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BIOLOGY DEPARTMENT

Loyola University Chicago Biology Department Updates

December 2016 - Issue 2

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**A MESSAGE FROM THE CHAIR**

Dear Alumni and Friends of the Biology Department,

It has been a very busy and productive Fall Semester for the Biology Department. We admitted a record number of freshmen and have over 1000 students each in General Biology 101 and 111. We were able to hire three new lecturers this year to help with the freshman courses (Dr. Janet Cullen, Dr. Harper Mazock, Dr. Xao Tang), added a faculty Lecturer, Dr. D. Megan Helfgott, and a tenure-track faculty member, Dr. Michael Burns. Dr. Burns' research

focuses on the gut microbiome and its interaction with colon cancer.



We also completed the construction of a new lab for Dr. Thomas Sanger whose research is on development and evolution using *Anolis* lizards as his model organism. Biology faculty have been successful in obtaining outside research funds with nearly 50% of the research faculty being funded in this way. We continue to have record numbers of undergraduates working in our research labs and we are trying to obtain even more research opportunities for undergraduates. Dr. James Lodolce and colleagues have put together a portal for students to express interest in doing research in the department's labs. This easy-to-use system will connect interested students with our research labs. This past summer we collaborated with SSOM's Cancer Center to place nine Loyola undergraduates in Cancer Center research labs. Students presented their research at a symposium at the end of the summer. The success of this program is leading us to seek further opportunities to partner with the Medical School.

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

Best wishes,
James M. Cheverud, Chair

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FEATURE STORIES

Biology Bootcamp

by Megan Helfgott



At the end of June, the Biology Department held our 5th annual Bio Boot Camp. The camp is a four-day program for 75 freshman science majors who take General Biology during their first semester. The program is designed to give incoming freshman, science majors a feel for what it's like to be a college student at Loyola.

While at camp the boot campers met biology faculty, staff, and other students. The students actively participated in sample lectures, lab sessions and examinations similar to what they experienced in General Biology this past fall. The camp also included a symposium which introduced the students to research opportunities in the Biology department. At night they stayed on campus with Biology graduate students as RAs. On their last day the students went to the Field Museum and we took them "behind-the-scenes"; bringing them to active research areas in the museum.

The Boot Camp students had fun; they met and made friends with other fellow freshman. As always, the students enjoyed hearing all the "unofficial" advice and gossip while talking to both upperclassman-undergraduates and the graduate student "den-parents". Most importantly, we believe our Boot Camp participants were more comfortable starting classes this past fall.

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Biology Outside of the Classroom

by Jennifer Zitzner

Several of the Biology classes taught at Loyola allow students to experience what they are taught in the classroom by venturing outdoors - engaging them in the natural habitats they are studying. One class that frequently brings its students into the field is Ecology Lab (BIOL266). The course, taught each fall semester, brings the students to sites around Loyola three times during the semester - two weekend trips and an overnight trip at LUREC (Loyola University Retreat and Ecology Campus). Other frequent sites vary throughout McHenry County including the McHenry County

Conservation District sites as well as Ryerson Woods in Riverwoods, IL.

Shown in these pictures are students exploring the ecology of the Piscasaw River in Chemung, IL.



As shown by the pictures, students gain first hand experience of wildlife in the outdoors such as the Northern creek chub as examined by Dr. William Kroll and his students. These experiences allow the students to benefit from the natural habitats surrounding the university as well as enjoy the outdoors.

Pictured here left to right are Ecology Lab Students Louise Cabantang, Klaudia Kukulka, and Miriam Reyes.

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Teaching Abroad in Rome

"How I Spent My Summer Vacation" by Bill Kroll



Well, technically it wasn't summer vacation, but I spent the first summer session of 2016 teaching UCSF 137 (The Scientific Basis of Environmental Issues) at Loyola's Rome Campus. Five weeks living in Rome and exploring Italy. The class met Tuesdays and Thursdays from 9am to 12:30PM which, of course, meant that from Thursday afternoon until Tuesday morning I was free to Rome...So to speak.

Not only Rome, but Venice, Florence, Naples, Pompeii, Capri and Sorrento. The high speed rail in Italy is inexpensive and, well, high speed. My wife, Barb, took two weeks off from work and joined me. Not only was the travel exciting, but I learned that it is impossible to get a bad meal in Italy. Much to the detriment of my waistline.

17 of my 20 students were participants in an exchange program from the University of Loyola Andalucia. I was worried about communication problems, but they spoke English quite well and I hablo a bit, so not a problem. In fact, they were one of the best aspects of the trip. Enthusiastic, respectful and funny. We had a lot of fun together. I could go on for pages, but I've hit my word limit. Ciao, baby.

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Heroes of the Biology Department

In honor of Biology Faculty and Staff who have served the department at milestone year markers, a luncheon gathered the faculty and staff to honor the "Heroes of the Department" who have reached the following milestones.



