



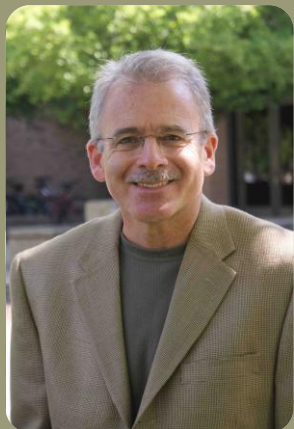
UNIVERSITY OF
NOTRE DAME

College of Science

Department of Biological Sciences

BioPathways

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A Letter from the Chair

Welcome to the first electronic edition of *BioPathways*, the newsletter of the Department of Biological Sciences! This newsletter follows on the heels of the printed magazine *Pathways* that has been published periodically by the Department. *BioPathways* is designed to inform our supporters of new initiatives and recent successes in the Department. With this new electronic platform, we hope to share with you news, updates, and information in a much more timely fashion than before, with a focus on short articles that describe the exciting activities and accomplishments of our faculty, staff, and students.

The broad mission of the Department of Biological Sciences is to “*advance human and environmental health*” through the teaching, research, and outreach that we perform. In this enormously exciting time for the life sciences, our department explores the broad scope of biology including cellular and molecular biology, infectious disease, neuroscience, physiology, ecology, and evolutionary biology. Our faculty, students, and staff study biological phenomena using the most cutting-edge approaches, including genomics, advanced imaging, and mathematical modeling. In *BioPathways*, we will focus especially on biological issues in which we are making a significant contribution with our teaching, research, and outreach. We will highlight the information being generated by our faculty, students, and staff that is being translated into new therapies for human disease, strategies for pathogen control, or solutions to environmental problems, among other applications. The integration of our graduate and undergraduate students into this discovery process will also be a strong feature of our newsletter.

We are excited to share this information with you, and we invite your feedback on this newsletter at any time (biosadm@nd.edu). Please also log on to our web site to find out even more about recent events in our department (biology.nd.edu). We invite you be a part of intellectual community of the Department of Biological Sciences and thank you for your support as we strive to fulfill our mission and advance our vision for the future.

With best regards,

Gary A. Lamberti
Professor and Chair of Biological Sciences

Two biology faculty receive NIH director's New Innovator Award

[Shaun Lee](#) and [Rebecca Wingert](#), assistant professors, were selected as recipients of the highly competitive National Institutes of Health (NIH) director's New Innovator Award. Each award provides \$1.5 million in research expenditures over five years.

The award, which encourages creative ideas in science, stimulates highly innovative research and supports promising new investigators. Lee and Wingert are part of a small group of only 49 exceptionally creative, early stage investigators who propose bold new approaches that have the potential to produce a major impact on a broad area of biomedical or behavioral research.

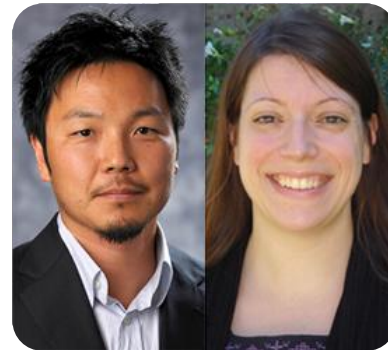
Support from the NIH allows Lee and Wingert to pursue highly innovative research that has the potential for unusually high

impact to propel these fields forward and speed the translation of research into improved health for the American public. The NIH expects to make competing awards of approximately \$117.5 million to the New Innovators in Fiscal Year 2011. Since the program's inception in 2007, the NIH Director's Award Program has funded a total of 216 New Innovator Awards, including these 49 new awards.

Lee, a member of the [Eck Institute for Global Health](#), is recognized for his innovative work in the design and use of bacteriocins. Dr. Lee's research has led to the discovery of a new class of bacteriocins that are produced by a diverse array of organisms, including several important human bacterial pathogens such as *Group A Streptococcus*, *Staphylococcus*, *Listeria* and *Clostridium botulinum*. Bacteriocins

are ribosomally synthesized toxins that function as antibiotics. Research on these bacteriocins holds valuable promise for new classes of antibiotics, and as targets for vaccine research.

Wingert is recognized for her highly innovative work on the identification of kidney regeneration mechanisms. Dr. Wingert's research focuses on how the human kidney regenerates nephron cells, a potential solution to devastating kidney diseases that destroy the nephron, the organ's basic functional unit. Her laboratory is studying nephron cell regeneration in zebrafish, whose kidneys are similar to human kidneys. Understanding of the molecular workings of the process could help design treatments for kidney disease in humans.



