LOYOLA UNIVERSITY CHICAGO

Preparing people to lead extraordinary lives

Department of Biology Updates

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A Message from the Chair

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Dear Alumni and Friends of the Biology Department,

It has been another busy and productive Fall Semester for the Biology Department. We had over 1150 students registered for our freshman biology lecture and lab courses. Forty-five percent of entering Loyola freshmen took our introductory courses, including students from the Institute of Environmental Sustainability and the Engineering Science Program. We hired two new lecturers, Dr. Andrea Gschwend and Dr. Helena Palka-Hamblin, to help us in teaching the increased number of students.

The new Interdisciplinary Neuroscience Program, a collaboration between the Biology and Psychology Departments, is off to a rousing start. The Program already has 350 majors with its first freshmen admitted this year. We are presently searching for a new Neuroscientist to help meet the needs of these new students. The Program is co-directed by Dr. William Rochlin from Biology and Dr. Toby Dye from Psychology. We are continuing our summer research experience with the Oncology program at SSOM. Another class will be recruited over the next months for Summer 2018.

In December we lost a long-term faculty member, Dr. Robert A. Morgan. He taught courses in Anatomy & Physiology and in his special field of Ornithology throughout his career at Loyola. He maintained his love and concern for his students throughout his teaching career. His faculty colleagues and students will greatly miss him.

The department has recently acquired a new micro-computerized axial tomography system (microCT) that allows 3D X-ray imaging of biological specimens at very high resolutions. We plan to use it for anatomical studies of embryonic through adult specimens. It also has the capability to perform live animal scanning allowing measurements on the same animal across different ages and experimental treatments. A number of faculty laboratories will be testing potential uses of the scanner in their research.

I wish you and your family a Happy New Year. I hope you remember the Biology faculty and students in your thoughts and prayers.

Best wishes,
James M. Cheverud, Chair

Biology Students Partner with Research Faculty at the Loyola Oncology Research Institute

Nine LUC undergraduate Biology student interns spent a productive summer doing molecular/cellular research at the Loyola Oncology Research Institute (Health Sciences Division) this summer. The summer research program kept these students busy investigating leukemia, liver cancer, immunotherapy, and other equally interesting projects. Each student was mentored by members of the oncology faculty. At the conclusion of their ten week program, each research intern gave a presentation on his/her work at a symposium hosted by the Cardinal Bernardin Cancer Center. These summer internships are co-sponsored by the ORI and the College of Arts & Sciences. The same program will be offered again next summer. Applications will be invited early in 2018 and will be available on the Biology Department Website.

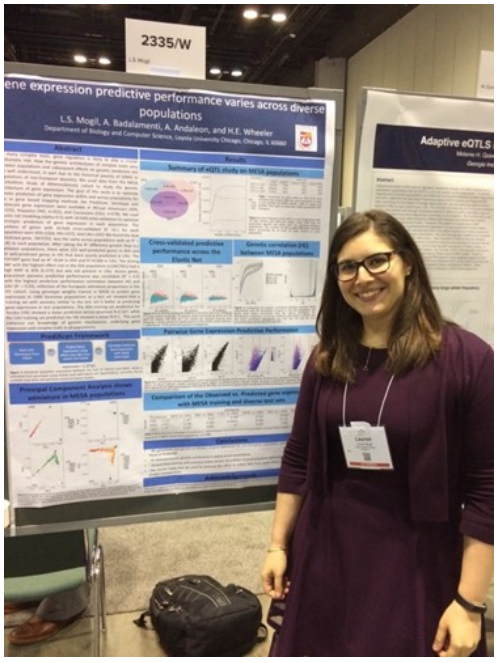
Left: LUC undergraduate Victoria Lee presents her summer research project “Retinoic Acid Targets FTL3-Mutant AML Cells for Elimination” at the Cardinal Bernardin Cancer Center.

Wheeler Lab Awarded NIH Grant to Explore Impact of Genetic Variation on Gene Expression and Traits

Heather Wheeler, assistant professor of Biology and Computer Science, has received a grant from the National Human Genome Research Institute of the National Institutes of Health (NIH) for $429,000 to use over the next three years. The award will support research in understanding the effect and impact of genetic variation on gene expression and complex traits across populations, which has the potential to improve the implementation of precision medicine among diverse populations and reduce health disparities.

“In human genomics, there has been an underrepresentation of data from diverse, global populations,” she explained. “While humans share 99.9% of their DNA, differences in the occurrence of variation can lead to differences in disease susceptibility and treatment effectiveness. We have developed statistical machine learning models that harness these DNA differences to predict gene expression levels, which are then tested for correlation with a disease or other trait of interest. With this grant, we will be able to expand our models to more diverse populations, including African Americans and Hispanics.”

