

EES Newsletter

2019 & 2020



Issue 13



On behalf of the EES faculty, staff, and students, I hope that all of you in the extended EES community, and your family and other loved ones, are safe and well and have found it possible to navigate this incredibly complicated and difficult time. In this Newsletter, we briefly highlight some of the many accomplishments made by our faculty, staff, and students.

Calendar years 2019 and 2020 were complicated, to say the least, with the university beginning to make some financial cutbacks (including in staffing) and undertaking large projects such as a planned increase in the number of undergraduate students, the creation of the College of Health, and several major building projects. The ban from entry into the STEPS building in March, 2020, forced our rapid transition to all-virtual learning and shutdown of all lab activities. During the following summer, we slowly gained access to our labs but most of us continued to work remotely. In the Fall, 2020, we were mostly in remote instructional mode, with very few EES folks in the STEPS building at any one time. Our seminar series has been running in virtual-only mode, rather successfully really, but we opted to postpone the Donnel Foster Hewett Symposium until we can again hold in-person events.

EES has achieved much, despite the obstacles presented. Thanks to some valiant efforts made by our faculty and Teaching Assistants, we've managed to deliver challenging and engaging experiences for our students. The department has been engaged in developing a strategic plan for the coming 5-10 years, with the plan of generating a written plan by early 2021. We have taken significant strides toward generating a more diverse and inclusive environment, in part guided by a new faculty standing committee dedicated to this goal. We have maintained, perhaps increased, the number of undergraduate majors and minors in our program and our graduate program remains at about 20 students.

Our students, undergraduate and graduate, have shown amazing resilience and cooperation, and a sense of humor even, as we've attempted to adapt to the evolving landscape. We're all in this together! A quick visit to the vacated STEPS building reminds us of the value of in-person interactions and what makes the Lehigh University on-campus experience so stimulating and vital to our educational and intellectual mission. I'd like to acknowledge all in the extended EES community who have made donations and provided other support to make what we do possible and assist us in weathering this storm. Thank you all VERY much.

Sincerely,

A handwritten signature in black ink, appearing to read "Gray E. Bebout".

Gray E. Bebout, Professor and Chair Department of Earth and Environmental Sciences

Congratulations to the Class of 2019 and 2020

2019

Bachelor Degree:

Olivia Barz - BA | Tiffany Baumann - BS | Dominic Behe - BS | Emily Bushta - BA | Zhihao Cheng - BA | Madeline David - BA | Eliza Dent - BA | Yannick Gbadouwey - BS | Jocelin Gregorio Alarcon - BA | Alexandra Layne - BA | Nicole Magura - BS | Kobe Miller - BA | Juwan Morrow - BS | Elizabeth Naka - BA | Joshua Nierer - BS | William Slattery - BS | Sarah Stankus*- BS | Boo Kyo Sur - BS | Jerry Vogel - BA

Graduate Degree:

Adam Benfield - MS | Zhongxiong Cui - PhD | Katrina Gelwick - MS | Joshua Gonzales - MS | Matthew Huff - MS | Jonathan Stelling - PhD | Lillian Soto-Cordero - PhD | Leslie Tintle - MS | Jessica Welkey - MS

2020

Bachelor Degree:

Reva Alderman - BS | Connor Downing*- BS | Harris Duling - BS | Anthony Gallo - BS | Courtney Giardina - BS | Neal Hafner - BS | Nathan Lam - BS | Chongrong Ma - BS | Samuel Marshall - BS | Mariah Matias - BS | Michaela Ott - BA | Monica Powers*- BS | Marlene Schuster - BS | Autumn Shaffer - BS | Elena Shubin - BS | Michael Simoneau - BS | Sianin Spaur*- BS | Patrick Yun - BS

Graduate Degree:

Susan Ambrose - MS | Mariah Hoskins - PhD | Anne Magdalena Sirait - PhD | Zhengyu Xia - PhD

*Denotes undergraduate student who graduated with department honors



(2019 Undergraduates From left to right: Nicole "Cole" Magura, Kobe Miller, Josh Nierer, Jerry Vogel, Juwan Morrow and Sarah Stankus)

Department Happenings

Challenges and Triumphs

These couple of years (since our last newsletter in December 2018) have been an *interesting* journey, with many changes.

