

LEARNING DISCOVERY IMPACT

Strategic Goals: 2015-2020
Department of Biological Sciences



UNIVERSITY OF
NOTRE DAME

College of Science

INTRODUCTION

The Department of Biological Sciences at Notre Dame seeks to understand the fundamental mechanisms by which living systems operate, and employs a wide range of cutting edge and innovative experimental approaches and systems. The Department is highly interdisciplinary and well positioned to fulfill the promise of the new integrative approach to biology. Diverse disciplines and programs in the life sciences converge here to catalyze the development of new knowledge and groundbreaking ideas. Foundational research is at the center of our endeavors and fuels and inspires our teaching and training efforts.

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. We continually strive for improvement through investments in our people; in growing and transforming our research enterprise; in enhancing our educational programs; in cultivating intramural and extramural partnerships; and in improving our operational efficiencies. We commit to ensuring diversity of all forms in the pursuit of excellence in learning and discovery.

Aerial view of the Notre Dame campus



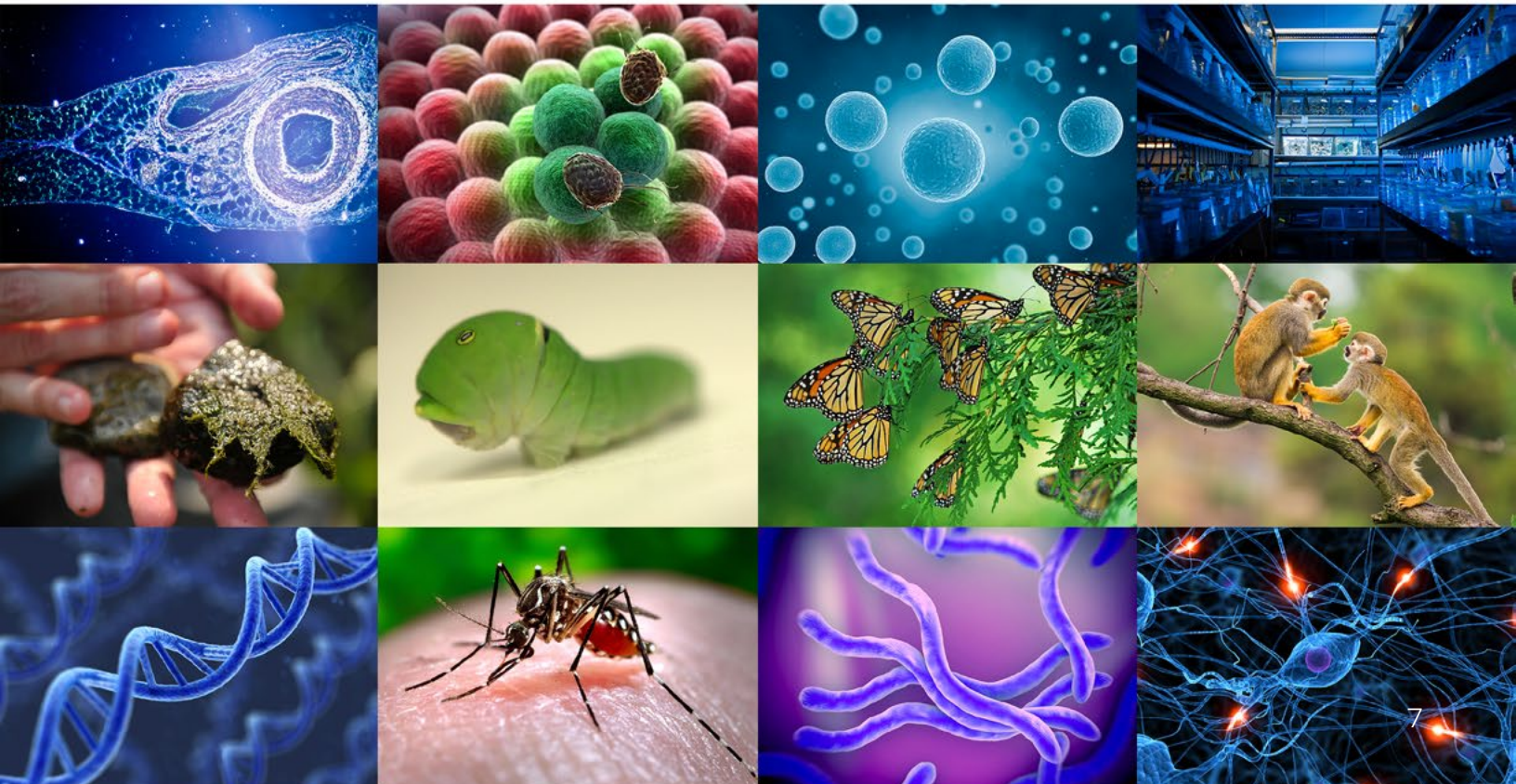
STRENGTHS

The department is the core of research and education in the Life Sciences at the University of Notre Dame. One of the largest academic units, the department consists of 43 tenured and tenure-track faculty members, 26 non-tenure track faculty, 11 concurrent or adjunct faculty, 139 graduate students, 32 postdoctoral scientists, more than 350 undergraduate majors and more than 50 research and administrative staff.

