

EES NEWSLETTER

December 2018



Earth and Environmental
Sciences Department



Season's greetings,

It has been a fast paced last six years since I became chair of the Department of Earth and Environmental Sciences. Now, I am looking forward to next year's approved sabbatical leave. My intent is to reside in northern Spain with an office at the Spanish National Lab for Human Evolution (CENIEH, Burgos, Spain), with fieldwork in the Pyrenean Mountains, Betic Cordillera, and a new quest for the earliest Europeans. All things to look forward to!

Great aspirations characterize the careers of my colleagues and the future hopes of the students of Earth and Environmental Sciences. They, like you, can expect great success as a result of intelligence, background, work ethic, and the range of opportunities the department can offer. During this time of Lehigh University transformation, I hope I can leave the department with greater resources to share our science and to expand future student experiences.

I want to thank colleagues, students, and alumni for helping the department move forward these last years. I have been impressed with my colleague's excellence and the time and wealth of our generous alumni. To those alumni who spoke at recent undergraduate and graduate symposiums, and career expos, thank you. Interest in our

courses and the number of majors in EES academic programs is high. To the friends and alumni who provided gifts and endowment to support field camp, undergraduate research, our graduate students, or unrestricted support, thank you as well. All this support is much appreciated and it has made administration duties associated with being chair far easier.

I want to wish Dr. Claudio Berti, the field camp director and our resident GIS expert for the last three and a half years, with much success in his new position at the Idaho Geologic Survey. We will miss his expertise and cheery presence in the S.T.E.P.S. Building. I want to end by wishing the next chair of EES, full professor Gray Bebout, a bright and productive future as chair and continued accomplishments in research, teaching, and service.

This newsletter is once again full of the great achievements of the students, staff, and faculty of EES. I hope you enjoy reading it (and then remember to forward it to your children if our address is out of date).

Sincerely Yours,

Dave Anastasio
Professor and Chair

EES RECOGNITION

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Anne Meltzer received the 2018 Lehigh University "Hillman Award for Excellence in graduate Advising". Anne is a model advisor to be emulated for the size, support, and success of her graduate advisees.

In recognition of **Dork Sahagian** for his outstanding work, American Geophysical Union (AGU) selected him for their 2018 Voices for Science program. Collectively, the Voices for Science participants will help to amplify the influence of the scientific community and help both policymakers and the broader community see that our nation continues to support and benefit from our scientific enterprise.

The Council of the Mineralogical Society of America announced that it has elected **Gray Bebout**, EES Professor, as a fellow of the Society. Nomination by the Fellowship Committee election by the Council attests to the high regard that his colleagues have for his scientific activities in that field. He joins a distinguished group of individuals who have been recognized for their outstanding contributions to the fields of mineralogy, crystallography, geochemistry, and petrology.

Patrick Belmont PhD '07 has been recognized as the Faculty Researcher of the Year 2018, S. J. and Jessie E. Quinney College of Natural Resources, Utah State. He also won the Kirk Bryan Award by the Geomorphology Division of the Geological Society of America.

Bob Booth earned the dean's award for teaching in 2018 and has been promoted to the rank of full professor of Earth and Environmental Sciences

Josh Stachnik was promoted to Senior Research Scientist and was also recognized with the The Outstanding Publication Award by the Structure and Tectonics Division of The Geological Society of America for "P-wave tomography of potential convective downwellings and their source regions, Sierra Nevada, California" a paper he co-authored that links structural geology, tectonics, and geophysics in a unique and forward-looking manner.

The Gulf Research Program of the National Academies of Sciences, Engineering, and Medicine today announced **Jill McDermott** as one of the recipients of its 2018 Early-Career Research Fellowships.

WELCOME

In November, **Dulcinea Groff** joined Dr. **Zicheng Yu's** laboratory at EES as a Postdoctoral Research Associate. Before joining EES she was a doctoral candidate at the University of Maine's Climate Change Institute and the School of Biology and Ecology. She was a fellow in the NSF's Interdisciplinary Graduate Research Traineeship (IGERT) in Adaptation to Abrupt Climate Change. For her dissertation work, she conducted paleoecological research in the Falkland Islands investigating linkages between terrestrial-marine ecosystems over the last 14,000 years. These interests stem from a desire to show others how the past can inform conservation decisions to manage and adapt to a changing world.

Dulcinea will be working with Dr. Yu's team to reconstruct late Holocene ecosystem and climate shifts in the western Antarctic Peninsula. This research will provide a useful context to understand contemporary climate change, and will expand her research interests in Southern Hemisphere environmental change.

In her free time, Dulcinea enjoys many outdoor activities such as hiking, mountain running, climbing, camping, and indulging in delicious foods with family and friends.



Congratulations Class of 2018

Master of Science

Kaylee Kraft

“Fate of Subducting Organic Carbon: Evidence from Western Alps HP/UHP Metasedimentary Suites”
(advisor: *Bebout*)

Adrienne Scott

“Illuminating the Crustal Structure of Khövsgöl, Mongolia Using Passive Source Seismicity”
(advisor: *Meltzer*)

Candace Wygel

“Bubbles and Dust: Volcanic Ash Dissolution Rates of Nutrients and Contaminants as a Function of Surface Area and Composition”
(advisor: *Sahagian*)

Doctor of Philosophy

Jennifer Schmidt

Revealing a Cenozoic History of Landscape Change and Differential Unroofing in the Southeastern Lhasa Block: Applications of Thermochronometry Along the Tibetan Plateau Margin

Bachelor of Arts

Patrick Clark
Connor Mobley-Reader
Krittanon “Pond” Sirorattanakul*
Gerald Welch
Susan Zea

Bachelor of Science

Michael Camera
Carlos Castell Croke
Christy Li*
Grant Loescher*
Danika Marzillier*
Sarah Stern*
Julian Traphagan*
Martha Villegas Soto
Ryan Wheeler
Yuning Zhang

*Denotes students who graduated with department honors

Field Camp Update

In 2018, Field Camp brought 30 students to the Rocky Mountains to learn advanced field studies, including 14 students from Lehigh. We appreciate the support of our alumni who enable Lehigh students to attend through the Vic Johnson scholarship. In the past year, your donations enabled 9 scholarships to be awarded for Lehigh students to attend camp. In particular, we recognize the Imhof family for their continuing support of a full scholarship to **Sarah Stankus**, Eckard Scholar, anticipated 2019 BS. Your generosity is appreciated!

Along with the faculty, we wish **Dr. Claudio Berti** the best as he brings his expertise to his new position as the Geoscientist and Director of the Mapping and GIS Lab at the Idaho Geological Survey. **Dr. Steve Peters** will be the camp's new director. Steve taught at the camp for a decade before Claudio became director in 2016.

In 2019, we return to the U.S. Rocky Mountains for our 44th year.



(Claudio Berti with a token of appreciation for his 10 years of service)



(photos from camp in Idaho this past summer, with Claudio Berti instructing (left) and Frank Pazzaglia and group (right)).

