Greetings 2013!

It is with much pleasure and pride that we bring you our annual Life Line newsletter. This past year has been quiet for the Department of Biology and Earth Science in some reassuring ways. With semesters in their second year we seem to have most of our curricular and schedule changes behind us. In addition, Dr. Jeff Vasiloff joined the Department full time and now he and Dr. Lisa Marr give much needed stability to our teaching the many sections and labs of Anatomy and Physiology and Pathophysiology. We were also fortunate to have a near seamless transition in the overseeing of our labs. Many of you will remember our wonderful lab coordinator, Tara Grove, who this past summer left our Department to become the Otterbein Chemical Hygiene Officer. She enjoys the responsibility of her new job, although with her new office in the Service Department we don’t get to see her as much.

Her former assistant, Erin Ulrich, has stepped up to be in charge of the labs, and she proving to be as equally wonderful as Tara.

One big difference for the Department this year is that we welcomed our first class of Zoo and Conservation Science majors in the fall. Interest has been high, and we will easily fill our cap of 20 majors per year. The major will be directed by Dr. Anna Young who arrived in August and who is busy sussing out internships, taking students to the zoo as part of the new Introduction to Zoo Science course that she is now teaching, and laying plans for her research lab. One integral part of her work on Budgie (parakeet) vocalization is an aviary to hold the birds.

Plans are finally in place for the aviary to be situated on the ground floor of the science building adjacent to the Atrium where we are sure it will generate the same buzz and interest among students that the salt water coral tank down the hall already does.

Please enjoy this 2013 issue of Life Line and take the time to learn about all the other goings on in the department that are included in the newsletter.

Hal Lescinsky, Chair

Students are Going Wild Over Otterbein’s Newest Major

The new Zoo and Conservation Science program has begun at Otterbein! The first class to major in Zoo and Conservation Science started in the fall of 2012, and students are currently taking an Introduction to Zoo Biology course. In their first zoo course, students are learning about zoo history, policies, function, and the role that zoos play in conservation. Students take weekly field trips to our partnering institution, the Columbus Zoo & Aquarium, and are working in teams to test a hypothesis by observing animals on exhibit. At the end of the semester, students will create posters summarizing their findings, and present their results to curators from the Columbus Zoo. The introductory zoo course has its own Twitter account where students can share some of the amazing images they have been able to capture while performing their observations. During their sophomore year next fall, Zoo and Conservation Science majors will start their practicum class at another partner institution, the Ohio Wildlife Center, where they will learn how to handle and perform medical procedures on some of the 5,000 animals rehabilitated at the center every year.

Daniel Droulias tweeted this photo at the zoo.
Anatomy and Physiology Update

The two-course series of anatomy and physiology I and II, with lab, has become the foundation of hundreds of Otterbein students who will ultimately find themselves in one of the many stable jobs in healthcare or related fields. We had four sections in lecture in the fall, as well as twelve lab sections!

Dr. Lisa Marr continues to lead her comprehensive laboratory curriculum, but this year with the help of two talented part-time faculty, both also physicians, Dr. Jim Cacchillo, and Dr. Ralph Graham. Students in my (Dr. V) three lecture sections frequently told me that they both enjoyed and learned a great deal in the laboratory exercises. Dr. Marr also taught one lecture section in the fall, a first for her.

This spring I am teaching all of the lecture sections of anatomy and physiology II. I am trying to lecture less and use more videos and class exercises. I have set up a classroom Twitter account so that the students can answer questions either as individuals (or as teams) with the use of a laptop, ipad, or smartphone. Thanks to my new colleague, Dr. Anna Young for the idea of using Twitter.

Speaking of the use of technology, anatomy and physiology students receive participation points for joining the Biology and Earth Science Facebook group. We now have more than a hundred students who can learn about biology-related scholarships, internships, and scientific and medical breakthroughs by checking out the site. Several departmental staff and faculty contribute to the site including Dr. Sarah Bouchard, Dr. Anna Young, Erin Ulrich, Donna Rhodeback, and myself.

