The Hopkins Environmental

Winter 2018, Issue 2



Letter from the Director

Aside from the "Great Dying" that occurred 251 million years ago, I cannot think of a more stressful time in our planet's history for the organisms that lie beneath this majestical roof fretted with golden fire. We live in undeniably challenging times, and only this month we received two independent reports on the massive losses in biodiversity and species abundance ruthlessly brought on by only a couple of generations of human activity.

Given these dire truths, for many our home might simply appear as no other thing than a foul and pestilent congregation of vapors. But enough of these Elizabethan era references, it is a time for optimism. Around this world there are countless individuals who are changing negative forecasted trajectories and protecting the unprotected. These paladins for Chesapeake Bay Oysters, champions of Sumatran Orangutans and benefactors of the Regal Fritillary are not just restricted to the scientific community. There are artists who

champion visions for a sustainable planet as well as business leaders who curd at the mere thought of greenwashing. Some of the advocates for biodiversity are sitting in the classroom next to you. They are in your conservation biology class and your sustainable business class. They are your peers.

We may have been failed by the current crop of politicians but I am humbled by much of the work that our current students, faculty and alumni are engaged in to make meaningful change on the ground and to make anti-oppression and environmental justice movements commonplace. Connected to our program are thoughtful leaders, researchers, environmentalists, artists, civic leaders, industry participants, media, philanthropists, and a whole host of environmentally-minded citizens. Some are mentioned in this newsletter. Reach out to them connect – start a society, club, nonprofit, or working group. Humanity may have brought on a frost to its



Jerry L. Burgess, Ph.D.

Director for the Environmental Science and Policy & GIS Programs

spring or a blight to its summer but the deeds wrought by today's activists will not fail of their seed! In this program and around the world, people, and especially young people, are rising up to tackle biodiversity loss, pollution, and overdevelopment. For me, every time that I walk into the classroom and hear about what many of you are doing to help the helpless reminds me of the reason we at ESP are honored to teach you and are optimistic about the future.

Alumni Spotlight:

Heather Lockwood

Since when is a C- a grade to cheer about? Well, according to 2017 ESP Alumni, Heather Lockwood (North), a C- is a symbol of improvement and hope when referring to the state of the Chesapeake Bay.

Heather has been the Virginia Oyster Restoration Specialist for the Chesapeake Bay Foundation (CBF) since 2014. In the four years that she's been living in Virginia's Hampton Roads area, she's witnessed significant improvements in water and on land. The Chesapeake Clean Water Blueprint, established in 2010 by the six states in the Bay watershed (as well as Washington, D.C.), sets statespecific limits for nitrogen, phosphorus and sediment pollution entering the Bay in order to restore the Chesapeake Bay by 2025. A midpoint assessment was released in 2017 to evaluate states' progress in reducing pollution loads by 60%.

Heather, with Jackie Shannon, is part of the all-female Virginia Oyster team. Their goal is to increase the oyster population throughout Virginia waters, providing habitat for over 300 different species of plants and animals. Under the Chesapeake Oyster Alliance, they are working with others toward a common goal of putting 10 billion new oysters into the Bay by 2025.





Reinventing Graduate Seminar

By Jenn da Rosa

Ask your professor sometime if they ever attended seminar as a graduate student. A smile will spread across their face and they will answer: "I did. I was required to." It's true. At most graduate institutions, regardless of whether you are pursuing a Master of Science in Oceanography or a Master of Arts in Anthropology – or any field for that matter – graduate students are expected to attend seminar on a regular basis. Why, you might ask? And what exactly is a graduate seminar?

Seminar refers to a graduate course with a different speaker presenting at each scheduled class, but it can also refer to a lecture series that is open to other scholars, students, and the general public beyond those enrolled in a course. Going back to my question: why are graduate students expected to attend seminar? The purpose of seminar lectures is to provide graduate students with exposure to current research, various methodologies, and new theoretical and practical applications. Such exposure helps to enrich a student's academic experience, inevitably making them a better scholar and practitioner. Seminars also give students the opportunity to hone their professional presentation skills

by watching other scholars present, and they provide students the opportunity to debate current issues, methodologies, and findings in a public forum.

