



DEPARTMENT OF
BIOLOGICAL SCIENCES

||||| 2022 - 2023 ACADEMIC YEAR HIGHLIGHTS

ADVANCING HUMAN AND ENVIRONMENTAL HEALTH



UNIVERSITY OF
NOTRE DAME
College of Science



The **Department of Biological Sciences** is the core of research and education in the Life Sciences at Notre Dame. Housed predominantly in the Galvin Life Sciences Building at the center of our beautiful campus, the department is home to a diverse community of scholars invested in biological inquiry. Our diverse teaching and research interests span the broad range of the life sciences.

Our endeavors can be conceptually organized into three foci: **Cellular and Regenerative Biology; Infectious Disease and Global Health; Ecology, Evolution and Environment**. However, our culture and practice is highly interdisciplinary; we integrate across these foci and beyond traditional disciplinary, scientific and administrative boundaries.

Our overall mission is to conduct research at the forefront of 21st century integrative biology and to cultivate leaders who will make a difference to the future of human health and the environment.

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EVOLUTIONARY BIOLOGY
CANCER
 ANATOMY AND PHYSIOLOGY
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 AND BEHAVIOR
ENVIRONMENTAL SCIENCES
 EPIDEMIOLOGY AND POPULATION BIOLOGY
REGENERATIVE BIOLOGY
GLOBAL HEALTH
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 DEVELOPMENT
 MICROBIOLOGY & IMMUNOLOGY
ND
 DEPARTMENT OF BIOLOGICAL SCIENCES

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LEADERSHIP AND ADMINISTRATION



Jason Rohr

Ludmilla F., Stephen J., and Robert T. Galla College Professor & Department Chair



Rebecca Wingert

Elizabeth and Michael Gallagher Associate Professor & Director of Graduate Studies



Michael Pfrender

Professor & Associate Chair; Director, Genomics & Bioinformatics Core Facility



Jennifer Robichaud

Teaching Professor & Director of Undergraduate Studies of Biological Sciences Major



David Hyde

Professor & Associate Chair; Kenna Director of the Zebrafish Research Center



Dominic Chaloner

Professor of the Practice & Director of Undergraduate Studies of the Environmental Sciences Major



Elizabeth Archie

Professor & Associate Chair



Nancy Micheal

Rev. John A. Zahm, C.S.C. Associate Teaching Professor & Director of Undergraduate Studies of Neuroscience and Behavior Major

THE DEPARTMENT OF BIOLOGICAL SCIENCES WELCOMES NEW FACULTY MEMBERS IN THE COMING ACADEMIC YEAR



Tyler Coverdale, *Assistant Professor*

Research in the Coverdale Lab seeks to understand how species interactions—particularly those between herbivores and plants—are shaped by a rapidly changing world, and how changes in the abundance and diversity of species affects the structure, function, and resilience of the world's ecosystems.



Joanna Larson, *Assistant Professor of the Practice & Biodiversity Museum & Herbarium Assistant Curator*

As an evolutionary biologist and herpetologist, Joanna's research focuses on the diversification, phenotypic evolution, and community ecology of amphibians and reptiles. As Assistant Curator of the Museum of Biodiversity and Greene-Nieuwland Herbarium, Joanna works to maintain and expand its scientifically significant collections of amphibians, fish, birds, mammals, insects, parasites, and fossils.



Anita Lerch, *Assistant Research Professor*

Anita's research focuses on analyzing genomic and transcriptomic data of vector-borne diseases, in particular *Plasmodium* and *Trypanosoma*, to study the development of the pathogen in the host and the population dynamics of the pathogen and its vector.



Ryan Sensenig, *Professor of the Practice*

Ryan's research focuses on integrating fire ecology, allometric scaling, and herbivore ecology in both savanna grasslands (Kenya) and in reconstructed Tallgrass prairies (Indiana). This work seeks to better understand how the key disturbances of grazing and fire influence plant compositional dynamics, ant-plant mutualisms (in Kenyan savannas), and the visitation to burn sites by megaherbivores (including elephants).



Michael McConnell, *Associate Professor of the Practice*

Mike's current research focuses on using molecular approaches together with in vivo infection models to identify targets for the development of novel vaccines and therapeutics for antibiotic resistant infections. He is inspired by the idea that elucidating fundamental aspects of pathogen biology will allow him to gain insights that facilitate the development of new therapies.