Our teaching and research interests span the broad range of the life sciences. Our endeavors can be conceptually organized into three foci: (1) Cellular and Regenerative Biology, (2) Infectious Disease and Global Health, and (3) 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. Grants and contracts from the National Institutes of Health, the National Science Foundation, the Department of Defense, and many others average approximately 15 million in external funding each year for the past decade. There are abundant opportunities for synergy with various Centers and Institutes on campus.

We believe in learning by doing. Our educational and honors programs have become models for other programs. We are investing in “flipped” classrooms, active learning, and online training modules. Our curricula offer unsurpassed experiential learning and professional development opportunities for our students. The vertical peer mentoring program, UPLIFT, is but one example of our student-led learning programs that improve student success. Our students join us because they seek a top-notch education in the life sciences afforded by two rigorous majors and the opportunity to work with innovative faculty who are at the top of their fields.

Pictorial representation of research interests. Learn more at biology.nd.edu/research



CHALLENGES

The higher education landscape in the United States is undergoing fundamental changes. We must ensure mechanisms for our faculty to respond in creative and original ways to the challenges presented by shifting funding models for teaching and research. We must find ways to increase our numbers of large, federally funded project grants and communicate more clearly with our internal and external constituents about the transformative ideas and programs within our department.

We must become as efficient as possible with our resources. We will develop a long-term plan to address our constrained research space and determine how to renovate a building with infrastructure that is in severe disrepair.

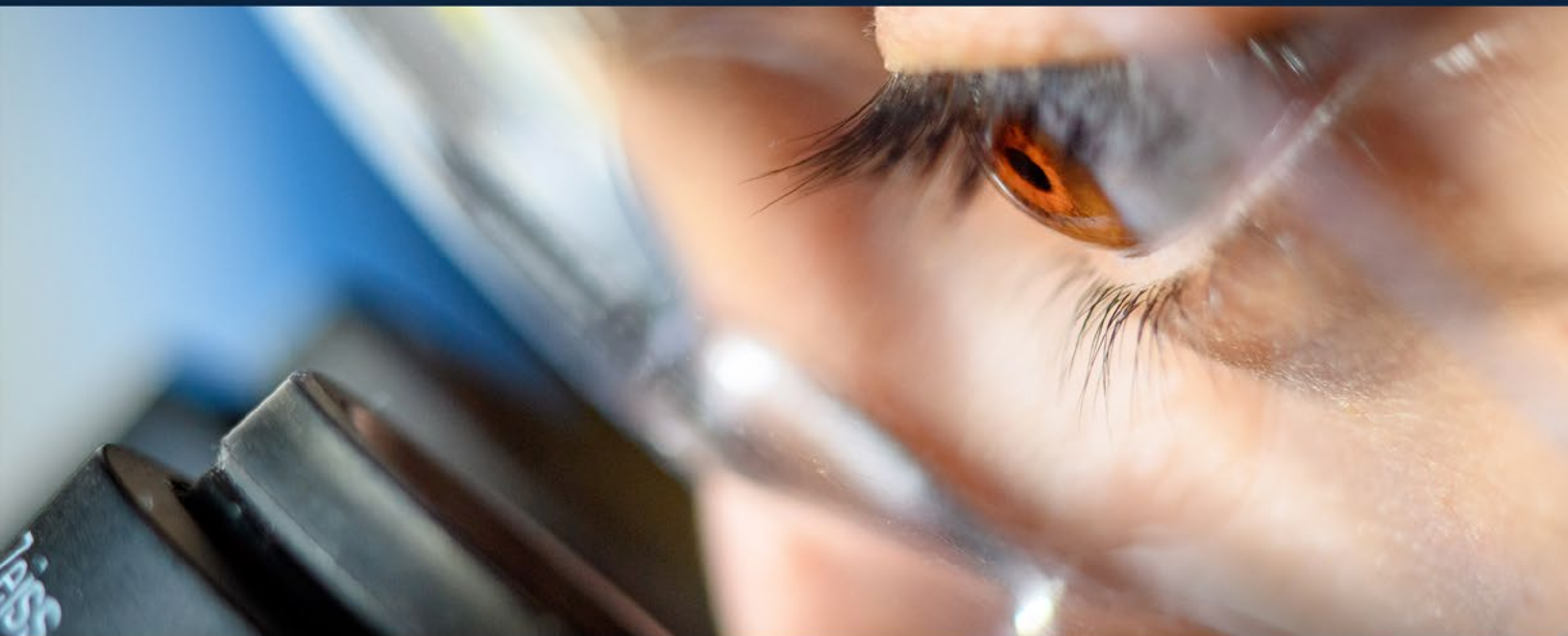
The ultimate strength of any unit is its people. We have recently lost senior faculty to other institutions, and to retirement. We must extend programmatic strengths through strategic faculty growth.