In the Environmental Science and Policy program, the majority of our students are remotely located and do not have the ability to attend a traditional seminar lecture in Washington, D.C. We've addressed this issue by livestreaming all graduate seminars as part of our Energy and Environmental Programs Speakers Series so that remote students can now watch and ask questions remotely. The Speaker Series features lectures given by policymakers, representatives from government agencies, leaders in the private sector, researchers, and academics discussing critical issues in the fields of sustainability, energy, climate change, environmental science and policy, and any of the "wicked problems" facing society in general.

Taking this a step further, for the spring 2019 semester, both the Environmental Science and Policy program and the Energy Policy and Climate program are partnering to offer the new AS.425.689 - Energy

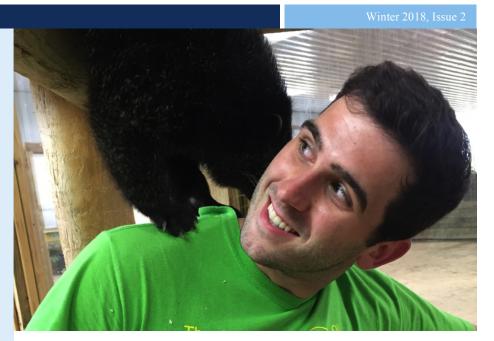
Alumni Spotlight: **Maggie Carroll**

The Aspen Institute Energy and Environment Program seeks to inspire and explore new ideas that provoke action and shape energy, conservation, environmental policies, governance systems, and institutions that support the wellbeing of both nature and society. Through non-partisan, non-ideological dialogue, this team brings together diverse stakeholders to improve the process and progress of energy, environmental, and climate change policy to inspire action and solutions.

As the Energy Program Manager, Maggie Carroll facilitates convenings across the globe focused on energy governance, clean energy technology and innovation, the US electricity sector, and global oil and gas markets. Heading into 2019, she is focusing on deep decarbonization across the US economy – here is a blog Maggie recently co-authored on decarbonization https://www.aspeninstitute.org/blogposts/necessary-but-not-sufficient-getting-on-the-right-path-for-climate-action/

Her time at JHU in the Environmental Science and Policy program was invaluable for understanding the intricacies of both science and policy and applying this knowledge to complex systems. The unique connections formed, and imperative lessons learned through ESP continue to be essential to her personal and professional growth. Outside of the workplace, she is a registered yoga teacher and enjoy reading, travelling, and hiking in my free time.





Value of Summer Internships

By Alexander Birk

My name is Alexander Birk, and I am in the program because of my passion for conservation of natural resources, and in particular a desire to preserve wildlife. Still in school, I have been exploring my options for the future and this summer I began working on an internship for a nonprofit wildlife sanctuary in Michigan.

The Creature Conservancy in Ann Arbor, Michigan posted an internship titled "Education Intern" and after reading more about how the position offered an opportunity to work with animals as ambassadors for education, it seemed like this was a great opportunity for me to get experience doing something that I had never done before.

Each week we covered different topics, using our animal ambassadors as learning tools in order to engage the kids and provoke more questions, along with offering a personal experience that provided a connection to conservation efforts that are expressed differently with each animal. The younger campers learned about general characteristics of mammals, birds, reptiles, amphibians, insects, and arachnids as background information for our "animal visitors".

The older group had more in depth lessons and were exposed to more conservation topics. These included talking about deforestation, urbanization, poaching, and how animals have to adapt to the effects of humans.

Overall, I have to say that this has been an extremely valuable experience. I have been able to learn new things, and also put my education into action, all while offering valuable education and experiences to a new generation who will likely be the difference in the state of the environment moving forward.

My course work with Johns Hopkins thus far has been very diverse and covered a lot of topics, but I would not have expected it to lead me here. I knew coming into it that I was well prepared with knowledge about conservation, environmental policy, and ecological concepts, but this internship allowed me to push my knowledge to the limits and required me to push myself to always be learning more which has been such a positive experience for me as I have enjoyed every second of it.

Reflections of a Distance Learner: On-site!