UNDERGRADUATE HAPPENINGS

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On Friday May 4, 2018 we held our annual undergraduate symposium where we welcomed keynote speaker **Kimberly Baldwin** BS '13, Earth and Environmental Science, Lehigh University, MS '16, Geological Sciences, Rutgers University, now a Researcher at Rutgers University. Her talk was entitled "Reflections of a Sea-going Geologist: Applications of Marine Geophysics". Her talk was followed by poster and oral presentations, undergraduate awards presentations and as always our annual department picnic at Lower Saucon Park.



POSTER PRESENTATIONS

Tiffany Baumann, "Long term fluid reservoir stability at a fast spreading mid-ocean ridge: A timescale paradox" (*advisor McDermott*)

Monica Powers, "Application of rock magnetic based cyclostratigraphy to the Baza Lake, Spain and implications for Pleistocene human occupation of the Iberian Peninsula" (*advisor Dave Anastasio*)

Talia Rodkey, "Testing applications of the Picarro laser spectrometer for methane C isotope determination in marine hydrothermal samples" (*advisor McDermott*)

Marlene Schuster and Sianin Spaur, "Ancient Oceans, Unconformities, and Building Stones" (*advisor Pazzaglia*)

Boo Kyo Sur, Patrick Clark, Neal Hafner, Zhihao Cheng, : "A rating curve for Saucon Creek" (*advsor Pazzaglia*)

Frank Tetto, "An AMS Investigation of Alaskan Stone Net Kinematics" (*mentors Evenson, Kodama and Hopkins*)



(Professor Steve Peters presenting Julian Traphagan with best talk award)

ORAL PRESENTATIONS

Christy Li, "Age and retreat rate of Ohiopyle Falls" (*advisor Pazzaglia*)

Grant Loescher, "Organic Geochemistry of Hydrothermal Vent Fluids: Pescadero Basin, Gulf of California" (*advisor McDermott*)

Danika Marzillier, "Glacial melt onset analyzed using brightness temperatures from calibrated enhanced-resolution passive-microwave data on Vatnajökull ice cap, Iceland" (*mentors Ramage, Pazzaglia and Felzer*)

Krittanon "Pond" Sirorattanakul, "Characterization of slip behaviors observed at the Bulnay fault system in Central Mongolia" (*advisor Meltzer*)

Sarah Stern, "Glacial Change Influenced by Debris Cover and Glacial Lakes in the Hunza River Basin, Northern Pakistan: 2013-2017" (*mentors Ramage, Peters and Pazzaglia*)

Julian Traphagan, "Distribution of Earthquakes and Crustal Structure of the Junction of the Gobi and Mongolian Altai in Southern Mongolia" (*mentors Meltzer, Pazzaglia, Ramage and Stachnick*)

SYMPOSIUM AWARDS

Best Talks

Julian Traphagan
Krittanon "Pond" Sirorattanakul
Sarah Stern

Best Posters

Monica Powers
Tiffany Baumann

ANNUAL UNDERGRADUATE AWARDS

Donnel Foster Hewett Award- Krittanon "Pond" Sirorattanakul, BA '18

This award goes to a senior in Geological Sciences Who Best Demonstrates the Potential for Professional Excellence.

Handwerk Prize- Danika Marzillier, BS '18

This prize is presented to a student for Outstanding Achievement in the Fields of Chemistry, Materials Science and Engineering, or Earth and Environmental Sciences.

J. Robert Munford- Grant Loescher, BS '18

This award is given to the senior major who Demonstrates Substantive Improvement over the Course of their Program of Study, and Attains, in the Senior Year, a Clear Record of Excellence.



Anne Meltzer's undergraduate seismology class conducting a seismic reflection survey last fall in Zionsville, PA.



As a senior EES major **Krittanon "Pond" Sirorattanakul BS' 18** was honored by The Mars Generation, through their annual 24 Under 24 Leaders and Innovators in STEAM and Space Awards. He was nominated by **Kathryn Semmens PhD '13**, Science Director, Nature Nuture Center for work he did through an internship with them at Lehigh in summer of 2017.

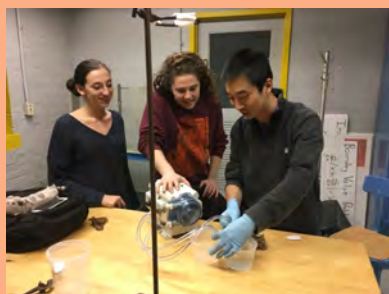
MOUNTAIN TOP SUMMER EXPERIENCE

In Search of the Fundamental Cause of River Meandering

EES Professor **Dork Sahagian** with the help of three undergraduates, **Madeline David** (EES and ES double major), **Zhihao Cheng** (EES and CEE), **Casey Urban** (IDEAS- EES and CEE), and Prof. **Diplas**, chair of CEE began their involvement in a "Mountaintop Project" last summer, in which they designed experiments to create meanders in a long flume in Fritz Laboratory. This led to 2-D meanders that only emerged if the water was allowed to accelerate downstream. When the flow was blocked, meanders developed upstream of the blockage.

The students used Google Earth Engine to find rivers whose slope decreased, increased, and then decreased again to demonstrate the presence and absence of the adverse pressure gradient and its association with meanders in actual rivers. They then constructed a system to test for 3-D meandering, otherwise known as "coiling" in which a fluid falls straight down and hits a blockage, causing it to coil up like a rope.

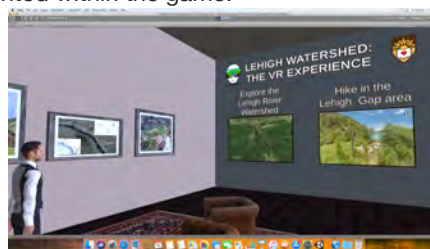
Next steps will include a theoretical formulation of fluid flow that represents the contrasting pressure fields in meandering and straight flows. This will lead to a "universal theory of meandering" as the ultimate goal of the project.



Immersive Virtual Reality (VR) Development of the Lehigh River Watershed

A team of Lehigh faculty including Dr. David Anastasio are developing an immersive VR environment to explore the environment of the Lehigh River watershed. This highly immersive VR space can be used in multiple types of educational settings for students to investigate the historical, ecological, and environmental issues of the Palmerton superfund site and Lehigh River watershed. Learning in a highly immersive VR environment will enable students to make better connections between science, social science, and decision-making contexts in their local environment, while promoting geospatial thinking and STEM workforce skills. The team are creating a VR space that will be used for the following curriculum learning activities:

1. Virtual field trips for both secondary and post secondary learners.
2. Collaborative problem-solving games to motivate and actively engage secondary learners in which they take on interdependent, differentiated roles and collaboratively solve a problem in the watershed. In the game, students play unique roles, receive role-specific, individualized information or gather specific data. Their findings are then shared digitally with their group to collaboratively solve problems presented within the game.





On March 2, 2018 we attempted to host our annual Graduate Symposium. Unfortunately mother nature had other plans and due to the mid day snow storm Lehigh was shut down. We were able to have lunch and our keynote speaker, **Dr. David Schneider**, PhD '00, was able to present his talk "Middle Cretaceous tectonism recorded in the shallow crust of eastern North America: more to the story than a hotspot". We had many alumni in attendance and thanks to **Frank Pazzaglia** the department pulled together an impromptu evening get together at Campus Pizza.



