



FROM THE CHAIR

Greetings from Gettysburg as we complete the 2017-18 academic year. While Matt Kittelberger is away for the 2017-18 academic year on a sabbatical leave, with an extension for the fall semester of 2018 (see below), I am serving as the Interim Chair of Biology through the Fall of 2018, and Matt will resume his position as Chair of Biology upon his return Spring 2019. There are several news-worthy updates to report in this Biology Newsletter.

Matt received a prestigious Fulbright Scholar award to teach science and develop science curricula for nine months at Chancellor College of the University of Malawi in Zomba. Starting January 2018, he is teaching biochemistry and animal physiology, and he also plans to study the evolution of social behavior using cichlid fish as a model system in the lakes of the Great Rift Valley.

The Biology Department welcomed Michael Caldwell as a Visiting Assistant Professor for the 2017-18 academic year. Over the past several years, he has taught a number of courses for Biology, including Animal Behavior (Biology 225), Vertebrate Zoology (Biology 224), and Form and Function in Living Organisms (Biology 112). We are pleased to announce that he has accepted a tenure-track appointment in the Biology Department beginning the 2018-19 academic year. The Biology Department is also pleased to welcome new Adjunct Assistant Professors David Wills, Rebecca Maldonado, and Dean Campbell to help teach Biology courses during the 2017-18 academic year.

Congratulations to Ryan Kerney for passing his tenure-review! He will be a tenured associate professor of Biology starting Fall Semester of 2018. During the 2016-17 academic year, Ryan received a Fulbright Advanced Research Fellowship to spend his pre-tenure leave at the University of Peradeniya in Kandy, Sri Lanka to study "Development and Disease in Sri Lankan Frogs" during Spring 2017; more about that below. He is the Co-Principal Investigator of a recent \$1 million grant from the Gordon and Betty Moore Foundation. Part of the grant will support three Gettysburg students for three years of research. They will study "Solar Salamanders: Investigating the only known vertebrate-alga intracellular partnership."

Jan Mikesell, Professor of Biology, is retiring after 45 years of service at the end of this academic year. His longtime botany courses such as Structural Plant Development (Biology 202) and An Evolutionary Survey of the Plant Kingdom (Biology 217) have served as important offerings in the "organismal" category for the Biology Major. He is enjoying his well-deserved year-long sabbatical this academic year. Congratulations, Jan, on your productive career, and we appreciate your service to the Biology Department and Gettysburg College. We wish you nothing but the best in your retirement.

Also retiring are three of our longtime adjunct instructors. Jo Ann Zeman retired in 2016 after 33 years of service. Her recent service includes lab instruction in Bio 111 and 112 as well as maintenance of the greenhouse. She and her family recently moved to Colorado and have settled in their new house. Barb Hulsether, after 29 years of service as lab instructor in Bio 110 and 102, retired at the end of 2016. She is enjoying her retirement by doing considerable traveling with her husband. Finally, Pam Castle is leaving the College at the end of the Fall Semester of 2017 after 19 years of service. She has served as laboratory coordinator for Bio 112 in addition to instructing labs in Bio 111, 112, and 211. She and her husband plan to move to Oregon in the near future for their retirement. Congratulations to all and the Biology Department expresses a heartfelt thanks for your many contributions.

Zakiya Whatley completed the second year of her tenure-track position as Assistant Professor of Biology. She taught Biology 333 during Spring 2018, a new course titled "Molecular Basis of Biofilms." She co-authored an article in the American Scientist (January-February 2017) with Ryan Kerney and Sarah Rivera (Biology '18) titled "The Prospects of Artificial Endosymbioses." At the end of Spring 2018, Zakiya accepted the position of Program Manager at CMNS-College of Computer, Math & Natural Sciences, University of Maryland to pursue her research on science pedagogy. We wish her continued success in her new endeavor.

Amanda Whitcomb, our new Departmental Administrative Assistant, nears the completion of her second official year in her position. She has adapted well to the rigors and challenges of a large department at the College and has transitioned into the ever-important role of "information central" for the Biology Department. Please contact her (awhitcom@gettysburg.edu) with any news that you would like to share with us and the extended Biology community.

The ten students who completed Alex Trillo's Biology 229 (Tropical Terrestrial Biology) during Spring 2017 were fortunate to conduct field research at Manu National Park in Perú after the end of the semester. Students had the opportunity to experience firsthand the connection between Alex's research interests and her teaching. Alex published an article in PLoS One titled "Mating patterns and post-mating isolation in three cryptic species of the *Engystomops petersi* species complex" in 2017.

