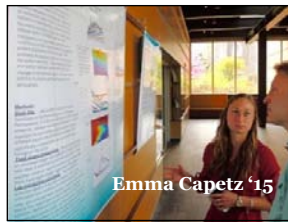




Recognition, pg. 2



Jon Stelling

20th Annual EES
Graduate
Symposium, pg. 5

Emma Capetz '15

EES
Undergraduate
Symposium, pg. 8Alumni
Corner, pg. 13Gifts,
pg. 15

EES NEWSLETTER



Dear EES alumni and friends.

On the occasion of Lehigh's sesquicentennial it gives me great pleasure to share the many accomplishments of the EES faculty and students in this annual newsletter. In 2015 **Benjamin Felzer**, a computational modeler who focuses on hydrologic and terrestrial ecosystem responses to climate, landuse, and air quality, was promoted to Associate Professor with tenure. This academic year we are searching for a new Assistant Professor in EES. The search attracted 411 applications; the large number is a testament to the department and Lehigh University. Our strengths lead to some of our current challenges such as the maintenance and operation of our extensive analytical facilities, which play a crucial role in our scholarship and the building of laboratory and analytical skills in our students. Furthermore, we remain committed to graduating students with field training and competency. From summer field programs, to Departmental field trips, to regular field exercises in our courses, we apportion a large amount of our budget and faculty time to field training. Therefore, I wish to personally thank all of our alumni who give so generously to support our many student opportunities.

In 2015, alumni gifts allowed us to replace the workstations in the STEPS advanced computer lab, new laptops for use in upper level courses, and to upgrade the computers used in our non-major laboratories. This is the first upgrade to these facilities since we moved to STEPS Building in 2010. Other gifts allowed us to offer our undergraduates scholarships in our summer field programs. Your gifts also helped us support student laboratory experiences and to support the purchase of a new Scanning Electron Microscope for use in teaching and research. So thank you to all who gave so generously to the department in 2015, especially **Jeff Williams** and **Rebecca Upton** who established a new endowment for student and faculty support in EES. Like most organizations, the department's largest costs are personnel related. To elevate our research footprint to the next level we hope to raise the resources to endow a postdoctoral research scientist so that the department can become a regular destination on the career path for the best young scientists in the Earth and Environmental Sciences. To help us achieve this goal, please consider directing your philanthropy to the Department; we are a sound investment in higher education.

I hope you enjoy reading the annual EES Newsletter, we welcome your comments, and if your travel plans bring you close to the campus, please come and visit us.

Best wishes for a healthy and prosperous 2016.



David Anastasio, Professor and Chair of EES

Still Seeking Alumni Mentors!

In last year's newsletter, we made an appeal to alumni seeking alumni mentors. The program we were planning has yet to launch due to lack of positive responses. This year, we are once again asking, if you are willing to share career advice as a mentor for EES majors or recent graduates? We're looking for department alumni willing to serve as a resource for current majors and graduates as they contemplate career paths and choices. We're looking to set up a password protected (Lehigh Login only for EES majors) part of our website with a list of alumni willing to be contacted for career advice. If you're willing to serve in this capacity or want to know more before committing, please let us know (email Nancy Roman nroo@lehigh.edu) We'll contact you directly as we implement this endeavor.



Recognition

Water on the moon? Sclar and Bauer knew in 1975

Astronomy Now reported on July 22, 2010 “Looking for water in lunar apatite is not a new idea. Geological Sciences Professor **Charles B. Sclar** and **Jon F. Bauer**, geoscientists at Lehigh University, first noted that something was missing from the results of chemical analyses of apatite in 1975,” says University of California research scientist, Jeremy Boyce. “Now, 35 years later, we have quantitative measurements – and it turns out, they were right. The missing piece was OH. The fact that we were able to quantitatively measure significant amounts of water in a lunar mineral is truly surprising.” *The reference is: Sclar, C. B. & Bauer, J. F. On the halogen deficiency of lunar apatite. Meteoritics 10, 484–485 (1975).*



Promoted

Benjamin Felzer was promoted to Associate Professor with tenure in 2015. He received his PhD from Brown University and his MS from University of Colorado. Prior to Lehigh, he was a research associate at the Ecosystems Center, Marine Biological Lab at Woods Hole, Massachusetts. Benjamin has been an EES faculty member since 2008. Congratulations Benjamin!

<https://bfelzer.cas2.lehigh.edu/>



Helen Malenda, MS '15, and her co-leaders of the new Women in Science and Engineering (WiSE) club at Lehigh (Kavita Jain-Cocks/Computer Engineering and Sara Farwell/Biosciences) were awarded the Graduate Life Leadership Award "A graduate student in good standing who has shown exemplary commitment, leadership and service to the Lehigh graduate student community and whose efforts have made significant contribution to graduate student life".

From the Editors-in-chief of Biogeosciences:

Last year Professor Zicheng Yu's paper "Northern peatland carbon stocks and dynamics: a review" (2012) was among the most cited articles published in Biogeosciences, according to the Web of Science. The top 10 cited articles in 2014 have been highlighted on the journal website (<http://www.biogeosciences.net/most-cited-articles-2014.html>).

GSA News....

Jonathan G. Price, BA'72, Lehigh University, MA '75 PhD '77, University of California, Berkeley, of Jonathan G. Price, LLC, Reno, Nevada, and Nevada State Geologist Emeritus, recently took the helm as president of The Geological Society of America. Price will serve a one-year term that began on 1 July 2015.

"The 2015-2016 GSA year will be exciting," said Price, "with great science published through our journals and presented at our annual and section meetings, rapidly evolving approaches to publishing, and changing demographics in our science."

Price delivered his Presidential Address, titled "The World is Changing," at the GSA 2015 Annual Meeting in Baltimore, Maryland on Sunday, 1 Nov. 2015. *Published in GSA Today v. 26 no.1 January 2016.*

Professor Frank J. Pazzaglia is a newly-elected Geological Society of America Councilor serving a three-year term from July 2015 to June 2019.



Earthquake Research

The College of Arts and Sciences fall **Acumen** publication highlighted doctoral student **Lillian Soto Cordero**'s research in an article entitled "Breaking New Ground in Earthquake Research". The article examines seismic activity and its impact on the eastern United States. Soto-Cordero states "understanding how an earthquake behaves will allow us to get a better sense of why they happen".

Read the article: cas.cas2.lehigh.edu/sites/cas.cas2.lehigh.edu/files/



Save Trees!

The EES Department offers an electronic only option for newsletters. If you are willing to receive your newsletter electronically, please email Nancy Roman, nr00@lehigh.edu, with e-newsletter in the subject line and your preferred email address. You will receive an annual email blast with a link to the newsletter. This and past newsletters are archived on the department webpage (see "after Lehigh" alumni section). Here's the link: <http://ees.lehigh.edu/alumni.html>



EES is now on Facebook!

<https://www.facebook.com/LehighEES?ref=hl>
Alumni! Share your news! Now you can keep in touch with us year-round on Facebook! –or you can send an email to Nancy Roman nr00@lehigh.edu



Bruce Hargreaves Retirement Reception

On April 2nd, **Bruce Hargreaves** was honored at a retirement reception held in the STEPS Concourse. There was a great turnout of friends and colleagues to congratulate Bruce on his 38-year career at Lehigh. Bruce, and wife Stephanie, have relocated to California to enjoy plentiful sunshine year round. Dave Anastasio presented them with a beautiful water color print of Bethlehem's Monocacy Creek.

The Changing Faces of EES



Leigh Anne Fernandez started in the EES office in August of 2013. In May of 2015, she made the decision to move on to a new position at Albright College, closer to her home. The entire EES family extends their very best wishes to Leigh Anne in her new position!

Leigh Anne and, retired EES coordinator, Laura Cambiotti, enjoying conversation at Bruce Hargreaves' retirement reception.



WELCOME Andrea! In August, EES welcomed our new front office coordinator, **Andrea Goff**. Previously, Andrea worked part-time in Lehigh's College of Education as coordinator for the Center for Developing Urban Educational Leaders (CDUEL) Program.

Andrea and her husband, Mike, have two children, Heather, 18 and Sam, 16.

Visiting research scientist

Jun Ouyang, PhD. is a visiting associate professor from the School of Geographical Sciences, South China Normal University. Jun is spending the year collaborating with Bob Booth's lab group on paleoecology projects utilizing testate amoebae.



From February 2013-August, 2015 **Charly Massa** was an EES Postdoc Research Associate working with Zicheng Yu. Charly has now moved on to a postdoc research fellow position at the University of Hawai'i at Mānoa, Honolulu.

EES Research Scientist, **Josh Stachnik** began his work with Anne Meltzer at Lehigh in May, 2012. In January of 2015, Josh departed Lehigh to take on a new career opportunity at Instrumental Software Technologies, Inc. (ISTI) in New York. However, Josh is continuing his collaboration with Anne Meltzer and recently traveled to Mongolia to continue fieldwork.