Since our graduate students had worked very hard preparing posters and oral presentations for this event we were able to hold a brown bag oral presentation on Thursday March 8 and a poster session accompanied by lunch on Friday March 9, 2018. We are very happy that the students were all flexible and still able to share their research with us.

Please save the date (and ask mother nature to stay away) for our 2019 Graduate Symposium on February 22, 2019 as we welcome keynote speaker **Julie Loisel**, PhD '12, Assistant Professor, Texas A&M University.



2018 Symposium Awards

Best Poster: **James Carrigan**

Best Talk: **Zhengyu Xia**

Oral Presentations:

Liliian Soto-Cordero
Zhongxiong Cui
Adrienne Scott
Candace Wygel
Zhengyu Xia
Jon Stelling



Poster Presentations:

Adam Benfield
James Carrigan
Heidi Cunnick
Katrina Gelwick
Josh Gonzalez

Hongcheng Guo
Mariah Hoskins
Matthew Huff
Mitch Johnson (CEE MS student)
Kaylee Kraft
Hanxiang Liu (Visiting PhD student)

Matthew Nikitzczuk
Anne Sirait
Leslie Tintle
Jess Welkey
Zhiqiang Wei (visiting post doctoral scholar)

CONGRATULATIONS

Micheal Polashenski (*advisor Ramage*) on passing his PhD qualifying exam.

Honcheng Guo (*advisor Zeitler*) on passing his PhD proposal defense.

Candace Wygel (*advisor Sahagian*) Paul B. Myers Jr. Distinguished Teaching Assistant Award which was presented by Emeritus Professor P.B. Meyers, Jr. (*picture right*).



WELCOME NEW GRADUATE STUDENTS

Susan Ambrose, East Stroudsburg University, BS in Biochemistry and Biology, '18 Research focus: Detection and analysis of environmental DNA (eDNA) in the marine environment, especially that of cold-water corals. (*advisor McDermott*), Teaching assistant and summer EES research fellow

William Dowd, University of Delaware, BS in Environmental Science, '18 Research focus: Geochemistry: Analysis of dissolved gases and organic acids. Soudan Mine, Minnesota. (*advisor McDermott*), Teaching assistant and summer EES research fellow

Adrienne Scott, University of Washington, Seattle, BS Earth and Space Sciences: Geology, minor Oceanography '15, Lehigh University, MS Earth and Environmental Science, '18 Research focus: seismology (*advisor Meltzer*) Kravis fellow

Michael Polashenski, Penn State University, BS in Physics Education and Music, '91, East Stroudsburg University, MEd and MS in General Science, '97 and '98 Research focus: Remote sensing of the cryosphere. (*advisor Ramage*), Dean's fellow

Some Graduate Student Professional Activities in 2018

Adam Benfield gave a talk and attended a short course on core processing at the Northeast GSA meeting in Burlington, Vermont in March. He traveled to Nevada as a field assistant to Ken Kodama in late May and presented a poster at AGU in December on his Colombia research. (*advisor Yu*)

James Carrigan traveled to Spain last winter break from December 12th to January 24th as part of his Ph.D. research. He took part in the Basic Seismic Interpretation webinar hosted by the Geophysical Society of Houston in May. He also attended GSA in Indianapolis in November where he presented his research. (*advisor Anastasio*)

William Dowd attended the International Continental Scientific Drilling Program (ICDP) training course in Windischeschenbach Germany in November 2018. (*advisor McDermott*)

Hongcheng Guo presented a poster at the 16th International Conference on Thermochronology at Quedlinburg, Germany in September. He also did field work in the Mongolian Altai mountains in August. (*advisor Zeitler*)

Mariah Hoskins presented at the Seismology Student Workshop at Lamont-Doherty Earth Observatory of Columbia University. She also presented at the combined annual meeting of the Seismological Society of America and the Latin American and Caribbean Seismological Commission as well as at the annual meeting of the American Geophysical Union (AGU) in December. (*advisor Meltzer*)

Matthew Huff did fieldwork this past summer for the National Park Service coring bogs in the Apostle Islands on Lake Superior. The cores from his work are now being used to reconstruct fire history in order to inform park management. (*advisor Booth*)

Michael Polashenski attended the 75th Eastern Snow Conference at the NOAA Center for Weather and Climate Prediction in College Park, MD (*advisor Ramage*)

Anne Sirait did an internship at National Earthquake Center - Meteorological, Climatology, and Geophysical Agency (PGN - BMKG), Indonesia for 2 months (June & July 2018). (*advisor Meltzer*)

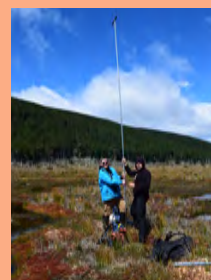
Lillian Soto-Cordero presented a poster at the Seismological Society of America Annual Meeting in May where she also attended 2 workshops. (*advisor Meltzer*)

Jonathan Stelling did field work in Karukinka Park, owned by the Wildlife Conservation Society (WCS) in January. Presented results of stable isotope analysis "Terrestrial archives of paleoecological change over the last 2,000 years on the western Antarctic Peninsula" at the Climate Variability in Antarctica and the Southern Hemisphere in the past 2000 years (CLIVASK2k) workshop. Funded as an early-career researcher through SCAR Antclim21 and the British Antarctic Survey, Cambridge, UK in May. Ended the year in December with an oral presentation on results of the January field work at American Geophysical Union (AGU) in Washington, DC. (*advisor Yu*)

Leslie Tintle was awarded the department scholarship to attend the Lehigh Microscopy School this summer. She also attended and presented a poster at AGU in Washington DC in December. (*advisor Sahagian*)

Jessica Welkey participated in the Basic Seismic Interpretation Short Course run by the Geophysical Society Houston. She traveled to AGU in Washington, DC in December to present an abstract entitled: Intracontinental Deformation and Crustal Structure: Hangay Dome, Central Mongolia. (*advisor Meltzer*)

Zhengyu Xia in September, attended CLIVASH2K workshop at British Antarctic Survey in Cambridge, UK, and presented a talk. (*advisor Yu*)



(*Jon Stelling and Wildlife Conservation Society Park Ranger Rodrigo Munzenmayer coring a peatland in the Upper Valle de Consejo Karukinka Park, Tierra del Fuego Chile*)

EES WEEKLY SEMINAR SERIES

Supported by the endowed **Bertolet and Blaustein** funds

EES seminars are scheduled every Friday at noon in STEPS 101 preceded by department lunch in ST 102 at 11am throughout the academic semester.