Pictured Left to Right: Howard Laten, Beata Czesny, Christopher Calderaro, Timothy Hoellein, Gerald Buldak, James LoDolce, F. Bryan Pickett, William Kroll, Elizabeth McGeehan

35 Years of Service

Warren Jones
William Kroll
Howard Laten

20 Years of Service

F. Bryan Pickett
15 Years of Service
Beata Czesny
John Kelly



10 Years of Service

Gerald Buldak
Christopher Calderaro
Peter Breslin, SJ
Erin Hayes
Elizabeth McGeehan
Bree Sines

5 Years of Service

Dawn Franks
Timothy Hoellein



James LoDolce
Pamela Osenkowski

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Master of Arts in Medical Sciences Program Update

by Dawn Franks



The Master of Arts in Medical Sciences program welcomed another highly accomplished 55 students at our two-day Orientation this past August. Competition for seats in the program remains stiff since an additional 68 disappointed students remained on the wait list by the time the fall semester started. This year's class have already collectively donated 90 years of service to hospitals and clinics around the country, published 13 scientific studies, performed 14 years of SCRIBE work, 8 years in emergency rooms, 5 years in Teach for America, 5 years as CNAs, 5 years as EMTs, 5 years in hospice, 2 years as medical assistants, and a year in phlebotomy and physical therapy. Our students performed 13 medical missions in all to Peru, Nicaragua, Guatemala, Eritrea, Honduras, Zambia, Haiti, Nigeria and the USA. Interestingly, about 20% of the class has work experience at EPIC or similar corporations bringing the perspective of digital medical record management to their pre-medical preparation. One student is a podiatrist and is preparing for a career change and let's not forget our amateur magician who performs for sick children during their hospital stays.

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Report from LUREC (Loyola Retreat and Ecology Campus)

by Bobbi Lammers-Campbell

LUREC has been a resource for both Biology and Environmental students during the last



year. A section of General Biology lab 111 has met at LUREC every other Saturday this fall instead of at Lake Shore Campus. They have had hands-on experiences studying organisms in their actual habitats, collecting native seeds, and bird-watching with Fr. Steve Mitten.

Nearly twenty First Year Research Experience (FYRE) students spent three weeks last summer at LUREC helping with the ecological restoration. All of them became state certified to apply herbicides in a restoration context. They made a significant difference to the work of controlling invasive species.

Dr. Joe Milanovich and his students have set up wood frog enclosures in the oak woodland to observe the impact of invasive species exposure on frog development. Permanent plots have been set up in an area of wetland cleared two years ago. Brittany Rivera, an undergraduate McNair scholar, has determined that the post-clearing management technique that most effectively aids the return of native species is the removal of woody debris.



Finally, native species have been reappearing in the cleared fen at a heart-warming rate. A list of the 97 native species that are now found in the cleared area can be found [here](#).

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ALUMNI HIGHLIGHT

Tanya Grancharova

After graduating from Loyola, I knew that I wanted to pursue a career in research science. I set out to be a molecular biologist (my undergraduate major), but soon realized I was more interested in genomics and evolution. Knowing that I needed a new skill set in order to pursue research in this field, I switched focus to bioinformatics in graduate school. I earned my Master's Degree at the University of Washington where I studied the evolution of large gene families. More specifically, I investigated the selective pressures driving the evolution of a superfamily of ubiquitin ligases in 50 plant species.



I currently work as a bioinformatics analyst at the Allen Institute for Cell Science in Seattle. Research at the Institute is focused on better understanding cellular organization and morphology using light microscopy of human induced pluripotent stem cell lines edited using CRISPR-Cas9 technology to contain endogenous fluorescent tags. I am involved in the editing design of

fluorescently tagged cell lines and analyze deep sequencing data as part of the quality control of each cell line.

I am excited to contribute to basic cell biology research and to work on a project that allows me to combine my interests in genomics and molecular biology.

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FACULTY HIGHLIGHTS

Senior Tenured Research Faculty - Dr. Jeffrey Doering

Studies on human genome heterochromatic regions

The currently available human genome sequence does not include the heterochromatic regions, although these sequences comprise 10-15% of the genome. Containing long domains of tandemly repetitious sequences, heterochromatic regions of the genome are important to the functioning of centromeres, telomeres and the control of gene expression in the interphase nucleus.



Pictured left to right: Sierra Pond, Dr. Jeffrey Doering, Alex Paul, and Sarah Tincher.

We have constructed a detailed physical map of the centromere and short arm of human chromosome 21 (HC21p) as a model for understanding the organization of heterochromatic genomic regions. The map shows that the structure of HC21p is highly complex, with clusters of a large number of tandemly repeated sequences interspersed with "islands" of low copy number sequences.