By Matt Taylor

This summer I chose to take the Field Methods in Stream and Water Quality Assessment as an on-site student. This was my third semester of the ESP program, and like many of my classmates, I live and work in a different part of the country (I reside in Fayetteville, Arkansas). As a result, all of my classes prior to this summer were taken in the online format. I have been pleased with the level of instruction and resources made available through online classes, but there are also challenges with that format. In many ways those challenges enhance the overall experience, such as the self-discipline and time management required to be successful. Other aspects represent lessons that cannot feasibly be replicated virtually, particularly hands-on field techniques and lab instruction.

With the majority of lectures being held at the Krieger school/AAP Building just off Dupont Circle. in D.C., I chose to stay in Washington. For lodging, I found the JHU SAIS off-campus housing website at https://housing.sais-jhu.edu/ to be a valuable resource. As someone not familiar with the area, it was beneficial to find a central listing that also provided a degree of security. As a result, it was not difficult to locate a place.

The classroom experience and field instruction were great. There was ample time allotted at each assessment location we visited in the field for a wellorchestrated, interactive learning environment that was also a whole lot of fun – splashing around a creek playing with fish and bugs (basically a six year old). In addition to the advantages of hands-on field instruction, it was also enjoyable to interact directly with instructors and classmates. Another big upside to the semester was the opportunity to spend time on the Homewood Campus where labs were held. The grounds are striking with open quads, elegant architecture and natural areas integrated into the



campus, but it is of course important to allocate adequate commute time, particularly in the afternoon on weekdays when meeting for a 6 p.m. lab.

Beyond the academics, this endeavor made for a rewarding personal venture that flew by much too quickly. I am a runner, and in addition to taking in many historic sites that way, I really enjoyed the network of parks in the city. The amount of protected green space accessible to the public is remarkable, and I experienced only a small portion of it. My instructors and classmates also strongly encouraged me to take advantage of the opportunity to check out the National Mall Fourth of July Celebration. I decided to try and see the fireworks by going for an evening run down to the Mall, and it did not disappoint - heading south down 19th Street allowed an almost completely unobstructed view and close access without being in the middle of the crowd inside the barricades.

My temporary relocation for this class was well worth it. I have never felt that the value of this program was in any way diminished because most of my classes were online from 1,200 miles away, but

engaging in traditional class structure did instill a greater sense of identity for the institution. From an academic standpoint, the field sampling and assessment experience was invaluable in its own right and complemented many of the core concepts emphasized in other classes. The only pre-requisite to this particular course is Principles and Methods of Ecology, but I strongly recommend taking Hydrology and Water Resources prior to as well if feasible. A general understanding of flow regimes and stream morphology was a great baseline to build upon with concepts of ecological integrity.

Personally, there is something gratifying about spending enough time in a new place to not only see the sites, but to make yourself at home if only for a brief time. "Show up stupid and leave a little less so," is a quote I heard on the Travel with Rick Steves radio show recently which emphasizes the journey or the learning process. To illustrate, the first time I got on a Metro bus I caught it going the wrong direction – got to see more of the city, that's all!

Alumni Spotlight: Lyle Robbins

Lyle Robbins (JHU/ESP 2017) is a Junior Officer on the NOAA Ship Rainer, a hydrographic survey vessel based out of Newport, Oregon. After a spring field season surveying glacial retreat in the fjords of south east Alaska, the Rainer is now using sonar to map fault lines off the coast of Washington and Oregon. The information gathered for this project will improve upon earthquake, tsunami, and landslide hazard assessments and awareness products.

The National Oceanic and Atmospheric Administration's (NOAA) Office of Marine and Aviation Operations manages and operates a fleet of research ships and aircraft dedicated to better understand our planets oceans and atmosphere. Within this office is the NOAA Corps, a uniformed service comprised of operational specialists that support scientific missions at land, at sea or in the air. As a Junior Officer on a hydrographic survey ship, Lyle is responsible for standing navigational watch and the safe operation of the ship, as well as a hydrographer, who plans, acquires, and analyzes survey data.

After his two-year tour on the Rainer, Lyle hopes to be promoted to Lieutenant, Junior Grade and operate research vessels supporting shellfish aquaculture operations and research on the East Coast. The NOAA Corps offers opportunities in many places from American Samoa to the South Pole, and NOAA Corps officers operate in leadership positions to support scientific research in a variety of fields.