Spring 2018:

January 26, Cody Sheik, University of Minnesota-Duluth, "Microbes in action: Evidence of microbial biogeochemical cycling in an Oligotrophic sediment"

February 2, Liz Hajek, Penn State University "Measuring landscape dynamics from sedimentary deposit"

February 9, Julie Bowles, University of Wisconsin-Milwaukee, "Assessing New and Old Methods in Paleomagnetic Paleothermometry: A Test Case at Mt. St. Helens, USA"

February 16, Erwan Monier, Massachusetts Institute of Technology, "Integrated assessment of the impact of climate change on air quality and health over the US"

March 23, Luke Copland, University of Ottawa, "Are Canadian Arctic glaciers speeding up or slowing down in a warming climate?"

March 30, Frieder Klein, Woods Hole Oceanographic Institution, "The pathways of serpentinization, hydrogen generation, and abiotic synthesis of methane"

April 6, Kate Allstadt, USGS GeoHazards, Golden CO, "Listening to Landslides and Lahars"

April 13, Elias Deeb, Cold Regions Research and Engineering Lab (ARMY), "Why does the Army care about snow? Top research priorities for the US Army."

April 20, Peter Heany, Penn State University, "Painting a Rainbow with Ochre: The Roles of Holes in Iron Oxides"

Fall 2018:

September 2, Matthew Jackson, University of California, Santa Barbara, "Lost continents and preserved primordial reservoirs: Clues from the Earth's deep interior"

September 14, Greg Reihman and Chelsea Gilbert, Lehigh University, "Supporting LGBTQ+ Coworkers in Earth and Environmental Sciences"

September 28, Asa Rennermalm, Rutgers University, "Greenland ice sheet melting: What happens with all the water?"

October 5, Neil Sturchio, University of Delaware, "Hydrology with noble gas radionuclides"

October 19, Sarah Hammitt, The Port Authority of New York & New Jersey, "Risk-Based Design: How to Incorporate Resilience into Project Development"

October 26, Donald Fisher, Penn State, "Silica Kinetics and Subduction Zone Slip Behavior"

November 16, Nicole Gasparini, Tulane University, "The influence of rainfall patterns on bedrock river incision in Hawaii"

November 30, Kristin Morell, University of California, Santa Barbara, "Upper plate deformation in the northern Cascadia subduction zone"

Mingkai Jiang, PhD, '16, Postdoctoral Research Fellow, Hawkesbury Institute for the Environment, Western Sydney University, Australia, "Investigating the Climate, Biogeochemical Cycling, and Biological Distribution Nexus – Theory, Data & Modeling"

EES OUTREACH

On Friday, March 9, 2019 Graduate students **James Carrigan, Gabe Epstein, Mariah Hoskins, Candace Wygel**; Staff **Bruce Idleman** and Faculty **Frank Pazzaglia, Steve Peters** in collaboration with Zoellner outreach provided a positive experience with interactive science activities for Raub Middle School students who visited Lehigh. Many of which the students this was their first time on a college campus. On the way out of the STEPS building, many of the students expressed their excitement and one of them even asked if "every day at college is cool like this".



ENVIRONMENTAL CAREER EXPO 2018

This year's career expo was well attended by over 30 undergraduate and graduate students from civil and environmental engineering, earth and environmental science, energy systems engineering institute and environmental initiative. Louis F. Vittorio, Jr., '88 MS, PG Vice President, EarthRes Group, Inc gave the keynote address, "Careers in the Environmental Fields". After the talk, invited students, faculty and 8 alumni from various environmental fields enjoyed a dinner and networking. The networking then expanded for 2 hours and was open to any student with

an interest in an environmental field. This annual event allows students at all levels to hear career stories, discuss their futures, distribute resume's and learn about career and internship opportunities. Thank you to College of Arts and Sciences, College of Engineering, College of Education, **Jack Breiner**, BS '13, EES, **Kristen Brink**, BS '12 CEE, MS '13, Environmental Engineering, **Rachel Henke**, BS '14, EES, **Sam Perugini**, PhD candidate, Teaching, Learning and Technology, **Amy Shotmeyer**, BA '05 EES and Science/Technical writing, **Sarah Stern**, BS '18, EES, **Daryl Strom**, MEng '13, ESEI, **Pantelis Takos**, BS '16, CEE and **Louis Vittorio, Jr.** for helping make the night a success.



ExxonMobil

EES once again hosted ExxonMobil Reservoir Characterization and Modeling short course and interviews for students throughout the northeast region. This year's course and recruitment was facilitated by ExxonMobil recruiters Amanda Mosola, Elspeth Hixon and Robert Decesari and attendees included Lehigh graduate students **Adam Benfield**, **William Down**, **Leslie Tittle**, **Jessica Welkey** and undergraduate students **Tiffany Baumann** and **Monica Powers** as well as students from Binghamton University, SUNY, Columbia University, Lafayette College, Princeton University, Rutgers University, Syracuse University, University of Connecticut, University of Delaware, University of Pittsburgh and West Virginia University. This event is a great opportunity for students to learn, network and interview for internships and or careers with ExxonMobil corp.

SAVE THE DATE

Thursday, February 7 and Friday, February 8, 2019

D. Foster Hewett Symposium

"The Peopling of North America"

Who were the first peoples of the Americas and what routes did they take to get here? For many decades it was thought that the big game hunters of the Clovis Culture, following their prey across the Bering land bridge ~13,000 years ago, were the answers to those questions. Recently, that paradigm has been challenged and interdisciplinary research at the intersection of Archeology, Earth and Environmental Sciences, and Biology is arguing for several pre-Clovis cultures and multiple, much more complex immigration patterns. The 2019 D. Foster Hewitt lecture series will present four leading scholars who will explore the stratigraphic, geochronologic, lithic technology, and genomic evidence for how North America came to be populated. Join us for a series of five talks and panel discussions over two days as we engage the broader Lehigh community in discussion of this fascinating research.

Keynote speaker: Tedd Goebel, Texas A&M

Jessi Halligan, Florida State University

Bruce Huckell, University of New Mexico

Jennifer Raff, University of Kansas



Travis Andrews '15, PhD, EES, is living and launching a tech startup in the quiet Driftless Area just west of Madison, WI. After Lehigh, Travis briefly retired to Pittsburgh for a deep inward look at the future, then decided to take a non-traditional postdoc at UW-Madison to manage a stealth-mode global consortium of nation-level labs focused on actionable strategy to reduce risk within the energy, water, food & human security nexus. Armed with management experience, an inward look at life, and Lehigh-derived abilities in research & teaching, in mid-2018, Travis launched a tech startup to understand group wellbeing. *Groups* can be anything from competing bio-derived materials, to communities on Twitter, or even meaningful things in life. *Wellbeing* is a measure and basis of strategy for improvement. Learn more at ThenAtlas.org.

Travis' advice to future and current EES graduate students: Lehigh is *the most* generous place to take an intellectual risk. To avoid the comfortable/formulaic and inspire the spirit of an entrepreneur, embrace Lehigh's: freedom to think; support to act/teach/travel; community to grow confidence. For example, Travis merged concepts into a thesis that no other advisors/university could have possibly anticipated or accommodated. Travis also took MBA classes at Lehigh while pursuing his PhD that turned out to be surprisingly useful.