Recent work has shown that the repetitive sequences found on HC21p are transcriptionally active in a variety of cancer cells, but inactive in normal tissue. We are trying to use this activity to develop cancer biomarkers for prostate cancer. In particular, we are determining which specific repetitive sequence families most commonly become active in the cancer cells and at which stages of tumor progression. The epigenetic marks of DNA methylation and histone modifications are being used to assay the repetitive sequences for their potential activity. Preliminary results indicate that several of the HC21p repetitive sequences reproducibly exhibit low levels of DNA methylation and thus activity potential in the tumor cells. Studies are ongoing to examine more of the repetitive sequences in a larger sample of cancer cells.

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Senior Lecturer Faculty Spotlight - Dr. Patrick Duffie

Interview by Andrew Kelly

Student Worker, Faculty Center for Ignatian Pedagogy

Dr. Patrick Duffie has been a member of Loyola University Chicago's Department of Biology for twenty-six years. Over the course of this period, he has always recognized the



immense value of student diversity to the teaching process and experience.

“My elementary school, junior high, high school, and college were all very homogenous, I think, in terms of the student population. So it wasn’t until I came to Chicago, and Loyola in particular, that I really got exposed to a lot of different people. That, I’ve found, is the most interesting aspect of Loyola. Just hearing where kids are from, what they do, what their backgrounds are, what they’re bringing to Loyola...it makes every semester interesting.”

Because many of his students are freshmen, Dr. Duffie strives to create an academic environment that is “relaxed and comfortable” but also pervaded by enthusiasm for the discipline. Hence, Duffie models his pedagogical practices upon those of the teachers whose courses he most enjoyed and found beneficial:

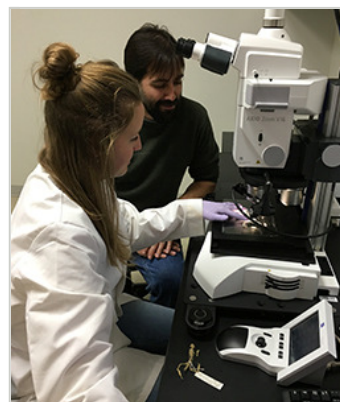
“In terms of teaching practices, I try to teach the way it has worked for me. I try to show the students that this can be fun, lecture class can be fun. I want participation, which is sometimes hard in biology when our classes get a little bit larger, but I want students to feel like they can approach me. Because I predominantly teach freshmen, I try to instill in them an enjoyment for the course so they can build a good foundation and like what they’re doing. I’ve always tried to make it relaxed, interesting, and not the end of the world because Biology One and Biology Two are just the beginning.”

Hence, Dr. Duffie has effectively combined a vehement enthusiasm for his discipline and students with a fervent commitment to Loyola University Chicago's Ignatian principles and mission of global progress. Such a combination is to be celebrated particularly as Dr. Duffie reaches his twenty-sixth anniversary of service to Loyola in 2016. A video with Dr. Duffie describing his work in the classroom and global excursions can be seen [here](#).

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Junior Tenure-Track Faculty Spotlight - Dr. Thom Sanger

My first year at Loyola has been a fast-paced learning experience, both for me and my students. Over my two semesters here I have helped guide students through the popular Human Structure and Function courses. I have greatly enjoyed preparing them for careers in the health professions or to simply help them better understand their own bodies. Research in my lab, which works at the interface of evolutionary and developmental biology, has also commenced during this time. Last summer my student, Judy Kyrkos, and I traveled to Florida to collect *Anolis* lizards to begin a project investigating whether rising global temperatures will affect lizard development. With the help of Laura Kratz, Dryden Lachance, and Patricia Chen we demonstrated that lizards may experience increased rates of brain, skull, heart, and limb defects over the next 50-100



years. Judy will be presenting these findings at the annual meeting of the Society of Integrative and Comparative Biology this January. My lab is also investigating the way specialized adhesive scales form on the feet of these lizards. We have developed new ways to observe the embryo develop outside of its shell so that we can actually see these scales emerge right before our eyes.

*Dr. Sanger and Loyola senior
Judy Kyrkos examine Anolis
lizard embryos for signs of
heat stress.*

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WELCOME NEW BIOLOGY FACULTY

- **Michael Burns** - Assistant Professor
- **Janet Cullen** - Instructor
- **Harper Mazock** - Instructor
- **Rachel McNeish** - Post-Doctoral Researcher
- **Lauren Mogil** - Post-Doctoral Researcher
- **Xao Tang** - Instructor
- **Jane Younger** - Post-Doctoral Researcher

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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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Mail:

- *Please mail and make checks out to:*

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c/o Stephanie Tomakowski
820 N. Michigan Avenue, Ste. 1721

Chicago, Illinois 60611

Please include in the memo line: Biology Department Gift Fund.

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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!

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