"The New Innovator Award provides tremendous funding support over the next five years—I feel blessed with having this amazing opportunity to forge ahead with our work on kidney regeneration, and confident that we will make critical strides forward as a result."
—Rebecca Wingert

"The more knowledge we gain about how the microorganisms engineer these compounds, the greater the hope that we can use this knowledge to design and develop the next generation of antibiotics and anti-infective agents."
—Shaun Lee

Archie wins NSF CAREER Award



*"A lot of my work is looking at how social behavior shapes patterns of disease transmission in wild animals."
-Elizabeth Archie*

[Elizabeth Archie](#), assistant professor of biological sciences, has won a National Science Foundation CAREER Award, providing \$750,000 across five years. The award, from the Animal Behavior Panel, will support her research into the spread of disease among wild animals.

She uses tools from population genetics, like those used to trace patterns in human migration, to follow the path of the parasites and pathogens of African animals. The study involves a population of wild baboons in Kenya that

has been studied for about 40 years. The spread of disease among groups could result from males' travel between territories or interaction at common watering holes, for example. Diseases within a group could spread from grooming, mating or other behaviors.

"A lot of my work is looking at how social behavior shapes patterns of disease transmission in wild animals – how parasites and pathogens move in populations of wild animals," Archie says, adding that the

transmission patterns are largely unknown. "It's hard to track how parasites and pathogens move from one animal to another in the wild."

Archie will travel with a team of students to Kenya to observe baboon behavior and collect samples of the parasites and pathogens. She is also collaborating with two science teachers at the local Penn High School, where students eventually will produce video documentaries from video footage captured on the visits.



Graduate Student Wins NSF Fellowship

[Elizabeth Miller](#), second-year graduate student in [Dr. Elizabeth Archie's laboratory](#), was awarded a prestigious National Science Foundation Graduate Research

Fellowship, a three-year award fellowship for any of the years in a five-year period.

Miller's proposal was entitled "Predicting

parasite transmission and diversity within social groups of baboons (*Papio cynocephalus*) using social networks and population genetics."

Graduate Student Wins Award at Society for Freshwater Science Annual Meeting

[Peter Levi](#), a doctoral student in [Dr. Jennifer Tank's laboratory](#), won the 2011 Best Oral Presentation in Basic Research Award at the 2011 Society for Freshwater Science

annual meeting (formerly the North American Benthological Society), held in Providence, RI. His paper was entitled, "Sediment nitrification rates may alter the nutrient

subsidy provided by Pacific salmon in Great Lakes' streams." His was chosen from 235 student presentations. The award will be presented at the 2012 meeting.



Valedictorians from Biological Sciences

Edward Larkin, a biological sciences major from East Lansing, Mich., was valedictorian of the 2011 University of Notre Dame graduating class.

Larkin was an active member of the **Haiti Working Group at Notre Dame** and wrote a bi-weekly column for the *Observer* student newspaper in which he expounded on the intersection of science, technology and society with a special focus on the cultural and social implications of modern scientific advances.

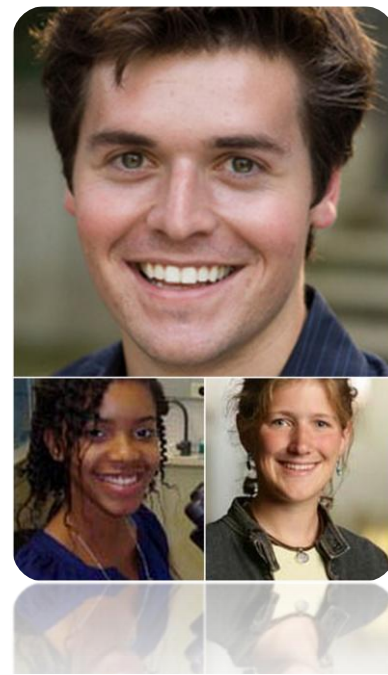
He conducted research on cancer cell metastasis in the laboratory of [Dr. Crislyn D'Souza-Schorey](#).

Larkin participated this past summer in Harvard University's program in Olympia, Greece, exploring cross-cultural interaction between East and West from antiquity to present. He has deferred his admission to the Yale University School of Medicine for one year so he can pursue a M.Sc. degree this academic year at the London School of

Economics in philosophy and public policy. He plans to study and write about end-of-life issues during the program.