Lorrie Carnes, BS '16 is a second year PhD student in the School of Earth and Space Exploration at Arizona State University. She is currently working on a project in the Sky Island topography of southeast Arizona using cosmogenic isotope paleo-erosion rates and paleoclimate records contained in carbonate paleosols. She spent her first year of graduate school taking courses, teaching geology labs, working in a cosmogenic isotope laboratory, and taking weekend adventures to explore Arizona!

After encouragement by the EES department faculty for senior students to pursue independent research projects, Lorrie began working on a senior honors thesis with **Frank Pazzaglia**. She helped conduct field work in Virginia by collecting samples and characterizing soil stratigraphy, prepared samples for cosmogenic isotope dating, and generated river profiles for landscape analyses. After finishing her thesis, she was funded by the department to attend a national conference and present her work. The constant support and encouragement from the entire department inspired her to continue research, and so when she received the Lehigh Presidential Scholarship to fund a fifth year of study at Lehigh, she chose to stay and pursue two research projects. She continued her independent research with Frank and began a new project studying the ancient paleointensity of basaltic rocks in Greenland with **Ken Kodama**.

She credits the faculty in the EES department for being tremendous role models to aspiring scientists. She received not only a great interdisciplinary geoscience education, but also learned how to enjoy a life in academia from the faculty who successfully model work-life balance, collegiality, and passion for their work.

Lorrie enjoys academia, but doesn't know where her research will lead her. She's hoping to expand her project to Australia where the climate is similar to Arizona.

In 2013, as a newly declared geologist, Lorrie felt unqualified to apply to prestigious REU programs and internships during summer breaks. However, older students and faculty frequently talked about 'imposter syndrome' and encouraged her to apply to every earth science related program that sounded interesting to her. She applied to many REU programs after her sophomore year and ended up in a geoscience/sustainability program at UT Austin. This experience taught her basic research skills and gave her the confidence to explore new geoscience disciplines. Throughout her time at Lehigh she also participated in Lehigh Field Camp, a martian geochemistry lab at LSU, and a karst geology internship in Kaibab National Forest. She credits getting into graduate school because of these summer programs (and of course great faculty mentorship!), and she strongly encourages younger students to take advantage of summer research opportunities!





Bob Mason, BS '15, MS '17 is an educator at NorthBay Adventure in North East, Maryland. NorthBay's mission is to teach middle school students that their attitudes and actions have a lasting impact on their lives, their communities, and the environment. NorthBay educators guide students from Maryland, Pennsylvania, and Delaware in hands-on exploration and investigation on the northern shores of the Chesapeake Bay and the surrounding marshlands and forests. The lessons within NorthBay's 5-day overnight camp program use daily theme words like niche, invasive species, filter, and action, and students are encouraged to think about and discuss these terms in both environmental and social contexts.

Bob's Lehigh experience prepared him for this work through research opportunities and countless field experiences with the EES Department, from remote study sites abroad to Lehigh's backyard on South Mountain. These excursions were led by instructors who were not only professionals with expert knowledge of their outdoor classrooms, but were also engaging storytellers and interpreters of nature, which showed Bob that the best way to connect with nature is to experience it first hand which he now carries over to the students he works with. Bob's Lehigh experience also included petitioning to minor in environmental engineering, working on forest restoration projects in Costa Rica, joining the gymnastics club (if only for a month), researching biodiversity in Lehigh's experimental forest and leading an ecological tour there, visiting geological marvels in Canada, and taking poetry, art history, music, and yoga classes which all pushed the boundaries of his major, department, and extracurricular involvement. He encourages current and future students to do the same and make the most of their college career.

In the future Bob would like a leadership position at a science/nature center where he can build connections between people and their own natural surroundings.

A few years after **Ariella Scalse**'s dad started working at Lehigh, it was time for her to take an official tour. It was a rainy day, but that didn't hide the beauty of the campus. Since 5th grade, Ariella knew she wanted to be a broadcast meteorologist, so during her college search she focused on schools with a meteorology program. Lehigh didn't have a meteorology major, but they did have Journalism and Earth and Environmental Science. She fell in love with the school and knew Lehigh would help her accomplish her dream.

The staff and students in the EES department helped shape Ariella into the meteorologist she is today. **Kayla Virgone**('13) and **Nicolette Sra**('14), were also EES majors and two of Ariella's closest friends at Lehigh. But they weren't just friends, they were also roommates. The three were able to study together for Frank's "celebrations" and still talk about "Daisy World." She knows she wouldn't be where she is today, without their help at Lehigh (...oh, and of course Johanna's!)



Every professor quickly found out about Ariella's interest in meteorology, but it was her adviser **Don Morris**, who pointed her in the direction of **Ben Felzer**. Ariella enrolled in Ben's Weather and Climate class, did a semester of research with him, and even visited his classroom in April of 2018 to talk about her career. Ariella's favorite part about EES was lab, especially when lab took them on an outdoor adventure.

While at Lehigh, Ariella interned at NBC 40 in Linwood NJ. After graduation('14) she took an internship in Austin, TX at Spectrum News. After a few months in Austin, she landed her first job as a Broadcast Meteorologist at the NBC affiliate in Laredo, TX. After a year in Laredo, Ariella was ready for a new challenge. In July 2016 she accepted her second job in Savannah, GA at the NBC station. While in Savannah she was able to cover Hurricane Matthew and Irma. She certainly got the challenge she was looking for, but she was ready for more! In August of 2018, Ariella started her current job as the weekday morning meteorologist at Spectrum News in North Carolina. She is responsible for forecasting and delivering the weather for the Greensboro-Winston Salem market, as well as a few times a week in Raleigh. Within her first months at Spectrum, Hurricane Florence made landfall in North Carolina and a few weeks later the state saw big impacts from Hurricane Michael (which came through as a tropical storm). Ariella is no stranger to tropical weather, but is looking forward to the challenge of winter weather forecasting.



Ariella plans to spend the next few years in the Tarheel state, but dreams of working in the Philadelphia market in the next 5 years. You can keep up with Ariella's career on social media (Facebook, Instagram, and Twitter), just search Ariella Scalse.

Ariella's most memorable moment from her 4 years at Lehigh was when Lehigh beat Duke. Ariella was at the game, on the court, and ended up on National TV. If you google Crying Lehigh Cheerleader, you will find out why.

In 2018 **Dave Anastasio** attended the American Association of Petroleum Geologists Convention, (April, Houston, TX) where he won a Best Oral Presentation Award for “Episodic Deformation Rates Recovered From Growth Strata, Pyrenees”, the annual meeting of the Geological Society of America (November, Indianapolis, IN), and the American Geophysical Union fall meeting (December, Washington, DC) where he co-authored a total of 11 papers. These papers presented results from tectonics and landscape evolution in the Betic Cordillera, Spain (with PhD candidate **James Carrigan**), ancient lake deposits as recorders of environmental change and hominin migration in the Baza Basin, Spain (with BS major **Monica Powers**), and science curriculum and educational technology in high school and college (with Lehigh Professors **Bodzin, Hammond, Holland, Sahagian**). A paper co-authored with the education colleagues to *Contemporary Issues in Technology Education* won the 2018 John C. Park National Technology Leadership Initiative Fellowship Award. Another paper with this group was published in *Cartography and Geographic Information Science*. With former graduate student **Kellen Gunderson** and EES Professor **Frank Pazzaglia**, he published a paper on intrinsic processes that modulate thrust motion in *Tectonics* and with longtime collaborator Josep Parés he published a paper on strain in the Pyrenean foreland in the journal *Geologia Acta Hispánica*. In 2018 he also conducted fieldwork in southern Spain and taught field camp in the Big Horn Basin, WY. Next academic year he is looking forward to stepping down as EES chair and spending a sabbatical at the Centro Nacional de Investigación sobre la Evolución Humana, in Burgos, Spain.