In Remembrance...

John S. "Jack" Rentschler, '54; '62, passed away on March 24, 2015. Jack earned his Lehigh BS and MS in geology. Jack also worked as technical support in Earth & Environmental Sciences until 2001. During his time in EES, he also traveled with and assisted the geology field camp for several years.



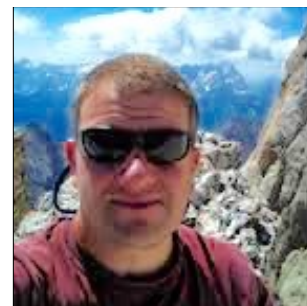
Re-Introducing Claudio Berti

Claudio Berti is the new Professor of Practice and EES Field Camp director.

Claudio received a PhD in geology in 2009 from University "G. d'Annunzio", Chieti, Italy. He comes to EES from the University of Delaware where he was an assistant professor of geological sciences. He has a history with EES and is enthusiastically returning to fulfill his new roles. Berti first came to EES as a post-doctoral scholar studying active tectonics in 2008 when he attended his first Lehigh field camp. He went on to become a research scientist in EES and field camp instructor from 2009-2011 before becoming co-field camp director with Frank Pazzaglia in 2013.

As a professor of practice, Berti is responsible for GIS courses and oversees the introductory non-major laboratory course that provides basic scientific training to 200 Lehigh students annually.

Claudio resides in Bethlehem with his wife, Kate and son, Massimo.



To read more: <http://giving.lehigh.edu/ees-field-camp-director-berti>

Berti's position was made possible by a 3-year University partnership with Chevron Corporation.





continued....



STEPS has a new SEM!

A cost-share between Lehigh's Critical Research Equipment Fund program (CREF) and EES, has made possible the purchase of a new Phenom XL Scanning Electron Microscope that recently replaced the aging Hitachi TM-1000 microscope. The new SEM was purchased to continue research strengths in STEPS. The instrument is turnkey, quick to train users, easy to operate, versatile, and will provide positive education impact to students and faculty, having much more advanced capabilities than the old instrument.

In April, Kerry Gallagher, Geosciences Department, Universite de Rennes, France, gave the noon Friday departmental seminar then gave two well-attended workshops on Bayesian inference. The first topic was changepoint modeling of geologic and environmental records, and the following was the use of his QTQt software to invert thermochronometer data for thermal histories. Friday's workshop was followed by a departmental dinner and reception.

ExxonMobil

Integrated Basin Analysis Short Course

September 18 – 21

Again, this year, ExxonMobil's **Tom Becker**, MS '02, along with Erik Haug and Carter Graham visited EES and conducted a short course as well as interviewing students for Exxon positions. Of the total 31 participants, the ten Lehigh EES students were, **Lenny Ancuta, James Carrigan, Elizabeth Dyer, Nathan Hopkins, Katie Jaeckel, Laura Markley, Kalin McDannell, Matt McGavick, and Jannell Thumma**. Short course students came from Rutgers, Bucknell, Lafayette, Pitt, Colgate, Williams, Wesleyan, Binghamton and Temple.

MS student, **Katie Jaeckel**, will be attending the BigHorn Basin Field School later this spring.

Jordan Dykman, BS '14, was awarded an internship after the 2014 interviews and has now gained a full-time position with ExxonMobil (see *Alumni Corner*).

Next year's short course is planned for Oct. 21 – Oct. 24, 2016



EESo23 (Weather and Climate: Past, Present, and Future) class during visit with Lehigh Valley WFMZ forecast meteorologist Mark Shanaberger in April. Pictured, left to right: Mark Shanaberger, Assistant Professor **Benjamin Felzer**, Students: **Kelsey Strobel, Michelle Gorson, Adrienne Chodnowsky, Kate Koser, Michael Garzillo, Jia Rao, and Mason Beckman**.



Frank Pazzaglia and GSA field trip co-leader, Mark Carter, explaining the geology from an overlook on the Blue Ridge Parkway.

OUTREACH

Due Diligence in River Incision Data

This popular science piece was inspired by a recent Geology article that was co-authored by **Frank Pazzaglia** in 2015.

In a new study in Geology, scientists look at one complicating factor in such calculations, what the authors call the "unappreciated effects of streambed elevation variability" on measuring river incision rates.

Read the article: www.earthmagazine.org/article/due-diligence-river-incision-data



20th EES Graduate Symposium

The symposium occurs annually to showcase graduate student research and to 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. The graduate symposium is also our venue to host the next year's prospective graduate students and interaction with nearby alums. The 2016 Graduate Symposium is scheduled on March 4 with invited alum speaker, **Jennifer Wollenberg**, PhD '09. Please let us know if you are interested in attending. Email Nancy Roman, nroo@lehigh.edu.

The Graduate Symposium was held on February 20–21, 2015. On Thursday afternoon, graduate alum, **Sean Gulick**, University of Texas, Austin, PhD, '99 Lehigh University, BS '93, University of NC, spoke on "Source to Sink on Overdrive: Tectonic-Climate Interactions in the Gulf of Alaska". The talk was followed by a reception in the STEPS Concourse. On Friday, the symposium started off with the poster session and was followed by oral presentations. The program included a keynote talk by Sean Gulick, entitled "Geophysical Characterizations of the Chicxulub Impact Structure: Insights into Planetary Processes and Extinction". After the talks and poster session ended, a banquet was held in the Asa Packer Dining Room in the University Center. As always, alumni are invited, to attend the Graduate Symposium. This year, alumni attendees included **Al Benimoff**, PhD '84, **Bob Bond**, MS '85, **Bob Gibson**, MS '86, **Jeff "Boomer" Griesemer**, MS '80, **Bob O'Neill**, MS '85 and **Pete Sudano**, MS '83.

Oral Presentations



Christopher Bochicchio, Dipolar Patterns in Alaskan Hydroclimate During Late Glacial and Middle-Holocene Revealed in Lake-Level Reconstructions

James Carrigan, Examining Terrestrial Growth Strata Using Rock Magnetic Methods, SE Pyrenees, Spain

Kate Cleary, MS '15, Rapid and Sustained Peat Carbon Sequestration in Arctic Tundra on the North Slope of Alaska

Nathan Hopkins, PhD '15, Magnetic Fabrics and Bed Deformation Beneath the Baltic Ice Stream, Southern Sweden: Implications for the Evolution of the Subglacial System Beneath a Short-Lived, Episodic Ice Stream

Helen Malenda, MS '15, Application of Optically Stimulated Luminescence Burial Dating on Paleo-River Terrace Deposits in the Mid-Atlantic Piedmont, USA

Jennifer Schmidt, Differential Unroofing across Southeastern Tibet: Geodynamic Links between Plateau-Scale Tectonics and Landscape Evolution

Stephanie Souza, MS '15, Upper Mantle Structure: Hangay Dome, Central Mongolia



Best Talk Award: Kate Cleary

Poster Presentations

Leonard Ancuta, Understanding the Lower Crust Beneath Central Mongolia through Geochemistry and Geochronology of Lower Crustal Xenoliths

Travis Andrews, PhD '15, Climate or Disturbance: Temperate Forest Structural Change and Carbon Sink Potential

Jill Burrows, PhD '15, Metals Removal and Stability as a Function of Coal Mine Drainage Treatment Method

Zhongxiong Cui, Lower-Crustal Eclogitization in Modern Orogenic Belts and its Geodynamic Implication: Northern Himalayan and Lhaasa Terranes

Zheng Gong, Rock Magnetic Cyclostratigraphy of the Doushantuo Formation, Dongdahe Section, South Cina, Determining the Duration of the Shuram Carbon Isotope Excursion

Mingkai Jiang, Mismatch in Changes of Land Use Between Public Anticipation and Model Predictions

Stefano Maraiò, Interaction between Alluvial and Debris Flow Processes at Vinschgau/Venosta Valley (Italian Alps), Revealed by High Resolution Seismic Reflection/Refraction Profiling

Kalin McDannell, The Hangay Dome, Central Mongolia: Cenozoic Relief Lowering During Post-Orogenic Erosional Decay

Daniel Minguez, PhD '15, High Resolution Ground Magnetic Survey of Salt Springs State Park, in the Appalachian Plateau: Testing for Magnetic Signatures of Migrating Hydrocarbons

Chandler Navara, MS '15, The Effects of Interspecific Interactions on Reproductive Success of Carolina Chickadees (*Poecile Carolinensis*)

Lillian Soto-Cordero, Lithospheric Structure of the Mid-Atlantic, Eastern United States

Jonathan Stelling, Response of an Antarctic Moss Peatbank Ecosystem to Late Holocene Climate Oscillations

Maura Sullivan, Testate Amoebae Assemblages of the New Jersey Pine Barrens

Janelle Thumma, Assessing the Timing of Intercontinental Uplift of the Gobi Altai Using Low-Temperature Thermochronology

Rebecca Whiteash, Controls on Mercury Uptake in Freshwater Ecosystems by Three Periphyton Taxa: Bacillariophyta, Cyanophyta, and Chlorophyta

Jien Zhang, Effects of Climate Extremes on Groundwater Recharge of the High Plains Aquifer, Great Plains, 1950-1999



Best Poster Award: Travis Andrews

Lehigh was founded in 1865 and the modern Earth & Environmental Science can trace its roots back to the very beginning to one of the original five professional programs, Mining Engineering and Metallurgy. EES was founded in 1991 when the Geological Sciences department merged with the ecological and ecosystem faculty from the Department of Biosciences.

