Biology studies the origin, structure, development, reproduction, and evolution of life. Biological research holds the key to understanding many modern challenges, including bio-engineering breakthroughs, environmental concerns, ecological relationships, and medical issues. The need for dedicated, innovative, and socially responsible biologists has never been greater than it is today. Thus, at the core of Gonzaga University’s Biology Department is the Jesuit mission to combine academic study with the pursuit of social justice and the development of the whole person.

THE PROGRAM
The faculty members in the Biology Department are genuinely devoted to teaching, mentoring, and helping students fulfill their academic ambitions. The program provides a strong foundation of knowledge and hands-on research experience, while cultivating curiosity and critical thinking.

DEGREES
The Bachelor of Science (B.S.) in Biology provides students with a broad education in biology, supported by a solid grounding in chemistry and physics. This degree is designed for students pursuing continued training in graduate programs in biological and biomedical sciences, medicine, and dentistry.

The Bachelor of Arts (B.A.) in Biology provides students with a thorough biology education, but with fewer chemistry and physics courses. It allows flexibility for students pursuing additional interests, such as teaching or a second major in another area of study.

RESEARCH CONCENTRATION
The Research Concentration within the Biology major is designed for students who want to explore graduate level training in science. This concentration adds math courses, a significant research experience, participation in a seminar course and involvement in science outreach to the major requirements.

CURRICULUM
The Biology Department curriculum emphasizes an integrative and evolutionary approach that exposes students to central ideas in the study of biology. All Biology majors take the same introductory courses that introduce foundational themes and concepts and then pursue their area of interest through elective courses. In general, our elective courses fall into the main categories of comparative physiology, genetics, cell and molecular biology, and ecology. Students are free to explore their interests in any or all of these areas.

RESEARCH OPPORTUNITIES
Biology Department faculty involve students in their research projects because they are passionate about discovering new information and convinced that doing research is a great way for students to learn science. In recognition of their dedication to undergraduate research, the Biology Department and the Department of Chemistry and Biochemistry were awarded two consecutive $1.2 million grants by the Howard Hughes Medical Institute to support science education and research at Gonzaga. The first grant allowed us to significantly expand research opportunities and our science education outreach program. The second grant focused on developing students as socially responsible leaders in science, research, and medicine by helping them develop a deep understanding of their discipline, extensive research experience, skills in communicating scientific ideas, and the ability to apply their scientific knowledge to societal challenges. Our intentional work with undergraduates in research has resulted in a strong overall research program. Gonzaga students present posters at regional and national scientific meetings and co-author papers in scientific journals with their faculty mentors.

The Biology Department’s educational mission focuses on inclusive excellence and leadership; that is, we seek to provide a rigorous yet supportive environment in which all students can develop and hone their interests and skills. Students can do this by participating in research, as teaching assistants or peer mentors, or through involvement in our science outreach programs. We strive to attract, retain and promote the success of our students, including underrepresented minorities and first generation college students, and have developed specific programs to build community among our diverse learners, such as the Science Scholars program, Hughes After Dark mentoring program and Science In Action! outreach program.
Current research projects seek to answer such questions as:

- What affects the evolution of arboviruses like Zika?
- How to best disinfect catheter ports to prevent hospital acquired infections?
- How do social woodpeckers choose mates?
- How are the genes in viruses regulated?
- Can we use a naturally occurring fungus to fight cheatgrass invasions?
- How does heavy metal pollution affect animal behavior?
- How do bacteria survive oxidative stress attacks from immune cells?
- Why are spider silk and other biomaterials so strong?
- How do salamanders communicate?
- How does environmental stress impact organisms and ecosystems?

For more detailed descriptions of faculty research, please see our Undergraduate Research website: www.gonzaga.edu/science-research.

STUDY ABROAD

Often, Gonzaga Biology majors combine coursework or research with travel, which allows students to learn about other cultures and ecological systems while pursuing their educational goals. Gonzaga currently offers field biology programs in Ecuador and Zambia. Gonzaga is also affiliated with the School for Field Studies, a consortium of colleges and universities that maintain science study abroad programs throughout the world. Through these programs, Gonzaga students gain "hands-on" experience in a variety of biological and ecological settings.

Sponsored programs in countries such as Scotland also provide students who are interested in medicine and biotechnology with the opportunity to take some upper division elective courses that count toward their major requirements.

