



# Neuroscience

*Studying Neuroscience at Gonzaga University allows students to explore the intricacies of the brain and nervous system through a dynamic interdisciplinary approach, combining physiology, molecular biology, genetics, anatomy, psychology, biochemistry, physics, and computer science. The program addresses fundamental questions of human existence and the mechanisms influencing behavior and cognition. Gonzaga's Neuroscience curriculum emphasizes scientific inquiry, critical thinking, and ethical considerations, preparing students for diverse careers and inspiring them to integrate their knowledge and skills in service to others.*

## THE PROGRAM

Housed in the Psychology department, Gonzaga offers a Bachelor of Science in Neuroscience. The B.S. in Neuroscience is an interdepartmental program with students taking courses from all over the University including the departments of Biology, Chemistry & Biochemistry, Human Physiology, Physics, and Psychology. This interdisciplinary approach allows students to gain skills from a diverse set of STEM and social science fields. Students will begin their studies with foundational courses in physical and life sciences, math, and psychology and then move onto the required major-specific courses, listed on the right, that ground them in the basics of Neuroscience. Students will also have a chance to tailor their education to their specific areas of interests by taking electives from several different departments.

Students who choose to major in Neuroscience will not only gain a profound understanding of the nervous system's biological and psychological aspects, but also develop critical skills in problem-solving and research methodologies. This knowledge empowers graduates to contribute to advancements in neurological disorders, mental health, memory, and aging. Beyond the academic curriculum, the study of Neuroscience enriches personal growth by providing profound insights into consciousness and the human experience, making it a rewarding academic pursuit at Gonzaga.

## NEUROSCIENCE FOUNDATION

### NEUR 201 Introduction to Neuroscience

Comprehensive overview of the nervous system's structure and function, physiology of cells and systems, development, learning and memory, neurological disorders, and research methods in neuroscience.

### BIOL 376 Cellular Neurophysiology

Examination of the cellular mechanisms of the nervous system, covering neuronal signaling, synaptic transmission, and neural plasticity.

### NEUR 399 Scientific Communication

Development of effective communication skills in neuroscience, teaching students to analyze literature, engage in discussions, and prepare scientific writings.

### HPHY 451 Systems Neurophysiology

Advanced study of neural cell functions and the physiological properties of neural communication, covering sensory and motor pathways and their integration in normal and diseased states.

## RESEARCH

Neuroscience faculty across several departments offer students a chance to engage in a broad range of research opportunities and gain valuable experience as they apply techniques working alongside faculty. Some research opportunities include:

- *Studying gait and balance function in individuals with Parkinson's Disease*
- *Exploring the evolution of sensory-based mate choice*
- *Uncovering the neural underpinnings of second language acquisition*
- *Utilizing mathematical modeling to describe visual attention*
- *Investigating high-altitude effects on brain function*
- *Modeling the neural synchronization of sleep*

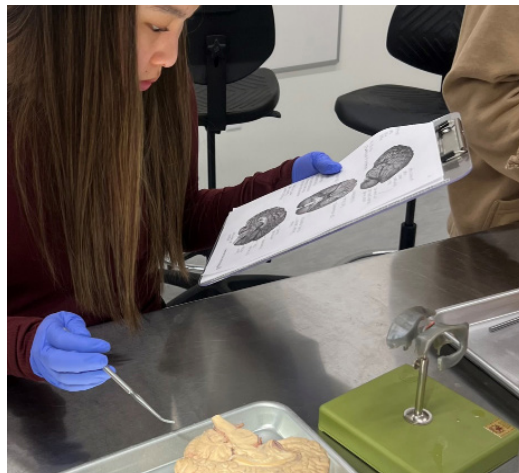
Past Gonzaga students have also participated in competitive off-campus summer research opportunities across the nation at major research universities, as well as opportunities through the University of Washington/Gonzaga Health Partnership on campus. Also close to home, Gonzaga undergrads have been welcome at Washington State University's Spokane campus for research opportunities in neuroscience and pharmacology.

## SERVICE

At Gonzaga, students have the opportunity to participate in service opportunities that educate the local community about neuroscience and the brain. Through Gonzaga's Science in Action! program, students partner with local elementary schools to lead hands-on, inquiry-based science activities, fostering scientific curiosity and literacy among young students. Additionally, the Spokane Center for Neuroscience Education (SCPNE) collaborates with our Neuroscience program to provide outreach at local K-12 STEM fairs and community demonstrations. Having students integrate outreach into their education aligns with our Jesuit values, emphasizing the importance of service, community engagement, and the application of knowledge to better the world around us.

## OUTCOMES

A Neuroscience degree from Gonzaga opens diverse career paths, including research in biotech, pharmaceuticals, counseling, clinical psychology, and medicine. Graduates can pursue academia, exploring behavioral, cognitive, computational, and molecular neuroscience, as well as AI, biomedical engineering, pharmacology, and clinical neuroscience. Beyond the lab and clinic, a Neuroscience degree paves the way for futures in science communication, education, and policy-making, where translating complex ideas into actionable insights can influence public health and wellness strategies.



## FACULTY CONTACT

**Kevin Measor, Ph.D.**

DIRECTOR, NEUROSCIENCE PROGRAM

MEASOR@GONZAGA.EDU

## FOR MORE INFORMATION:

[gonzaga.edu/neuroscience](http://gonzaga.edu/neuroscience)

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## FOUNDATION (CONT.)

### HPHY 453 Neuroanatomy

In-depth study of the anatomical organization of the human nervous system, combining lectures and hands-on labs to explore brain and spinal cord structures and their functions.

### NEUR 499 Neuroscience and Society

Senior capstone course that explores the intersection of neuroscience and our community, examining how scientific advances shape our understanding of everyday life and integrating knowledge from neuroscience and liberal arts to understand societal implications.

## DESIGNING YOUR EDUCATION

The Neuroscience major requires nine credits of neuroscience-related electives. Students will be able to choose courses from five different areas of interest, deciding whether to focus in any given area or to combine across different areas. Areas of interest and example courses include:

### Cellular and Molecular Area

- Biochemistry
- Developmental Neurobiology
- Advanced Genetics

### Physiological and Anatomical Area

- Neuropharmacology
- Physiology of Aging
- Neuromuscular Control

### Philosophical Area

- Philosophy of Mind
- Philosophy of Science
- Philosophy of Time

### Computational Area

- Biological Data Analysis
- Speech and Natural Language Processing
- Biophysical Systems and Modeling

### Behavior Area

- Neural Mechanisms of Animal Behavior
- Cognition
- Sensation and Perception