Welcome to this year's new graduate students!

James Carrigan University of Massachusetts, BS Geology '13, Lehigh University, MS '16 Earth & Environmental Sciences. Research focus: applying high-resolution timing to structural problems, and relating surface geology with deeper crustal processes. Kravis Fellow. (*adviser, Dave Anastasio*)

Rui Cheng Sun Yat-sen University, BS Atmospheric Sciences '15. Research focus: climate modeling, extreme climate events (*adviser, Benjamin Feltzer*)

Megan Clark George Washington University, BS Geological Sciences and Environmental Studies '15. Research focus: Size distribution of bubble imprints in volcanic ash to improve understanding of the relationship between bubble nucleation and eruption energetics (*Dork Sahagian*)

Elizabeth Dyer University of Georgia, BS Geology '15. Research focus: remote sensing to study effects of climate change on patterns of glacial melt. Kravis Fellow. (*Joan Ramage*)

Katie Jaeckel, Stockton University, BS Geology '15. Research focus: understanding the roles of deformation and related fluid-rock interaction in enhancing C mobility during subduction through the use of stable isotope geochemistry (western Alps). (*Gray Bebout*)

Darwin Janes Boston University, BA Earth Science '15. Research focus: researching the role of crystal defects on Helium diffusion and U-Th/He dating of apatite (*Peter Zeitler*)

Laura Markley Eastern Connecticut University, BS Earth & Environmental Science and minor in Geographic Information Systems '15. Research focus: geochemistry of iron rich soils in Pennsylvania and implications for paleoclimate. University Fellow. (*Steve Peters*)

Bob Mason Lehigh University, BS Earth & Environmental Sciences '15. Research focus: Oak forest successional dynamics and conservation (*Bob Booth*)

Matt McGavick, Union College, BS Environmental Geology '15. Research focus: tectonic geomorphology in Eastern U.S., tectonic processes and faulting alteration of surface landscape, Central VA. (*Frank Pazzaglia*)

Zhengyu Xia, China University of Geosciences, BS Geology '15. Research focus: paleoclimate in Patagonia and tropical South America. Presidential Fellow. (*Zicheng Yu*)

Professional Activities of Graduate Students

Travis Andrews, PhD '15 gave a talk on the effect of irrigation in the Great Plain on drought in New York City at Lehigh's High Performance Computing symposium in April. (*adviser, Bob Booth*)

Christopher Bochicchio attended the November Baltimore Geological Society of America (GSA) Meeting and was co-author of three talks. (*Zicheng Yu*)

James Carrigan attended the ExxonMobil Guadalupe Mounts field course in April. He also participated in a *Statistical Data in Structural Geology* short course and presented a talk during the November GSA meeting in Baltimore, MD *Fault propagation fold kinematics recovered from terrestrial growth strata with 20 kyr time resolution, Sant Llorenç de Morunys, Pyrenees, Spain.* (*David Anastasio*)

Lillian Soto-Cordero participated in the *Eastern North American Margin (ENAM) Seismic Refraction Processing Workshop* at the University of Texas in May. She also gave a talk at the November GSA Meeting in Baltimore in the session *Intraplate earthquakes, seismotectonics, and geodynamics in eastern and central North America*. Her talk was entitled "Crustal structure of the mid-Atlantic, eastern United States". Lillian also presented a poster at the 2015 American Geophysical Union (AGU) Fall meeting in San Francisco, session: *Crustal structure and evolution across the continental United States from 10 years of Earthscope investigations: What have we learned and what are the open questions?* (*Anne Meltzer*)

Zhongxiong Cui attended the fall AGU meeting in December and presented a talk on *Characterizing the Lower Crust in Southern Tibet by a New Layer-stripping Method.* (*Anne Meltzer*)

Zheng Gong attended the AGU fall meeting in December and presented a talk entitled "Rock Magnetic Cyclostratigraphy of the Ediacaran Doushantuo Formation, South China: Determining the Duration of the Shuram Carbon Isotope Excursion". He also attended the summer school of rock magnetism held by Institute of Rock Magnetism at University of Minnesota this June. (*Kenneth Kodama*)

Nathan Hopkins attended the ExxonMobil Guadalupe Mounts field course in April. He also presented a talk at the AGU Joint Assembly, Montreal, Canada, May 3-7, "Bed Deformation beneath the Baltic Ice Steam,

Southern Sweden: Implications for the evolution of the marginal subglacial system beneath short-lived, episodic ice streams" and "Magnetic fabric of stratified basal ice: Matanuska Glacier, Alaska" at the GSA Annual Meeting, Baltimore, Maryland. Nov 1-4. (*Edward Evenson*)

Mingkai Jiang attended the American Geophysical Union-Canadian Geophysical Union (AGU-CGU) joint conference in Montreal this May and presented a poster on his research on land use scenarios in the Columbia River basin "ecosystem implications of vision-driven land use scenario in the Pacific Northwest". He also gave an oral presentation at Fall AGU on predictability of climate extremes. (*Steve Peters*)

Laura Markley attended the *Sequence Stratigraphy* short course at the November GSA Meeting in Baltimore. (*Benjamin Felzer*)

Kalin McDonnell presented at the AGU Fall meeting (December 14-18) in San Francisco entitled: "Characterization of helium diffusion behavior from continuous heating experiments: Sample screening and identification of multiple ^4He components". (*Peter Zeitler*)

Jennifer Schmidt presented and participated in the NSF sponsored FACET 2015 (Feedbacks Among Climate, Erosion and Tectonics) workshop in Taipei, Taiwan in May. Jen also attended the AGU fall meeting in December. (*Peter Zeitler*)

Jonathan Stelling attended the 3-day workshop *Samples International Geo Sample Number (IGSN)* in January and the *PAGES C-Peat 3-day Workshop* at Lamont-Doherty Earth Observatory, NY, Oct. 11-13. He also presented a talk, entitled "Late Holocene ecological and climate change from peat core records in the western Antarctic Peninsula" at the Nov. 2015 Geologic Society of America annual meeting in Baltimore, MD. (*Zicheng Yu*)

Janelle Thumma attended the Baltimore GSA in November and participated in the *Sequence Stratigraphy for Graduate Students* short course. (*Peter Zeitler*)

Zhengyu Xia, attended *PAGES C-Peat Workshop* on October 11-13. (*Zicheng Yu*)

Jien Zhang, gave a talk at Ecological Society of America (ESA) in Baltimore on detection of climate extremes, and presented a poster on the carbon effects of extreme precipitation in the Southern Great Plains at the Fall AGU Meeting in San Francisco. (*Benjamin Felzer*)

Congratulations 2015 Graduates!



PhD

Travis Andrews

“Why precipitation and forest structure are changing in the eastern U.S.: insight from analysis of large empirical and climate model datasets”

Jill Henry

“Geochemical factors controlling the fate of Fe, Al, and Zn in coal-mine drainage in the anthracite coal region, Pennsylvania, USA”

Nathan Hopkins

“Magnetic till fabric: Applications of anisotropy of magnetic susceptibility (AMS) to subglacial deformation of till and ice”

Daniel Minguez

“Chronostratigraphic applications of paleomagnetism and rock magnetic cyclostratigraphy: Case studies from the Ediacaran and Devonian period”

MS

Kathleen Cleary

“Carbon sequestration implication of shrub expansion, peat initiation, and sphagnum growth in Arctic Tundra on the north slope of Alaska”

Helen Malenda

“Investigating terrace genesis in the Virginia Piedmont, USA”

Chandler Navara

“The effects of interspecific interactions on the reproductive success of Carolina Chickadees (*Parus carolinensis*)”

Stephanie Souza

“Upper mantle structure beneath the Hangay Dome, central Mongolia and implications for high topography and magmatism”

BS

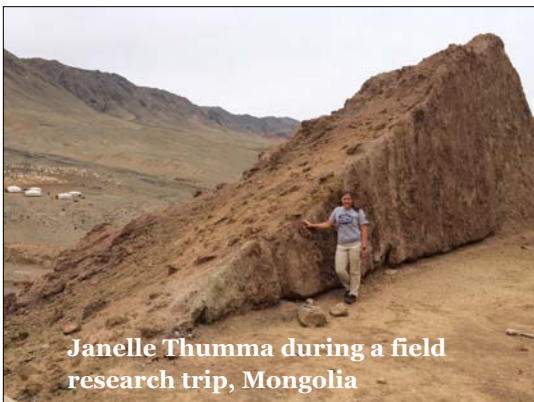
- Austin, Kerry K.
- Bausher, Emily A.
- Capetz, Emma M.
- Cummins, Katherine
- Dobroski, Laura G.
- Geist, Christopher R.
- Giampa, Rachel L.
- Kimball, Katherine M.
- Kreitz, Ashley L.
- Malmborg, Charlotte A.
- Mason, Robert A.
- McCarter, Allyson N.
- Meys, Austin
- Raup, Cody J.
- Ryan, John W.
- Sharif, Rahgida

BA

- Birch, Katie L.
- Gat, Ayelet
- Lexa, Ryan A.
- Mizack, Joshua W.
- Moschella, Matthew V.
- Robinson, Jamil A.
- Schaufeld, Jacob A.