Spring 2019

- University begins to take financial measures to afford exciting new ventures - increased numbers of undergraduates and faculty, creation of the College of Health, and several major building projects
- Lehigh offers a voluntary retirement package to staff with over 10 years of service and meeting a certain age
- Planning is initiated for restructuring of staff across the university and CAS

Summer 2019

- Professor Gray Bebout becomes EES Department Chair as of July 1st
- Diane Hyland becomes Interim Dean of the College of Arts and Sciences
- EES Department Coordinator Nancy Roman retires
- CAS Dean's Office staff are reorganized
- College of Health temporarily moves into the STEPS building

Fall 2019

- Business Manager, Libby Seyfried joins EES and Chemistry staff
- Department Coordinator, Andrea Goff begins service on the LVAIC Leadership Institute and is appointed to a two year term on the CAS Dean's Staff Advisory Council
- Bob Flowers is named Dean of the College of Arts and Sciences

Spring 2020

- In-person course delivery is cut short mid-semester, due to COVID-19, with the campus in shutdown mode
- All faculty and staff switch to working remotely

Summer 2020

- All courses remain online
- Work from home continues, with some faculty and graduate students working in labs, safety measures in place
- Planning for a hybrid (partly in-person, partly online) fall semester

Fall 2020

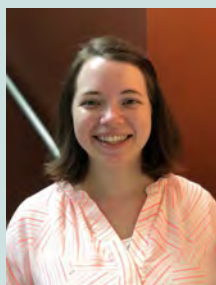
- Courses are taught in several modalities (online, in-person, and mixtures of these modes of delivery)
- Work from home continues with a few faculty and graduate students working in labs, safety measures in place
- Postdoctoral Research Fellow Dulcinea Groff leaves Lehigh

Welcome Post Doctoral Research Fellows



Kelden Pehr is a post doc in Lehigh University's Earth and Environmental Sciences Department. She received her B.S. from MIT in environmental engineering in 2013 and her Ph.D. in geosciences from the University of California, Riverside in 2020. Her work has focused on the preservation and transformation of organic compounds in deep time. She is interested in improving the use of organic compounds to inform us of the past and aid in the search for extraterrestrial life. Now at Lehigh working with Dr. Jill McDermott, she is focusing on how organic compounds are formed and transformed in hydrothermal vents, which represent a unique environment that has nevertheless been a constant of our planet since the earliest ocean. The extreme conditions present in hydrothermal vents have been proposed to aid in both the destruction and the formation of organic compounds. This research will serve to further our understanding of the potential of hydrothermal vents as sources of abiotically derived organic matter.

Frank Pazzaglia has started a new NSF-funded research project in northeastern Sicily with colleagues at Tulane University and Utah State University. The project goals are to understand how periodic tectonic and climatic forcings in a drainage basin become encoded into the sediments of the depositional sink. Young, recently uplifted mountains and Gilbert deltas on the Sicilian coastline provide an excellent natural experiment for this research. The Lehigh research team includes M.S. student Ben Bliss and the newest addition to the EES family, postdoctoral researcher Francesco Pavano. Francesco earned his Ph.D. at the University of Catania and now will be pursuing his post-doctoral studies as the lead researcher on this project for the next two years. Francesco and his wife Giorgia relocated to Bethlehem in December, 2019, just long enough to find an apartment and begin settling in before COVID-19 changed everything. Field work for the project has been postponed, but that has not stopped Francesco and Ben from moving forward with different aspects of the research, including numeric modeling of the uplift rates in northern Sicily, as we try to work around the travel restrictions.



Mariah Hoskins finished her Ph.D. at Lehigh in May 2020 and has returned as a postdoctoral fellow in EES. She has trained and assisted fellow researchers in seismological analysis methods, including an analysis that uses recorded earthquakes to model the 3D structure of the earth's crust in Mongolia. Also, she is participating in a multi-institutional, international collaboration to produce a joint inversion for 3D velocity model to understand earth structure in Ecuador, which includes a portion of the South American subduction zone and the Andes mountains, along with active volcanoes. Through this work, Mariah seeks to better understand the geologic and tectonic factors that play a role in this region that experiences great earthquakes and volcanic hazards.

