Biology Department Newsletter Summer 2015

From the Chairs

Greetings from Gettysburg! We've had another busy and dynamic year in the Biology Department. First and foremost, we are excited to welcome two new tenure-track faculty members, Dr. Nikki Shariat and Dr. Zakiya Whatley.

Dr. Shariat uses molecular genetic techniques to study small RNA molecules – a hot field right now - in bacteria, particularly in *Salmonella*. She'll be teaching our first-year research intensive Phage Biology course, as well as helping teach Genetics. Dr. Veronique Delesalle and Dr. Greg Krukonis brought the Phage course to Gettysburg in 2011, and we've been thrilled at the success of that course at getting students engaged with legitimate biological research in their very first semester. Nikki's hire represents the next step in making Phage Biology a more permanent part of our first-year curriculum. She brings a ton of energy and ideas and has already hit the ground running.

Dr. Whatley is a molecular geneticist who studies DNA damage and repair in bacteria, particularly in *E. coli*. She served last year as a Gondwe Scholar at Gettysburg and will continue in that role this coming year before stepping into a tenure-track position in the fall of 2016. Zakiya has many exciting and creative ideas about teaching science, and will be teaching Microbiology this year and Cell Biology in future years, as well as helping with our Introductory Biology sequence. See more about both Nikki and Zakiya below.

At the other end of the career spectrum, Dr. Ralph Sorensen has announced his plans to retire from Gettysburg at the end of the 2015-16 academic year, after 39 years at Gettysburg (he started his appointment in 1977). Stay tuned for opportunities to thank Ralph for his many years of exemplary service to Gettysburg's students and community.

The third year of our Howard Hughes Medical Institute Grant continued to provide opportunities for our students to engage in active, interdisciplinary experiences in their courses and in research with our faculty. The HHMI grant has allowed us to offer explicitly interdisciplinary courses, such as a Biophysics course this past year, and a course on drug development, merging chemistry and cell biology perspectives, this coming year. We have also used the grant to expand our use of case study methods in our introductory biology courses, and to train our students to mentor and teach others. See more below on HHMI-funded initiatives, especially in relation to student-faculty research. The College has recently announced several donations, including a $2 million gift from Eric Kolbe '65 and a $5 million bequest from the estate of Dr. Harrison Dickson '48. These generous donations in conjunction with a previous gift

from the estate of Randy Alberte '69, will allow us to continue to offer a diverse array of research experiences to students, beyond the end of the HHMI grant next year.

Finally, we would like to offer a sincere thank you to Dr. Veronique Delesalle, who has completed her role as Chair of the Biology Department after close to eight years of clear visioned leadership. See more below about Veronique's accomplishments as Chair. Dr. Kazuo Hiraizumi served as Interim Chair this past spring (and will continue to serve as Director of the Biochemistry and Molecular Biology Program), and Dr. Matt Kittelberger took over as Chair in July. As always, we encourage you to stay in touch – we're always excited to hear how your lives and careers beyond Gettysburg are unfolding.

All Our Best,

Kazuo Hiraizumi, Interim Chair of Biology
Matt Kittelberger, Incoming Chair of Biology

New scholarship program to enhance diversity in the Sciences

Dr. István Urcuyo (Biology) is the program director for a new NSF-funded scholarship program at Gettysburg College. Dr. Urcuyo together with Dr. Darren Glass (Math) and Dr. Jacquelynne Milingo (Physics) was largely responsible for writing the grant, which includes as one of its main objectives the recruitment and retention of underrepresented minorities and first generation students in Science, Technology, Engineering and Math (STEM) majors at Gettysburg College. Through this program, Gettysburg College will provide scholarships to 26 students, divided in three cohorts over the next five years, who plan to earn bachelor's degrees in the following STEM disciplines: Biology, Biochemistry & Molecular Biology, Chemistry, Computer Science, Math, and Physics. In selecting members of each cohort, the program will take heightened interest in academically-promising and financially disadvantaged underrepresented minority and first-generation students. STEM Scholars will receive enhanced mentoring opportunities during their crucial first two years at college; elements include a mentor in their field, a STEM-focused First-year seminar, field trips, preference for residence in Science House, and internship opportunities with institutional industry partners. For additional information see:
http://www.gettysburg.edu/s-stem/

Faculty/Student Research
In its third year, the HHMI-funded Cross-disciplinary Science Institute at Gettysburg (the X-SIG) continues to oversee our science summer research program, funding student participation in summer research as well as their involvement in early research and attendance at conferences, and facilitating increased interdisciplinary connections among the science departments. This summer, the X-SIG is providing partial or full funding for 54 students (compared to 43 last year) doing research with 26 (ten in Biology) faculty members.

Of the 19 students working with Biology faculty, four were supported by the **Randall S. Alberte '69 Research Fund**: in Dr. Hiraizumi's lab, **William Ueckermann '17** studied variation in expression of the Dip-B gene in *Drosophila melanogaster*; **Huanjia Zhang '17**, with Dr. Kerney, examined symbiosis between salamanders and green algae; **Alexandra Siegel '16** mapped brain circuits involved in vocalization in midshipman fish, working at Wood Hole with Dr. Kittelberger; **Albert Vill '16** worked with Dr. Krukonis and Dr. Delesalle to describe the community diversity of *Bacillus* phages from the Southwest deserts. We think Randy would have been pleased by this variety of research topics.

Kelly DiGeronimo '17 and Amanda Finck '17 worked on antibiotic resistance and biofilm development over the summer with **Dr. Zakiya Whatley.** Kelly followed up with work on the epsilon subunit of DNA polymerase III in *Escherichia coli*. Amanda focused on resistosome mapping by isolating and characterizing microbes from surfaces on campus. They will continue work on these projects during the upcoming academic year.