44% of our 2015 graduates completed one or more undergraduate research projects as part of their EES degree!

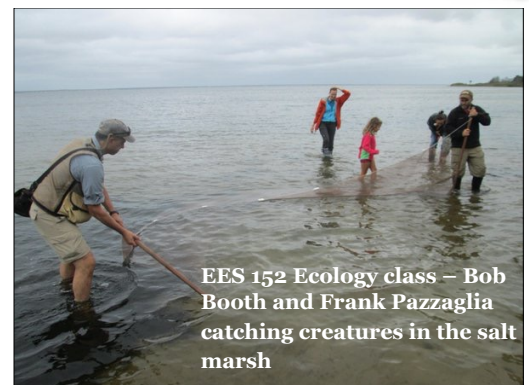
Environmental science and the economic market mechanism are a developing force coming together to create new and nontraditional environmental markets. Biodiversity credits may someday become a commodity bought and sold like gold or soybean futures. Emerging environmental markets may also serve as forces affecting traditional agriculture markets (e.g., affecting the availability of pollinators near crop fields).Earth Science can provide information about ecological systems and how they function. To learn more: www.usgs.gov/blogs/features/usgs_top_story/using-the-



Janelle Thumma during a field research trip, Mongolia



EES 152 Coring a tree



EES 152 Ecology class – Bob Booth and Frank Pazzaglia catching creatures in the salt marsh

EES Undergraduate Symposium



Keynote speaker, Justin Stroup

The **EES Undergraduate Symposium** is held annually on the last Friday of the spring semester. 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. Once again, **P.B.** was on hand to present the award that is named in his honor.

On May 1st, 2015's symposium began with a presentation by Lehigh alum, **Justin Stroup**, BS '07. Justin earned his MS at the University of Cincinnati in 2009 and is currently a PhD candidate in the Department of Earth Sciences at Dartmouth College. Justin spoke on *"The Holocene puzzle, interpreting the fluctuations of Quelccaya Ice Cap, Peru"*

Oral Presentations



Raghida Sharif '15 presented Geospatial thinking and reasoning enhanced in a structural geology and tectonics course using web GIS

Advisers: Anastasio, Rutzmoser, Bodzin

Raghida is now in a Master's Teaching program at the Museum of Natural History, NYC

Robert Mason '15*, The Influence of white-tailed deer herbivory on tree recruitment in forest canopy gaps created by Hurricane Sandy. *Adviser: Booth*

Robert is now in the fifth year Master's program in EES at Lehigh

**honors thesis*



Best Talk Award



Poster Presentations

Emily Bausher '15 Ground acceleration-prone soils in Philadelphia County, PA; Input to risk-based models of earthquake hazards in the central and eastern United States. (Adviser, Pazzaglia)

Emma Capetz '15 Oxygen dynamics measured and modeled in Lake Lacawac. (Hargreaves)

Katherine Cummins '15 Geochemistry and pedogenesis of three late Cenozoic paleosol in east central Pennsylvania. (Peters, Pazzaglia)

Ayelet Gat '15, Katie Leboeuf MS'14 Peatland and upland vegetation responses to a climatic and disturbance event in the early Holocene of northern Wisconsin. (Booth)

Ryan Herbert '16 Travis Andrews PhD '15, The influence of light intensity on testate amoeba communities in floating Sphagnum Peatlands. (Booth)

Kaylee Kraft '16, Charlotte Malmborg '15, Along-strike variation in sedimentary carbon inputs at the Sunda Margin, Indonesia: Significance for estimating efficiencies of subduction-zone carbon cycling. (Bebout)

Charlotte Malmborg '15, The use of fungal micro remains in studies of peatland paleoecology: Validation and Calibration. (Booth)

Ragida Sharif '15, Geospatial thinking and reasoning enhanced in a structural geology and tectonics course using web GIS (Anastasio)

EES Field Courses

Pymatuning Laboratory of Ecology summer courses are three weeks long, begin in May and go through mid July. **Bob Booth** teaches *Wetland Ecology* which is one of ten ecology-oriented sections offered through the University of Pittsburgh's Department of Biological Sciences.

The EES Department provided internship scholarships for undergraduates **Kristina Abens** and **Casey Ching** for the 2015 **Lehigh in Costa Rica Summer Program**, led by **Don Morris**, is a 7-week internship. Activities are closely tied to sustainable development.

Two **EES Field Camp** students shared a scholarship gift from alum, **Anthony A. Imhof '69**. The scholarships were awarded to **Taylor Cummins** and **Mary Pettit**. There were also three Vic Johnson scholarships awarded to **Lorraine Carnes**, **Yang Gao** and **Kaylee Kraft**.

Read more at <http://www.lehigh.edu/~clb208/fieldcamp/index.html>



Professor **Zicheng Yu** presents **Bob Mason '15** and **Laura Dobroski '15** with the 2015 Donnel Foster Hewett Award

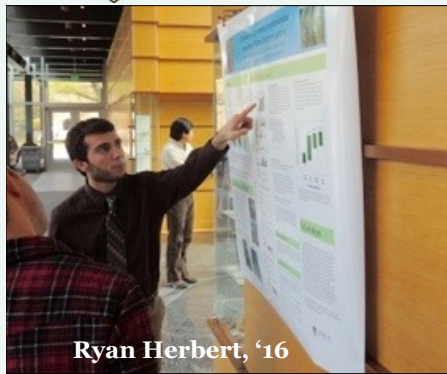


Students sampling macroinvertebrate communities in **Bob Booth's** field intensive wetland ecology class. The course was taught at the Pymatuning Laboratory of Ecology, a field station operated by the University of Pittsburgh in northwestern PA

Undergraduate Symposium pics....



Kaylee Kraft '16



Ryan Herbert, '16



Raghida Sharif '15

EES Annual Picnic at Saucon Park



Peter Zeidler presents Nathan Hopkins, PhD '15, with the P.B. Myers Distinguished Teaching Assistant Award

Distinguished Teaching Assistant Award

EES Chair, Dave Anastasio, Steve Peters, Joan Ramage and, Peter Zeidler (in hiding), enjoy some R&R on the final day of the semester.



As always, Ed Evenson mans the grill while sharing stimulating conversation with Undergraduate Symposium keynote speaker, Justin Stroup.



- *22 EES students, faculty and research staff attended the November GSA Meeting in Baltimore where they presented 18 papers.
- *19 EES students, faculty and research staff attended the Fall AGU Meeting in San Francisco and a total of 35 presentations were given.

EES 380 Presents

A Stakeholder's Workshop on Climate Change

November 10th, ST 280

In keeping with past practice, the EES senior seminar, *The Practice of Science*, held a public event. The public event provides an opportunity for our seniors to integrate and synthesize concepts they've learned in our major and to extend their knowledge and skills to new and complex problems. It also takes core EES concepts and joins them directly to societal issues. This year's event was a stakeholder's workshop on climate change, giving students that additional experience of holding stakeholder workshops. Student teams took on various stakeholder roles including manufacturing, agriculture, energy, government, environmental groups, and the general public. Each student team needed to present and discuss the causes and consequences of climate change from the stakeholders' perspective. After brief opening statements, participants from the audience joined the discussion. A panel of graduate students and faculty choose the team that did the best job representing their stakeholder's position.

Prize winners, representing the environmental groups, were Ryan Herbert '16 and Kaylee Kraft '16. Class instructor, Anne Meltzer.



Annual Undergraduate Awards, 2015

Students are recognized at the annual EES Undergraduate Symposium each spring

- J. Robert Munford Award** Katherine Cummins 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.
- Donnel Foster Hewett Award** Awarded to Bob Mason and Laura Dobroski. This award goes to a senior in Geological Sciences Who Best Demonstrates the Potential for Professional Excellence.
- Handwerk Prize** Allyson McCarter This prize is presented to a student for Outstanding Achievement in the Fields of Chemistry, Materials Science and Engineering, or Earth and Environmental Sciences.

