QUANTITATIVE BIOLOGY

This interdisciplinary major bridges the space between biology, chemistry, data science, and engineering. It allows students interested in studying the life sciences to achieve a fuller background in the quantitative sciences, including computer science and statistics courses that are essential for modern data-driven biological science. The Quantitative Biology major is designed to train students to be both high-level biologists and high-level data analysts. Students will take an introductory seminar, participate in undergraduate research, and write an honors thesis.

BACHELOR OF SCIENCE (BS) GENERAL OVERVIEW

Ten lower-division courses:

- **General Biology — Organismal Biology and Evolution**
- **General Biology — Cell Biology and Physiology**
- **Introduction to Quantitative Biology Seminar**
- **General Chemistry A**
- **Introduction to Programming**
- **Data Structures and Object Oriented Design**
- **Calculus I**
- **Discrete Methods in Computer Science**
- **Physics I**
- **Statistics**

Choose three specialization courses. Examples include:

- **Physics**
- **Mathematics (Calculus, Algebra, Statistics)**
- **Organic Chemistry**

At least two upper-division courses. Examples include:

- **Cellular and Molecular Neuroscience**
- **Mathematics of Machine Learning**

Choose two Capstone courses from the following:

- **Computational Genome Analysis**
- **Structural Bioinformatics: From Atoms to Cells**

Research Experience:

- **Students are required to enroll in directed research in a lab approved by the Quantitative Biology Executive Committee or assigned faculty adviser**

ACADEMIC OPPORTUNITIES

Freshman Science Honors Program: FSH allows exceptional freshmen to study in an enriched first-year biology and chemistry sequence, featuring smaller classes and access to lectures, tours, and field trips.

Supplemental Instruction: This academic support program provides regularly scheduled, peer-led study sessions for common Biology, Chemistry, Math, and Physics courses.

Research: There are numerous opportunities for students to engage in hands-on research in the labs of 20 departmental faculty members as well as dozens of scientists on the University Park Campus. Students also have the opportunity to conduct research in the folllowing areas: Cellular and Developmental Biology, Ecology and Evolutionary Biology, Bioimage Analysis, Genomics and Epigenetics, Machine Learning and AI, Metagenomics, Molecular Biology, Quantitative and Population Genetics, Structural Biology, and Systems Biology.

Progressive Master's Degree: This program allows exceptional students the opportunity to earn both a BS and MS in as little as five years.

For additional information, please consult the USC Catalogue.

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