LOYOLA UNIVERSITY CHICAGO

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BIOLOGY DEPARTMENT ALUMNI NEWSLETTER

SPRING 2010

Jeffrey L. Doering, PhD

Professor and Chairman

INSIDE THIS ISSUE:

A Note from the Chair

Michael R. and Marilyn C. Quinlan Life Sciences Education and Research Center

In the hope of renewing connections with you and other alumni and friends of Loyola's Biology Department, I present the first issue of our alumni newsletter. In many ways the department is dramatically different than most of you will remember, starting with its location. In 2005 we moved into the Michael R. and Marilyn C. Quinlan Life Sciences Education and Research Center, a five story, 135,000 square foot state-of-the-art facility housing teaching labs, faculty/student research labs, classrooms and faculty offices. Not only does it have very well-equipped facilities, but unique features include an artificial stream lab and a "green roof" planted as a native prairie. Our old home, Damen Hall, is slated for demolition later this year.

The Department, with more than 1500 undergraduate majors, is one of the largest private university life science programs in the nation. We are involved in many new academic programs, including majors in molecular biology, ecology, bioinformatics, forensic science, clinical lab sciences and biophysics, as well as new minors in bioethics and biostatistics. The faculty pride themselves on balancing teaching and research, and the high quality of our teaching has been recognized by the College with 11 Biology faculty winning teaching excellence awards in recent years.

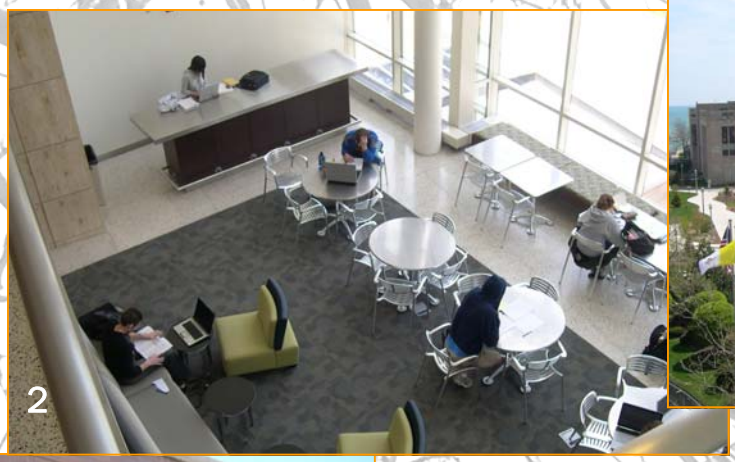
Our faculty are seriously committed to research, and both undergraduates and graduate students are involved in most projects. More than 60% of our faculty now have grants from federal agencies, with a combined active total of more than $3 million. You will read about some of this work in this issue.

We plan to provide you with this newsletter on a regular basis to keep you informed of our activities as well as provide a place for you to learn about what your fellow alumni are doing. In the meantime I invite you to visit the department' s website at www.luc.edu/biology. Feel free to drop me a note or e-mail with updates about yourself and your professional activities so we can include the information in future issues. Your ongoing involvement with the Biology department enables us to maintain the excellence of our programs, and I deeply appreciate your interest in our work.

Sincerely,

Jeffrey L. Doering, Ph.D.

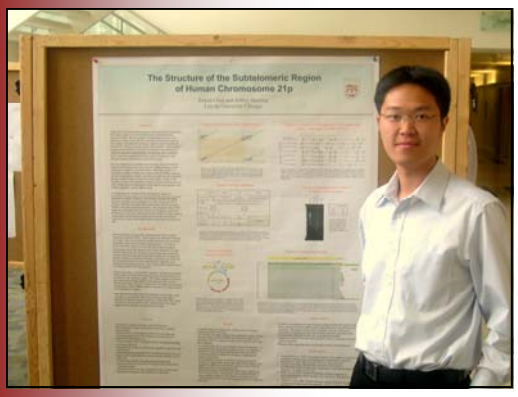
Professor and Chairperson



The Michael R. and Marilyn C. Quinlan Life Sciences Education and Research Center