SES Club Report by Ryan Herbert '16, SES Club Treasurer

This semester, the Society of Environmental Scientists has been busy fostering interest in environmental activities that are both fun and educational. Continuing last year's trend, the club now consists of a wide variety of members, including both EES majors and non-majors. This diversity has given the club a fresh perspective on many of the oft-visited topics that majors are so familiar with. Education goes both ways, and EES majors find themselves both teaching and learning from the other members.

So far SES has offered a wide range of activities for members to enjoy together in the fall of 2015. For example, the club hiked all over Lehigh's nearby South Mountain, and it hosted a screening of the acclaimed documentary, Chasing Ice. The largest event SES featured this semester was a trip to the Lost River Caverns in Hellertown. There, members had a great time spelunking, all the while learning about the unique geology and calcite formations of the caves. It was a wonderful outing to a local model of geological and hydrological processes in action. At the same time, the SES officers have offered advising to majors on a per-person basis, making sure to answer personalized questions with in-depth insights.

Next semester, despite the cold weather, SES plans to continue holding activities regularly to keep its members engaged. These events include indoor activities like modeling geophysical processes with specialized cake baking, but there are also plans to work with the chilly weather and perhaps even run spur-of-the-moment events in response to snowfall. When it warms up later in spring, other activities such as kayaking and camping will also be possible. It's been a wonderful semester with a bunch of enthusiastic members, and SES looks forward to what it can explore in the near future.

The SES club is sponsored by EES and the Environmental Initiative. Club officers are **Julian Traphagan**, president; **Susan Zea**, secretary; and **Ryan Herbert**, treasurer.



SIXTH LEHIGH VALLEY WATERSHED CONFERENCE

Freshwater Ecology

Oct. 13, 2015



Scott Rutzmoser and Claudio Berti



Macroinvertebrate Workshop

A workshop on open source GIS entitled "Working with publicly available information to build an effective watershed GIS" was presented by senior developer of Lehigh's Web and Mobile Services, Scott Rutzmoser, and EES's **Claudio Berti**.

EES professor **Benjamin Felzer** presented a lecture "How regional hydrology and streams respond to changing climate".

Lance Leonhart, and EES Research Scientist **Bruce Idleman**, presented a *Macroinvertebrate Workshop* using live samples and the scanning electron microscope, participants learned about the identification and ecology of stream macroinvertebrates.

Alum, **Josh Galster** PhD '06, Montclair State University, attended the conference and presented "How stream and river levels respond to storm events in different watersheds and how storms are expected to change in the future".

EES sponsored a networking reception for students interest in environmental careers.

"Career Opportunities and Professional Geologist Licensing"

(Geoscience Employment Options & the Advantages of P.G. Licensure)

On the evening of March 24th, **Louis F. Vittorio, Jr.**, P.G. (BS University of Pittsburgh '84, MS Lehigh University '88), Vice President, EarthRes Engineering and Science, Pipersville, PA and **Valerie Holliday** PG, CPG (BS '82, MS '85, Lehigh University), Principal Scientist, GeoLogos, LLC, Berwyn, PA visited the department and presented valuable career information to EES students.



Both Lou and Valerie are EES alumni and board members of the Pennsylvania Council of Professional Geologists, an Earth Science advocacy organization. The presentation focused on the value of obtaining a professional license for getting a job, career advancement, license requirements, and how to obtain a PG license.



For the last two years, the STEPS building has been a nesting area for a pair of red-tailed hawks. This is the view through the mesh shaded window from teaching lab, ST 571. A video camera has been installed that will enable us to get a peek at these birds of prey and their eggs, should they return this year. Red-tailed hawks are monogamous and both the male and female incubate the eggs for 4-5 weeks and feed the young from the time they hatch until they leave the nest approximately six weeks later.

The next **EES Career Night** is scheduled for **March 8, 2016**



Geology ranked #7 in Forbes list of Most Valuable College Majors with job growth projected at 19.3% and starting salaries of \$83,000. Environmental Engineering ranked #5. The STEPS building was a good investment for Lehigh University. <http://www.forbes.com/pictures/lmj45jgfi/no-7-geology/>

Change of address? Let us know if you have a new address. Email Andrea Goff at ahg212@lehigh.edu

In 2015, **David Anastasio** conducted field work in the Pyrenees and Betic Cordillera, Spain and helped guide the return of EES field camp. Collaborators in the Pyrenees are Josep Pares from CENIEH, Burgos Spain and recent MS graduate James Carrigan. James' thesis research determined the kinematics and high-resolution (10^{+5} yrs) rates of fault-propagation folding recovered from terrestrial growth strata using magnetostratigraphy, cyclostratigraphy and fabric analysis. These data serve to inform our evolving ideas on what modulates rates of crustal deformation. James is remaining in EES to pursue a PhD degree and plans to study tectonic process and landscape evolution using a combination of empirical studies and modeling. In the Betic Cordillera, Parés and Anastasio are investigating hominin migration and the peopling of Europe. At field camp, Anastasio taught projects in Yellowstone National Park, WY and the Beartooth Range, MT. One science education project completed in 2015 was with EES senior undergraduate student, Raghida Sharif, who is now pursuing a MA in science education at the American Museum of Natural History in NYC. Raghida and Anastasio developed a Web-GIS based culminating activity for teaching plate tectonics, which was pilot-tested in his Structural Geology and Tectonics class. The exercise is freely available at <https://gisweb.cc.lehigh.edu/ees223>.

Gray Bebout and his students recently wrapped up a large field-based and geochemical study of deep (up to 100 km) carbon subduction, working on some beautiful exposures of high- and ultra-high pressure metamorphic rocks in the French and Italian Alps. This work, by former EES graduate students Jennie Cook-Kollars and Nathan Collins, was published in a two-part set of papers in the journal *Chemical Geology* and also summarized in a newly published review article in the journal *LITHOS*. EES major Kaylee Kraft is conducting a detailed petrographic study of metamorphosed basaltic rocks from some of the same localities. M.S. student, Katie Jaeckel, is following up on the work by Jennie and Nathan, examining evidence for deformation-enhanced C mobility along thrust fault systems in the Italian and Swiss Alps believed to be ancient subduction interfaces. A newly funded NSF PIRE grant (Partnerships for International Research and Education) will provide support of Bebout's work on the subduction interface exposures, one of them in Breuil-Cervinia in the shadow of the Matterhorn ("Cervino" in Italy). Bebout is the lead editor of a large publication venture ("Subduction Top to Bottom 2") to be published in the e-journal *GEOSPHERE* (now accepting manuscripts!). Some of Bebout's efforts in 2015 were directed at developing a new project in which altered terrestrial volcanic glass (palagonite) will be examined for records of alteration environment, as an analog study of glassy volcanic rocks on the Mars surface. This project development has benefited from the College of A&S New Directions program funding. A large part of this work, which partly involves nitrogen isotope measurements, will be conducted at the Institute for Study of the Earth's Interior, Okayama University, Misasa, Japan.

Bob Booth spent the spring semester on sabbatical, visiting research collaborators in Arizona, Wisconsin, and New York. He taught his field-intensive wetland ecology course at the Pymatuning Laboratory of Ecology in June, and did field work in northern Minnesota, northern Wisconsin, and western Pennsylvania. Along with several of his students, Bob presented research results at both the Ecological Society of America and Geological Society of America meetings. Bob's lab group was joined by Dr. Jun Ouyang, a visiting research professor from South China University, and several visiting graduate students spent time learning techniques in his laboratory this fall.

Ed Evenson continued to do the "same old things" in 2015. He and his grad student, Nathan Hopkins (Ph.D defended December 2015), made two trips to Sweden and two to Alaska to continue their investigations of basal ice deformation and till kinematics using AMS measured fabrics. He published two papers with Nathan (and Ken Kodama and others) and visited the University of New Mexico, Lafayette College and Waterloo University to deliver invited seminars on his AMS research and on "Darwin's Boulders in Tierra del Fuego, Argentina". In 2016 Ed plans to again visit Sweden (where Nathan has a post-doc) and Alaska - if he is successful in recruiting a new grad student who would like to work there. Ed and Laura continue to summer at their "cabin" in Mackay, Idaho - everyone is welcome to stop for a visit if they are

in the area - just ask a local where they live.

Benjamin Felzer gave two invited talks in 2015, one on regional climate change and hydrology at the Lehigh Valley Watershed Conference in October, and another on the effects of disturbance on the U.S. carbon sink at the Penn State Meteorology Department in October, which he also presented at the Fall AGU Meeting. We welcome new Ph.D. student Rui Cheng to our group, who has begun to work on our new interdisciplinary NSF-funded project to explore the effects of climate on human society. Jien and Travis both have papers in review at *Hydrological Processes* and *PLOS-ONE*, respectively. Felzer was promoted to Associate Professor in June.

Ken Kodama became a AAAS Fellow in February 2015. His new book, "Rock Magnetic Cyclostratigraphy" co-authored with Linda Hinnov and published by Wiley-Blackwell came out in early 2015 (Kodama and Hinnov, 2015).



