordesa y Monte Perdido National Park, Valle de Pineta and the nappe de Gavarnie. The trip concluded with a day of churches and museums in Barcelona. The map figure shows the locations where we made stops. The impact of field experiences like this one can tremendously positive for the career development of our students. One of the trip attendees this year wrote:



left to right, Daniel Minguez, Claudio Berti, Dave Anastasio, Kate Semmens, Jien Zhang, Kate LeBoeuf, Johanna Blake, Travis Andrews, Kellen Gunderson, Lenny Ancuta at Rio Galego Gorge, External Sierras, Spanish Pyrenees

“Dave, Thank you again for the opportunity to learn about the Pyrenees. I learned a lot about the area and felt that the information nicely complimented things I have learned throughout my academic career. Through the knowledge I gained, I think I could return to the area to run a trip of my own some day. I have

been on three departmental trips, Italy, Hawaii, and Spain. Each was unique in their own way, but all three were very educational. A geology professor once told me that he (or she) who sees the most geology is ultimately the best off. I am a firm believer that this is true. The more places I travel and learn the specifics of the processes there, the more confident I am with my geologic training. These experiences have afforded me knowledge that has improved my research and teaching abilities....”
Johanna Blake, PhD. candidate in geochemistry.



Red triangles denote the outcrops that were visited by the group in May 2013

Watch the YouTube video! <http://youtu.be/tihmkKPwgR0>



Kellen *longest*, Daniel *intermediate*, and Johanna *shortest*, demonstrate the principal axes of strain on an outcrop north of Benasque, Spain.

The 2014 trip will be to Death Valley, CA and will be led by Professor Ken Kodama. The department contributes funds to keep the costs as low as possible for the students, generally \$500 for domestic trips and \$1000 for international trips. If you are feeling generous and also believe in the transformative nature of field education, your gift of \$500 will sponsor the attendance of one EES student on the 2014 trip. Our students report that it is the cost that is the biggest challenge to their attendance.