1. A view of the Michael R. and Marilyn Quinlan Life Sciences Center from the parking garage. The new building is conjoined with Flanner Hall, home of the Chemistry Department. 2. The Atrium on the building's third floor has become a popular study area and meeting place for small receptions. The Atrium's large windows allow for a lovely view of the campus while providing natural light making it an ideal place for study. 3. Our new building, named for our alumnus benefactor Michael R. Quinlan and his wife Marilyn, stands as a testament to how important our alumni support is to keeping the Loyola University Biology Department a world class educational and research institution. 4. (from left) Biology Major Jennifer Cox, Bioinformatics major Maguerite Hoving, and Bioinformatics and Biology major, Vinnie Reynoso at work in the research lab of Dr. Catherine Putonti. 5. The Aquatic Lab on the building's penthouse floor houses artificial streams and six artificial ponds to replicate aquatic ecosystems. Students can simulate a variant array of different environments, studying aquatic life in a controlled environment. 6. The construction of the new Life Sciences Building during its very early stages in September 2003. For more photos of construction, with slide shows and architect images of the new building Click Here.

Frontiers in Life Sciences Symposium



Top: Drs. Putonti, Laten and Gilad at the 2010 Frontiers in Life Sciences Symposium. Below: Ernest Chan presenting at this years FLSS.

On April 29, 2010 the Biology department hosted the 2010 Frontiers in Life Sciences Symposium (FLLS). This year featured over twenty presentations from Graduate and Undergraduate Biology students leading up to the keynote address, "What Makes Us Humans: A Genomics View" by Dr. Yoav Gilad of the Department of Human Genetics at the University of Chicago.

Dr. Gilad's research focuses on the study of genetic and regulatory differences between humans and our close evolutionary relatives. In particular, Dr. Gilad is looking to determine the genetic basis for human specific traits that lead to higher susceptibility to certain diseases in comparison with other primates. Dr. Gilad took a handful of questions from the near-capacity crowd that piled into the Life Sciences Auditorium to hear the keynote address. The talk was followed by a reception attended students, faculty and staff .

Dr. Gilad is the latest in a series of high profile scientists to speak at FLLS. Dr. Neil Shubin of the University of Chicago and the Field Museum of Natural History gave his keynote talk, "Using Fossils and Genes to Find Your Inner Fish," in 2009. Dr. Shubin is best known for his team's discovery of *Tiktaalik roseae*, a lobe-finned fish from the Devonian period exhibiting traits that shed light on the evolutionary movement from fish-life in the sea, to early the amphibian life on land. In 2008, the department was proud to welcome Dr. Lynn Margulis who delivered her talk, "Symbiogenesis in the Evolution of Cells on the Proterozoic Earth" for the keynote talk. Dr. Margulis, a Distinguished University Professor at the University of Massachusetts, is best known for her significant contributions to endosymbiotic theory, particularly her theory on the origin of eukaryotic organelles.

The symposium is one of the ways the department provides students with a broader view of what working in the contemporary sciences entails, at once exposing them to high-profile scientists working at the forefront of their fields., while also giving them a venue to present their own work to their peers and mentors,. Continue reading on this page and the next for a sample of winning abstracts from this years symposium.

Michael Lamm

The role of the Mitochondrion in the *Plasmodium* ookinete

Presenter: Michael Lamm

Faculty Advisor: Dr. Stefan Kanzok

The role of the mitochondrion in the mosquito stages of the malaria parasite *Plasmodium* is poorly understood. Although it has been shown that the glycolytic pathway is the parasite's main source of ATP while it resides within its human host, little is known about parasitic energy metabolism within the mosquito. My research focuses on mitochondrial energy production pathways the parasite utilizes to survive and develop in the insect vector, with an emphasis on the expression and role of the electron transport chain and the ATP synthase complex. I hypothesize that the parasite switches from substrate to oxidative phosphorylation to generate the ATP required for development and survival in the mosquito. We are using the rodent malaria model organism *Plasmodium berghei* to examine parasite biology during various stages of its lifecycle. Preliminary data generated in our lab shows that genes of the mitochondrial ATP synthase complex are significantly upregulated during parasite development in the mosquito midgut supporting my hypothesis. Here I describe the methodology I use to generate samples, such as culturing of *P. berghei* mosquito stages *in vivo* and *in vitro*, RNA extraction, as well as purification and quality control procedures. Using quantitative real time PCR, I expanded on our preliminary data investigating the expression profiles of additional target genes that comprise the electron transport chain of *P. berghei*. The results will be discussed and future directions outlined. This is the first time the mitochondrion is evaluated in the mosquito stages of the malaria parasite, and data generated from these experiments will increase our understanding of this important pathogen and may elucidate exploitable targets to help regulate the transmission of this debilitating disease.