Dr. Wheeler is currently working with a team of 7 people, one postdoctoral associate, one BS/MS student and five undergraduates, on this project in her computational genomics lab at Loyola.



Right: Dr. Lauren Mogil, postdoc in the Wheeler Lab, presenting her work at the American Society of Human Genetics Annual Meeting in October 2017.

Masters of Arts in Medical Science (MAMS) Update

It is another great class for MAMS this year! The talent includes 9 EMTs/ER techs, 9 lab techs, 8 scribes, 4 with social work experience, 4 from the medical records/IT field, 2 registered nurses, 3 with hospice experience, 2 phlebotomists, 2 American Red Cross Disaster responders, 1 podiatry assistant, 1 physical therapy assistant, and a host of tutors and coaches in a plethora of fields. 12 articles have been published in scientific journals by members of the class. They have carried out 15 medical missions abroad, and speak 14 different languages! Under leadership from MAMSer Jennifer Byk, a group of students worked as Medical Records/Nurse Volunteers in Aid Stations at this year's Chicago Marathon. Working alongside other medical personnel they provided emergency care for participating runners who sought medical attention. Recruiters from seven different medical school admissions offices have visited the class to recruit from our pool of talent. MAMSers from the Class of 2017 are currently going through the interview cycle, with 3 interviewed by Ivy League medical schools and several already with offers of admission in hand. Consistent with Loyola's Mission, the MAMS community of students, faculty and staff continue to "expand knowledge in the service of humanity through learning, justice and faith."

Artist Hunter Cole Presents Exhibit Featuring Photos of Bacteria That Create Their Own Light

Art and science come together in a mesmerizing new multimedia exhibit entitled, **"Living Light: Photographs by Light of Bioluminescent Bacteria,"** on display at ARC Gallery, 2156 N. Damen in Chicago, from Jan. 3 through Jan. 27. An opening reception will be held on Jan. 5 from 6 to 9 p.m. and a closing reception will be held on Jan. 27 from 4 to 6 p.m.

Hunter Cole features photographs of human figures (portraits; installations) illuminated by a glowing blue light created by bioluminescent bacteria depicting her keen interest in surreal imagery and symbolism. This exhibition will feature a survey of Cole's bioluminescent art during the period 2005 to 2017. On the final day of the exhibit (January 27, 4-6pm), attendees will have the opportunity to see the bacteria glowing in person, when an installation of live bioluminescent bacterial drawings will be on view.

Hunter Cole is an artist and scientist that produces work that is inspired by science, but lives as art. Cole, who holds a PhD in genetics, reinterprets science through art. She is a lecturer in the Biology Department at Loyola University Chicago where she teaches Biology through Art, a course that provides opportunities for students to create art while working in a biology laboratory. See more at www.huntercole.org

Right: "The Entomologist I: Portrait of Bob Hamilton," photograph by the light of bioluminescent bacteria, Hunter Cole. Bob Hamilton was an entomologist at Loyola for over 45 years.

Biology Alumnus Update—Dr. Laurel Yohe

My training as a research scientist has been a meandering and exciting adventure. As an undergraduate at Loyola Chicago I double majored in biology and bioinformatics, graduating as a part of the class of 2011. Eager to join the world of research, I was fortunate enough to receive the Carbon fellowship, where I investigated the neurochemical and behavioral effects of chronic versus acute stress in rodents. The Carbon fellowship was a pivotal experience for me. I realized that I loved asking questions and coming up with creative ways to answer them. This project instilled in me the confidence necessary to take on large-scale projects. I was leading my own independent study as an undergraduate and the study eventually led to a publication.

During her Fulbright fellowship, Laurel carried out several field expeditions to the central highlands of Vietnam to study a diverse group of songbirds called babblers. Here she in Bi Doup Nui Ba National Park measuring a babbler species to collect data to better inform conservation efforts for these birds.

However, I yearned to study non-model organisms and became interested in phylogenetics. I joined a research lab to study speciation of a group of Asian birds called babblers, working with Dr. Sushma Reddy in the Biology Department. Working in this lab was transformative for my view on research and the world at large. I was exposed to the exciting world of natural history, making frequent visits to the collections at the Field Museum. I dreamed of going out in the field and working with the animals.

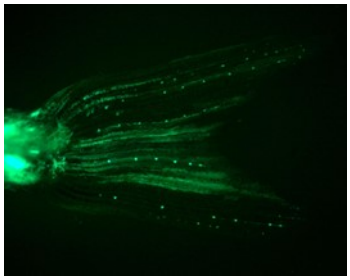
Laurel sampled bats throughout South and Central America to collect genetic data for her analysis on bat sensory evolution. In the Dominican Republic, she worked with many species only found in the Caribbean, such as this Ghost-faced bat pictured here, a highly specialized insectivore.