In addition, inspirational quotes by great scientists and other thinkers are posted on the department's Facebook account—like these words of wisdom—directed to students—by one of the most accomplished biologists of our time, E. O. Wilson:

“You [students] are capable of more than you know. Choose a goal that seems right for you and strive to be the best, however hard the path. Aim high. Behave honorably. Prepare to be alone at times, and to endure failure. Persist! The world needs all you can give.”

This has been my first fulltime year at Otterbein and I am really enjoying it! Before I went to medical school at The Ohio State University, I graduated with a degree in chemistry from the College of Wooster, an institution that is very much like our own. Wooster was about twenty miles from where I grew up, in a rural area outside of Wadsworth, Ohio.

Working at Otterbein as an assistant professor has given me the chance to pay forward some of the lessons and knowledge that I began to learn and acquire when I received my liberal arts education years ago.

My current position also allows me to use the fruits of my career in health care and public health with students. For example, I was the state of Ohio’s Chief of HIV Prevention from 2002 to 2006. Therefore, I am currently mentoring three students on some epidemiologic research in the areas of HIV and syphilis control, as well as health disparities. My students will present their work at the Ohio Public Health Association’s annual meeting this May.

Finally, returning to a liberal arts institution has given me many opportunities to share some of my other interests, such as writing prose, poetry, and music, with interested faculty, staff, and students.

Dr. Jeff Vasiloff

Otterbein and EcoSummit

Many faculty from the Department of Biology and Earth Science participated in EcoSummit this past summer. EcoSummit 2012 brought the world’s most respected minds in ecological science to discuss restoring the planet’s ecosystems. Plenary sessions were given by Pulitzer Prize winners E.O. Wilson and Jared Diamond, Kyoto Prize winner Simon Levin, Stockholm Water Prize laureates Sven Jorgensen and William Mitsch, and many others in the first conference ever linking the Ecological Society of America (ESA), The International Association for Ecology (INTECOL), and the Society for Ecological Restoration International (SER). Included in the weeklong conference were fieldtrips. Two of these trips were led by Dr. Kevin Svitan and me. Mine started in the morning at the Mussel Research Facility at the Columbus Zoo and Aquarium where Dr. Tom Waters described the work his group is doing to reestablish mussels throughout the Ohio River drainage basin. We moved from there to the City of Marysville’s inflatable dam site, where alumnus Scott Ross described the environmental work he, other staff members of S&ME, and I have been doing regarding the removal of the two hard dams and the construction and use of this inflatable dam on Mill Creek. When the dam is un-inflated, which is most of the time, there are no blockages to flow in this Scioto River tributary.

Our final stop was to a site on Big Darby Creek where the group put on chest waders and went out to see if we could find some of these elusive animals. We had a full day examining restored populations of endangered mussels (with Tom), a restored river (with Scott), and the discovery of mussels buried in a stream bottom. Not even a few brief showers dampened our day.

Michael Hoggarth
Dr. Young Studies Budgies

Otterbein welcomes the new director of the Zoo and Conservation program, Dr. Anna Young. She has recently moved to Ohio from the southwest, and is learning how to shovel snow! Dr. Young has worked as both a zoo keeper and a zoo educator. She completed her Ph.D. at New Mexico State University in the area of Animal Behavior, with a focus on Animal Communication. She will be continuing her research on vocal learning in parrots at Otterbein, which means that an aviary and a flock of parrots will be an upcoming addition to the Science Center! Dr. Young's research focuses on vocal learning, behavior, and social stress in captive budgerigars, or “budgies,” a small colorful parrot native to Australia. When budgies are kept in captive groups, each flock develops its own call type, and when a bird is transferred into a new flock, it will learn their call. By manipulating social groups, Dr. Young can study the benefits of this form of vocal learning, a rare trait in the animal kingdom that is shared by only a handful of animals including humans.

