THE PROGRAM
The faculty members in the Biology Department are genuinely devoted to teaching and mentoring students, and to 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 to prepare students for careers in biology, including 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 OPTION
The Research Option is a challenging, optional track within the Biology degree. It is designed for motivated students who want to pursue research after graduation (Ph.D. programs, industry, government, medical school, science education). Courses provide additional grounding in math, statistics, and scientific writing, and activities include significant independent research, participation in scientific meetings, and science education outreach.

THE PASSION
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.

COURSEWORK
The Biology Department recently revised the curriculum for its majors to emphasize an integrative and evolutionary approach that exposes students to ideas that are central to biology. Introductory courses focus on the overarching themes of information and energy. Courses in physiology and biodiversity, ecology, and genetics follow. All biology majors take the same introductory courses in biology. Students then pursue specific interest areas through upper division electives. Examples include: biochemistry, molecular biology, comparative physiology, vertebrate biology, field botany, developmental biology, parasitology, conservation biology, and advanced courses in cell biology, genetics, evolution, and ecology. All students take at least one Advanced Topics course, which is a small seminar class exploring scientific literature in biology.

RESEARCH OPPORTUNITIES
The faculty in the Biology Department involve students in their research projects because they are passionate about discovering new information and are convinced that doing research is a great way for students to learn science. As a testament to their dedication to undergraduate research, the Biology Department and the Department of Chemistry and Biochemistry have been awarded two, consecutive $1.2 million grants by the Howard Hughes Medical Institute to support science education and research. Since 2008, the first of these four-year grants has allowed Gonzaga to offer more research positions for undergraduates both during the academic year and the summer, hire additional faculty, develop new courses, and expand our science education outreach program. The second grant began Fall of 2012. This award is focused on developing students as socially responsible leaders in science, research, and medicine by cultivating science majors with a deep understanding of their discipline, extensive research experience, experience communicating science, and the ability to apply their scientific knowledge to societal challenges. New initiatives include the implementation of The Science Scholars Program to promote greater diversity among science majors and a research-based lab experience for all students in our introductory biology class. Our intentional involvement of undergraduates in research projects has resulted in a strong research program. Gonzaga students present posters at regional and national scientific meetings and have been co-authors with their faculty mentors, publishing papers in scientific journals.
Current research projects seek to answer such questions as:

- How does cell adhesion relate to colon cancer?
- How did cocaine synthesis evolve in plants?
- Can lady beetles be used in place of pesticides?
- What does calcium do in photosynthesis?
- How does an extra chromosome affect a cell?
- How do social woodpeckers choose mates?
- Can we use a naturally occurring fungus to fight cheatgrass invasions?
- How does heavy metal pollution affect animal behavior?
- Why are spider silk and other biomaterials so strong?
- How do salamanders communicate?
- What controls investment in reproduction over survival?

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

**STUDY ABROAD**

Often, Gonzaga biology students combine research with travel and the development of an understanding of other cultures and ecological systems. 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 programs throughout the world. Through the Gonzaga courses or the Field Studies programs, Gonzaga students gain “hands-on” experience in a variety of biological and ecological settings:

- Tropical Rainforest Studies (Australia)
- Sustainable Development Studies (Costa Rica)
- Biological Diversity (Ecuador, including Galapagos Islands)
- Wildlife Management Studies (Kenya)
- Tropical Island Biodiversity and Conservation Studies (Panama)
- Marine Resource Management Studies (Turks & Caicos)
- Chimfunshi Wildlife Reserve (Zambia)

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.

**THE POTENTIAL**

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 Hollister-Stier Laboratories, Signature Genomics, and ICOS Biopharmaceuticals. Others take jobs with government agencies, hospitals, or research university 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 they 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 UC-Berkeley.

**HEALTH SCIENCE CAREERS**

Several members of the Biology Department serve on the Committee for Health Science Careers, a group of interdisciplinary 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, which offers 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.

**THE PEOPLE**

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 accomplishments of Biology faculty (and our undergraduates, noted with an *) are listed in the next section.

**GRANTS**

**Howard Hughes Medical Institute.** Awarded to Catherine Mader, Hope College; Nancy Staub, Gonzaga University; Luther Williams, Tuskegee University; Sandra White, North Carolina Central University; Véronique Delesalle, Gettysburg College; Bettye Sue Hennington, Tougaloo College; Robert Merritt, Smith College. The Phage Model Goes Viral: Developing Other Models for Course-based Research Experiences (CREs). 2013. Award Amount: $50,000.


**Howard Hughes Medical Institute.** Awarded to: Gonzaga University Biology and Chemistry & Biochemistry Departments. Grant to develop students as socially responsible leaders in science.
Pyrenophora semeniperda effects on the cheatgrass seed bank pathogen.


E.L. Wiegand Foundation (Reno, NV). Awarded to: David Boose. Grant to purchase three environmental growth chambers and ten sets of plant physiology analysis equipment. 2007. Award Amount: $191,000.

Institute of Systems Medicine. Awarded to: Nancy Staub. Grant to fund K-12 science outreach in the Spokane community. 2007. Award Amount: $9,000.

U.S. Air Force Office of Scientific Research award. Awarded to: Brook Swanson. Grant for equipment to study the strength, extensibility, and toughness of biomaterials. 2007. Award Amount: $148,000.

The M.J. Murdock Charitable Trust College Research Program for Life Sciences has also recently funded research projects for Gary Chang, Kirk Anders, Julie Beckstead, Mia Bertagnolli, and Nancy Staub.

Publications


Research Grants to Mentored Undergraduates
Weed Science Society Association Undergraduate Research Award. Awarded to: *Trevor Davis, undergraduate (mentored by Julie Beckstead). Title: Variable virulence of *Pyrenophora semeniperda* with the presence of other pathogenic fungi in double infections of *Bromus tectorum*. 2009. Award Amount: $1000.


Faculty Contacts and Specialties
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