Lava, Learning & Lasting Friendships at the Ahu Lani

By Vickie DeNicola & Leigh Kellet Fletcher

This summer, Geology & Tropical Ecology of Hawai'i students were welcomed to the Big Island with the quirky song of coqui frogs and the sweet scent of Kahili ginger in the air. Our anticipation was high for the week-long field course exploring the unique habitats, interconnections between geology and ecology and the integrated management of the island's biodiversity. And, why not? Over the previous months, we'd nervously placed our fate into the hands of Pele, Hawaiian goddess of fire and volcanoes, as lava flows enveloping area landmarks and beaches meant the threat of cancellation. Thankfully, the ancient deity delivered. Soon enough, the diligent planning of Dr. Kathryn ("Kathy") Schubel and Professor Jenn da Rosa kicked in, and we were bouncing over miles of dark highway in a dusty white van (aka "The Beast") to the Ahu Lani Sanctuary, our rainforest eco-retreat home for the week. That first night, we kicked off our shoes, fired up our headlamps, filled our air

mattresses, and made fast friends. After orientation and introductions, Garrett, our gracious Ahu Lani host, gave a lecture on the retreat's sustainability initiatives and tips for "off the grid" living in the beautiful rainforest. With the week ahead of us and internet bandwidth at a trickle, we tucked in early.

Each day we were up at dawn, greeted by resident retreat dogs, Truman and Jasmine. We usually spent some time negotiating precious bathroom space before jostling for line position at delicious breakfasts cooked up by MJ (the retreat's hidden gem). At 8 a.m., we would load into The Beast to begin the day's adventures. Alyssa Moritz recalls being "excited to explore the Big Island and looked forward to traveling through so many different climates and ecosystems in just one day." If we were lucky, we'd make it

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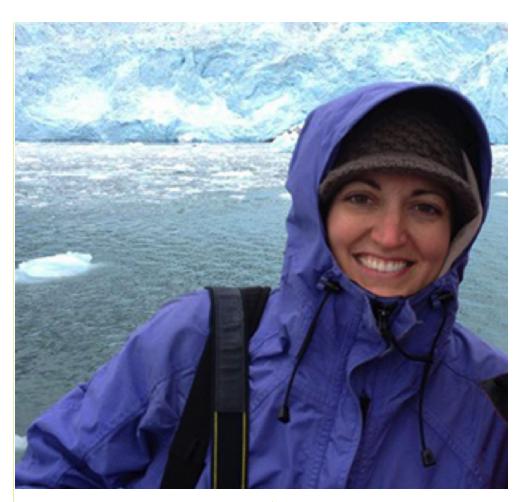
How Can the Science Community Connect with the Policymaking Community?

By Rebecca Aicher

Over the last few decades, many scientists have become more interested in connecting with policymakers to share the results from their research to inform and potentially improve public policies. However, making those connections and building trusted relationships takes time and engagement from both the science and policymaking communities. Scientific evidence plays an informative role for decision-makers, but it isn't the only factor that influences them. The reality for a decision-maker is that they are weighing many different factors, including their values, the politics of a situation, the public opinion around an issue as well as the scientific evidence and many other factors.

Think about your own experiences and how you interpret the world before making decisions. What influences you? Science has made it quite clear that sugar is not good for the human body. Do you avoid it every time you want a snack or sit down for a meal? I know I certainly don't, but I still value the scientific evidence that has informed my decision to eat a lot less sugar than I might otherwise.

The American Association for the Advancement of Science (AAAS) is an organization that is committed to connecting scientists, policymakers, and the public. AAAS is the world's largest general science society with over 120,000 members from all over the world with a mission to "advance science, engineering, and innovation throughout the world for the benefit of all people." As part of that mission, AAAS offers many unique



opportunities for scientists to engage in the policymaking process. The <u>AAAS Science</u> and <u>Technology Policy Fellowships</u>

"provides opportunities for scientists and engineers to contribute to federal policymaking while learning firsthand about the intersection of science and policy" by providing a one-year fellowship in the executive, legislative, and judicial branches of the federal government. For many scientists, this is a pivotal career moment and they take this hands-on policy experience with them throughout their career. During my AAAS S&T policy fellowship with the EPA, I worked with a team of scientists to synthesize scientific research to inform policy decisions. After that experience, I was hooked on

connecting scientists, scientific evidence, and policymakers.

