



Biology

Biology is the science of life. Each living thing is an amazingly complex system, and each interacts with other living things in complex ways. Biological science holds the key to addressing many issues facing humanity, including disease treatment and prevention, food production and its impacts, environmental changes, loss of biodiversity, genomic editing of organisms, regenerative medicine, and more. The need for dedicated, innovative, and socially responsible biological scientists, physicians, educators, and citizens 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 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, 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.

The Biology Department's educational mission focuses on inclusive excellence and leadership; that is, 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 science outreach programs. The Biology Department strives to attract, retain, and promote the success of its students, including underrepresented and first generation college students. Specific programs have been developed to build community among diverse learners, such as the Science Scholars program, Hughes After Dark mentoring program, and Science In Action! outreach program.

DEGREE PROGRAMS

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.

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 is designed for students who want to explore graduate level training in science. In addition to the requirements for the major, this concentration adds math courses, a significant research experience, participation in a seminar course, and involvement in science outreach.

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 Chemistry and Biochemistry Department 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 the program to significantly expand research opportunities and the science education outreach program. The second grant focused on developing students as socially responsible leaders in science, research, and medicine. Our intentional work with undergraduates in research has resulted in a strong overall research program. Gonzaga students present their research at regional and national scientific meetings and co-author papers in scientific journals with their faculty mentors.

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 are the genes in viruses regulated?
- Can a naturally occurring fungus be used 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/student research, please see our Undergraduate Research website:

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 offers field biology programs in Ecuador, Zambia, and the Pacific Northwest. Gonzaga is also affiliated with the School for Field Studies, the premier environmental study abroad program for undergraduates, which operates field stations 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 medicine, research, teaching, and other biology-related fields. Some students decide to work for biotechnology companies after graduation, such as Jubilant HollisterStier Laboratories and AGC Biologics. 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.

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:

- Johns Hopkins University
- University of California - Berkeley
- University of Indiana
- University of Michigan
- University of Wisconsin - Madison
- Washington State University
- Yale University

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, some of which include:

- Case Western Reserve University
- Creighton University
- Medical College of Wisconsin
- Oregon Health and Science University
- St. Louis University
- University of Arizona
- University of California - Irvine
- University of Florida
- University of Iowa
- University of Nebraska
- University of Pittsburgh
- University of Utah
- University of Washington
- Washington State University



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