EES Graduate Program selected as an Inaugural Member of the American Geophysical Union's Bridge Program

The Earth and Environmental Sciences remain one of the least diverse STEM fields, a problem that has been recognized but gone unaddressed for decades. As such, we are missing the creativity and innovation that a significant part of the population can bring to our field, creativity and innovation required to help us navigate the challenges associated with natural hazards, resources, land use, climate change, and more. In 2019, American Geophysical Union (AGU) announced the Bridge Program to increase diversity in the Earth and space sciences with a specific focus on increasing the representation of African American, Hispanic, American Indian, Pacific Islander, Alaskan Native and Native Hawaiian students. The AGU Bridge Program is part of the Inclusive Graduate Education Network (IGEN), "to develop, adopt, and share inclusive practices for recruiting, admitting, and retaining women and underrepresented minorities in science, technology, engineering, and mathematics graduate programs". EES was selected as one of thirteen departments as an inaugural member of the program. We look forward to being part of this program and to broadening participation in the Earth and Environmental Sciences. If you'd like to know more about and/or support our efforts in this area let us know!

Welcome Graduate Students

2019

MS:

Tiffany Baumann (advisor Gray Bebout)
Ben Bliss (advisors Frank Pazzaglia and Ken Kodama)
James Fisher (advisors Dave Anastasio and Frank Pazzaglia)
Ethan Kurak (advisor Frank Pazzaglia)
Will Reichard-Flynn (advisor Anne Meltzer)
Alex Sabo (advisors Bob Booth and Steve Peters)
Frank Tetto (advisor Ken Kodama)

PhD:

Drew Spatz (advisor Peter Zeitler)

2020

MS:

Christopher Andrade (advisor Ben Felzer)
Connor Downing (advisor Jill McDermott)
Mariah Matias (advisor Joan Ramage)

PhD:

Zhihong Huang (advisor Steve Peters) |
Thomas O'Rourke (advisor Bob Booth)
Alexis Stansfield (advisor Bob Booth) |
Dannielle Waugh (advisor Ben Felzer)

Symposium Series

Undergraduate Symposium 2019

Keynote Speaker: Cora Summerfield '13

Role of Lakebed Sediments in Lake-Groundwater Exchange in Lake Lochlossa, Central Florida

Graduate Symposium 2019

Keynote Speaker: Julie Loisel

Integrating Expert Judgement with Evidence-Based Science: the Good, the Bad, and the Ugly

Graduate Symposium 2020

Keynote speaker: Katie Jaeckel M.S. '17 EcolSciences Inc.

A Foot in Both Worlds: Pursuing a Career in Environmental Consulting while Continuing to Explore my Role in Academia as an Adjunct Professor

PhD Dissertations and MS Theses

PhD Dissertations

2019

Zhongxiong Cui- Advisor Anne Meltzer
"Evolution of the Continental Lithosphere: New Evidence on the Continental-Continental Collision in Southern Tibetan Plateau and Intraplate Deformation"

Lillian Soto-Cordero- Advisor Anne Meltzer
"Earthquake and Tectonic Processes in the Mid-Atlantic US Passive Margin and the Ecuador Subduction Zone"

Jonathan Stelling- Advisor Zicheng Yu
"Understanding Climatic and Topographic Influence on the Dynamics of Peat-Forming Ecosystems and its Implication for Paleoenvironmental Reconstructions in the Antarctic Peninsula and Patagonia"

2020

Mariah Hoskins- Advisor Anne Meltzer
"Multi-Scale Analysis of Postseismic Deformation and Structure in the North Ecuador Subduction Zone"

Anne Magdalena Sirait- Advisor Anne Meltzer
"Seismogenic Segmentation in Subduction Zones: Investigation of the Java portion of the Sunda Arc subduction zone"

Masters Theses

2019

Adam Benfeld- Zicheng Yu
"Late Holocene History and Environmental Controls of Distichia muscoides Dominated Peatlands in the Eastern Colombian Andes"

Katrina Gelwick- Frank Pazzaglia
"Decoupled lithostratigraphy, orbitally-driven climate, and tectonics for a middle Pleistocene stratigraphic section"

Joshua Gonzales- Frank Pazzaglia
"Using knickpoints as geomorphic markers of crustal deformation in Appalachian Piedmont seismic cluster"

Matthew Huff- Bob Booth
"A High-Resolution Paleocological Perspective on Historical Fire Regimes in Great Lakes Barren Communities of Stockton Island, Wisconsin"