We will develop innovative ways to ensure that all students have access to small learning environments and the courses necessary to progress in their degree. We will explore creative ways to use technology to expand inquiry-based learning opportunities and prepare all our students for an evolving landscape of career possibilities.

Finally, it is imperative that our department across all levels, reflect the diversity of our multicultural society and that we expand our reach in educating and preparing the next generation of life scientists.

Zebrafish core facility in the Galvin Life Science building





STRATEGIC GOALS

The department aspires to shape the future of life science education and to foster the creation of knowledge that together improves the well being of humankind and our planet.

We embrace this **vision** by focusing on the following goals:

- 1 Provide our students a holistic education that cultivates lifelong learning and develops the next generation of leaders in the life sciences.
- 2 Inspire excellence by integrating the study of life across traditional disciplinary fields and promoting innovation.
- 3 Build a distinctive and distinguished graduate program that lays the foundation for offering effective solutions to pressing health and environmental issues.
- 4 Promote a departmental culture that embraces inclusive excellence.
- 5 Engage in research, teaching, and outreach efforts within our local and global communities that advance social justice and societal good.

Our aspirations are fitting with our University's mission, as preeminence in the Life Sciences maximizes our potential as a force for global good.

1

Provide our students a holistic education that cultivates lifelong learning and develops the next generation of leaders in the life sciences.

SPECIFIC ACTIONS:

- Revamp Introductory Biology by reassessing learning goals and core competencies.
- Consider the effective utilization of specialized tracks in the Biology major.
- Support and facilitate the development of teaching methods that merge technology and inquiry-based instruction to improve student learning. Offer professional education and assistance for faculty to effectively implement changes in courses.
- Develop laboratory courses to ensure that every undergraduate major can engage in a creative and original research project.
- Develop mechanisms for career advising and professional development for our student majors.

Poster presentations at Jordan Hall of Science



Inspire excellence by integrating the study of life across traditional disciplinary fields and promoting innovation.

SPECIFIC ACTIONS:

- Grow the faculty in core disciplines and fields that emerge at the interfaces of those disciplines.
- Grow and support computational facilities and informatics that will allow our faculty and students to reach and stay at the frontiers of discovery.
- Support and encourage efforts to infuse life science initiatives with university strengths in the humanities and social sciences, and provide platforms for understanding the cultural, economic and social attributes that affect human and environmental health.
- Strengthen and stabilize the non-tenure track faculty by developing and articulating clear standards and practices for hiring, evaluation and rewards for these faculty members.
- Develop and incentivize a postdoctoral scholars program. A number of top-ranked departments have seen the benefit of attracting postdoctoral scientists. Programs through the Kaneb Center for Teaching and Learning will be an attraction for postdoctoral scholars who seek a future career as educators.
- Continuously assess the relevance and quality of our organizational structures and administrative processes. Develop a front office with talented staff and integrate them fully into the fabric of the department's research and educational programs so the needs of the students and faculty are better served.