Time-dependent impacts of cattail (Typha X glauca)invasion after more than fifty years of invasion in Great Lakes coastal wetlands

Presenter: Mark E. Mitchell[1,2] **Co-Authors:** Shane Lishawa [2], Pamela Geddes[1,2,3], Daniel Larkin[1,2,4], David Treering [2] **Faculty Advisor:** Dr. Nancy C. Tuchman [1,2] 1Department of Biology, Loyola University Chicago, Chicago, IL, 2The Center for Urban Environmental Research and Policy, Loyola University Chicago, Chicago, IL, 3Department of Biology, Northeastern Illinois University, Chicago, IL, and 4Chicago Botanic Garden, Glencoe, IL

The invasive hybrid cattail, Typha x glauca, has established in wetlands across the Great Lakes Region decreasing native plant diversity and altering soil and microsite characteristics. We utilized 50 years of historical aerial photographs from the Illinois Beach State Park wetland complex to map the spread and determine the age of T. x glauca stands. Floristic, edaphic, and environmental data were collected from plots across an invasion age gradient. Compared with reference uninvaded sites, litter mass was more than 2 times greater ($p<0.001$) within 11 years of invasion, plant diversity declined by more than 50% ($p<0.05$) within 25 years of invasion, and soil organic depth was more than 29 cm deeper ($p<0.05$) in areas invaded for more than 35 years compared with areas invaded for less than 11 years. These progressive changes in plant communities, soil, and environmental conditions through time will likely alter the fundamental structure of invaded wetlands, affecting a range of wetland ecosystem services. We believe this timeline of invasion can aid land managers in assessing the status of invaded parcels and in designing management strategies.

Mark E. Mitchell

Protein Folding of G Protein Alpha Subunits

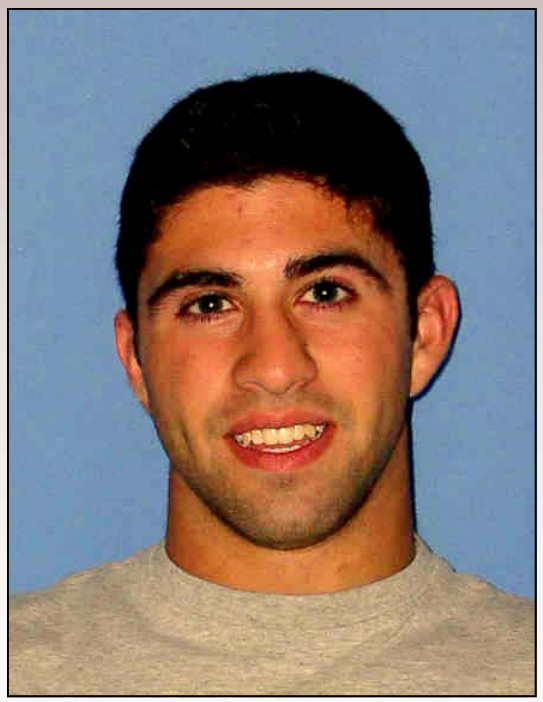
Presenter: Matthew Najor

Co-Author: Steve Chukwulebe

Faculty Advisor: Dr. Duarte Mota de Freitas

The objective of this study is to understand the folding of guanine nucleotide – binding (G) proteins using a variety of spectroscopic tools. G proteins are membrane-bound proteins consisting of three subunits (α,β, and γ) that are required for the transduction of extracellular signals to various intracellular effectors. Activation of G protein coupled receptors by neurotransmitters or hormones result in a conformationalchange of a G protein that is triggered by the exchange of guanosine 5'- diphosphate (GDP) bound to the a subunit for guanosine 5'- triphosphate (GTP) and concomitant dissociation of the bg dimer. Evidence has shown that Mg2+ facilitates G protein activation from its inactive GDP-bound state into its active GTP-bound state and catalyzes the hydrolysis of bound GTP.