Students Study Hot Topics in Cell Biology

In cell biology lab this year, I’ve started incorporating a variety of multi-dimensional labs that address hot topics and expose students to some of the most relevant cell and molecular techniques. Students begin by studying protein function and enzyme kinetics by testing an enzyme used in the development of biofuels. They are then exposed to proteomics by running SDS-PAGE gels of total protein and finishing with a western blot analysis targeting the fish muscle protein, myosin. We are currently conducting a three-week mini-project that engages students in RNA laboratory techniques, allowing students to extract and quantify RNA from a bacterial sample then compare gene expression between wild-type and mutant cells using semi-quantitative PCR. Each group will examine expression for a different target gene and the research findings will return to my research students who will conduct Real Time PCR at Ohio State University. The students in the cell biology lab are therefore working on a novel research project that directly relates to publishable research conducted in my research program. The findings in the cell biology class could confirm possible targets of bacterial signaling proteins. Other labs include using the newly upgraded fluorescence microscope with image capture and figure construction, and participation in metagenomically sequencing for 16S RNA of the microbes found in Alum Creek as related to a research collaboration between myself and Dr. Kevin Svitana.

Otterbein Research Featured at American Water Works Association Meeting

Otterbein student and faculty research was highlighted in Dr. Kevin Svitana’s presentation at the December 12, 2012 meeting of the Ohio American Water Works Association. Dr. Svitana was an invited speaker at the AWWA’s fall meeting; this meeting was intended for Ohio's licensed water treatment professionals to earn CEU’s as part of their annual registration requirements.

Dr. Svitana’s talk “Real Estate Development and the Effects of Deicing Compounds on the Water Quality of Alum Creek” is a culmination of both his research and the research of Otterbein students Rodney Boaster, ’11, Lauren Kopas, ’12, Mary Evert, 12 and Patrick Conley ’13. Westerville, which is the only Columbus suburb that provides its own source of drinking water to the community, started noticing seasonal water quality issues in the mid-2000s related to “a salty taste” of the drinking water during the winter months. Conversations with Westerville Water Department Director, Mr. Richard Lorenz led to developing a series of student research projects to identify potential sources and the magnitude of noted impact. Students Evert and Kopas while working on a Merck scholarship completed water quality analysis of Alum Creek during summer months specifically noting the difference of various chemical parameters prior to and following rain fall events. This effort provided baseline data for the Alum Creek watershed in the vicinity of Westerville water intake. Lauren Kopas then completed her senior research project, which looked specifically at deicing salt impacts to Alum Creek during the winter of 2011. Her research showed correlations between precipitation events, warming trends and increases in salt levels in the creek. The city water department personnel found these results helpful with their water management decisions and further discussions centered on using groundwater as an alternative to Alum Creek water when the salt content in the creek increases.

The city of Westerville is in the process of expanding its groundwater supply by adding wells in the vicinity of Alum Creek. To determine if there is potential risk to the ground water supplies from the deicing compounds runoff, Otterbein student Patrick Conley is currently researching the potential inflow of salt from the Creek to the aquifer. This study is a follow-up to the original work done in the Otterbein Lake area by Rodney Boester, whose research did show a correlation between the Creek and the aquifer.

These research projects have provided students with first-hand experience at looking at data from individual projects to build on a larger body of knowledge that focuses on complex problem-solving. Their work is helping Westerville manage its water resources to help reduce potential water quality impacts associated with highway deicing activities.
New Award for Premed Travel

Thanks to the endowment of a new award by Dr. Melinda Phinney (’85), one or more premed students will soon be aided to travel for the purpose of gaining clinical experience. Although students need to know as much as possible about clinical life in order to make an effective, informed application to medical school, it is becoming increasingly hard to find opportunities. Physicians cite issues of privacy, confidentiality, and trust (fiduciary obligation) between themselves and their patients as being of greater importance than the student’s need to learn. The ethics of a physician-patient encounter also involve autonomy, meaning the patient has the right to refuse the presence of a person who cannot contribute to management.

However, in areas or countries where health care is less readily available than in Ohio there is a different balance of needs. The need for volunteer help to provide any kind of health care to low-income populations is the first consideration there, as evidenced by the many organizations that have developed to co-ordinate opportunities to volunteer and learn. These opportunities are not inexpensive, as airfare, accommodation, food and insurance must be budgeted for. To overcome the barrier of cost, the specific purpose of the Melinda S. Phinney, MD ’85 Fund is to aid domestic or international travel for clinical premedical experiences by students pursuing a career in medicine.