Last spring, **Anne Meltzer**, Francis J. Trembly chair, visited Universitas Gadjah Mada in Yogyakarta Indonesia to develop new research collaborations related to subduction zone processes and to explore opportunities for undergraduate student experiences related to hazards. She also helped organize and attended a workshop in Santiago Chile on National Geophysical Networks in Latin America: Best Practices, Challenges, and Opportunities for Collaboration. The workshop was an outgrowth of research and capacity building efforts in the wake of the 2010 Mw 8.8 Maule earthquake offshore Chile. This travel combined with two extended field seasons operating 2 temporary broadband seismic arrays in Mongolia made for a lots of frequent flyer miles. Closer to home we took delivery of a new Ground Penetrating Radar digital acquisition system used in geophysics courses at Lehigh.

Don Morris continues to teach the Natural History of Costa Rica course during intercession and, teaches a cross-disciplinary course, Sustainable Development: The Costa Rica Experience. Don is also the director of the Lehigh's Environmental Initiative Program.

Frank Pazzaglia had a very busy GSA National meeting in Baltimore. In addition to serving on GSA Council, he ran a pre-meeting field trip, gave two talks, and chaired two sessions, one of which was a Pardee Session on Appalachian Geomorphology. The field trip was a particular success, attracting an international audience of 24 participants who observed the topographic, geomorphic, and stratigraphic consequences of the 2011 Mineral, Virginia earthquake.

In the geochemistry group led by Assoc. Professor

Stephen Peters, PhD candidate Jill Henry defended her dissertation on the fate of Fe, Al, and Zn in Coal Mine Drainage. She presented her research at the Geological Society of America meeting in Baltimore last fall. Her papers on the controls on Zn adsorption and temporal evolution of AMD outfalls has received attention from the geochemical community. Johanna Blake (PhD 2014) has accepted a position at the USGS New Mexico Water Science Center. Current projects in the group include moving forward with studies of the complex reactions between Dissolved Organic Carbon and Mercury. The current investigation, led by M.S. student Rebecca Whiteash and Assoc Professor Don Morris utilizes a biosensor strain of *E. Coli* that luminesces on exposure to Hg(aq). A new project is starting to investigate the connections between red paleosols in Pennsylvania and the climate of the last 1 myr. Initial work by undergraduates Jordan Dykman, Taylor Cummins, and Cora Summerfield comprise the initial parts of the study, which is continued by M.S. student Laura Markley. The project, in collaboration with Frank Pazzaglia and Ken Kodama aims to use the geochemical and soil textural data recorded in the soil profiles to estimate temperature and rainfall parameters inclusive of MIS 11.

Joan Ramage is studying the changing ice caps of the Russian High Arctic. She is pursuing questions about how these glaciers respond to variations in climate and sea ice adjacent to the archipelagoes. She was recently invited to present some of her novel teaching materials on hurricane

hazards at a collaborative workshop on sea level change and associated risks in an effort to improve undergraduate teaching collaborations in minority serving institutions. Currently, she is on sabbatical writing up her research and developing new projects that work with LiDAR observations.

Dork Sahagian had a busy year in 2015. Highlights include finishing up a project to measure the paleoelevation of central

Mongolia using vesicular basalt flows (uplift of 1 km in the last 9 million years), launching a project to determine the fundamental cause of river meanders (force imbalance between driving and resistive forces), and starting a new graduate student studying volcanic ash eruptions. Teaching has been fun, with the big intro class in Environmental Science, the junior majors class in Earth History, the senior Volcanology class, and the grad class in Scientific Foundations for Environmental Policy Design. The new book for the intro class appears to be a big hit with the students here and in a number of universities nationwide. As we learn more science, we realize that very little action is being taken on the basis of science we already know, so outreach is reaching a new level of importance. Presentations this year at the U.N., various conferences, and even a synod of evangelical bishops are some small steps in bringing our science into the hands of those that need to begin to understand not only what already know, but how it affects them and their communities.

Zicheng Yu worked with his collaborators (Phil Camille and Dave Beilman) on an NSF-funded collaborative project studying responses of circum-Arctic peatlands to past warm climates. Yu delivered a lecture on climate change and Arctic landscapes at an outreach event held at Bowdoin College in southern Maine in late June 2015. About 70-80 people from local communities attended this evening event. More information can be found at the following web pages:

<http://www.bowdoin.edu/environmental-studies/symposia/climate-change-arctic-landscapes/index.shtml>

He attended XIX INQUA Congress in Nagoya, Japan in summer 2015, where he convened a session on peat deposits in the Quaternary, organized a C-PEAT group meeting, and gave two talks on circum-Arctic peatlands and Antarctic peat-forming ecosystems. Afterwards he convened a session on lake-to-peat transitions at the 13th International Paleolimnology Symposium held in Lanzhou, China. Yu went to Venice, Italy in early September to attend PAGES Antarctica2k Workshop on planning and carrying out climate data synthesis for the last 2000 years from other archives as well as ice cores. Antarctica2k is a regional group as part of PAGES (Past Global Change) 2k Network. In October, he lead-organized a C-PEAT (Carbon in Peat on Earth through Time) workshop at Lamont in New York. The workshop was attended by over 50 people from 10 countries and was supported by PAGES, INQUA, NSF and Lehigh's EES Department. At the workshop a plan was laid out for C-PEAT Working Group activities over the next two years. For more detail see the website below: www.pages-igbp.org/?searchword=C-PEAT+working+group&searchphrase=any&limit=50&ordering=newest&view=search&option=com_search

In early December, Yu gave a talk remotely to The MilliPeat Workshop on Global Peatland Carbon Synthesis and Modeling in the Last Millennium held in southern England. He then attended two more meetings: Neotoma Paleocology Database (<http://www.neotomadb.org/>) Workshop, and Permafrost Carbon Network (www.permafrostcarbon.org/) Meeting in San Francisco, over the weekend before AGU Fall Meeting.

Peter Zeitler, CAS Iacocca Professor, spent the year continuing work on three NSF projects, and collaborating with five graduate students: Kalin, Jen, and Lenny working to finish their Ph.D.'s. Janelle to finish her M.S., and Darwin who joined the noble-gas group this year to do an M.S. Peter's year included brooding about the effect that small pores and defects have on noble-gas diffusion, and spending a great few weeks in the Gobi Altai of Mongolia helping Janelle get her samples. Peter also heads the International Standing Committee on Thermochronology, which oversees the planning and continuity of biennial meetings held across the globe - everyone's looking forward to Maresias, Brazil in 2016.

2015 EES WEEKLY SEMINARS

supported by the endowed *Bertolet and Blaustein Funds*

–EES seminars are scheduled every Friday, 12 noon in STEPS 101– Please join us!

Spring

January 23 Matthias Ruth, Department of Civil and Environmental Engineering, Northeastern University "Land Use Conflicts, Energy Use, and Emissions in their Regional and Global Context."

January 30 Karen Harpp, Geology Department, Colgate University "Darwin's Enchanted Isles: Where Geology and Biology Meet"

February 13 Christy Goodale, Department of Ecology and Evolutionary Biology, Cornell University "Nitrogen Retention & Loss, and Climate Implications"

February 20 EES Graduate Symposium – Keynote speaker, EES Alum **Sean Gulick**, '99 "Geophysical Characterizations of the Chicxulub Impact Structure: Insights into Planetary Processes and Extinction".

February 27 Mary Voytek, NASA "Astrobiology: Understanding Our Place in the Universe"

March 6 Beth Lambert, Massachusetts Division of Ecological Restoration, Department of Fish and Game "Dam Removal and River Restoration: The Intersection of Science, Policy, and Community Engagement"

March 20 Yiqi Luo, Department of Microbiology and Plant Biology, University of Oklahoma "Big Data Science in Ecology."

March 27 Adam Schlosser, Programs of Atmospheres, Oceans and Climate, Massachusetts Institute of Technology "The Future of Extreme Events Over the U.S.: What Shifts Could We Expect from Climate Change and what Could be Avoided through Mitigation?"

April 3 Allison Duvall, Earth and Space Sciences, University of Washington "Beyond Wallace Creek: Exploring deeper into the geomorphic signature of strike-slip faulting."