Leslie Tittle- Dork Sahagian
"Geochemical Controls on Volcanic Ash Morphology: Insights from the 2016-2017 Multi-Phase Eruption of Turrialba, Costa Rica"

Jessica Welkey- Anne Meltzer
"Intracontinental Deformation and Crustal Structure: Hangay Dome, Central Mongolia"

2020

Susan Ambrose- Jill McDermott
"Assessing Environmental DNA Degradation in Deepwater Marine Environments to Determine Persistence Controls"

Awards

Undergraduate Awards:

2019:

Donnel Foster Hewett: Sarah Stankus

Handwerk: Dominic Behe

Munford: Tiffany Baumann

2020:

Donnel Foster Hewett: Monica Powers

Handwerk: Courtney Giardina

Munford: Connor Downing

EES Citizenship: Autumn Shaffer

2019 Graduate Symposium Awards:

PB Meyers TA award: Matthew Huff

Best talk: Katrina Gelwick

Runner-up: Adam Benfield

Best poster: Jessica Welkey

Runner up: Leslie Tintle

2020 Graduate Awards

PB Meyers TA award: Hongcheng Guo

Best poster: James Fisher

Best talk: Zhengyu Xia

Congrats to **James Fisher** on receiving the Shlemon Quaternary Engineering Geology Scholarship from the Association of Environmental & Engineering Geologists (AEG)

Faculty Awards:

Professor **Ken Kodama**, in EES, has received the prestigious Petrus Peregrinus Medal, awarded annually by the European Geosciences Union.

Professors Dave Anastasio and **Al Bozdin**, and Lehigh University, have received a **Special Achievement in GIS (SAG) Award from the Esri** (<https://www.esri.com/en-us/home>). This award is given to user sites around the world to recognize outstanding work with GIS technology. The work by Dave and Al stood out among more than 100,000 others considered.

Professor **Peter Zeitler** was the 2019 recipient of the **Libsch Research Award**, the University's highest research prize in recognition of his continued success and lifetime achievement.

The Changing Faces of EES

Nancy Roman, Coordinator - retired August 2019

Libby Seyfried, Business Manager EES/Chemistry - began October 2019

Dave Anastasio, Department Chair - stepped down June 30, 2019

Gray Bebout, Department Chair - began July 1, 2019

Tesia Chciuk, Director of Instrumentation - began July 2019, left February 2020

Corrine LaViolette, Director of Instrumentation - left April 2019



In October 2019 we welcomed Libby Seyfried as our Business Manager. Libby's career began at Lehigh in January of that year as the Financial Coordinator in the Department of Civil and Environmental Engineering. She holds a B.S in Economics and a Master's of Business Administration, and has gained experience in the corporate sector working primarily with retirement funds, auditing, and financial reporting. She enjoys bicycling, hiking and kayaking adventures with her family, listening to Indie music, and reading.

Field Work



In October 2019 Ken Kodama and his students Mike Polashenski and Frank Tetto sampled the early Cambrian Glen Mountain anorthosite in Oklahoma in a paleomagnetism study recently funded by NSF. They are working with John Tarduno at the University of Rochester (Lehigh, geophysics, 1986) looking for the signature of inner core nucleation.

Gabe Epstein Ph.D. '21 and Tiffany Baumann BS '19 (current M.S. student) conducted fieldwork in the Val d'Isère area in the French Alps, July, 2019. They collected samples for stable isotope analyses in an NSF-funded study of fluid-rock interactions in the ancient Alps subduction zone (advisor Gray Bebout). Collaborators in this study include Samuel Angiboust (IPGP, Paris).



Undergraduate Projects from COVID Spring, 2020

On Friday, May 1, 2020, the last day of the semester, the EES Department was treated to a celebration of student resilience and triumph over a difficult challenge not of their making. The undergraduate research symposium demonstrated to us that we have much to be proud of with our Lehigh undergraduate student body in general, and our EES students in particular. EES has a long tradition of engaging undergraduates in research, some of which leads to scholarship, making it a hallmark of our curriculum and the EES/Lehigh experience. EES continues to explore ways to stand out among the crowd, engage in inquiry-based learning, integrate in-classroom with out-of-the classroom (field) learning, publications and presentations at conferences and make an impact in scholarship.

