

# BIOCHEMISTRY

## Overview

New College's Biochemistry Area of Concentration (AOC) is an interdisciplinary program focused on exploration of the interface between chemistry and biology.

Like the Chemistry program at New College, our Biochemistry AOC develops students' scientific judgment and independence and encourages a high level of performance. Biochemistry students work closely with faculty who have been trained at leading universities and continue to carry out engaging and relevant research. With their guidance, students acquire the skills needed for scientific research in academia and industry.

New College's Biochemistry and Chemistry students have a long tradition of being awarded prestigious undergraduate research grants. In the past several years, nine New College students have received highly prized National Science Foundation Research Experience for Undergraduates (REU) grants for the summer. These programs are sponsored by the National Science Foundation and are hosted in various universities. They are among the most prestigious summer programs in which an undergraduate can participate.

With the dedicated mentorship and counseling of Biochemistry professors, New College students consistently attain placement into high-level graduate programs or launch promising careers in industry, medicine, or other professional fields.

## Faculty in Biochemistry

Amy Clore (<https://www.ncf.edu/directory/amy-clore/>), Professor of Biology

Katherine Walstrom (<https://www.ncf.edu/directory/katherine-walstrom/>), Professor of Biochemistry

## Requirements for the AOC in Biochemistry

A minimum of twenty-three (23) academic units.

Code	Title
<b>General Chemistry</b>	
CHEM 2100	General Chemistry I*
CHEM 2150	General Chemistry II
CHEM 2160	General Chemistry Laboratory
<b>Mathematics</b>	
MATH 2311	Calculus I*
MATH 2312	Calculus II*
<b>Biology</b>	
BIOL 2200	Foundations of Biology II*
<b>Organic Chemistry</b>	
CHEM 3100	Organic Chemistry I: Structure and Reactivity*
CHEM 3110	Organic Chemistry Inquiry Laboratory
CHEM 3600	Organic Chemistry II: Structure and Reactivity*
CHEM 3610	Organic Chemistry II Laboratory*

### Physics

PHYS 2525 or PHYS 2500	Physics I (Calculus-based)* Physics I (Algebra-based)*
PHYS 2510	Physics I Laboratory*
PHYS 2550	Physics II
PHYS 2555	Physics II Laboratory* (Recommended for graduate school)

Physical Chemistry	
CHEM 4760	Physical Chemistry: Thermodynamics of Biomolecular Systems
CHEM 4755	Physical Chemistry Laboratory

Biochemistry	
CHEM 4400	Biochemistry I
CHEM 4600	Biochemistry II: Metabolism and Advanced Topics
CHEM 4610	Biochemistry Laboratory

Electives
Two Molecular-Level Biology Courses (chosen from Genetics, Cell Biology, Molecular Biology, or Microbiology)
Two Molecular-Level Biology Labs (chosen from Genetics, Cell Biology, Molecular Biology, or Microbiology)
Additional Requirements
One Independent Study Project (ISP) in Chemistry, Biochemistry, or Molecular Biology
Senior Thesis in Biochemistry and Baccalaureate Exam <sup>1</sup>

<sup>1</sup> The thesis prospectus must be signed by two chemists and one biologist.

\*Note: Since Biochemistry is already an interdisciplinary AOC with a significant number of requirements, a Joint AOC in Biochemistry is usually not possible.

## Representative Senior Theses in Biochemistry

- Analysis of the ATPase activity of *C. elegans* RNA helicase A
- Purification and kinetic characterization of *C. elegans* malate dehydrogenase
- RNA Helicase A May Function to Upregulate Genes in the ALG3/ALG-4 26G RNA Interference Pathway
- Kinetic Characterization of the *C. elegans* Metabolic Enzyme IDH-1
- Kinetic Characterization of Glyceraldehyde- 3-Phosphate Dehydrogenase-1 from *C. elegans*
- Stability-Modifying Mutations of *C. elegans* Cytoplasmic Malate Dehydrogenase
- Genome Sequence Analysis of a Novel Sediment-Derived Marine Bacterium and its Biosynthesis of the Antimicrobial Molecules Prodigiosin and Cycloprodigiosin