April 10 Kerry Gallagher, Geosciences Department, Universite de Rennes "Transdimensional (Inverse) Modelling in Earth Sciences"

May 1 EES Undergraduate Research Symposium – Keynote speaker, EES Alum, Justin Stroup '07, "The Holocene puzzle, interpreting the fluctuations of Quelccaya Ice Cap, Peru"

Fall

August 28 "EES Summer photo presentations"

September 4 Sarah Penniston-Dorland, University of Maryland "Strength and heat in the subduction channel: Evidence from the metamorphic rocks"

September 11 Jun Ouyang, South China Normal University, School of Geographical Sciences "Paleoclimatic perspectives on the Asian Monsoon since late MIS 3: insights from swamp sedimentary records of south China"

September 18 Thomas P. Becker, ExxonMobil "Cretaceous-present foreland subsidence as a constraint on the rise of the Puna Plateau in northern Argentina"

September 25 Donna Jurdy, Earth & Planetary Sciences, Northwestern University "Mars magnetic mystery"

October 16 Amy Hessler, Montane Forest Dynamics Lab, West Virginia University "Climate Change, the Mongol Empire and Modern Mongolia"

October 23 Hilary Christensen, Biological Sciences, Moravian College "Evolution of mammalian herbivory in the aftermath of the KT extinction"

October 30 Marty Grove, School of Earth, Energy, & Environmental Sciences, Stanford University "Detrital zircon U-Pb provenance of the Colorado River: A 5 m.y. record of incision into "Colorado Plateau cover strata"

November 6 Samuel Kelley, Environmental Sciences, "University of Waterloo "The fall and rise of the Holocene Greenland Ice Sheet, a perspective from west Greenland" (*Samuel Kelley is the son of EES alums Joseph Kelley and Alice Repsher Kelley*)"

November 13 Nikki West, Pennsylvania State University "(Micro)climate controls on watershed evolution in the central Appalachians"

November 19 & 20 D. Foster Hewett Symposium (*details below*)

The 38th annual

D.F.Hewett Symposium

"CHANGES IN THE WORLD'S OCEANS"

Keynote speaker, **Richard A. Feely**, NOAA Senior Fellow, NOAA Pacific Marine Environmental Laboratory, Seattle, WA

"Ocean Acidification: A Global Problem with Local Impacts on Marine Ecosystems"

Jonathan Payne, School of Earth, Energy, and Environmental Sciences, Stanford University

"Geologically Distinctive Selectivity of the Emerging Mass Extinction in the Oceans"

Joan Kleypas, Climate and Global Dynamics, National Center for Atmospheric Research

"Bad Chemistry: Impacts of Ocean Acidification on Marine Ecosystems"

Michael Arthur, Department of Geosciences, Penn State University

"Notions of Stinking Oceans– Causes and Consequences of Past Ocean Anoxia and Implications for the Future"

Bärbel Höhnisch, Earth and Environmental Sciences, Lamont-Doherty Earth Observatory, Columbia University

"Reconstructing Ocean Acidification in Earth History"

The D.F. Hewett Symposium talks will be made available on our [Facebook](#) page!



From our invited speakers....

"Thank you so much for having us! It was a really nice experience and in the end we all decided that we should have similar symposia at our own institutions."

"This was one of the best visiting speaker experiences that I have had."

"I thought it was a great experience for presenters, faculty and students alike"

Click on this link to check our website for more details on our weekly seminars:
[EES Weekly Seminar](#)

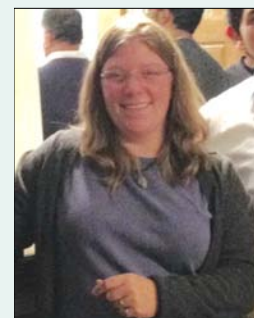
**ALUMNI
CORNER**
Interviews with some recent EES alums.....

Johanna Blake, PhD '14 is currently a Hydrologist with the US Geological Survey New Mexico Water Science Center. She assesses the water quality and quantity and geology of an area in New Mexico to understand the potential environmental impacts of oil and gas development. Additionally, she is working with a team to understand the hydrology and water quality of a watershed in western New Mexico. Johanna uses tools such as geologic maps, well logs, geochemical data, and cross sections in the office and, flow meters, field probes, etc. in the field. Prior to this, Johanna was a postdoctoral fellow at the University of New Mexico studying the mobility and accumulation of uranium associated with abandoned mine waste in New Mexico and Arizona.

When asked how Lehigh prepared her, Johanna said the diverse EES department and vast opportunities at Lehigh prepared her as a geochemist. *"As a student, teaching assistant, and member of the EES community, I was exposed to everything from ecology to mountain building to earthquakes. This diverse knowledge has been very useful outside of Lehigh. Additionally, being a teaching assistant at Field Camp and traveling abroad with the department has allowed me to see the world from many perspectives which has also helped immensely in my current endeavors."*

Johanna believes this combination of experiences at Lehigh will best prepare students for a career in the Earth sciences. Taking advantage of every opportunity and understanding at least a little about the different subject areas will help to take students far. Her advice is *"work with each other". "If you are an undergraduate, try to work with a graduate student and vice versa. The experience will be rewarding for both of you. It also helps to have a good attitude and work hard"*.

Five years from now, Johanna sees herself doing high-impact research on geochemical issues related to environmental impact in the Southwest and beyond.
PhD adviser, Stephen Peters



Jordan Dykman, BS '14, 2014 Mumford Award recipient, works as a Geoscientist for ExxonMobil Exploration Company, in Houston, Texas, on the West Africa South Operations team. She analyzes and interprets seismic- and well-data to identify new locations for hydrocarbon accumulation.

Jordan's Lehigh career started a little different than most of her EES Colleagues. She began Lehigh in the P.C. Rosin School of Engineering as a mechanical engineer. With every intention of going into energy engineering, by the second semester of her sophomore year, she found that she wasn't truly passionate about what she was learning. She decided then to switch her major to Earth and Environmental Science. During her two years in the EES department she was able to build upon her preexisting knowledge of the earth system and find her passion for geology. *"The experiences that I had with both the students and the faculty helped so much to shape me as a scientist. My senior year I had the privilege of working with Johanna Blake, Steve Peters, and Frank Pazzaglia on my research project for my thesis. This project taught me how to think critically about a problem, develop a plan to try to understand that problem, write a well thought out scientific paper, and present my findings in a logical manner. I have been able to use all the skills that I have learned from the classroom as well as from my research project in my current job."*

In one conversation she had with Steve Peters he asked her what she wanted to do once she graduated and Jordan replied, *"I wanted to work in the energy industry. Considering my research project was doing a geochemical and geophysical analysis of soil, Steve couldn't figure out why I had picked a project like this instead of one more geared towards the energy industry".* I told Steve *"I was very happy to be doing such a different kind of research project because the whole point, and the bigger picture, is learning how to solve a problem"*. Throughout the course of her research project, Steve and Frank decided the upcoming regional GSA conference would be a great opportunity for some of the EES seniors to show off their research. *"When we found out that we all got accepted to present our work, I was extremely excited."* That excitement quickly turned to fear when she learned that her research would be presented not in a poster session, but in a talk. *"Public speaking was not my strongest suit, and I was certain that I wouldn't be able to do it."* As the months got closer, her anxiety levels rose higher and higher, but when the time came she stood in front of the crowd and gave a 30-minute presentation, and it went better than she could have ever imagined. *"I am so happy that my professors and my peers had so much faith in me, and pushed me to do things I was afraid of because that challenge and that experience helped me so much to prepare for my career."* In five years, Jordan still sees herself working for Exxon Mobil in Houston.

Allyson McCarter, BS '15, 2015 Handwerk Prize recipient, is now working as an environmental scientist 1 for Arcadis, a global design, engineering and management consulting company. Her job entails fieldwork on both long- and short-term projects doing groundwater and soil sampling to monitor the effects of site-specific contaminants. She has gained experience with environmental drilling oversight, monitoring well installation, as well as, laboratory data evaluation and reporting. In November, Allyson was looking forward to heading to California to assist with wildfire cleanups!

Allyson mentioned that her Lehigh experience prepared her on a personal growth and maturity level for her job and, her life, post-Lehigh. She learned to guide herself through tough decisions, how to prioritize, plan, and make judgment calls on her own. She now has the confidence to make decisions and learned valuable time-management skills. *"The EES department at Lehigh prepared me so well for my current line of work" and "each and every one of the labs I took at Lehigh gave me hands-on experience, collecting analyzing, and reporting data. Even though my job now is mainly physical field work, having the background coursework helps me to understand the "why" of what I am doing."*

Allyson feels that her relationship with EES staff helped to prepare her in terms of networking and communication in the workplace and, they made her feel comfortable going to them for extra help and career advice.

When asked, where do you see yourself five years, Allyson responded that she still sees herself in the consulting industry. She enjoys conducting fieldwork but could also see herself eventually transitioning to do more report generation and suggesting future remedial action plans. She also said that project management is also a possibility, handling a more logistical portion of projects.

Finally, Allyson mentioned that she seriously considers her EES major as a *"truly unique experience where knowledge flows seamlessly between professors, TAs, graduate students, and undergraduates and is something for which the department should be very proud"* and expressed how rewarding it is to share her Lehigh experience with *"an incredible group of faculty and students!"*



ALUMNI CORNER *cont....*

Daniel Minguez, PhD '15 is now a geologist at Chevron, in Houston, Texas, working on plate tectonics and paleogeography. When asked how Lehigh prepared him, Daniel said that Lehigh faculty gave him the opportunity to *"take ownership of meaningful research while maintaining just the right amount of guidance and oversight"*. As a result, Daniel gained competency as a scientist and made contributions to the scientific community in the form of peer reviewed research. The work he did at Lehigh developed the basis of the skills he uses every day on the job.