For scientists and engineers interested in learning more about engaging with the policymaking process, AAAS and the American Association of Universities co-chair the Engaging Scientists and Engineers in Policy (ESEP) coalition. ESEP hosts science policy webinars throughout the year, and you can find the archive of webinars here. Additionally, they host a monthly D.C. based happy hour, that anyone interested in science policy is encouraged to attend, as well as periodic happy hours throughout the US ESEP

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Experiential Residential Courses:

In ESP we don't just learn in the classroom, we provide opportunities for students to explore their passions, learn relevant skills, explore other cultures, and connect to the many organizations and issues that require environmental expertise. These courses vary widely in their focus as well as location. The field trips provide a unique opportunity for field-based experiential learning and compliment classroom teaching by exploring local geology, ecology, sustainability, geography, and a variety of local environmental and land management issues. Many involve camping and hiking in pristine environments and also provide students with ideas for capstone research projects. This coming year we have five courses for students to explore their adventurous side:

- Nature Conservation and Sustainability in Cuba
- Newfoundland and Labrador: A Geo-Eco Journey through Time
- · Conservation Biology and Wildlife Management in Montana
- Drones Geospatial Decision Making
- Great Lakes Environmental Management

These academic ventures can result in the creation of a community of learners whose effects can last a lifetime.

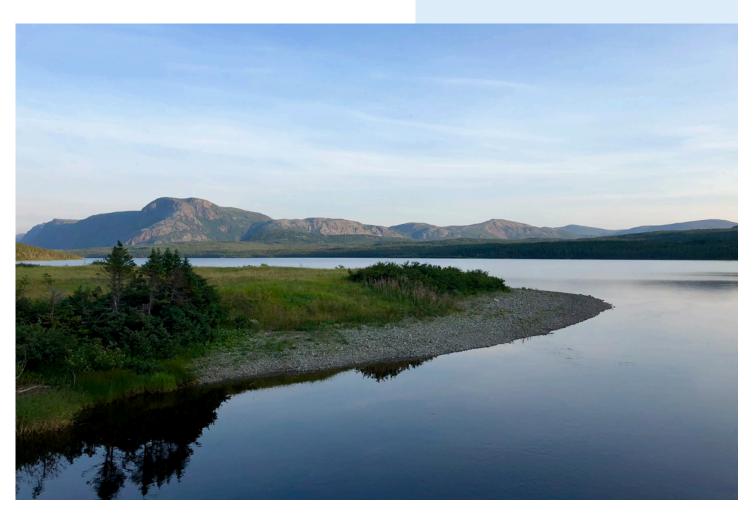
Auditing Courses

In addition to organizing alumni events, the Energy and Environmental Programs at JHU are pleased to announce a new pilot program for alumni interested in auditing courses.

Starting in 2018, all ESP, EPC, and GIS alumni can audit any program course for a discounted rate of \$500. Prior to this initiative, alumni had to pay 50% of tuition in order to audit a course. This new program recognizes that, given the dynamic nature of energy and environmental disciplines, alumni need to remain lifelong learners in order to stay current in their fields. Importantly, alumni bring rich applied knowledge to the ESP and GIS learning community and having their voice and experience in JHU classrooms is beneficial to current students and faculty. If you are considering auditing an ESP or GIS course in the coming year, please check out the Multi-Year Schedule of each program for an up-to-date course listing.

Multi-year Schedule for ESP

Multi-year Schedule for GIS



Reinventing Graduate Seminar

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and Environmental Graduate Seminar course as an elective for the first time. This is a hybrid course for both local and remote students craving the academic and practical exposure to current research and the opportunity to further delve into the lecture topics with classmates. Part of the course will have students attending, either in person or via livestream, the Energy and Environmental Programs Speakers Series each week. Then, the class moves to Blackboard and have an active, asynchronous dialog about the topic presented. There is a progression each week of listen and observe the speaker, ask questions of the speaker, have a discussion with your classmates and professor afterward, and then analyze/reflect and write. The last week of class is used to reflect, evaluate, and present on best practices in research presentation and communication technical content and scientific material.