Selection of the student/s will be through application to the Selection Committee; the Chief pre Health Professions advisor, (Mary Gahbauer MD), a representative of Biology (Lisa Marr MD), a representative of Chemistry (John Tansey PhD) and a representative of Institutional Advancement (Stella Law). Successful students will show a strong track record of academic achievement, initiative, leadership, and volunteerism, and will be able to show detailed, viable plans of both application to medical school and to an area of volunteer medical aid.

Dr. Melinda Phinney is the daughter of Dr. George Phinney, Emeritus Professor of the Department of Life and Earth Science, and is a nephrologist in Akron, Ohio.
Kristen Giesting Earns Trip to Green University

October was a busy month for environmental science student, Kristen Giesting. On top of classes and other obligations, she also participated in an international competition called Project Green Challenge. The online challenge involved 3-4 tasks everyday which encouraged students to learn more about environmental topics and take action to change behaviors and inform others. Each day was a different topic such as Food, Style, Zero Waste, Sharing, and Green Clean. Points were accrued daily and prizes were awarded for the best submissions. The top 14 students would be flown to San Francisco to attend Green University, a 3 day eco summit. At the end of October, participants were asked to submit a final exam and a video recap of their experience. Over 2,600 students participated; Kristen was in 25th place at the end of the month. Her submissions and a skype interview earned her a place at Green U where she met with over a dozen esteemed eco leaders such as Renee Sharp (senior scientist at the Environmental Working Group) and Pamm Larry (instigator of Prop 37- GMO labeling). Day two involved social change platform building with mentors and final presentations given by the finalists. All finalist presentations are available on youtube.com (Search Kristen Giesting or Teens Turning Green). Kristen is continuing to work with the nonprofit, Teens Turning Green, to develop future green programs and initiatives for students and campuses across the country.

Registration for Project Green Challenge 2013 is open, check out www.projectgreenchallenge.com!

MEDLIFE: Peru

We (Alana Cheplowitz, Curtis Baker and Brooke Weisenburger) recently had the opportunity to travel to Lima, Peru and work through MEDLIFE. The organization’s mission is to help families achieve greater freedom from the constraints of poverty, empowering them to live healthier lives. Students are paired with motivated individuals, including doctors and dentists, in poor communities working to improve their access to medicine, education, and aid community development. The culture is very different than the United States. Poverty is taken to a new extreme. The people being served do not have access to basic needs: sanitary running water, electricity, health care, etc. We travelled in mobile health clinics to the poorest areas of Lima. We worked alongside physicians, dentists, and pharmacists doing hands on shadowing. Many of the patients we saw had many health problems related to their living conditions, such as tuberculosis and typhoid. The patients were appreciative of our help, even though we were not the ones diagnosing or treating their health problems. Being a part of this experience has significantly impacted our lives. We have gained a new sense of appreciation of what we have as well as a new sense of motivation to pursue careers in the medical and dental fields to help underprivileged people, such as those we served in Peru. We are establishing a MEDLIFE chapter here at Otterbein, to allow other students to participate in clinics all around the world, and have the opportunity for this life-changing experience.
Jacob Bowman enjoys studies as a BMB major

My name is Jacob Bowman and I am a sophomore Biochemistry and Molecular Biology (BMB) major here at Otterbein. This program has gone above and beyond any expectations that I had going into college. My academic adviser, Dr. John Tansey, has been a wonderful resource in planning my courses and getting prepared for my goals beyond Otterbein, such as graduate school. My research advisor, Dr. Simon Lawrance, has also been heavily involved and helpful with my plans and undergraduate career. When it comes to research, the BMB program has made it both appealing and accessible. I am directly involved in the process and have even gotten the ability to present my research outside of Otterbein. The relatively small classes and strong professors have afforded me deeper insight into the field of BMB. The professors are always willing to help everyone. The style of teaching fuels more questioning and logical thinking rather than rogue memorization and this approach has allowed me to become more independent in my learning. Lab classes that are associated with my courses have also been strong in my learning of modern techniques. We have the resources and modern equipment that allows for practical and real-life experience. The overall strength of this program lies in the outgoing faculty that make me feel confident and a part of the program. I’ll always be glad that I chose this university for these very reasons.