The undergraduate student symposium featured 17 different EES 293, 393, and creative inquiry projects, 25 students, and 3 honors theses. Participating graduating seniors are moving out into the workforce or beginning graduate studies. Continuing students will be returning to Lehigh in the Fall and continuing their research, as allowed by the COVID safety protocols. An example of some of the projects showcased include:

Connor Downing (Jill McDermott advising), Tracing Rare Earth Elements in the Pacific Ocean
Monica Powers (David Anastasio advising), Geoarchaeology in the Baza Basin, Spain
Sianin Spaur (Frank J Pazzaglia advising), Pleistocene paleosols in Schuylkill County, PA
Nathan Lam (Steve Peters advising), Nonpoint sources of lead in the Lehigh River
Sam Marshall (Gray Bebout advising), Isotopic fractionation in the western Alps
Michael Simoneau (Frank J Pazzaglia advising), Cutting Slippery Rock Gorge, PA
Mariah Matias (Joan Ramage advising), Analysis of Seneca White Deer Habitat using drone technology
Ava Scally (Bob Booth advising), Changes in peat, North Slope Alaska
Elena Shubin, Julia Bebout, Alie MacVicar (Bob Booth advisor), Apostle Island fire and vegetation history

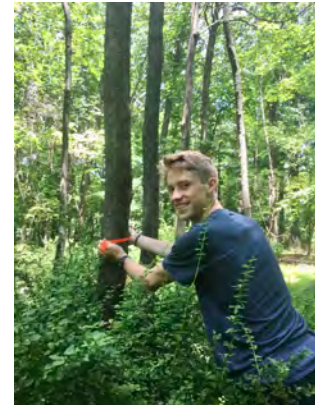
Increasingly, the incorporation of new technology, such as drones, is playing an important role in how students collect field data. A creative inquiry, student-driven research project at Island Beach State Park completed by a team of 8 students is one example of this kind of research. This research team assembled past data sets, complemented those with new data collected in early March before the COVID shutdown, and interpreted these data in terms of sea level rise and storm intensity and frequency.



Mariah Matias flying drone "LUEESA" at Island Beach State Park, NJ March 2020



2020 EES Seniors



Jon Krupnick working in the forest at the top of South Mountain

EES Student Research Thrives Despite the Pandemic

Some of the EES undergraduate students have been involved in research projects supported by the EI-STEPs Summer Fellowships. Professors Booth, Pazzaglia, and Ramage mentored students tackling exciting and timely environmental science questions. Graduate students Ethan Kurak and Mariah Matias '20 also mentored. Kendall O'Farrell (EES major, '22) and Vicki Jagdeo (EES Major, '21) are working with Joan Ramage using satellite data to study glacier changes in Iceland. Kendall used multispectral Sentinel-2 satellite images to map the southern part of Vatnajökull, the largest ice cap in Iceland. Vicki used synthetic aperture radar (SAR) images from Sentinel-1 sensors to study the evolution of radar glacier zones and patterns in snow, ice and melt surfaces on Vatnajökull. Jon Krupnick (EES, '21), mentored by Bob Booth, is working in the forests at the top of South Mountain to document and quantify the distribution of the Spotted Lantern fly (*Lycorma delicatula*), with the research aimed at testing whether they preferentially feed on toxin bearing trees in order to deter would-be predators. Jon's research mapped the current infestation on South Mountain, a valuable baseline data for comparison in future years and to inform management strategies. Brianna Gipson (BIOS major, '21), mentored by Joan Ramage, has taken on the challenge of monitoring changes in air quality throughout the progression of the COVID-19 lockdown in Pennsylvania. Utilizing two different NASA-engineered applications, GIOVANNI and Panoply, she has been able to access satellite data from the AURA-OMI instrument then produce visualization maps from said data. She found a relationship between present and past NO_2 concentration and health outcomes. Adam Patching (EES, '21), mentored by Frank Pazzaglia, is working with graduate student Ethan Kurak in the Ohiopyle State Park in south-western Pennsylvania where they are studying new river terrace exposures of the Youghiogheny River. Through the EDMAP program (a USGS program designed to train the next generation of Geologic mappers) Adam will assist Ethan in creating a detailed river terrace map which would add an important data layer to a new generation of bedrock maps. The pair will also analyze the soil chemistry of the Carmichaels Formation which will lead to a senior thesis project for Adam. Adam will also be generating content for geology interpretive panels that will be presented to the DCNR staff for development of educational materials at the park. The students presented their results in September at the annual Environmental Initiative Icebreaker and research presentation, which was held virtually and is available on the EI website.