Whether joining the Energy and Environmental Programs Speakers Series lectures for course credit or merely attending for joy of learning and expanding your knowledge, we have a number of notable speakers already lined up for the spring 2019 semester. To list just a few: Ashley Lawson from the Center for Climate and Energy Solutions will be presenting on how businesses are preparing for climate change risks, Carol Jones and Jay Pendergrass from the Environmental Law Institute will be co-presenting on the economics and legalities of sustainable forestry in Indonesia, Thomas Jenkin from the World Bank will be lecturing on innovative energy storage solutions, Jairo Garcia from Urban Climate Nexus will be presenting on cities as the driving forces to avoid temperature overshoot, and Elizabeth Hessami from the Environmental Law Institute will be speaking about increasing access to electricity in Afghanistan with micro-hydropower.

There is much to learn from the work of others, so join the tradition this spring and catch a seminar talk or two. It is a great way to participate in the ESP community and broaden your horizons.

How Can the Science Community Connect?

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provides exciting opportunities for students, scientists, and engineers interested in policy engagement to network and learn from one another.

For scientists and engineers interested in connecting with the media, the <u>AAAS Mass Media Science Engineering Fellows Program</u> "strengthens the connections between scientists and journalists by placing advanced undergraduate, graduate, and post-graduate level scientists, engineers and mathematicians at media organizations nationwide." For over 40 years, for 10 weeks during the summer, the AAAS Mass Media Science Engineering Fellows work with mass media professionals at radio and television stations, newspapers, and magazines learning how to share science news in an easy way for the public to understand. This could be you next summer; applications are open until January 15, 2019.

If you are interested in connecting with AAAS and the work that it supports, consider attending the <u>AAAS annual meeting</u>. This year the theme is "Science Transcending Boundaries," and the meeting will be in Washington, D.C. from February 14-17, 2019.

There are many other scientific associations and societies working to connect the science and policy communities. Discipline specific societies like the <u>Ecological Society of America</u> share specific opportunities for ecologists to get involved with policy by providing direct links to public comment periods on ecology related policy, sharing changes to current laws and proposed legislations, as well as <u>sharing general science policy news</u>. You can sign-up for their policy news updates <u>here</u>.

There are many opportunities to engage with the policymaking process, and I encourage students and faculty to reach out to policymakers and start the conversations that matter to you. Sharing your understanding of science and the scientific evidence that can inform policies is crucial to creating sound public policy. If you are interested in engaging with policymakers or connecting scientists with the policymaking process, explore some of the <u>resources for engagement</u> including <u>AAAS's Top 10 Rules for Working with Congress</u>, and then start building relationships and engaging.

Lava, Learning & Lasting Friendships at the Ahu Lani Sanctuary

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home by 8 p.m. for an awesome meal, a field journal prompt, and classmate presentations. Of those presentations, Barbara Lau said, "I could tell everyone worked hard on the research and they wove in the different things we learned throughout the week."

We worked around forest fires, hurricanes, and an actual earthquake as we experienced how natural disasters throughout the years have shaped the geology and ecology of the island. Along the way, Tiff Keanini and Leslie Chau served as our resident Hawaiian experts, happily assisting with local name pronunciation, history, and plant identification.

The first day took us to Waipi'o Valley (a spectacular sapping valley that appeared onscreen in the 1995 movie "Waterworld"), where we explored nearby rock outcrops and had fun guessing the origins of phenocrysts in a hunk of basalt Kathy found.

The second day, we visited Rainbow Falls and the Boiling Pots, carved by the Wailuku River flowing along the meeting point of lava from the Mauna Loa and Mauna Kea volcanoes. Stefanie Dimayuga Mendoza said she "loved being in the field again" for the experience. But, the real fun started when we descended into Kaumana Caves, a meandering underground lava tube, and were rewarded with beautiful lava formations and spectacular windows to the jungle outside.

