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Life Line

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Welcome Summer 2017

Welcome to another issue of our Biology & Earth Science department newsletter! I know, like me, you'll continue to be impressed with all the endeavors of our students, faculty, and staff. The fact that we are a little later than usual with this issue is a testament to how busy and productive everyone has been. As you'll see, faculty continue to develop new curricula and design engaging class assignments. Our students have been hard at work conducting research with faculty both in the field and at the lab bench, peering through binoculars, wading through rivers, culturing bacteria, and amplifying DNA. Working closely with faculty, they have presented the fruits of their labor at various regional and national conferences. We even hosted another successful conference on campus this year! Students continue to crisscross the globe, taking classes, collecting

data, and doing meaningful service work. The only thing better than watching them grow and develop at Otterbein is hearing about their adventures post-graduation!

That's why it is always so nice to see the alumni updates. This year, I was especially excited to run into a few alumni face-to-face at the Columbus March for Science. If you're an alum reading this, don't forget to take a minute and tell us what you've been up to. We'd love to hear from you.

*Dr. Sarah Bouchard,
Professor and Chairperson*



Above and left: Faculty, Staff, Students and Alumni at the March for Science.

Otterbein Research Presented at International Coral Reef Symposium

Dr. Hal Lescinsky presented research conducted with Honors student Jill Keefer '16 and Distinction student Samantha Hargrove '16 at the Caribbean *Acropora* Research, Monitoring, and Population Enhancement session at the International Coral Reef Symposium in Honolulu last June. Their paper "Resurgence and health of *Acropora*, mid shelf patch reefs, Southwater Caye Marine Reserve, Central Belize" documented the comeback of the U. S. endangered corals *A. cervicornis* (staghorn) and

A. palmata (elkhorn) on a subset of the patch reefs in the area. Field work quantified coral abundance but also examined the incidence of factors limiting the corals' comeback including damselfish bites, snail and worm predation and disease. The patch reef results were then compared to sub-fossil skeletons in the area that the team collected from recent underwater earthquake exposures. The study documented a 2-3 fold increase in disease and predation rates in recent times. This work continues



Jill Keefer '16, Hal Lescinsky, Samantha Hargrove '16 during field work on the reefs of Belize.

Lescinsky's research program to utilize fossil and subfossil corals to establish a pre-human baseline against which we can evaluate ongoing declines in coral reef communities.

It's All About the Mussels!



So ... my first thought was just to go with the title and microphone drop – after all, what more needs to be said. One might say that I'm somewhat passionate about mussels. They have been the subjects of my studies since graduate school and I



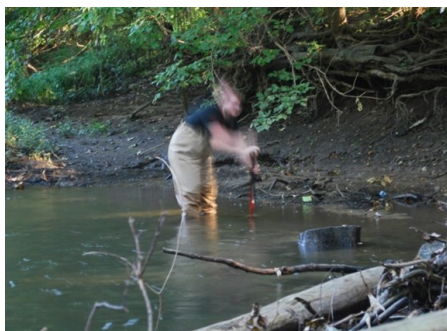
Kierra and myself collecting quadrat data to quantify the mussels in each reach of the creek.

often involve Otterbein students in my research now.

This past summer two other faculty and three students joined me in a study of the distribution of sediments and the chemistry of those sediments in relationship to mussel diversity in the lower portion of Big Walnut Creek in central Ohio. It is a continuation of other studies over the past few years where we first found the mussels in the creek, and then tried to understand why they were present in large numbers in some sections of the reach we studied and eliminated from other reaches. We've looked at land use and how land use around the creek might affect the mussels (land use doesn't seem to be the reasons why mussels are lost) and then we looked at the distribution and abundance of the fish communities within the reach. Mussel larvae are parasites of fish and generally where fish diversity is good, so too is mussel diversity. But not so in this section of Big Walnut Creek. Fifteen years ago Ohio EPA found that the fish community was excellent in this portion of Big Walnut Creek and the summer before last another student, Trevor Smoot '16, and I found even more species of fish than OEPA, and some of the most diverse fish

communities were we found to have no or only a few live mussels.