Daniele de Almeida Miranda, *Assistant research Professor*

For more than a decade, Dr. Miranda has been investigating the environmental processes that spread man-made substances in the environment. Over the past six years, Dr. Miranda has focused on studying Per- and Polyfluoroalkyl compounds (PFAS), which are also known as forever chemicals, in aquatic systems.



Prasad Padmanabhan, *Assistant Research Professor*

Prasad's research interest is to describe the molecular mechanisms of two independent disorders; kabuki syndrome and non-ketotic hyperglycinemia (NKH) and explain the associated complications. The lab is interested in multiomics approaches such as bulk RNA sequencing, single cell RNA sequencing and label free proteomics and these techniques are invaluable for understanding the molecular signatures associated with these disorders.



Maria del Pilar Perez-Romero, *Associate Research Professor*

Research in the Perez-Romero lab is focused on characterizing the interactions between *Human cytomegalovirus* (CMV) and the host cell at the level of gene expression, and identifying and characterizing viral gene products that play a role in regulating the host immune response.



Sheri Sanders, *Associate Professor of the Practice*

Sheri's academic interests lie at the intersection of biology and computational science. With a background rooted in biological sciences and a passion for data-driven problem solving, her work has increasingly brought her into the world of high throughput computing (HPC) while still keeping one foot in the realm of cutting-edge biological research. Bioinformatics is a bridge between these two communities and has become an increasing critical skill for biologists.

FACULTY PROMOTIONS

THE DEPARTMENT OF BIOLOGICAL SCIENCES IS PROUD TO ANNOUNCE THE SUCCESSFUL PROMOTION OF THE FOLLOWING FACULTY MEMBERS



Kristin Lewis; to Teaching Professor

Kristin Lewis' graduate training was in ecological genetics, and in addition to this, she has developed expertise in STEM education and assessment. She has been a valuable member of the Department of Biological Sciences since 1998, expertly teaching each of her courses. She was promoted to Associate Teaching Professor in 2003. In addition to her teaching responsibilities, Kristin has contributed to or led significant curriculum development and assessment initiatives within the department. Kristin has been one of the major drivers of a complete revamp of the department's introductory biology series.



Patricia Vaughan; to Associate Professor of the Practice

Dr. Vaughan's training is in cell and microbiology. Her graduate work focused on the enzyme complex required for DNA replication and her postdoctoral research focused on histone proteins and their transcriptional regulation. Dr. Vaughan received her Bachelor of Science degree in Medical Technology from the State University of New York at Albany. She later completed her Doctor of Philosophy in Microbiology, Immunology and Pathology in the laboratory of Michael O'Donnell at Cornell University Medical Center, New York. She joined the University of Notre Dame in 1998. Since arriving, her research in the laboratory of Associate Professor Dr. Kevin Vaughan has focused on molecular motors and Niemann-Pick Type C disease. During her research, she has mentored numerous undergraduate research assistants and graduate students in the Vaughan Lab.

FACULTY RECOGNITIONS

THE FOLLOWING AWARDS RECOGNIZE FACULTY ACCOMPLISHMENTS OVER THE ACADEMIC YEAR.



College of Science Research Award
Recipient: Elizabeth Archie, *Professor*

Each year, the College of Science aims to recognize an outstanding investigator who has made substantial recent contributions to her or his field. This award highlights a highly-productive faculty member with a steep upward trajectory in research and widening national and international impact.



James A. Burns, C.S.C. Award
Recipient: Patricia Champion, *Professor*

Each year, Graduate School aims to recognize outstanding faculty mentorship, and showcases our very best doctoral advisors and the value of positive mentor/mentee relationships



Faculty Senate Annual Exemplary Service Award
Recipient: Amy Stark, *Associate Professor of the Practice*

The Faculty Senate recognizes one or more senators each academic year with the Exemplary Service Award. These employees are honored for outstanding performance in all aspects of their service to Faculty Senate.



The Rev. Edmund P. Joyce, C.S.C., Award for Excellence in Undergraduate Teaching
Recipient: David Veselik, *Teaching Professor*

The Rev. Edmund P. Joyce, C.S.C., Award for Excellence in Undergraduate Teaching annually honors up to 20 faculty members who have had a profound influence on the undergraduate learning experience, elevated students' intellectual engagement, and fostered students' ability to express themselves effectively within a disciplinary context.