3

Build a distinctive and distinguished graduate program that develops and offers effective solutions to pressing health and environmental issues.

SPECIFIC ACTIONS:

- Reassess the graduate training of our students changing what we teach and how, as a means to improve the graduate education experience. We will determine the magnitude of change needed to align with best practices and make recommendations for change.
- Enhance strategies for recruitment to the graduate program. Cultivate the visibility and international presence of our graduate program.
- Integrate professional development and career planning into graduate training thereby allowing students to reach their full potential.
- Develop a dissertation option that encourages student entrepreneurial activities.
- Develop an annual student led, faculty-mentored research symposium that provides opportunities for students to network with elite scientists in various disciplines of Biology.
- Promote and formalize graduate student engagement in the departmental seminar series.
- Develop a mechanism for tracking placement of students upon graduation.

Professor Rebecca Wingert and her student in the laboratory



Promote a departmental culture that embraces inclusive excellence.

SPECIFIC ACTIONS:

- Continuously reshape courses, particularly introductory courses, to increase retention particularly of first generation college students and students that are traditionally underrepresented in the STEM fields.
- Encourage the hiring of faculty that significantly diversifies our faculty demographics. Develop a set of *Practices* for faculty searches that promote increasing diversity and 'hiring the best' as compatible goals.
- Develop a certification program that cultivates student leadership.
- Support policies for graduate students, postdoctoral fellows, staff and faculty that facilitate work-life balance.



Engage in research, teaching, and outreach efforts within our local and global communities that advance social justice and societal good.

SPECIFIC ACTIONS:

- Enhance the dissemination of knowledge that continues to emerge from our research by promoting the process by which new discoveries can be publicized, patented and commercialized and cultivating a productive relationship with the University's IDEA Center.
- Increase our benefit from global research and educational opportunities, by leveraging our strong international collaborations and building partnerships with our global programs and gateways through Notre Dame International.
- We will continue to expand strong departmental presence in programs and centers such as the DNA Learning Center, the Center for Rare and Neglected Diseases, the Eck Institute for Global Health, ND LEEF, and others which engage with the greater Michiana community and beyond to provide science engagement, patient advocacy, expertise, and service.
- We will continue to support the Biology Graduate Student Organization (BGSO) in their efforts to promote social, institutional, and intellectual engagement between biology graduate students, faculty and the greater Notre Dame community. The BGSO has been active in K-12 educational outreach programs in the South Bend community through participation in classroom and on campus visits, NIRSEF science fair judging, Science Alive and many other events.
- We will reach the campus and beyond to promote an understanding of and appreciation for our discoveries and beyond, and further connect with alumni through an annual newsletter and expanded web-based presence.

Community event at the Notre Dame Linked Experimental Ecosystem Facility (ND-LEEF)



OUR FUTURE

The department is strong today, but it will be better in the future because it will have:

- A vibrant community of scholars engaged in innovative, inquiry-based educational programs that coalesce the academic and research missions of our university.
- A strong, stable foundation and efficiently utilized resources for faculty growth and innovative teaching.
- Students, faculty members and staff who reflect the diverse populations of our multicultural society and serve as positive role models for future generations of biologists.
- Thriving graduate student and postdoctoral scholar programs that generate high-impact discoveries in partnership with our faculty.
- Well-supported, integrated non-tenure track faculty dedicated to the profession of teaching and research.
- Strong partnerships with Notre Dame International and the IDEA Center
- Discoveries that are a force for good.

Our strategic goals are steps to create this future and are placed within the context of Notre Dame's distinctive vision and strategic plan—A Legacy Expanded.



DEPARTMENT LEADERSHIP

Crislyn D'Souza-Schorey, Professor and Department Chair

Nora Besansky, Professor and Associate Department Chair

Michelle Whaley, Teaching Professor and Assistant Department Chair

Rebecca Wingert, Associate Professor and Director of Graduate Studies

David Veselik, Associate Teaching Professor and Director of Undergraduate Studies (Biology)

Dominic Chaloner, Associate Teaching Professor and Director of Undergraduate Studies (Environmental Sciences)



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