Gray Bebout's research group continues to investigate surface-to-deep-Earth volatiles cycling, with focus on subduction margins (ancient and modern), and the identification of textural/chemical biosignatures in Mars-analog materials, the latter aimed at informing planning for upcoming Mars sample return. The work on subduction cycling (in which EES Ph.D. student **Gabe Epstein** is involved) is supported by three NSF grants and is, in part, being conducted on paleo-subduction metamorphic suites in the Italian/French/Swiss Alps, building on the work of a number of past EES Ph.D. and M.S. students (**Robbie King, Jennie Cook-Kollars, Nathan Collins, Katie Jaeckel, and Kaylee Kraft**). Work on modern margins has been focused on the Sunda margin (Indonesia) and, more recently, the Hikurangi margin, New Zealand. The study of the Hikurangi margin takes a multidisciplinary field, geochemical, and theoretical approach to tracking the transfer of volatiles such as CO₂ and N₂ (and the noble gases) across the forearc and subarc, beginning on the seafloor in subducting altered oceanic crustal rocks and sediments. During the upcoming winter/spring, Gabe will conduct two sampling/analytical endeavors, each involving fieldwork in New Zealand (collaborating with Dr. Bruce Christenson, GNS, Wellington), then analyses of volcanic gases at the University of Tokyo (working with Prof. Hirochika Sumino). His datasets and his thermodynamic modeling of fluid loss will be merged with the thermal models for the margin being developed by Prof. Ikuko Wada at the University of Minnesota. **Matthew Nikitczuk's** Ph.D. research on Mars-analog materials is in part being conducted in the extensive analytical laboratories at the Institute for Planetary Materials, Okayama University, Misasa, Japan. Samples on which he is working are from Antarctica and from the extensive sub-glacial hyaloclastite exposures in Iceland, where he conducted fieldwork in July/August, 2018. Also related to Mars volatiles and biogeochemistry, Matthew has been investigating the extents of storage of N, in various forms, in Mars-analog materials, analyzing the N concentrations and isotope compositions of N in mineral phases such as clay minerals, zeolites, and sulfates. This work builds on the research of former EES graduate students **Kristin Lazzeri** and **Lauren Anderson**. Another part of his astrobiology-oriented Ph.D. research will be with co-advisor EES Prof. **Jill McDermott**, investigating the geochemistry of waters from hydrothermal vents along the southern East Pacific Rise.

Bob Booth started two new projects this past year. With funding from the National Park Service, he is developing paleoecological records of fire history, vegetation, and water-level changes from the Apostle Islands National Lakeshore in Wisconsin. Along with his graduate student **Matt Huff** and undergraduate student **Marlene Schuster**, Bob spent a week on Stockton Island this summer coring two bogs and a small lagoon, and the records they are developing will be used to inform fire management plans for the island. Bob also spent ten days in Alaska this summer, as part of new USGS-funded project aimed at better understanding the hydroclimate and fire history of the Kenai Peninsula in Alaska. He continues to work on the development of a global testate amoeba database (neotomadb.org), and teach a number of popular courses, including ecology, conservation and biodiversity, reconstructing environmental change, and wetland ecology. Bob won the Dean's Award for Teaching in 2018 and was also promoted to full professor.

Ed Evenson and his students had another fun, productive year that involved a lot of travel and fieldwork. Ed made two trips to Alaska – one in the dead of winter (basal ice project) and one in the “dead” of summer (patterned ground project). On the summer trip he was accompanied by Dr. **Claudio Berti** (Lehigh field camp director and POP) and **Frank Tetto** (Lehigh undergrad). At a remote site on the Old Denali Highway in the Alaska Range they sampled sorted stone circles for AMS analysis and conducted a detailed “drone topographic survey” (resolution 1 cm) to better understand the genesis of these enigmatic permafrost features. The samples are currently being analyzed by Frank Tetto. Ed (with **Nathan Hopkins**, Ph.D. Lehigh '16) also made a trip to central Sweden to continue his work on till kinematics. In his spare time Ed presented seminars on “Darwin's Boulders in Argentina” at the University of Pennsylvania and at his (BS & MS) alma mater – University of Wisconsin. Ed continues to summer with Laura at his summer home in Mackay Idaho – flying out as necessary for field projects.

Ben Felzer's article with former Ph.D. student **Ming kai Jiang** (now a postdoctoral associate at the Hawkesbury Institute for the Environment in Australia) - “Effect of land use and land cover change in context of growth enhancements in the United States since 1700: net source or sink?” - is in press at Journal of Geophysical Research – Biogeosciences. Based on model results, we show that the U.S. has not regained carbon lost from previous agricultural disturbance despite being a carbon sink in recent decades. He is revising a paper with former Ph.D. student **Jien Zhang** (now a postdoctoral associate at Iowa State University) and Lehigh CEE professor **Tara Troy** exploring how the productivity of semi-arid grasslands will change with future warming and elevated CO₂ levels. He is working with Mingkai, former M.S. student **Rui Cheng** (now a Ph.D. candidate at Cal Tech), and colleague **Carol Ember** on a paper exploring how extreme wet, dry, and cold climate indices and the predictabilities of these extremes affect societal adaptation to shortages in food supply and how well weather data can predict ethnographic flood and drought events. This work is the end-product of his NSF Interdisciplinary Behavioral and Social Science grant. He is mentoring one undergraduate student (**Meredith Hoo**) to explore the effects of insect damage on carbon dynamics towards an upcoming proposal. Last spring he taught his annual EES023: Weather and Climate, Past, Present, and Future course. The semester I am teaching EES250: Terrestrial Ecosystems for the second time. I am enjoying my new Freshman seminar, EES090: From Ice Age to Greenhouse Earth. I also group-taught EES004 (The Science of Environmental Issues) both semesters. I continue to chair the Faculty Committee on Student Life until the end of this semester, which seeks to advise the administration in all aspects of undergraduate and graduate co-curricular student life, and has focused on the bLUeprint grants as a means of supporting innovative and sustainable projects that will enhance the sense of community and faculty-student collaborations here at Lehigh.