Larkin is the third university valedictorian from the Biological Sciences department in three years.

Katie Washington was the 2010 valedictorian, and **Brennan Bollman** was the 2009 valedictorian, both of whom are now attending medical school.



"I believe that we, as graduates of this University, are well positioned to thrive in this world. You simply can't insulate yourself at Notre Dame. This is a school where we were necessarily immersed in the varieties of human experience."

–Edward Larkin

Two Faculty Members Named NAE Fellows in Life Sciences

Kristin Hager, Associate Teaching Professor of Biological Sciences, and [Joseph O'Tousa](#), Professor of Biological Sciences, were named National Academies Education Fellows in the Life Sciences for the 2011-2012 academic year.

They were granted this honor after their attendance at and participation in the 2011 National

Academies Summer Institute on Undergraduate Education in Biology at the University of Wisconsin, Madison.

The focus was on examining new pedagogical approaches based on current research detailing how students learn. Each of the 16 universities that attended formed a team that created a

series of "teachable tidbits" from these best practices that will be implemented during the current academic year and then analyzed for success. Each university present also committed to designing a seminar with the aim of further encouraging graduate students and postdoctoral fellows to mentor undergraduates in the laboratory setting.



"The NAE conference provided excellent rationale for making positive changes to my lecturing strategies and course designs, lessons that Kristin and I can carry to the biology faculty."

–Joseph O'Tousa

New Department Faculty

Our department welcomes three new faculty members this academic year.

"[It's] very simple [why I chose Notre Dame]: great values, welcoming environment, excellent colleagues and ambitious goals."
 –Miguel Morales

Miguel Morales

[Miguel Morales](#), assistant professor, received both his M.Sc. and Ph.D. from Universidad Complutense de Madrid in Spain. He was a Postdoctoral Fellow at New York University, and most recently, he was a Research

Associate at the Pasteur Institute in Paris, France. His research focuses on the biology of the human disease Leishmaniasis and includes molecular parasitology, stress response, and drug resistance.



"I became excited about the many campus initiatives and myriad possibilities for integrative research, particularly those opportunities that cross the traditional boundaries of scientific disciplines."
 –Matthew Ravosa

Matthew Ravosa

[Matthew Ravosa](#), professor, received his Ph.D. from Northwestern University and completed a postdoctorate at Duke University Medical Center. He comes to us from the University of Missouri School of

Medicine, where he was a professor since 2006. His research interests include evolutionary morphology and pathobiology of the mammalian skull, masticatory complex, and musculoskeletal system.



"With my expertise in chemical ecology, sensory physiology and organismal behavior, I am looking forward to developing exciting collaborations across disciplines, and offering a great platform for students to develop and translate their ideas."
 –Zain Syed

Zainulabeuddin Syed

[Zainulabeuddin \(Zain\) Syed](#), assistant professor, received his Ph.D. from the University of Neuchâtel, Switzerland, and his M.Sc. from Aligarh Muslim University in India. He was a postdoctoral scholar at

Free University (Germany) and then University of California, Davis. His research focuses on the neuroethology and chemical ecology of arthropod vectors of diseases, including mosquitoes.



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Departmental Outreach

The members of our department continue to be active in outreach activities:

- The [Museum of Biodiversity](#) in Jordan Hall, curated by Barbara Hellenthal, hosted **over 1100 people** in the past year for educational activities; outreach to local K-12 classrooms reached **hundreds more**
- **Over 200 Notre Dame students** participated in undergraduate research for credit
- The [Science Café](#), hosted by [Global Linkages of Biology, the Environment, and Society \(GLOBES\)](#) fellows, had **over 400 individuals** attend the

lectures

- The [Invasivores website and blog](#), dedicated to sharing recipes for preparing invasive species, was founded by three GLOBES fellows and has a **monthly average of 1,600 hits** from many states and several foreign countries
- **44 middle and high school students** from the [Robinson Center](#) worked alongside biology students conducting research experiments in the genetics laboratory

Summer is a popular time for outreach:

- **29 current Notre Dame students** were selected for [College of](#)

[Science - Summer Undergraduate Research Fellowships \(COS-SURF\)](#)

- **50 students** participated in the summer [Research Experience for Undergraduates \(REU\)](#) program
- **15 high-school teachers** were a part of the [Research Experience for Teachers \(RET\)](#) program
- **24 high school students** were involved in our Summer Scholars Program
- **35 fellows** participated in the GLOBES [Summer Undergraduate Research](#) program

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