Dr. Whatley with Amanda Finck

Dr. Alex Trillo and biology major **Samantha Siomko '17** spent the summer at the Smithsonian Tropical Research Institute in Panama studying the frog-eating bat, *Trachops cirrhosus* and its predatory behavior when hunting in mixed species frog choruses. When frogs congregate to breed, the number of individuals per species may vary each night and the predation pressure on individuals may be affected by the presence and abundance of other species close by. The "oddity effect" hypothesis states that odd individuals within an aggregation are more conspicuous to predators and all else being equal, will suffer greater predation than more common species. Dr. Trillo and Samantha tested this hypothesis using field playback experiments and video analyses of bat behavior during visits to speakers that had a rare or common call. Understanding how rare species fare in mixed-species chorus is important due to the massive decline in amphibian populations; rare species might be even more vulnerable due to the oddity effect.


Dr. Trillo and Samantha Siomko set up for a night's work in Panama.

Dr. Trillo also worked with biology major **Kalli Qutub '17** this summer measuring the effect of nutrition on the developmental interaction of sexually selected traits in the neotropical beetle *Acromis sparsa.* Kalli looked at the effects of nutrient availability on the size of male weapons and genitalia as well as on the relationship between these two sexual traits.

During spring break **Dr. Ryan Kerney** took **Jasper Leavitt '15 and Huanjia Zhang '17** along with researchers from Humboldt State University and the American Museum of Natural History to the Pacific Northwest. They drove 1000 miles in a rented RV through Oregon and Washington, stopping to collect embryos of the common Northwestern salamander (*Ambystoma gracile*). The microbial symbionts of these embryos were compared to those found with our local species, the spotted salamander (*Ambystoma maculatum*). Jasper completed a BIO 460 project on the culturing of these embryos and their symbionts. This summer Huanjia and Elizabeth Hill (2017) further analyzed the material and the products of Jasper's research project.


Huanjia Zhang and Dr. Ryan Kearney with friend.

All of our summer students contributed to the X-SIG Summer Research Blog. There are some great entries with lively writing and super photos. Check it out at: https://xsigsummer.wordpress.com/
You also can stay updated about activities associated with our HHMI grant at our web site: http://www.gettysburg.edu/about/offices/provost/hhmi/

A recent publication in the journal, Marine Environmental Research was co-authored by **Dr. Peter Fong** and students **Taylor Bury ('16)**, **Abby Dworkin-Brodsky ('15)**, **Rose Kell ('14), and Christina Jasion ('13)**. The research "The antidepressants venlafaxine ("Effexor") and fluoxetine ("Prozac") produce different effects on locomotion in two species of marine snail, the oyster drill (*Urosalpinx cinerea*) and the starsnail (*Lithopoma americanum*)" was funded in part by HHMI and the Randall S. Alberte'69 Research Fund. For more faculty and student research, see http://cupola.gettysburg.edu/biology/

FACULTY NEWS

Introducing Dr. Nikki Shariat – I grew up in England and moved to the US in 2002 to do my Ph.D. at Vanderbilt, where I studied small RNA therapeutics. I next moved to the West Coast to do a postdoc at the University of California, San Francisco. While there, I heard about small RNA-mediated bacterial immune systems called CRISPRs and decided to change my focus in order to study the function and evolution of these genetic systems. That led me to Penn State in 2011 for a second postdoc where I investigated CRISPRs in *Salmonella*,

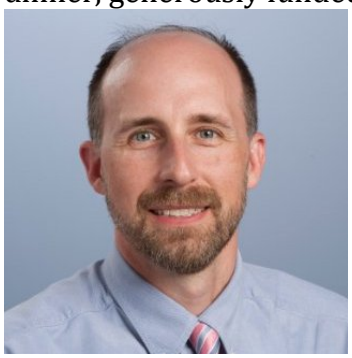
I'm excited to be teaching Phage Hunters (Bio 113/114) and will incorporate phage therapy approaches into the course. Students will isolate and characterize phage that infect and kill the pathogenic plant bacteria, *Erwinia amylovor*a. This bacteria causes Fire Blight disease in apple trees, an enormous problem for Adams County fruit growers, because it can decimate entire orchards of young apple trees. While 'hunting' phage, students have an opportunity to also test their own phage on apples and apple seedlings to see if they can limit Fire Blight. I hope this will be a great opportunity for student-led research to overlap with helping our local community. (And, did you know that phage are often described as Biology's "Magic Bullets?" So, **Go Bullets!**)

In my spare time (?!?) you can find me biking around the country roads outside town or volunteering; I am a disaster action team volunteer for the American Red Cross and also serve as their Adams County Community Volunteer Leader.

Thank you - After six years as a Visiting Assistant Professor, **Dr. Greg Krukonis** has accepted a position as Visiting Assistant Professor at Bucknell University. We thank Greg for his many contributions, particularly for the enthusiastic energy he brought to the development of the Phage Biology course. We wish him the best of luck.

The Class of 2015 and beyond

Four Biology majors and five BMB majors received honors in April, and we welcomed back **Dr. Robert Pomponio '88**. scientific advisor for Sanofi Corporation specializing in translational biomarker. He spoke on the transformation in science and medicine resulting from the Precision Medicine movement at the seminar preceding the honors dinner, generously funded by the Barnes fund and the Vitarello family (P '13).



Biology and BMB were well represented at graduation this past spring with **Aden Lessiak** as Valedictorian and **Warren (Alex) Campbell** as Salutatorian. In addition, **Janine Barr '15** (Biology-ES double major) was awarded the Stock Writing Prize in the natural sciences.

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!