The Rev. Edmund P. Joyce, C.S.C., Award for Excellence in Undergraduate Teaching
Recipient: Rebecca Wingert, *Elizabeth and Michael Gallagher Associate Professor*

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FACULTY HIGHLIGHTS



Patricia Champion, Professor, has been elected by the **American Association for the Advancement of Science (AAAS)** as a lifetime fellow. Dr. Champion is being honored for her contributions to the field of bacterial genetics, particularly for identifying mechanisms of bacterial protein transport across membranes in mycobacterial pathogenesis.



Michael Ferdig, Professor, had a paper published in the **Journal Nature Microbiology**, which describes a second gene implicated in malaria parasite resistance evolution to chloroquine.



Research by **Ana Flores Mireles, Hawk Assistant Professor**, was selected to compete in a virtual, bracket-style tournament to find the most innovative medical biomedical research of the year, **STAT Madness**. Dr. Flores-Mireles finished in the top eight of the competition.



Gary Lamberti, Rev. Julius A. Nieuwland C.S.C. Professor of Aquatic Science, and a postdoc in his lab, **Daniele Miranda**, along with **Graham Peaslee** (Physics) received a grant from the **Great Lakes Fishery Trust** to study PFAS in Lake Michigan fishes.



Xin Lu, John M. and Mary Jo Boler Collegiate Associate Professor, had a paper published in **Science immunology** with a graduate student in his lab, **Yini Zhu**, as first author. The paper describes the lab's research which shows Pygo2 is an oncogene, meaning that it promotes cancer progression, and that it is found in high levels in advanced prostate cancer tumors.

MANY FACULTY IN THE DEPARTMENT OF BIOLOGICAL SCIENCES LEAD IN THEIR DISCIPLINES THROUGH SCHOLARSHIP AND SERVICE. HERE IS A SAMPLING OF FACULTY ACCOMPLISHMENTS



Jason McLachlan, Associate Professor, had a paper published in *Science* that describes how evolution has occurred more rapidly than previously thought in the Chesapeake Bay wetlands, which may decrease the chance that coastal marshes can withstand future sea level rise.



Jason Rohr, Ludmilla F., Stephen J., and Robert T. Galla College Professor & Department Chair, has been honored with the **George Mercer Award** from the **Ecological Society of America**. The George Mercer award is given annually for an outstanding ecological research paper published within the past two years by a younger researcher. The paper for which the award is based was published in the *Proceedings of the National Academy of Sciences* in February 2022.



Felipe Santiago-Tirado, Assistant Professor, had a paper published in *mBio*, the journal of the **American Society for Microbiology**, which describes a gene they discovered that increases the chance for drug resistance in the fungi *Cryptococcus neoformans*.



Nathan Swenson, Professor & Gillen Director, Environmental Research Center (UNDERC), had a paper published in *Ecology and Evolution*, which outlines how the research team utilized hierarchical Bayesian models to characterize species-specific height and crown size allometric parameters.



Cody Smith, Elizabeth and Michael Gallagher Associate Professor, had a paper published in *Nature Neuroscience* that demonstrates how lymphatics are associated with microglia and brain development in zebrafish.

GRADUATE STUDENT ACCOMPLISHMENTS

Graduate Student Researcher of the Year

Recipient: Aurel Holzuchuch, nominated by advisor Cristian Koepfli

Recipient: Alyssa La Bella, nominated by advisors Flores-Mireles & Santiago-Tirado

This award recognizes a current Biological Sciences graduate student (M.S. or Ph.D. track) who has demonstrated an exceptional research achievement.

Exemplary Graduate Research Career

Recipient: Megan Vahsen, nominated by advisor Jason McLachlan

This award recognizes a current Biological Sciences graduate student who best personifies the department's mission of advancing biological knowledge by demonstrable excellence in research, educating the next generation of leaders in the life sciences, and applying their findings to solve the grand challenges that will shape the future of human health and the environment.

Outstanding Graduate Student Leader of the Year

Recipient: Madison Schmidtman, nominated by advisor Crislyn D'Souza-Schorey

Recipient: Camille Mosley, nominated by advisor Stuart Jones

Recipient: Elise Snyder, nominated by graduate student Emma Thrift

This award recognizes a Biological Sciences graduate student who has exhibited outstanding leadership and made a unique contribution to our community. This award is intended to recognize students who conceptualize and actualize events/activities that promote the education, professional development, social health and well-being of fellow students and/or other community members.