Students raise gray treefrogs for research

The past year marked a transition in Dr. Bouchard’s lab from a focus on tropical Red-eyed Treefrogs to Ohio Treefrogs. This sent Lindsay Wargelin, Kaitlin Massey, and Morgan Bowling wading around in a lot of wetlands looking and listening for mating frogs. Turns out that Ohio frog love isn’t quite as easy to spot as we expected, particularly because the mild winter wreaked havoc with the timing of the breeding seasons. Many frogs were done just as we were getting started. Still, their perseverance paid off, and we launched a highly successful study examining density dependent effects in Gray Treefrogs. The students investigated the effects of tadpole density on frog anatomy, body composition, jumping ability, growth and feeding behavior. If it sounds like a lot, it was! Luckily, we had help from Rachel Young and Kadeen Jennings who came on the project as research assistants.

All this work wouldn’t have been possible without an update to our lab itself. Thanks to cooperation from the Equine Science Department, we were able to set up an array of outdoor tanks at the Austin E. Knowlton Center for Equine Science. This allowed us to rear our tadpoles in large mesocosms under more natural conditions than in the lab. We also converted the animal room to one that was better suited for frogs. Because frogs are amphibians that require moisture, students were required to gently mist the tanks twice a day with spray bottles of water. They maintained this daily routine for 12 weeks! Luckily, we are in the process of installing an automatic misting system, so next year’s cohort of researchers will spend less time misting and more time analyzing data.

Wargelin, Young present at SICB

In January, we (Rachel Young and Lindsay Wargelin) had the opportunity to travel to San Francisco, California with Dr. Bouchard to present our research at the annual meeting for the Society of Integrative and Comparative Biology. At the meeting, we presented a poster about our feeding and growth studies done this past summer with the gray tree frog. Attending SICB was extremely beneficial because it gave us the opportunity to meet other scientists in our field and gain feedback and advice for our study. This also allowed us to learn about the leading current research being done in our field. Thank you to the department of biology and the SRF for making this great experience possible!
Department Receives Mineral Collection

This fall the Department added to its rock collection with a large donation of minerals from Jan and Carol Van Donk. The 70+ boxes of rocks, minerals, and fossils contain some great teaching specimens ranging from columnar andesite to manganese nodules, gold ore and fossilized insect wings. Freshman Conner Musial is currently organizing the material and we plan on putting some of the large crystals on display in the Science Building Atrium and a special treat for next year’s physical geology course will be the many new fluorescent minerals. . . Thanks to the Van Donks for the gift!

Preserving Penguin Polymorphism

Seniors Courtney Kast and Kelly Huth are working with Dr. Lawrance on a new research project aimed at conserving biodiversity in the ex situ African Penguin Spheniscus demersus population housed at the Mystic Aquarium in Mystic, Connecticut. The penguins at Mystic are part of the American Zoo Associations Species Survival Plan. African penguins are monogamous and produce only one or two eggs per year. The goal of the SSP is to optimize their management and reproductive success. To this end Courtney and Kelly’s research involves examination of genetic variation or polymorphism found in genes that are key to successful mating and essential for the maintenance of healthy immune systems. Courtney and Kelly will be traveling with Dr. Lawrance to the Mystic Aquarium during Spring break to report their findings.