External grants (USDA -National Institute of Food and Agriculture, State Horticultural Association of Pennsylvania) to Nikki Shariat will continue to support students in contributing to research applications such as assays to monitor *Salmonella* population diversity in the poultry industry and treatment of apple trees with phages against bacteria that cause fire blight. See following section.

The summer of 2017 offered X-SIG summer research fellowships to 15 Biology majors and 13 Biochemistry and Molecular Biology (BMB) majors to conduct collaborative research with Gettysburg Faculty (see update from Veronique Delesalle). We appreciate the generous donations from Harrison Dickson ('48) and Eric Kolbe ('65) along with support from the Provost's Office to make these research opportunities possible for Gettysburg College science students.

Through the support of the National Science Foundation STEM (Science, Technology, Engineering and Math) grant, 11 students in 2016 and 11 students in 2017 started their first year at the College. Of these 22 students, 11 have declared Biology or BMB as their major. The Co-Principal Investigators (Istvan Urcuyo, Biology; Darren Glass, Mathematics; Jackie Milingo, Physics) and science department liaisons and Admissions have worked diligently to select the new cohort of students who aspire to pursue a career in STEM.

As we strive to improve and enhance Biology education at the College, we are grateful for the generous support from our alumni and friends. We appreciate your support, without which many initiative and student opportunities would not be possible. We all look forward to news from you regarding your own lives and successes since your graduation.

All Our Best,
Kazuo Hiraizumi, Interim Chair of Biology

FROM DELESALLE -X-SIG SUMMER RESEARCH

The Biology Department was heavily involved in our science summer research program with 26 students conducting research with 8 Biology faculty. We are grateful that a gift from the estate of Harrison Dickson '48, in conjunction with other funds such as the **Randall S. Alberte '69 Research Fund** has allowed us to continue most (but not all) of our HHMI-funded initiatives. If you are interested in helping us continue all of these initiatives, do let us know. In particular, we have very limited funds to take our students to present at national meetings!

All of our summer students contributed to the X-SIG Summer Research Blog.

These are great entries with lively writing and super photos. Check it out at: <https://xsigsummer.wordpress.com/>

You can stay updated about activities associated with our X-SIG program at our web site: <http://www.gettysburg.edu/about/offices/provost/hhmi/>

DELESALLE LAB 2017

The Delesalle lab was pretty busy, with 14 students involved in research in my lab either during the academic year or the summer. In June, three of these students (Alexandra Agesen'18; Jenna DeCurzio'18; Madison Strine'18) each presented a poster at the meetings of the Society for the Study of Evolution in Portland, OR, on various aspects of the ecology and evolution of bacteriophages. Madison Strine'18 had a fantastic year being awarded fellowships from the Goldwater Foundation and the American Society of Microbiology. All three students are looking into graduate programs for next year. Natalie Tanke'17 is headed for a Ph.D. program at the University of North Carolina at Chapel Hill. We are looking forward to another busy year.



POWELL LAB 2017

Zoe Yeoh '18 won first place in the Plant Biology division at the NSF Emerging Researchers National Conference for her poster presentation on the research she performed during Summer 2016 at an NSF Research Experience for Undergraduates at the University of California Riverside. Leah Gulyas '19 received the Goldwater Fellowship, one of the most prestigious national awards for undergraduate science students. Jenny Giannini '18 received a Fulbright Fellowship, which she will use to perform biomedical research in Berlin, Germany for a year.

Leah Gulyas '19 and Zoe Yeoh '18 presented their research in the Powell lab at the International *C. elegans* Meeting in Los Angeles, CA in June 2017. Both received competitive Student Travel Fellowships from the Genetics Society of America, as well as funding from Gettysburg College, to attend this conference. Also at the meeting were Powell lab alumni Jon Hibshman '12, who just defended his PhD dissertation at Duke University, and Joe Robinson, '15, who is a PhD student at the University of California Berkeley.



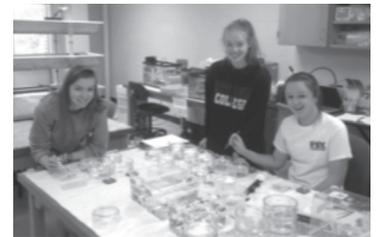
Joe Robinson '15, who is in a PhD program at the University of California Berkeley, Jennifer Powell, Zoe Yeoh '18, and Leah Gulyas '19



Zoe Yeoh and her painting of the Powell lab. McCreey 208" and is oil on wooden panel. Zoe won second place at the Juried Student Exhibition 2017 at Schmucker Art Gallery.