Wild type Giα1 has three tryptophan (W) residues, with W211 being the most sensitive to the conformational change. Wild type Giα1 and the W131F, W211F, and W258F mutants were used to investigate the dependence of protein folding on conformation and Mg2+ concentration. The data were interpreted in terms of the crystal structures of wild type Giα1 in its inactive, active, and transition state AlF4- conformations (1BOF, 1CIP, and 1GFI), which display predominantly alpha helical secondary structure, (47 %, 46 %, and 45 %, respectively.) We have explored Giα1 overall secondary structure by circular dichroism, and the localized movements of tryptophans into more hydrophobic environments through the use of intrinsic tryptophan fluorescence. Lastly, we investigated the interaction between arginine 208 and W211 that is responsible for a red shift upon activation. Several diseases are associated with disrupted G – protein mediated signal transduction and our multi – pronged approach may lead to a better understanding of Giα1 functional and structural stability.



Matthew Najor

Natural Resource Conservation Class in Costa Rica

By Robert Hamilton, PhD

Professors Robert Hamilton and Robert Morgan led another group of Loyola students to the lowland rain forest of northeastern Costa Rica. This was the 7th class trip to Costa Rica associated with Professor Hamilton's Natural Resource Conservation Class (Biology 393, NRC). NRC was first offered as a special topics class in 2000. Biology 393 uses Chiras and Reganold's text "Natural Resource Conservation" 10th Ed. 2010 which includes coverage of local, regional, national and global resource and environmental issues. The course requires permission of the instructor and includes additional costs associated with the spring break trip to Costa Rica. Most of the additional cost is associated with air fare and station fees at La Selva.

The group arrived at the La Selva biological station on March 8, 2010. La Selva is a premier tropical biology teaching/research station that is well known throughout the world. It is owned and operated by the Organization of Tropical Studies (OTS) which is centered at Duke University. OTS is a consortium of universities from the U. S., Europe and Central America and operates two other research stations in Costa Rica: Palo Verde and Las Cruces. Last year's NRC class visited the Las Cruces station in southwestern Costa Rica near the Osa Peninsula . La Selva is approximately 1600 hectares (3,900 acres) that averages 4 meters (13 feet!) of rain each year) and contains 70% old growth primary forest and well developed trails. The main class objective is to observe and photograph the rich biodiversity of Costa Rica's rain forests.

Each student focused on a particular rain forest species or group of related species. No collecting is allowed in this preserve (not even capture and release) so the only way to "bring 'em home" is on film or digital images. PPT presentations during class time and written papers on the niche characteristics of their particular organism(s) are now underway.

Two side trips were taken from La Selva. We visited a Dole banana plantation near La Selva and learned the history of the commercial banana as well as sustainable and eco friendly ways to propagate them. Lets hear it for "Parthenocarpy" ! We also traveled to Tortuguero National Park on the Caribbean coast. We were a little too early for the mass arrival of the green turtles for their egg laying on the beach. However, we did see a good video regarding the turtles and the importance of their preservation. Hope you enjoy the associated pictures. PURA VIDA!

From Top: 1)Students Steven Zachar and Heather Gaal take a break from science to surf on the Caribbean coast. 2) Students Snover Punia (left) and Gabriela Marquez (right) collecting in La Selva. 3) Red-eyed Tree Frog at La Selva. 4) Amblyoygid at La Selva.

MEET OUR NEW TENURE TRACK FACULTY: DR. SUSHMA REDDY

1) Please tell us a little about your background; where do you come from originally? From where did earn your degrees? Where did work before coming to Loyola?

My parents are from India. I was born in the US, lived in India between the ages of 1-9, then moved back to New York where I spent most of my life before moving to Chicago 5 years ago. I got my undergraduate degree from Barnard College, Columbia University. I then went back to Columbia for my PhD in Ecology and Evolutionary Biology. After graduating, I worked as a postdoctoral research scientist at the Field Museum of Natural History, Chicago.

2) What ultimately made you decide to come to Loyola?

I was ready to move on to a position that allowed me to pursue my research interests as well as teach. I am excited to be at Loyola where the undergrads seem to be very eager for research experience, which I think is an essential complement to classroom learning. I am also happy to have colleagues that do research on other aspects of biology and I look forward to stimulating interactions with them.

3) What are your primary research interests? Please tell us about a recent project and how direction you plan to take your work now that you are here at LUC.

My research covers a broad range of topics related to evolution and genetics, primarily using birds as the subject. To date, these subjects include molecular evolution, phylogenetics, biogeography, diversification, patterns of diversity, and conservation. In terms of evolutionary genetics, my research scope includes recent divergences within species groups to the deep evolutionary history of the entire class Aves--the bird tree of life. One main project that I have developed since my dissertation is to examine the evolution and biogeography of birds across tropical Asia. I use genetic, morphological, and geographic data to examine patterns of speciation in a highly diverse group of birds called babblers. This study will help us understand how geological and environmental changes in the landscape of Asia have shaped the evolution of its endemic birds. It will also address fundamental questions for conservation, such as what are the distinct species, what are the distributions of these species, and what are the areas of high diversity.