That led to the study this year. Organisms are limited within ecosystems in three broad areas: environmental quality (the chemical and physical attributes of their environment), habitat (where they live) and symbioses (who they interact with in their environment and how they interact with them). In the case of the mussels, water quality and the presence of suitable host fishes were both not limiting. Habitat and water quality had not been negatively impacted by land use in the watershed, and so that leaves the very substrates where the mussels live as potential limiting factors. And that is what we did this past summer — Kierra Lathrop (a senior Biology and Zoo and Conservation Science student) collected new numbers of mussel distribution and abundance. Nate Hess (Environmental Science student)



Nate working furiously to collect sediment samples – didn't want them to get away.

and Dr. Kevin Svitana (Earth and Environmental Science faculty member) examined the distribution of sediments within the reach. Hayley Quinn (Biochemistry and Molecular Biology student) and Dr. Joan Esson (Chemistry faculty member) used the sediment collected by Nate to look at contamination of the sediments in the immediate vicinity of living mussels. What we found was that the same mid-reach of the creek had lost mussels while the upper reach had retained its species and the lower reach was slowly



These are specimens of *Lampsilis fasciola* (wavy-rayed pocketbook), an Ohio Species of Concern found in the creek.

recovering as mussels attached to fish move from the Scioto River (Big Walnut Creek flows into the Scioto River). Also, we found that sediments within the reach were relatively the same (that is that sediment composition was not the factor that eliminated mussels) and that some chemicals (especially some heavy metals known to be harmful to mussels) were greatly elevated in the reach where the mussels had been



Nate's samples were taken to the lab and sorted with the fine sediments (after weighing), then going to Hayley for sediment chemistry analysis.

eliminated. This sediment pollution happened many years ago, but its effects are still affecting mussels today. Our next step will be to follow this sediment fingerprint upstream and determine the source to make sure it is a pollution event in the past. We will also work with Franklin Soil and Water Conservation to continue to monitor the effects of the polluted sediment and, hopefully, document the continued recovery of the mussel fauna of Big Walnut Creek. The pictures show some of our story.

Michael Hoggarth

“Fantastic” Internship Experience in South Africa, says Stiles

My name is Jessica Stiles and I am currently a junior in Zoo and Conservation Science at Otterbein University. Last summer I was lucky enough to get an internship with the Cape Parrot Project in Hogsback South Africa from May 30, 2016 to August 1, 2016. I worked with Delaney Galbraith '18, Cassie Carsten, and Don and Abby deSwardt. It was the best experience of my life. Each morning we would get up before sunrise and go out to observe the parrots as they flew down the mountain for the day in search of food and we would observe them as they flew back in for the night around sunset. Some mornings we would get up early and go to the pecan orchard in the town called Alice and record the parrots as they arrived in search of food. The time between was spent collecting data from the trees with nest boxes in them such as the height of the tree and the position of the box, what type of box (bird box or bee box), aspect, if it was being used, etc. Some of our time was spent going to

a bird sanctuary where we picked up a Grey Headed Parrot which is a cousin to the Cape and tested different tracking devices on it. Once we got the recording equipment we focused on getting vocals of the parrots when we saw them in the morning and evening and what they were doing at the time of the recording. In about mid-July, we traveled to Limpopo to get vocal recordings of the secluded Cape Parrot population there for comparison to those in Hogsback.



Delaney, Jessica and George Quoba students.

Not all of our work was focused completely on the parrots though. We spent time collecting yellowwood seeds for the Project's nursery and helped to educate the local communities. We even went to a local school to teach the students the importance of certain trees and the Cape Parrot (or Isikhwenene in Xhosa). We were not the only ones doing the teaching though. Xhosa is the language commonly spoken among the surrounding communities and they tried their best to teach us some of it. During our time at the George Quoba School we planted trees



Male Cape Parrot

around the grounds to help get the students involved. Each tree was given the family name of the student that planted it to help spark a sense of pride and encourage the students to take care of the trees so they would one day grow big and hopefully be a spot for the parrots to find food. The students were all very interested in what we had to tell them and they all wanted their photos taken with us before we left.

This opportunity has opened up the world to me. Before I went I would have never thought about traveling as part of my career choice or even something that I myself could accomplish. Now I am studying abroad and considering my options on a global scale. It has taught me many things but most of all, do not be afraid to step out of your comfort zone to try something new and amazing. I did and it was fantastic!

Jessica Stiles '18



Jessica with the Marantz recording equipment.

Environmental Health and Safety Degree Coming to Otterbein University

Dr. Kevin Svitana is happy to announce that a new major focusing on environmental, health and safety issues will begin Fall 2018. Dr. Svitana and Ms. Tara Chinn developed the curriculum and moved the proposal for adding the major through university governance last spring.