FONG LAB 2017

The summer of 2017 was a busy time for three research students: Olivia Lambert'19, Margot Hoagland'19, and Emily Kurtz'20 all of whom worked on the toxicology of environmental chemicals on the life cycle of frogs and toads, and the behavior of aquatic snails. The snail work was a continuation of research done during summers 2015-16, and which was published in 2017 in the journal *Environmental Science and Pollution Research* with students Taylor Bury (Biology'16), Lizzie Donovan (ES-Biology'16), Olivia Lambert, Julia Palmucci (Biology'18), and Stephanie Adamczak (ES-Biology'15) as co-authors. Professor Fong also published a paper in the journal *Environmental Toxicology and Chemistry* on uptake of gold nanoparticles by wood frogs and bullfrogs, co-authored by Chemistry Professor Lucas Thompson, Physics Professor Kurt Andresen, former visiting Professor Gerardo Carfagno, and students Andrea Sitton (BMB'14), Laura Lee (Chemistry'15), Taylor Bury, and Kevin Lerner (BMB'17).



Fong lab summer'17 students Margot Hoagland (left), Olivia Lambert (center), and Emily Kurtz (right), working on snail behavior.

KERNEY LAB 2017

Assistant Professor Ryan Kerney recently received funding from the Gordon and Betty Moore Foundation to study the endosymbiotic interactions between a green algae (*Oophila amblyostomatis*) and the embryos of its spotted salamander host (*Ambystoma maculatum*). The research is in collaboration with Solange Duhamel (Columbia University), John Burns (American Museum of Natural History), and David Matus (Stony Brook University). Together they will be employing microautoradiography and confocal RAMAN spectroscopy to examine metabolite transfer and tiling light-sheet single-plane illumination microscopy (TLS-SPIM) to investigate algal movement within the embryo. The research team will be recruiting post docs to work on algal physiology (Columbia) and embryo imaging (Stony Brook) over the next few months. The grant will also support three years of summer research for three students, student and faculty conference travel, as well as multiple trips to New York to work with the post docs and collaborators.

Assistant professor Ryan Kerney completed a six month Fulbright in Sri Lanka in July 2017. While there he worked with collaborators on "The Disease and Development of Sri Lankan Frogs." His work as an "Advanced Fulbright Researcher" brought him into the field and lab with Sri Lankan students to work on various aspects of local amphibian biology. Kerney was also joined by his wife and four children. Together they learned about the natural history and culture of this South Asian island nation. They returned with a fifth family member, a village dog named Robin, who they adopted as an abandoned puppy.



Finch Kerney with Robin, the puppy

CRISPR (SHARIAT) AND BIOFILM (WHATLEY) LABS 2017



Hallie Rauch '20, Elli Vickers '20, Nikki Shariat, Zakiya Whatley, Sarah DiDomenico '19, Alexi Doak '18, Erin Schroeder '20 tour of the National Institute of Health and National Library of Medicine

The CRISPR & Biofilm Labs completed their 2nd annual retreat, which included a tour of the National Institute of Health and National Library of Medicine, an internship information session and workshop with the National Human Genome Research Institute, and professional development workshops with Professors Shariat and Whatley. During the professional development workshop, students identified several goals (such as learning how to write effective graduate school applications) and developed these into S.M.A.R.T. goals that they could tackle over the semester.

SHARIAT LAB 2017

Six students performed summer research in the Shariat Lab (aka The CRISPR Crew): juniors, Naufa Amirani (Bio/CS) and Jacob Marogi (BMB), and sophomores Nolan Graham, Hallie Rauch, Erin Schroeder, and Claire Woodward (all BMB). They were funded by X-SIG summer research funds, and a United States Department of Agriculture grant.

We started a new project in our lab this year to examine the diversity of *Salmonella* in creeks surrounding Gettysburg College. Nolan and Claire worked on this project over the summer. Pro-tip: don't drink creek water, there's lots of *Salmonella*! While were out collecting river samples and measuring water quality,



Nolan Graham and Claire Woodward collect water samples from Rock Creek as it runs through the battlefield.



Collecting trash from the banks of Marsh Creek.

Claire noticed a lot of trash on the banks. This inspired our second annual CRISPR Crew Cares Day where we collected trash from the banks of Marsh Creek near the Sachs covered bridge.