In the next five years, Daniel sees himself *"leveraging my academic and industry experience to tackle new challenges. (The details are top secret!)"*

Daniel really enjoyed teaching at Lehigh. *"Teaching holds you to a high standard of knowledge and rigor on short time scales. It also hones your ability to communicate. Obviously this all comes in handy in a number of situations. I definitely recommend investing the time in your teaching duties, your students will thank you, and you'll thank yourself down the line."*

Andrew Moodie, BS '14 is currently a second-year PhD student in the Department of Earth Sciences at Rice University in Houston, Texas. In his research, he attempts to link process-scale fluvial sedimentology to long-term landscape evolution through numerical modeling and field observation. Andrew's goal is to develop a framework for sustainable river and delta management strategies that can be applied to important domestic deltas, like the Mississippi River delta.

Upon leaving Lehigh, Andrew said he felt well-prepared for graduate school. The broad interests of the EES faculty meant that he left Lehigh with experience in many topics in Earth Science. Lehigh prepared him to be a good field geologist through Summer Field Camp. Courses that focused on improving science writing prepared Andrew for writing grant and fellowship applications, as well as research manuscripts.

Andrew told us about a favorite Lehigh memory... *"I vividly remember working late into the night at STEPS in the final weeks of the semester, trying to wrap up my senior thesis. I was surrounded by many of the other students also completing theses, and we all helped keep one another sane and complete our projects. Looking back, this is one of my favorite memories of Lehigh, and certainly the most rewarding experience of my undergraduate career. I would encourage any student even remotely interested in research to get involved and see what's out there for you to experience."*

Within the next five years, Andrew plans to have completed his PhD and hopes to have a postdoctoral research or assistant professor position.



"I am in the best city in America!" declares **Raghida Sharif, BS'15** who is currently enrolled in a residency-based master's program through the American Museum of Natural History (AMNH) in New York City. By August 2016, she will complete a Master of Arts in Teaching. During the school year, she spends Monday to Thursday at a public high school in Brooklyn where she co-teaches with a mentor teacher. On Fridays and 2-3 Saturdays a month, Raghida attends class at AMNH. Her responsibilities include lesson planning with her mentor teacher and teaching lecture and lab classes. She also needs to keep up with homework, including residency-based lessons and essays. Her classes are both graduate-level science courses (in geology, space systems, meteorology, etc.) and graduate-level pedagogy courses (curriculum and instruction, scientific literacy, educational theory, etc.).

Raghida told us *"My classes at Lehigh prepared me well in many Earth science concepts. My research experience introduced me to many of the educational terms and strategies that I am immersed in now. Above all, my experiences in the field offered me the best stories to tell my students (e.g. Canadian Rockies, Costa Rica, Ringing Rocks)."*

We asked Raghida where she sees herself in five years. *"I would like to be transitioning into an administrative or managerial position at either a museum or a department of education. Basically, I want to tell people what to teach and learn."* She would like to complete either a Ph.D. or Ed.D.

One unique experience that Raghida wanted to share is how she got into the field of education. In August, before her senior year at Lehigh, she began a small project with Dr. Dave Anastasio that developed into her senior thesis. *"I initially learned about this project at a picnic table in Calgary, B.C. The conversation that I had with Dave at that picnic table set up my trajectory for the rest of my school year, and for the next four years of my life."* It was through Dave that she learned about her current master's program. If I could pass along one piece of advice to EES students, it would be to *"talk to the professors and see what possibilities are out there. They might be surprised!"*

"I did love the EES department. It's not unique, but I would encourage current students to embrace the department and really get involved."

**PCPG News Update****Geology students are the happiest on college campus study finds**

According to the National Student Survey in the U.K. the Geology students at UK colleges and universities are the happiest. The top 10 reasons, in the author's opinion, are provided:

<http://www.forbes.com/sites/trevornace/2015/12/18/geology-students-happiest-college-campus-study/#2715e4857a0b18a4c90e717a>

ENDOWED FUNDS for EES STUDENTS

New endowment for EES

S. Jeffress Williams '69G and Rebecca Upton Endowment Fund in Earth & Environmental Sciences



This endowment was generously gifted in 2015 by alumnus **S. Jeffress "Jeff" Williams, '69** and **Rebecca Upton**, and will support EES students and faculty to advance their research.

S. Jeffress Williams graduated from Lehigh with a Master's degree in geology in 1969 after receiving a geology BS from Allegheny College. He was a senior research coastal marine geologist and focused his research career on the geologic history and processes of coastal, estuarine, wetland, and inner continental shelf regions with more than 40 years research experience investigating topics such as the geologic origins and development of marine coastal and estuarine as well as Great Lakes coastal systems, Holocene sea-level history, climate-change effects on coasts, and the geologic origins and character of marine sand bodies and their importance to coastal sediment budgets. Williams has led or participated in more than 80 field studies along the Atlantic, Gulf of Mexico, Pacific, Great Lake coasts, and the Irish Sea, UK and has been PI on many geologic mapping investigations. Jeffress directed the USGS Coastal and Marine Geology Program from 1996 to 2000 in Reston, VA. Prior to joining the

USGS in 1983, Williams was a research marine geologist with the Coastal Engineering Research Center and an invited visiting scientist at the Institute of Oceanographic Sciences, Taunton, UK. He was awarded the 2009 Coastal Zone Foundation Award for career achievement.

In 2010, S. Jeffress Williams retired from, and was granted a scientist emeritus position with, the USGS, Woods Hole Science Center, Woods Hole, MA. He is an affiliate graduate faculty member with the coastal geology group in the Geology & Geophysics Department at the University of Hawai'i, Manoa.

Charles B. Sclar Scholarship



The Charles B. Sclar Endowed Scholarship Fund was established for Lehigh University, by his wife, Ruth C. Sclar, in October, 2001.

Charles B. Sclar, was a professor emeritus of geological sciences. He was a professor at Lehigh from 1968–1990. Prior to coming to Lehigh, he was associate chief and director of the High-Pressure Laboratory of the

Chemical Physics Division of the Physics Department at Battelle Memorial Institute in Columbus, Ohio. He was a researcher at Battelle for 17 years. From 1949-1951 he was a member of the geology faculty at Ohio State University.

Sclar earned his bachelor of science degree from the College of the City of New York where he was the Ward Medalist in geology, and his Master of Science and Doctor of Philosophy degrees from Yale University, where he was the James Dwight Dana Fellow. He was one of the principal investigators for NASA on the Lunar Sample Analysis Program of the Apollo Program, from its inception in 1969 until 1978 and, he was one of only 142 scientists around the world who were given samples from the rocks and dust collected by Neil Armstrong and Buzz Aldrin from the Sea of Tranquility in July 1969 (*see story on pg. 2*).

To elevate research activity in geological science, Sclar was recruited by Lehigh. During his tenure as chairman, and through relentless effort, the department developed a strong record in graduate studies and research. He was an indefatigable proponent for geological sciences, a demanding and proud mentor to young faculty, and an enthusiastic teacher, who strove to reveal his fascination with science to students.

Sclar held two U. S. patents and authored many articles and books. He was named a Fellow of the Geologic Society of America and a Fellow of the Mineralogical Society of America. He was a founder and past secretary-treasurer of the International Association of Genesis of Ore Deposits and a member of many other geological societies. Additionally, the mineral, "sclarite", $(\text{Zn,Mg,Mn})\text{oZn}(\text{CO})\text{r}(\text{OH})_{10}$, was named after Sclar.

EES Gifts 2015

All gifts, no matter the size, contribute to the success of our program. We wish to thank the following alumni and others who have generously donated to the EES Department in 2015.

Anonymous
James E. Baxter '80
Robert C. Booth '55
Thomas P. Becker '02
Keith A. Brugger '78
Patrick Burkhart '93
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*A special thank you to **Richard B. Palmer '43** who has been contributing to the geology and earth & environmental science department for 26 consecutive years!*

We apologize if we omitted your gift. If your gift check was cashed, you can be assured that it arrived safely at Lehigh. If your name should have appeared on this list of donations for 2015, please bring it to our attention and we will include an acknowledgement in our next newsletter. Please notify Nancy Roman nroo@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, ST 102 and seminar, ST 101 (11 AM-1:00PM)
- The Graduate Student Symposium, **Friday, March 4, 2016**
- Undergraduate Symposium, **Friday, May 6, 2016**
- *Department picnic and awards presentations follow the Undergraduate Symposium on May 6*

Many of the programs we offer in EES that allow us to excel in education and research are made possible by endowed accounts and annual donations by alumni. We are always looking to augment our resource base for graduate and undergraduate research, EES field programs, and 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.

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

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

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