4) Please tell us a little about yourself. What is life like outside of work?

My household includes my husband, 6 month old daughter, 2 dogs, and 2 tortoises. We generally enjoy walks in the park, doing things in the city, and eating good food (but who doesn't?). I used to enjoy reading novels but it has been exactly a year since I last had time to pick up a book. Such is life.

MAMS: SIX YEARS OF SUCCESS, AND COUNTING

When the Master of Arts in Medical Sciences (MAMS) Program opened its doors in Fall 2004 to an inaugural class of 55 students, no one dreamt it would be as successful as it has been. Not only are our graduates being admitted into both allopathic and osteopathic medical schools at unprecedented numbers, but the personal and professional growth they achieve over the course of our one-year, extremely rigorous curriculum of advanced biological sciences courses has significantly contributed to the strength of their scholarship once in medical school and has also allowed them to contribute to their talents to community and research.

The feedback we have received from our alumni has been remarkable. Korosh Sharain ('08), a first-year medical student at Loyola University Chicago's Stritch School of Medicine, writes, "The biochemistry has been a breeze, thanks to Dr. Castignetti." Robert (Bob) Zemple ('07), a second-year medical student at the University of Wisconsin School of Medicine and Public Health, volunteers at two free healthcare clinics for Madison's underserved population, conducts medical student admission interviews, has engaged in research in the Cardiothoracic Surgery department and serves as the Class of 2012 co-president and president of the study body. In a thank you email to MAMS Program Director Dr. F. Bryan Pickett and MAMS advisor Sally Fell, James Ballard ('08), indicates that his experience at MAMS helped him to the "top of the class" in his first semester of medical school, helping him achieve over 90% average in all of his coursework. After graduating MAMS, Jackie Renfro ('07) conducted research in the Department of Neurological Surgery at Northwestern University, resulting in two articles published in the July 14, 2009 issue of the Journal of the American Medical Association. She is currently in her first-year at Wake Forest University School of Medicine.

From the outset, the vision for MAMS has been an academically demanding, yet non-competitive program where dedicated faculty and passionate students work together to create a strong foundation for medical education. Consonant with Loyola's mission, we have sought out students enthusiastic about learning and helping others, and whose character and values rise to the highest level. While students may credit the MAMS Program, it is they who deserve the accolades for their success; they make us all very proud.

Top: MAMS Director, Dr. F. Bryan Pickett (left), shakes hands with Christopher Migliore, MAMS class of 2009. Christopher currently works as a part-time instructor in the Biology Department and will begin his medical studies in Fall 2010 at Rush University.
Bottom: MAMS students celebrate their graduation at Chicago's Navy Pier.

Catching up with our alumni

Joseph J. Ferretti, Ph.D (B.S. ’60)

Professor Ferretti completed his 10th year as Senior Vice President and Provost at the University of Oklahoma in Health Sciences Center in Oklahoma City. That institution honor Dr. Ferretti by naming a new library lounge after him for his 37 years of service in administration, teaching and research.

John Wolosewick (M.S.’69)

A graduate of the very first Loyola University Biology M.S. class, John Wolosewick went on to spend nearly thirty years as a faculty member at the University of Illinois at Chicago in their Anatomy and Cell Biology department. We regret to announce that John passed away last year. The self-described "scientific pack rat" donated a number of text and pieces of equipment to the department. These materials cover the areas of histology, cell biology, electron microscopy, anatomy and cytology, all of which will be put good use by our faculty.

Claudia Perez-Tamayo, M.D. (BS '77)

Resident of Salina, Kansas, has been inducted as a Fellow in the American College of Radiology. She is a radiation oncologist at Salina Regional Health Center; Newton Medical Center, Newton, KS; and Kansas Medical Center, Andover, KS.

Kim Lindquist, DDS (B.S.’88)

After graduating Summa Cum Laude, Kim Lindquist went on to earn her Doctor of Dental Science from the University of Minnesota School of Dentristry. She would go on to complete her certificate in Endodontics and Masters of Science in Dentistry at Case Western Reserve University School in Cleveland, Ohio in 2005. Dr. Lindquist maintains a practice in Endodontics in Duluth, MN and is the president of the Minnesota Association of Endodontists. Kim and her husband, John, have four children.