Otterbein's Environmental Health and Safety major prepares students for the challenges of a career that emphasizes workplace safety and environmental stewardship. Our EHS major combines approaches to workplace health and safety with environmental compliance and risk management in a curriculum which our

industry advisors recognize as unique for a Bachelor of Science degree. Students receive training to form a complimentary blend of health, safety and environmental risk management skills demanded by industry. The new major will be housed in the Engineering Department.

Otterbein Rock Garden Gains Obsidian

Just outside the atrium of the Science Center a new garden has been sprouting. Although this garden does contain one plant (a petrified log), it is purely geological. Its newest addition is a large obsidian boulder that comes to us by way of students from Otterbein's Field Geology course. Last May, 12 students, and Professors Hal Lescinsky and Kevin Svitana traveled to Nevada and Eastern California to explore and study some of the most amazing geological stories on the continent. One such story was

the explosive volcanoes around Bishop California, and the group visited an old obsidian quarry. While there, Brent Mullin '16, Scott Shipkowski '16, Nick Grisso '17 and Hannah Tucky '17 decided to collect a sample for the rock garden. Since they had driven to Nevada for the course they figured that bringing a 162 pound hunk of volcanic glass back to Otterbein would be possible. The obsidian boulder which they later named after Nick who had to fly back (rather than Wilson), completed the

Field Geology course in the back of a van before Brent, Scott, and Hannah transferred the unwieldy specimen to their car for its circuitous journey to Otterbein. After three weeks and 6,000 miles of road tripping, sight-seeing, and general geologizing in National Parks up and down the west coast, the boulder is now safely at rest in the Otterbein rock garden over a thousand miles from the nearest natural source of obsidian. Thanks guys!



Field Geology students studied the Titus Canyon Megabreccia, Death Valley



The obsidian starts its journey in Nevada.



Our new obsidian at home in the rock garden.

Svitana Looks at Alternative to LNAPL Recovery

Persistent hydrocarbon-based light non-aqueous phase liquids (LNAPLs) have proven to be one of the more problematic challenges for obtaining site closure or no further action status at remediation sites. The source of the LNAPL oils can vary, ranging from leaking underground petroleum storage tanks to manufacturing facilities where long-term oil loss from equipment creates LNAPL accumulations beneath factory floors. Active recovery using pumping or periodic vacuum recovery from wells or sumps typically are employed as a remedial action, but these methods usually have disappointing results because the

LNAPL re-accumulates to thicknesses that exceed the 0.01-foot action level recognized by many states shortly after active recovery ceases. Dr. Kevin Svitana is developing a simple passive approach to recovering persistent LNAPL using non-woven hydrophobic oil absorbing fabrics. This method is being explored with the assistance of students Jacob South and Bryce Shanaman in a laboratory setting to assess physical properties of the sorbent cloth. Parameters the students are evaluating include sorptive capacity, buoyancy and LNAPL wicking.

Prototypes of rolled sorbents have been deployed at two manufacturing

facilities that have had persistent LNAPLs present for over a decade. In both instances, LNAPLs were reduced to thicknesses below the action level in less than two months. At both locations, the sorbents were removed and LNAPL thicknesses were gauged one month later. In most wells LNAPL did not re-accumulate; where it did re-accumulate, it was less than 50% of the original thickness. Monitoring of the long-term effectiveness is ongoing along with the potential for utilizing sorbents to demonstrate compliance with mobility and migration analysis which is required as part of regulatory agencies no further action decision.

Otterbein Medical Brigades Travel to Nicaragua

Global Brigades is a non-profit organization that gives student volunteers the opportunity to make a difference in under-resourced communities in Panama, Honduras, Nicaragua, or Ghana. Their vision is to ignite the largest student-led social responsibility movement on the planet. In order to accomplish their mission to resolve global health and economic imbalances in the world, this organization uses a holistic approach. Through their interdisciplinary brigades, which include medical, public health, business and other brigades, they guide the students to help these communities in need become more well-rounded.

Otterbein University's medical chapter of Global Brigades had the opportunity to travel a second time with the non-profit organization to Nicaragua for nine days. During these nine days, three of them were spent setting up medical clinics in Molino Sur and El Hatillo. At these medical clinics, fifteen students from Otterbein University rotated through five positions: triage (taking vitals and patient history), assisting the doctors, the dentists, the pharmacist, and running charlas (dental hygiene lessons). We were able to provide efficient and effective medical care and 743 people were seen by the local physicians and were able to leave the



Abby Grospitch and Sean Kirk working a triage station during one of the medical clinic days.

clinic with medications and personal hygiene kits. Volunteers also had the opportunity to participate in a water brigade day and a public health project that were integrated into the medical brigade. During these three labor days, we helped dig a roadside trench where piping will be installed for the community of El Hatillo who suffered from a five-year drought and still does not have clean and accessible water. We also helped build three latrines (bathroom, shower, sink combination) for families who had to walk down to the river to bathe and wash clothes in the Los Encuentros de San Gabriel community. Not only did this help each community work toward a cleaner water supply, but it also allowed us to build a relationship with the families we worked with.