SCIENCE OUTREACH

In addition to valuing research, the Department emphasizes the relationship between biological study and social justice. Gonzaga biology students participate in a variety of science outreach programs, including Science in Action! This popular science education outreach program sends teams of GU students to K-12 classrooms in Spokane to do inquiry-based science activities. Other students volunteer at local science education events or serve as lab mentors to high school students who have an interest in science.

OUTCOMES

The Biology Department faculty members are dedicated to excellence in teaching and mentoring students as they navigate the rigorous curriculum of the Biology degree. Consequently, Biology majors are well prepared for careers in research, teaching, medicine, and other biology-related fields. Some students decide to work for biotechnology companies after graduation, such as Jubilant HollisterStier Laboratories and ICOS Biopharmaceuticals. Others take jobs with government agencies, hospitals, or university research laboratories. Still others pursue careers that integrate a passion for biology with other interests, such as genetic counseling, science writing, forensics, law, and health care.

GRANTS


GRADUATE STUDIES

Through their undergraduate research experience, a number of Gonzaga students discover how exciting and intellectually stimulating scientific research can be and decide to pursue graduate study for advanced degrees. Gonzaga graduates are currently working on Ph.D. degrees in neuroscience, infectious diseases, cell and molecular biology, ecology, molecular plant sciences, and others at research universities throughout the country, such as Yale University, Johns Hopkins University, Washington State University, and University of California, Berkeley.

HEALTH SCIENCE CAREERS

Several members of the Biology Department serve on the Committee for Health Science Careers, an interdisciplinary group of faculty who advise Gonzaga students applying for professional schools in medicine, dentistry, and veterinary medicine. Before applying, students submit essays and practice interviewing before the Committee, who offer valuable feedback and advice. Many students are strong candidates for medical, dental, and veterinary schools, and each year a number of Gonzaga graduates are accepted. Gonzaga Biology alumni are currently at schools across the country, including the University of Washington, Washington State University, Mayo Medical School, Creighton University, Emory University, and others.

National Science Foundation. Awarded to Joseph Haydock, Gonzaga University; Walter Koenig, Cornell University; Eric Walters, Old Dominion University. Collaborative Research: Evolution of Cooperative Behavior. 2015. Total Award Amount: $645,186. Gonzaga Award: $114,056.

National Science Foundation. Awarded to Brook Swanson, Gonzaga University; Laura Lavine, Washington State University. Collaborative Research: The Evolution of Extreme Trait Size. 2015. Award Amount: $700,000. Gonzaga Award: $142,110.

Gonzaga’s Biology Department’s core strength is its team of dedicated faculty. Faculty members serve as academic advisors and enjoy mentoring students both personally and professionally. Examples of recent research accomplishments are listed below.

**SAMPLE OF FACULTY & STUDENT RESEARCH**

*GU Biology faculty denoted in *italics*; GU undergraduate co-authors in *bold*


**Howard Hughes Medical Institute.** Awarded to Nancy Staub, Gonzaga University; Susan Meyer, US Forest Service. Cheatgrass Stand Failure in the Great Basin: Fungal Pathogens, Carbon Dynamics, and Fungistasis. 2014. Award Amount: $34,852

**Howard Hughes Medical Institute.** Awarded to Elizabeth Addis. Urbanization of Yellow-Bellied Marmots (*Marmota flaviventris*). 2015. Award Amount: $21,000.

**W.M. Keck Foundation.** Awarded to Jeff Watson and Carla Bonilla. Linked Experimental System. 2014. Award Amount: $250,000.


**Howard Hughes Medical Institute.** Awarded to Gonzaga University Biology and Chemistry & Biochemistry Departments. Grant to develop students as socially responsible leaders in science, research, and medicine and provide course-based undergraduate research experiences. 2012. Award Amount: $1,200,000.

**Joint Fire Science Program (USDI and USDA).** Awarded to Julie Beckstead (with collaborators, Dr. Meyer and Dr. Allen). Enhancing the Effectiveness of Annual Grass Weed Biocontrol with the Black Fingers of Death Pathogen (*Pyrenophora semeniperda*). 2012. Total Award Amount: $424,018; Gonzaga Award: $160,000.

**Murdock Charitable Trust College Research Program for Life Sciences.** Awarded to Gary Chang. Study of the population ecology of a weevil. 2012. Award Amount: $37,650.
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