In May 2018, **Ken Kodama** took students to the Desert Range north of Last Vegas to collect samples for a paleomagnetic and carbon isotope study of Late Precambrian age rocks that carry a record of the Shuram C-isotope excursion. He is looking for a correspondence between normal to reversed polarity transition of the geomagnetic field and the lowest point in the Shuram excursion, similar to relationships his students have observed in similar age rocks in southern Australia and Death Valley, CA. He will be reporting on the results at the Fall 2018 AGU meeting in Washington DC in December. He is also a convener of a session at AGU about magnetic methods used to determine chronostratigraphy in sedimentary sequences. He and **Frank Pazzaglia** will be guiding a GSA-sponsored field trip after the AGU meeting to the Calvert Cliffs in Maryland highlighting some of the rock magnetic cyclostratigraphy work that they have done with students on the sediments. Earlier in 2018, Kodama gave an invited talk at the Carnegie Institute in Washington, DC about this rock magnetic cyclostratigraphy work on ancient rocks carrying the Shuram C-isotope excursion. Finally, he and his wife Anna hiked the West Highland Way in Scotland in June. 96 miles from Glasgow to Ft. William over the Scottish Highlands.

In 2018, **Jill McDermott** worked with undergraduate student **Grant Loescher**, who investigated the chemistry of hydrothermal fluids at Pescadero Basin for his honors thesis. Grant is currently enrolled in the M.S. program in the School Of Earth and Space Exploration at Arizona State University. Currently, Jill continues to mentor **Tiffany Baumann** and **Talia Rodkey**. Tiffany is exploring a new model for hydrothermal fluid origin at fast spreading ridges, while Talia is studying the depth distribution of sulfur-rich minerals collected from an active seafloor arc volcano. Two new M.S. students, **Susan Ambrose** and **Billy Dowd**, recently joined the lab. Susan will conduct laboratory experiments on live corals and participate in an upcoming research cruise to assess the utility of environmental DNA as a new tool for monitoring deep sea biodiversity. Billy will travel 1.7 km vertically into the Soudan iron mine in Minnesota this spring, to collect fluid and gas samples from artesian saline groundwater aquifers. Jill developed and taught a new graduate-level course, 'Chemical and Geological Oceanography.' She published a paper on Earth's deepest hydrothermal system, will deliver two invited presentations at the 2018 AGU meeting, and was awarded a National Academy of Sciences Early Career Gulf Research fellowship. She also sailed on the drill ship JOIDES Resolution, spending just over 2 months at sea in the first-ever attempt to drill an active arc volcano. The volcano didn't give up easily; however, the cruise did culminate in the successful recovery of several exotic fluid samples and over 400 m of core.

This summer **Anne Meltzer**, **Josh Stachnik** (Research Scientist), and **Adrienne Scott** (PhD student) carried out a dense deployment of seismometers along a section of the Bulnay Fault in Central Mongolia. The Bulnay is one of two large strike-slip faults in Mongolia. In 1905, the Bulnay ruptured in two large earthquakes ($M_w > 8$) within a two-week period. The fault remains active and is an excellent place to study earthquake slip behavior away from plate boundaries. The deployment is part of a larger pilot project (joint with colleagues **Peter Zeitler** and **Frank Pazzaglia**) funded through Lehigh's Faculty Innovation Grant (FIG) program. This research is a collaboration between Lehigh and colleagues at the Institute of Astronomy and Geophysics (IAG) in Ulaanbaatar. With funding from the US Dept. of Energy – Lawrence Livermore National Laboratory, Anne also organized a two-week capacity building workshop in Ulaanbaatar for colleagues at IAG. The workshop covered aspects of high-precision earthquake location and attenuation of seismic waves. The workshop focused on hands on exercises using a variety of data sets from Mongolia. Research on subduction zone earthquakes offshore Ecuador and Indonesia continues.

Since July (and for the next few semesters), **Don Morris** has been directing both Lehigh's Environmental Initiative and the Sustainable Development program. SDev is a big departure from EES, as he is exclusively teaching courses in sustainable development and directing a number of student research projects. Last summer, 6 Lehigh students (some from EES) participated our the 7-week summer internship in Costa Rica, working on projects related to tropical forest conservation. As this letter goes to press, we are recruiting students and trying to obtain funding for summer 2019. The winter sustainable development course to Costa Rica will depart at the end of December with 18 students participating. He also continues his close association with the UN's Division for Sustainable Development and the UN Environmental Program, participating in conferences and workshops with our students.

Frank Pazzaglia spent much of 2018 mentoring undergraduate and graduate projects, traveling to Mongolia in the summer, and co-organizing field trips for the Field Conference of Pennsylvania Geologists and AGU. The Mongolia travel and field work with Lehigh colleagues, including M.S. candidate **Katrina Gelwick** was a real highlight of the summer. We mapped, measured section, and collected samples for cosmogenic geochronology as seed data for what hopefully will evolve into a much larger, longer-term funded project focused on understanding recent mountain building and large intracontinental earthquakes. A good part of July was spent with M.S. student **Josh Gonzales** and undergraduate **Boo Kyo Sur** walking the streams of Lancaster and York counties, PA, collecting data relevant to the earthquakes that occur in this part of Pennsylvania. Another highlight of the summer was spending a few days in the field with Lehigh alumn **Peter van de Kamp**. Peter visited Lehigh's field camp in Idaho and had the opportunity to see a cohort of 14 EES students interacting with 18 others from around the nation learning geology in the field.

This past year saw **Steve Peters** received funding to pursue a big data approach to the hydrologic impacts of disturbances in three east coast watersheds with **Tara Troy** (CEE) and graduate student **Jillian Cunha**. He enjoys seeing the tremendous accomplishments of the graduating class in the Senior Seminar course. In the coming year, he will offer the Human Health and the Environment course again, contributing to the campus wide health initiatives. Steve accepted the position of field camp director and looks forward to sustaining the traditions and excellence of the program. As always - we enjoy learning all we can while having fun in the lab and field.

Joan Ramage is working on a novel passive microwave satellite dataset called calibrated enhanced brightness temperatures (CETB) that greatly improve old data to better image earth's surface. Joan uses it to map snow melt hydrology on glaciers and seasonal snow. She and her students are working to revise snow melt algorithms using the new data and apply them broadly in the Western USA, Russian High Arctic, and the Indus River. Ramage is active with the Universities Space Research Association, local watershed steward programs and on a multi-township groundwater committee that assists township boards with research and planning on issues of groundwater.



(EES 223 students on field trip along the Potomac River, MD)

STAFF GRAFFITI

Dork Sahagian teaches and conducts research in a range of disciplines, including volcanology, tectonics, hydrology, climate change and its impacts, environmental policy, and pedagogical approaches for STEM education for school children. In the area of volcanology, he and his students determined that the widely used “volcano explosivity index” (VEI) could be calculated simply in the real time during an eruption by an easy calculation based on eruption column height. This year, in collaboration with **Panos Diplas** of CEE, a flume was set up in order to test a hypothesis regarding the fundamental instability that leads to river meandering (see article page 5). Dork continues efforts not only in education of our college and grad students, but also of school children, policy-makers, and the general public. In particular, with the AGU Centennial celebration in 2019, and with a growing involvement in the National Council for Science and the Environment, his outreach efforts are expanding far beyond what one would have expected.