Traveling to Nicaragua allowed our volunteer group to break the language barrier and help people who barely have any medical resources. However, we did not just focus on the medical aspect of the trip; we were able to connect with the community, dance with the children in the rain, and talk for hours with our coordinator and translators. This trip was more than just an opportunity to gain international clinical experience, it was our chance to connect with people we never would have met without this life-changing trip. That

being said, four volunteers, Emily Bliss, Sean Kirk, Rachel Nguyen, and Mallory Soska, would also like to take this opportunity to acknowledge the generous donation from the Melinda S. Phinney, MD '85 Fund for Pre-Medical Experiences for Students that enabled them to have this unique and eye opening experience in Nicaragua.

Rachel Nguyen



Phinney Award recipients (from left to right Rachel Nguyen, Emily Bliss, Mallory Soska, and Sean Kirk).



The fifteen students from Otterbein who went on the trip, including one student from Denison University.



Rachel Nguyen, Sean Kirk and a group of children at one of the communities.

Alumni News



Chris Shockley '11

Greetings from St. Kitts*! I've joined the class of 2020 at Ross University School of Veterinary Medicine. I haven't been in school for a little while now, but with classes in full swing, it's obvious I was prepped well at the OC. I'm thoroughly enjoying learning about what I truly want to learn about! The beach isn't bad, either. Another Otterbein alum and Ross alum, Dr. Kayla Mitchell, has been a huge help getting me situated on this little island. It's a whole other world down here. I plan to return to Ohio State for my final clinical year.

Chris Shockley '11

*Saint Kitts, also known as Saint Christopher Island in the West Indies and borders the Caribbean Sea.

Macie Smith '16 is gearing up to work with Colorado State University and the US Geological Survey as a wild horse and burro field technician. Her specific role will utilize radio telemetry to locate individuals and determine the demographic parameters and behavioral ecology of wild horses. This work will contribute to a five year study that will help determine the effectiveness of herd management attempts. She is ready to get started and hoping for a successful field season.

Students Present Research

Students Samantha Bonifas, Hayley Quinn, Troy Neptune and Kierra Lathrop presented posters of their research at the Ohio Academy of Science Annual Meeting at the University of Cincinnati on April 8, 2017. They are pictured at right with Dr. Michael Hoggarth, who also attended the meeting.



Independent Research in Physiology

As independent research projects in Animal Systems Physiology, students were asked to explore their own physiology and perform measurements related to their health. The goal of this laboratory exercise was for the students to apply what they were learning from the textbook and through case studies. Students also qualified for one of their "5 Cards" through this research experience.

Out of class, students actively engaged in self-chosen "healthy" manipulations over 10 weeks – exercising regularly, quitting smoking, regulating salt intake, and even switching to a vegetarian diet. In the lab, students performed weekly baseline measurements like resting heart rate, electrocardiographs, blood pressure, and muscle strength and activity with dynamometry and electromyography, respectively, and analyzed how their own numbers changed over time. Most students learned that, while not always easy, being healthy is a choice that can lead to significant improvements in physiological parameters. Engaged students saw significant improvements in their resting heart rate, blood pressure, etc., and reported a better sense of well-being and understanding of their own physiology.



Mara Eisenbarth and Lorien Salier participated in the research

Finding Your Voice

In October of 2016, Dr. Anna Young joined Beth Armstrong of Conservation Initiatives and organized 'Finding Your Voice,' a summit focused on women in conservation. Hosted by Otterbein, university and high school students from across Columbus were in attendance to hear about different speakers' conservation work, and the career paths that they followed to achieve their goals. Students also participated in a speed Q&A session that allowed them time to interact with each speaker in a smaller setting. Comments from the attendees and photos from the conference are below.

"A big thing for me is that paths aren't always direct. We may think something is set in stone but it never is, and where we end up & how we get there is where we are meant to be."

"During the conference I had an epiphany on what I want to accomplish in my life."



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