Dr. Adil Javed (B.S.’91)

After graduating from Loyola, Adil earned his MD at SIU and his PhD at Stritch before doing his residency at Yale. Currently, Dr. Javed holds a position as Assistant Professor of Neurology at the University of Chicago’s Department of Neurology. Currently he is doing research on Multiple Sclerosis.

Guntippar Pratumngern, MD (BS ’94)

Dr. Pratumngern and her husband, Judge Robert Bastone, are the proud parents of a baby girl, Angeline Marie Bastone. Pratumngern is a physician at Concentra Medical Center, specializing in occupational medicine.

Shawn Kingzette (B.S.’94) I.S.A.

Shawn is an I.S.A. Certified Arborist (IL-0959), and a District Manager for The Care of Trees, the largest private tree care company to earn accreditation from the Tree Care Industry Association. Mr. Kingzette continues to support Loyola by lending care to trees on campus.

Maureen M. Hughes, PhD (B.S.’97)

After graduating from Loyola with honors, Maureen went on to study in the Division of Biology and Biomedical Sciences at Washington University in St. Louis, Missouri. There she earned her PhD in Immunology with her thesis dissertation entitled “Functional Analysis of the Requirements for Target of V Beta to D Beta Rearrangement in the T Cell Receptor Beta Locus.” Currently, Professor Hughes works as a territory manager for Clontech Laboratories, Inc.

Matthew Bozovsky (B.S. 2001, M.S. 2004)After completing his B.S., Matt received his M.S. degree for work he completed in determining the structure of the chromosome 21 centromere and its relationship to Down syndrome. Matt joined the Integrated Graduate Program in the Life Sciences at Northwestern University in 2004 and currently works in the Division of Reproductive Research. Matt has taught courses in both Biology and Natural Science here at Loyola.

Trishia E. Shaw (B.S.’01)

In the fall of 2005, Ms. Shaw gained acceptance to the University of Illinois at Chicago, College of Pharmacy as Doctor of Pharmacy Candidate. She is set to complete the program in 2009.

Krishna Millsapp (B.S.’01)

Since graduating from Loyola, Krishna has taught Biology and Chemistry in the Chicago Catholic High Schools. She spent three years teaching at De LaSalle Institute before taking time off to care for her newborn son. Now she is back teaching Biology and Physical Science at Mount Carmel High School on the city’s Southside. Concurrently, she is working toward her teacher certification and a Masters degree in Science Education from the Illinois Institute of Technology. She also has her sights set on entering a Masters in Biology program.

LOYOLA UNIVERSITY CHICAGO

PREPARING PEOPLE TO LEAD EXTRAORDINARY LIVES.

Alumni Support

The University and the Department of Biology are extremely grateful for the generosity of all our donors. Your support of the **Biology Enhancement Fund** permits us to continue two programs.

The **student research fellowships** allow some of our very best students to conduct full-time research during the summer with our faculty, who are nationally-recognized researchers in many of the most important areas in contemporary life sciences. The fellowships pay the students a stipend and provide funds for research materials. These students hone their laboratory skills, grow as practicing scientists, and give themselves a competitive advantage once they enter the job market or apply to graduate or professional schools.

The **Biology Lectureship** brings a major, distinguished scientist to Loyola for several days to share with our students and faculty their research as well as their experiences working in the life sciences. This guest scientist interacts with students in the classroom and meets with them informally, further enhancing the education our students receive.

You may make a contribution in one of two ways:

- **Online:**

  Contribute Via Secure Web Server—Click Here

- **Mail:** Make checks payable to Loyola University Chicago and mark **Biology Enhancement Fund** and send to:

  Gift Processing

  820 N. Michigan Ave.

  Suite 1500

  Chicago Il, 60611

ABOUT THIS NEWSLETTER

This newsletter was compiled written and edited by Brian Norton, Audrey Berry, Pam Bradley and Jeffrey Doering, PhD for the purpose of keeping our departmental alumni abreast of new developments , programs and events.

LOYOLA UNIVERSITY CHICAGO

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We would Love to hear from you!

We here in the Loyola Biology Department just love hearing from our alums. So don't be a stranger!

Email us at biologydept@luc.edu and let us know where you are and what you're doing, and send us pictures if you got them.