This summer the CRISPR Crew hosted scientists from the US Food and Drug Administration's Division of Microbiology – Claire, Erin, Hallie and Jake each gave a presentation on their individual research projects and these have led to some exciting scientific collaborations.

We had many opportunities to share our science this summer: Dorothy Vosik (Bio '19) and Dr. Shariat both presented at the American Society for Microbiology meeting in New Orleans. Lots of great science, beignets and po'boys! Dr. Shariat also presented at the CRISPR 2017 Meeting in Montana where she got to check out some cool microbial mats at Yellowstone NP.

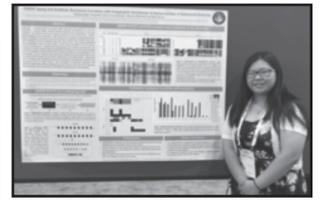
Dorothy was also the first author on a manuscript that was accepted in the journal Foodborne Pathogens and Disease.

In the second year of our "Bridging the Fruitbelt Furrow Program", we hosted Elizabeth Garcia, a local high school senior. She and Hallie worked together to look at CRISPR patterns in *Salmonella* from chicken and retail meat.

Nolan was deployed at the end of the summer as a member of the Army Reserve. We had a send off for him in July – we're wishing Nolan a safe year and look forward to welcoming him back next year!



FDA scientists join the Shariat Lab on Little Round Top for a battlefield tour.



Dorothy presented a poster in the Foodborne Pathogens session at ASM-Microbe 2017.



Elizabeth learning how to set up a PCR to analyze Salmonella CRISPRs



Members of the Biology Department gather to wish Nolan a safe year.

TROPICAL BIOLOGY COURSE

This past May, Dr. Trillo and her Tropical Terrestrial Biology students embarked on a three-week field expedition to the Amazon. This trip served as the lab portion of the course, where students would get to experience first-hand all they had learned about tropical ecology and conservation during the Spring semester. They started in the Andes and dropped down to the Amazons, surveying several life zones including paramo, cloud forest, pre-montane rainforest, and lowland wet forest. Students not only learned concepts of tropical ecology, such as gradients of diversity, mutualisms, or plant adaptations to herbivory, all in real time, but they also were confronted with importance of conserving biological diversity, witnessing the effects of diversity loss with their own eyes. This was also an important experience at the personal level for all students. As one student puts it: "The lessons learned in Perú will stay with us for a lifetime. It taught us not only class material, but also enhanced our appreciation for biology and the natural world"



Brian Ruether '19 standing on a Strangler Fig tree



Julia Palmucci '17 and Sarah Finley '18 birdwatching with bird expert Fortuna Rayau



Natalie Tanke '17 crossing the canopy bridge in Wayquecha biological Station



Tropical Terrestrial Biology Class (from left to right) Back row: Dr. Trillo, Sarah Congdon '18, Julia Palmucci '18, Erin Thorin '17, Natalie Tanke '17, Kyle Kameika '17. Front row: Brian Ruether '19, Lindsey Kraus '18, Sarah Smith '18, Sarah Finley '18, Sam Donnelly '17

HONORS DAY AND GRADUATES 2017

Dr. Katherine Burns, class of 2000, Assistant Professor in the Department of Environmental Health, University of Cincinnati College of Medicine was the featured Robert D. Barnes lecturer for Honor's Day, 2017. Her presentation was titled "From Mycology to Medicine: Stepping Stones to Study Endometriosis." Biology graduated 47 students in 2017 and BMB had 18 graduates. Thirteen Biology majors and six BMB majors received honors in April 2017.



BIOLOGY DEPARTMENT

Left to right – front row: Istvan Urcuyo, Alex Trillo, Steve James. Back row: Zakiya Whatley, Veronique Delesalle, Nikki Shariat, Kay Etheridge, Kazuo Hiraizumi, Jan Mikesell, Amanda Whitcomb, Jen Powell, Matt Kittelberger, Peter Fong

Supporting the Biology Department

Any gifts that you make to the Gettysburg Fund indirectly support the work that we do in the Biology Department. If, in addition, you want to support the Biology Department directly, you can now do that in one of two ways:

- ❖ Donations to the "**Alberte Fund**" will allow us to grow that resource and to support more summer student researchers.
- ❖ Donations to the "**Biology Special Gifts**" fund will be used to support new teaching initiatives and to buy small pieces of equipment for particular research projects.

Until the next Newsletter

Please visit the departmental website at www.gettysburg.edu/academics/biology/ for more stories about student and faculty research, and current information about the department. And remember- we always love to hear from our alums!