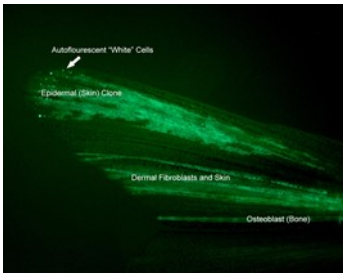
Under the mentorship of Dr. Reddy, whom I continue to collaborate to this day, I applied and was awarded a Fulbright research fellowship to study bird conservation in Vietnam. My goal was to understand how past and present bird distributions could inform future conservation policies in a rapidly developing country with remarkable biodiversity. Along with a team of Vietnamese researchers, I demonstrated a creative way to study critical conservation issues using museum specimens and field data. This project led me to pursue a PhD at Stony Brook University as a NSF Graduate Research Fellow to work with Dr. Liliana Dávalos . I continued to ask questions about what underlies the diversity of animals, but also began to incorporate my passion for neurobiology. My dissertation research focused on the evolution of the sense of smell in bats. The bats that I study are found and South and Central America, and they are special because they are known for eating may different types of food resources. These bats include many types of fruit-feeding bats, nectarivorous bats, and even the notorious vampire bat that feed on blood! I wanted to know if their ability to find food differed from that of most insect-feeding bats, and if these special adaptations were reflected in their genomes. My work allowed me to travel to Peru, Dominican Republic, and Costa Rica to catch bats and collect samples for genetics research.

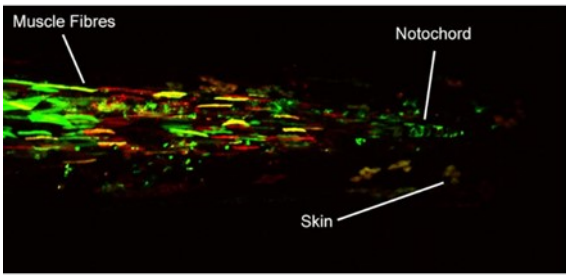
I recently graduated with my PhD in Ecology & Evolution in August 2017. What's next? I am eager to continue on the winding path that has led me to where I am today. I will begin a postdoctoral research position at Yale University to study the development of nasal cavities in vertebrates. My experience at Loyola instilled in me the ambition and inspiration to discover something new. It carved an attitude within me to always dive into new experiences headfirst. This is something I will always carry with me.

Dr. Bryan Pickett's Research Sabbatical at Washington University Focuses on Stem Cell Populations in Zebrafish

We were able to develop a collaboration with Dr. Steve Johnson at the Wash. U. School of Medicine to begin to study the stem cell populations that build the fish fin. We are using genetic mosaic analysis to produce uniquely fluorescently labeled cells to ask the question "can stem cells contribute to specific tissues in the fin, or do these cells contribute to many diverse tissues". If cells contribute daughter cells to many tissues we may be able to define stem or founder cells for structures in the fin, however if we discover that cells are highly constrained this suggests that cells are already highly programed regarding their future role in the fin before they even migrate to their final position. So far we are seeing surprising patterns of sharing between skeletal elements in the tail and bone and non-bone cells in the fin. This suggests that a common universal stem cell for skeletal bone and fibrous tissue exists in the embryonic tail. Below are some of the beautiful fin and tail mosaics we have generated so far. Cheers!! Dr. P. (Paula says "Hi!" to our lab alumni!)



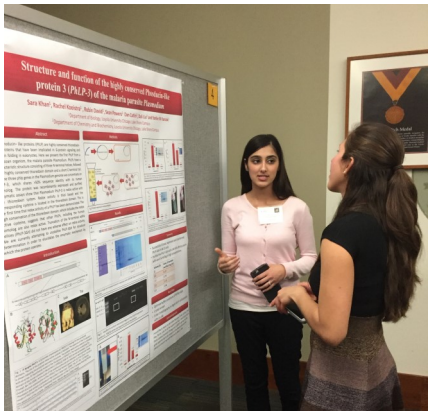




Left two images are zebrafish caudal fins from embryos injected with a GFP expressing transposon under a constitutive promoter. The right hand image is an embryo injected with cocktail of GFP and mCherry transposons, so cells fall into three color classes, green only, red and green (seen as orange/ yellow) and red only. Tracing clones by their adjacency we can determine based on their shared color whether or not two cell populations likely shared a single progenitor cell at some point.