In Memorium

Richard B. Palmer '43, Burlington, N.C., March 17, 2020. Dr. Palmer was a Theta Delta Chi brother, and a member of The Brown and White, the debate club, the glee club and the track team. He served in the U.S. Army during World War II and retired from the Army Reserves as a major. He made his career with Texaco Inc., retiring after thirty-plus years as a company executive. He received an honorary doctorate from Lehigh in 1979. He was the son of the former dean of the College of Arts and Sciences, Phillip Mason Palmer, for whom the dorm is named. In addition to his father, his brothers – Parker Palmer '37, Carl Palmer '38, Robert Palmer '40 and John Palmer '48 – are members of the Lehigh family. Dr. Palmer was also a member of the Asa Packer and Tower societies. Due to the extremely generous endowment he set up many years ago, and other donations he has made, we are able to support a variety of field experiences, in many cases individual grants to students requesting support of their M.S. or Ph.D. field-based research. We thank the Palmer family for their long-term support of our department.

P. B. Myers, EES Emeritus Professor, passed away on Monday, June 1, 2020. Paul was a stabilizing and kind force in the department, and we had the pleasure until recently of seeing him each year at the EES Annual Spring Picnic, where we presented the Paul B. Myers T. A. Award.

Paul was born on May 4, 1933 in New Bedford, MA to parents Paul Sr. and Aletha. Paul obtained his Bachelors degree in Chemistry from Colgate University, his Masters and Doctoral degrees in Geology from Lehigh University where he taught Geology for over 35 years.

Paul has survived by his wife of 58 years Ruthanne, his sister Priscilla (husband Peter), children Amy and Paul (wife Susan), grandson Tyler (wife Michela) and great grandson Tristan. Paul loved teaching his students, coaching ice hockey, playing golf, and all of the wonderful friends that came with those activities. He spent the last eleven years watching his NHL grandson's every game. He was a kind, caring intelligent man who will be missed by all who knew and loved him.

Thank You To Our Donors

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Also, we again thank our long-time supporters who have established endowments to support what we do. In this Newsletter (see next page), we highlight the recently established **Lawrence A. Taylor '68G Graduate Student Endowed Research Fund**.

A Special Thank You

Professor Lawrence A. Taylor '68 PhD, a leader in the field of planetary geochemistry, and who passed away in 2017, has left EES an endowment "to support graduate students in the Department of Earth and Environmental Sciences, or its successor, with a preference for graduate students concentrating in geochemistry and planetary science."

Larry's education included degrees from Indiana University, Bloomington (B.S., Chemistry; M.S., Geology) and Lehigh University (Ph.D., Geochemistry), with predoctoral experimental petrology research at the Geophysical Laboratory of the Carnegie Institution of Washington (now the Carnegie Institution for Science). This continued with a Postdoctoral Fellowship at the Geophysical Lab, followed by a Fulbright Fellowship and Humboldt Stiftung at the Max-Planck-Institut für Kernphysik in Heidelberg, Germany. After two years as Assistant Professor at Purdue University, he moved to the University of Tennessee (UT) in 1973 as it embarked upon its thrust into research. He directed the UT Department of Earth and Planetary Sciences until his retirement in 2017.

Larry Taylor is among Lehigh's most recognized alumni, having contributed to many advances in his fields, including involvement and leadership in the Apollo lunar exploration program. Much of his most prominent research was focused in some way on the evolution of Earth's moon.

For some background on Larry's life and accomplishments:

[https://en.wikipedia.org/wiki/Larry_Taylor_\(geochemist\)](https://en.wikipedia.org/wiki/Larry_Taylor_(geochemist))

Dawn Taylor, his wife, informed us that Larry was extremely appreciative of how Lehigh University contributed to his life and career and that they always wanted to give something back. This endowment will provide approximately a full summer support package each year for one of our graduate students, a precious resource and another example of the generous support we receive from alumni helping us achieve our goals.

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.

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. We thank you, in advance, for your consideration and support. If you are in a position to donate, please choose your method of payment below:

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