Mussel Study of Big Walnut Creek

Michael Grumney is a senior at Otterbein. He and I spent most of the summer assessing the mussel community of lower Big Walnut Creek thanks to a grant from the Friends of Big Walnut Creek. We had two objectives: to determine if the extant mussel community is similar to the historic community (Michael’s project for his senior project) and to assess the water quality of the reach using a Mussel-IBI that I created a few years back. Here are a few things we discovered: 1) that the reach from Hoover Dam through Gahanna has very similar historic and extant communities, 2) that the reach through Reynoldsburg, Columbus, and Obetz has a much more depauperate mussel community than it once did, and 3) that the mussel community in the lower portion of the creek once had a diverse community, that community was mostly lost, and now that community is being replaced by species gaining access from a much improved Scioto River. Michael is presenting our finding at the upcoming Ohio Academy of Science Meeting and he and I are working with the Friends group and Franklin County Soil and Water Conservation to identify specific threats to the stream. One last discovery – A local news reporter found out about our study and wrote a small article for This Week Community News. The article is a nice summary of our work and a promotion for Michael. I think his grandmother was the first to notice that he was now a graduate student at Otterbein rather than an undergraduate. I do believe it is true to say that many of our students have a research experience here that is not too different from what they will get later in their graduate program. It is one of the hallmarks of our degree.

Michael Hoggarth
**Department to Graduate Five Science Teachers**

The Department will graduate five Life Science majors with completion of the Teacher Licensure Program. We asked what their plans are after Otterbein.

“Post-graduation the job hunt is on! I am currently looking at suburban districts for an opening next year. I plan on seeking a full time teaching position in biological sciences including biology, ecology, environmental science and/or any biology elective grades 7-12. I plan on starting a master's program the summer after my first year of teaching.” -- Kaitlin Massey

“I hope to graduate and join the work force teaching at a local high school and coach football as well.” -- Kiefer Hinkle

“After graduation I plan to stay in the central Ohio area and would like to teach middle school or high school science. I love the Columbus area and would love to find a job and settle down around this area.” -- Jordan Rausch

“I am student teaching at Pickerington North High School right now. I plan on living around here and applying to local schools to pursue my passion of science and teaching in this lifelong career.” -- Anne Boucher (Kemmerer)

“I hope to be a teacher and coach that kids will remember for the rest of their lives. I just simply want to make a difference and inspire our future generations to tap into their endless potential, both in academics and athletics, two very large parts of my life.” -- Patrick Daugherty

---

**Alumna Earns Ph.D, Continues Research**

After graduating from Otterbein College in 2008, I began my journey as a graduate student at Wake Forest University in the Department of Biochemistry and Molecular Biology. At Wake Forest, I worked in the laboratory of Dr. Peter Antinozzi on a multi-faceted project analyzing the involvement of Wnt/β-catenin signaling in various diseases. My research focused on understanding the complexity of Wnt/β-catenin signaling in diabetes and cancer, specifically hepatocellular carcinoma. Type 2 diabetes in addition to obesity is currently of epidemic proportions in the United States and worldwide. With its proposed role in pancreatic development and insulin secretion, this pathway may provide future therapeutics for diabetics and/or preventing many of the life-threatening complications. The other aspect of my research focused on Wnt/β-catenin signaling in hepatocellular carcinoma (HCC). This cancer is poorly understood and displays a high resistance to current treatment methods leaving patients with a grim prognosis. It is hoped that researching the aberrant regulation of Wnt signaling will enhance our understanding of HCC and improve survival odds for these patients.

In December of 2012, I successfully defended my research and obtained my doctoral degree. I have returned to the Columbus area for a postdoctoral researcher position in the laboratory of Dr. Noah Weisleder in The Davis Heart and Lung Research Institute at The Ohio State University. My research focuses on the membrane-repair family of TRIM proteins and their involvement in diseases such as muscular dystrophy, cardiomyopathy, and possibly metabolic disorders. Examining these proteins will increase the ability to properly diagnose and treat these diseases. I attribute my success in graduate school to the dedication and efforts of all the professors at Otterbein. It is enthusiastic and dedicated professors like those found at Otterbein that helped me and will help many others find and pursue their future careers. I can’t even count the number of faculty that contributed to my success. The experience, hands-on-training, and knowledge I received at Otterbein set me far ahead of many in graduate school both academically and scientifically, and I believe this fueled my success. I hope one day to return to Otterbein and offer students the same career developing experiences and enthusiastic learning environment I received during my time there.

*Heather Manring, Ph.D heather.manring@osumc.edu*