Undergrad Biology Students Present at St. Albert's Day

On November 2nd, three students from the Biology Department, Farah Siddiqi, Chase Gauthier, and Sara Khan, journeyed to the Maywood campus to present their work at the annual *St. Albert's Day Research Symposium*. In the halls of the Stritch School of Medicine, they set up their posters alongside postdocs, Ph.D. and MD students from the UMC graduate school, the Nursing School, and the SSOM. Notably, the three were *the only undergraduate researchers* at the meeting. UMC investigators and researchers, who visited their posters, expressed (positive) surprise about the quality of the research and their presentations from the Lake Shore Campus. The constructive and positive feedback not only made the visit a positive experience for all involved it also serves as encouragement to present *more* LSC research on St. Albert's Day.



Left: Sara Khan presenting her poster; Right: Chase Gauthier, Sara Khan, Farah Siddiqi at St. Albert's Day

In Memorium

In December, the Department lost a colleague, teacher, and friend. Dr. Robert (Bob) Morgan's work in the Biology Department has helped shape the courses we teach and his contributions to the department and friendship to many will not be forgotten. Please see the message from Bob's wife, Anita, below to learn more about his life, interests, and time at Loyola University Chicago.

"Robert A. Morgan, 68, senior lecturer at Loyola University, Department of Biology, died at his home on Sunday, December 3. Born on December 6, 1948, Bob grew up in Bletchley, England where he began his life-long interest in bird watching. After graduating with honors in biology from University College Cardiff, Wales, he began work in 1971 until 1984 as a scientific officer for the British Trust for Ornithology. There he lectured extensively at conferences and bird clubs throughout Britain. He trained bird-banders to improve and maintain standards of banding techniques, and conducted census fieldwork in specific study areas to determine relationships between breeding bird communities and habitat.

In 1984 until 1987, Bob worked as a scientific officer for the British Antarctic Survey. There he assisted in albatross research projects in the far south Atlantic Ocean, Bird Island, South Georgia, and directed the mapping and counting of large penguin colonies on remote sub-Antarctic islands. He published 40 papers over the years, and attended major conferences.

In 1987 Bob entered the Ph.D. program in ecology at the University of Illinois at Chicago. His doctoral research, and fieldwork at the Morton Arboretum, focused on the behavior of woodpeckers and nuthatches. In 1994, he married Anita (Keller) on August 20; was awarded his Ph.D.. And began as a lecturer in the Department of Biology at Loyola University. There he taught until several weeks ago, general biology, human anatomy and physiology, and ornithology.

Since 2002 during the breeding season of May through September, Bob monitored the distribution of nest and nest success of the state endangered population of Swainson's hawks in Kane and McHenry counties, Illinois. Of the two known remaining sites, the most productive has reared one to three young each year. How Bob found this particular nesting site is indicative of his prowess, experience, and determination. After spotting this rare and elusive Swainson's hawk, he followed the bird by car, and scanned its location in the sky for several hours. Within a four-mile radius, he saw where the bird landed to take prey to its mate. With the landowner's permission, Bob and his wife Anita have been returning to this private site for many years—the most successful of all.

In 2005, with the help of others, he founded the Illinois Swainson's Hawk Project to organize field workers to search over a wider area of Illinois for nesting hawks. He was nominated for a 2007 Grassroots Conservation Leadership Award by the Chicago Audubon Society for his efforts in this research. Bob presented his most recent data on Swainson's hawks at the 2017 Wild Things Conference. He played a role in organizing and participating in numerous Christmas and spring bird counts.

Bob is survived by his wife, Anita; his step-daughter Laura (DelGenio) and her spouse Kevin Attebery; two grandchildren, Annabella and Kale; his sisters Anne (spouse Simon Robinson) and Joan Prior; nephew Anton, and two nieces, Penny and Lucy; grandnephew Connor and grandniece Aoife; Dan and Anna, and many friends and relatives."

Our condolences, thoughts, and prayers go out to Anita Morgan, and all of his family and friends. Peace be to his memory.

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ABOUT THIS NEWSLETTER

This newsletter was compiled by Dr. Jennifer Zitzner and edited by Drs. Jim Cheverud, Michael Burns, and Jeff Doering for the purpose of keeping our departmental alumni abreast of new developments, programs, and events.

We would love to hear from you!

If you know someone whom you would like to see featured in the Faculty or Alumni Spotlight section, or have ideas about things you would like to see in future newsletters, please send an email to: biologydept@luc.edu

Also, we here in the Loyola Biology Department just love hearing from our alums. So don't be a stranger! Please email us at biologydept@luc.edu, let us know where you are, what you're doing, and send us pictures if you have them!

Alumni Support

The University and the Department of Biology are extremely grateful for the generosity of all our donors. Donations in any amount from one to thousands of dollars are appreciated and help the department serve our students. Your support of the Biology Department permits us to continue many programs and services including:

- Student research fellowships
- Travel funds for students to attend local and national meetings
- Professional development opportunities for Biology Faculty
- Equipment for teaching and research laboratories

If you would like to make a gift to the Biology Department Gift fund, you may do so in two ways:

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