Up next was the Lava boat adventure, an incredible lava viewing opportunity and an exceptionally wild ride. Katie Donohue said, "[It] was one of my favorite memories, despite being soaking wet! Being so close to the lava and feeling the heat as we approached was incredible." Dakota Stormer wore his Frogg Toggs in the 15-foot waves and got thoroughly soaked while trying to take pictures.

With field notebooks in hand, we spent the morning of day three learning about



abalone and shellfish farms, followed by a trip to NELHA (Friends of Natural Energy Laboratory of Hawaii Authority) to discuss ocean-based renewable energy sources. Angela Galarreta said, "Seeing such a large-scale operation conducted in a seemingly sustainable manner was inspiring."

We spent the afternoon rockhounding at collapsed lava tubes and along the road. For our student geology expert, Rachel Moore-Benaway, this was a highlight. "Wild olivine, y'all," she exclaimed after finding a vein along the roadside. "Wild, wild olivine."

Jessica Kelsey noted, "My favorite part of the trip was, hands-down, going xenolith hunting. We looked crazy to people driving by." Rachelle Feliciano concurred, saying, "We spotted other geology students doing the same thing. We're not strange, we're scientists!"

Our mid-week ecological restoration work took place on a beautiful day; pulling up pesky non-native invasive species felt good after learning about the ecological damage they cause. We worked for several hours then broke for a lovely picnic of deli lunch meats, MJ's prepared salads and other goodies. The afternoon was a favorite.

Vickie DeNicola loved exploring the cinder cone and attempting a hike to the top with Taylor McElroy and Lidia Murillo. "It was a beautiful day, and we could see Haleakalā in the distance," Taylor said. Late that night, with her presentation on native and endangered Hawaiian plants, Amber Smith helped us understand why the beautiful but pervasive ginger and coqui frogs are problematic.

Thursday included a lovely drive to Ka Lae (South Point) and a hike to the famous green sand beach. It was the first visit for lifelong Hawaii resident Leslie Chau. "There are very few places in the world where we can find green sand, and this was worth the incredible hike," she said. Leigh Fletcher added, "The green sand beach surrounded by the eroded volcanic cone was something I will never forget." Our next stop, a black sand beach, was a study in contrasts.

On our last field day, we took a short but breathless hike to Lake Waiau, a site of historical importance to native Hawaiians at 13,000 feet. Heather Quattlebaum said, "Hiking to the glacial lake and our time there was one of the coolest things I've ever done."

Washington D.C. – JHU Environmental Sciences Alumni Reception During AGU Conference

The Johns Hopkins University invites you to a reception during the American Geophysical Union 2018 Fall Meeting. This informal gathering will bring together JHU faculty and researchers in the Environmental Sciences & Earth, Planetary and Space Sciences and will provide an opportunity for alumni and friends of JHU to reconnect. Please join us from 5:30 p.m.



to 7 p.m. in the Club Room of the Morrison-Clark Historic Inn & Restaurant which is located at 1011 L Street N.W., Washington D.C. 20001.



ESP Alumni to the Utah Legislature

ESP Alumni Casey Snider was appointed on the 15th of October to the District 5 Utah Legislature. Rep. Casey Snider grew up farming in his hometown of Liberty, UT. He received his undergraduate degree from the Quinney College of Natural Resources at Utah State University and has a Masters in Environmental Science and Policy from Johns Hopkins University. Casey has worked in the US Senate, the US

House, and in various other capacities at the national, state, and local levels of government. He has been actively involved in natural resource policy in both the non-profit and government sectors. We are extremely proud of Casey and his contributions to the conservation land ethic.



Environmental Sciences and Policy

MASTER OF SCIENCE

Jerry L. Burgess, Ph.D.

Director for the Environmental Science and Policy & GIS Programs
Johns Hopkins University
1717 Massachusetts Ave., N.W., Suite 104U
Washington D.C. 20036
Follow us on Facebook -JHU Environmental Programs

Email: jerry.burgess@jhu.edu Office: (202) 580-7562

Jennifer da Rosa

Program Coordinator for the Environmental and Energy Programs Johns Hopkins University 1717 Massachusetts Ave., N.W., Suite 829 Washington, D.C. 20036 Follow us on Twitter and Instagram @JHUesp

Email: jdarosa@jhu.edu Office: (202) 452-1915