Zicheng Yu started a new research project in 2018 on tropical mountain peatlands in Colombia supported by Lehigh’s Faculty Innovation Grant, and, along with his graduate student **Adam Benfield** and Colombian collaborator **Juan Benavides**, carried out field work for two weeks in the High Andes in mid-January to collect *Distichia* peatland core and other samples. Also, in January, Yu’s PhD student **Jon Stelling** carried out fieldwork sole in Patagonia, southern Chile. Yu was on sabbatical during the fall 2018, and he spent most of his summer and fall semester at Northeast Normal University in Changchun, China—his hometown. In addition to his travels in China for conferences, fieldwork and pleasure, he traveled to Davos, Switzerland in mid-June to attend POLAR2018 Conference on Antarctic and Arctic sciences; to Cambridge, England in early September to attend PAGES (Past Global Changes) CLIVASH2k Workshop on Southern Hemisphere climate variability where he and his PhD students **Jon Stelling** and **Zhengyu Xia** each gave an oral presentation; to Hamburg, Germany in mid-November to attend PAGES Workshop on Tipping Point in Earth history; to Washington DC in mid-December to attend AGU fall meeting with all of his three graduate students. Yu will be deployed, along with **Zhengyu Xia** and his new postdoc **Dulcinea Groff**, to Palmer Station on the Antarctic Peninsula from late December to mid-February—we will be wishing you a Happy New Year from Antarctica then. A personal note... I’m proud that my daughter, Viola—majoring in Environmental Science—graduated from Cornell University in May 2018, and she now during her gap year works at Princeton University as a laboratory specialist.

In 2018, **Peter Zeitler** continued to split his research focus between improving tools for measuring thermal histories and applying those tools to geodynamic problems. Along with former PhD student **Kalin McDannell**, he published two papers addressing the evolution of older terranes in Mongolia and in the Canadian craton, and he collaborated with **Bruce Idleman** and PhD candidate **Hongcheng Guo** on methods to understand and correct for excess dispersion seen in apatite U-He ages. The year also involved lots of travel. With support from a Lehigh Faculty Innovation Grant, in August Zeitler carried out more field work in the Altai ranges of western Mongolia, along with **Anne Meltzer**, **Frank Pazzaglia**, Mongolian colleagues, and three EES graduate students (**Hongcheng Guo**, **Katrina Gelwick**, and **Adrienne Scott**). In September, Peter, Hongcheng, and Bruce traveled to Quedlinburg, Germany to attend the Thermo2018 international conference on thermochronology, and all gave presentations; Peter was also kept busy in his role as Chair of the international standing committee that oversees the conference series and organizes the thermochronology community. Finally, in October, Peter traveled to Australia, spending most of his time in western Australia but also fitting in a quick trip to Canberra.

Bruce Idleman continued to keep the major instrumentation in the geochronology, stable isotope, and paleomagnetism labs fed and happy during 2018. On the research front he pursued several ongoing geochronology projects in Alaska and continued to explore the application of time-of-flight mass spectrometry to noble-gas analysis. In August he traveled to Scotland to collect samples for a pilot detrital dating study in the Southern Uplands accretionary complex, and while in the UK he also toured the resonance ionization mass spectrometry laboratory at Manchester University. After returning from the field, Bruce, EES colleague **Peter Zeitler**, and graduate student **Hongcheng Gao** commissioned a new laser-based instrument to perform noble-gas analyses using a newly-developed ramped heating method developed in Lehigh’s thermochronology lab. This effort culminated in a trip to the Thermo 2018 conference in Quedlinburg, Germany in mid-September, where Bruce gave an invited talk on the new method and the group presented a poster reporting their first results with the new instrumentation.

In addition to developing and implementing maintenance protocols and schedules for analytical instruments in the terrestrial and aqueous geochemistry lab spaces, **Corinne LaViolette** has been part of several collaborative projects. In the spring, she collaborated with an engineering technician in the Packard lab to create field equipment for EES research and course activities. She also collaborated with EES faculty on technical projects such as the modification of sample introduction systems for gas analysis. In June, she attended a research conference in Washington D.C. for professional development and enjoyed the opportunity to network with other technicians in the earth science community. Currently, she is focusing on equipment repair and diagnostics, particularly with regard to vacuum systems. Future collaborative projects include, developing and validating EES lab methods for total rock digestion and trace element analysis.

In 2018, **Josh Stachnik** continued research and collaborations in Mongolia working with EES faculty **Anne Meltzer**. This included a temporary deployment of seismic stations around the Bulnay Fault in northern Mongolia to further image the rupture area of the 1905 M8 earthquake. Ongoing analysis of this dense network of stations will promote the submission of a larger collaborative NSF proposal to better understand the fault dynamics and extent of rupture. Capacity building in Mongolia was supported through a DOE funded workshop in Ulaanbaatar this fall where a two-week course was co-taught with Anne and other colleagues on high precision earthquake location and seismic attenuation. Earlier in the year, Josh traveled to Tajikistan to continue collaborative efforts in Central Asia to help maintain seismic networks in the region. This work is also affiliated with a conference he attended in Tbilisi, Republic of Georgia, to kickoff a multi-year DOE project in the region. Along with supporting seismology graduate students, Josh gave an invited talk at Cornell University and met with students there on professional opportunities inside and outside

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VIC JOHNSON SCHOLARSHIP FUND

The Vic Johnson Scholarship Fund was established in 1984 with an initial contribution from alumnus, James Bloomfield '83, and a matching gift from the Shell Foundation. In a letter from Bloomfield to professor Ed Evenson, Bloomfield suggested the fund should benefit individuals who show strong interest in field-oriented geology. Over the years, many alumni, have continued to contribute. Including, Anthony Imhof '69, who recently supported a full student scholarship.

Vic Johnson was a Idaho cattle rancher and head of the Copper Basin Cattleman's Association. He met then Field Camp Director, Ed Evenson in 1974 when the Field Camp set up camp near Johnson's 1,000-acre ranch. The following year, Evenson phoned Vic and asked him if the camp could make use of the Basin's cow camp and he agreed. Johnson's family would see the Field Camp participants daily during their 3-week stay in Idaho and some became like family to them. After their stay in

Idaho, students would send Christmas cards, wedding invitations, and postcards to the Johnsons. He said he learned a lot from the students who helped him understand the land he lived on for, at the time, 47 years.

In 1984, Vic Johnson was invited to Bethlehem for a weekend ceremony to receive the Lehigh University Alumni Association's *Friend of Lehigh Award*. Johnson stated about receiving the award, "it is really an honor"

Field Experiences, domestic or international, at the undergraduate and graduate levels are critical to the Lehigh University Earth and Environmental Sciences student experience. We need your help in securing financial resources to support Lehigh students without the financial means to attend field training and discovery experiences. Please make a gift today by visiting mylehigh.lehigh.edu/giving and typing in the other section Vic Johnson Field Camp Scholarship Fund to support our undergraduate students or EES Graduate Student Fund to support our graduate students. Any questions can be directed to Kelly Stazi, director of development for the College of Arts and Sciences, at kbs415@lehigh.edu.

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