The science of biochemistry seeks to understand how organisms function by investigating chemical reactions and cellular structures at the molecular level. It asks how animals, plants and bacteria make use of energy to grow, work and pass on their genetic inheritance.

Many of the biochemist’s findings are of direct relevance to humanity—to understand disease, improve food production and find new techniques to produce valuable products like vitamins and antibiotics. Not surprisingly, biochemistry is fueling one of the fastest growing sectors of the new economy.

Biochemistry brings researchers together from around the world to explore the function of all genes in the human genome. It provides the theoretical foundation for advancements in cloning and genetic engineering and is fostering the remarkable growth in biotechnology firms and the emerging field of bioinformatics.

The Carleton advantage
As a student of Biochemistry at Carleton University, you will be provided with a solid foundation in biology and chemistry, as well as with many opportunities to apply your knowledge to modern-day challenges facing the discipline.

Our programs help you understand how advancements in biochemistry can be successfully applied to a wide range of issues. By developing a strong foundation in both basic and applied science, you will become a better scientist, and your undergraduate education will allow you greater flexibility throughout your career.

Co-op opportunities
Carleton’s flexible and innovative co-operative education program offers you the opportunity to apply your classroom studies in a job placement. Co-op placements can give you work experience in private-sector biotechnology firms, government and university laboratories, or pharmaceutical companies.

In order to begin the co-op program, students must have completed at least two years of an Honours Bachelor of Science program. Co-op students complete at least three work terms during their degree program.
**Hands-on lab experience**
Our Biochemistry programs provide you with hands-on work experience in well-equipped laboratories. If you are an Honours Biochemistry student, you will have the additional opportunity to develop a research project in an area of special interest, working alongside a faculty advisor. Not only will you graduate with exceptional hands-on experience with some of the most up-to-date methodology, but you will also have a defined area of expertise.

**Excellent research facilities**
The Institute of Biochemistry is housed in two buildings at Carleton University: the Nesbitt Biology Building and the Steacie Chemistry Building. The teaching that we do in laboratories and the research that students share in are abundantly supported by the latest in biological instrumentation and state-of-the-art computer facilities. Included in the pool of instruments and techniques available to students are excellent light and electron microscopes, digital imaging hardware and software, PCR and other molecular biological techniques, and research-grade spectrophotometers. Many of these instruments and techniques are used by students in our introductory courses.

The Nesbitt Building is state-of-the-art with open-concept architecture to foster collaborative work and to invite interaction between scholars. Design features such as open laboratories, lounges used by both students and faculty, and faculty offices clustered in a central area, promote an atmosphere of shared learning.

**The capital advantage**
The Ottawa area is one with considerable environmental and biotechnology companies. Several government departments are involved with the research that leads to environmental legislation and regulations, and over 100 companies are conducting research in medical, agricultural and environmental biotechnology. Associations with these organizations, as well as with the National Capital Commission, national museums and the National Research Council Canada, can provide you with unparalleled research and study opportunities.
Choosing the right program

**Biochemistry – BSc (Major)**

**Biochemistry – BSc (Honours)**

**Biochemistry and Biotechnology – BSc (Combined Honours)**

**Computational Biochemistry – BSc (Honours)**

**Biochemistry (Major and Honours)**

The first and second years of the Major and Honours programs in Biochemistry provide a solid foundation in the sciences and mathematics. You then progress to more intensive studies in biochemistry, cell biology, molecular genetics and organic chemistry.

By the fourth year of your program, you will be focusing on more specialized courses such as those dealing with bioinformatics, proteins or DNA repair. If you are in the Honours program, you will complete an Honours thesis project.

**Biochemistry and Biotechnology (Combined Honours)**

The science of biotechnology applies the basic principles of biology and biochemistry to the study and manipulation of living organisms in relation to industrial, medical, agricultural and environmental problems. Some of the topics of current interest include genetic engineering, metabolic modification, applied microbiology and fermentation techniques, biological control and culture and modification of cells and tissues.

**Computational Biochemistry (Honours)**

Computational Biochemistry allows you to complement your studies in biochemistry with a rigorous program in computer science, mathematics, computational methods and data analysis. It will give you a strong background in core areas of biology and chemistry such as genetics, cell biology, organic chemistry and analytical chemistry. You will take a variety of lecture and laboratory biochemistry courses, including bioinformatics. Optional courses allow you to focus on areas such as molecular genetics, pharmaceutic drug design, functional genomics and protein structure and function.
Your first-year experience
First-year Seminar in Science
Carleton introduces you to issues of contemporary science in a first-year seminar course called *Seminar in Science* (NSCI 1000). You will attend six special lectures given by prominent Canadian researchers, as well as small group seminars led by a professor who acts as both your mentor and teacher. Through assignments, presentations and discussions, you will develop analytical and communication skills needed for success in the world of science.

A sample first year

- 1.0 credit in *Introductory Biology I* and *Introductory Biology II*
- 1.0 credit in *General Chemistry*
- 1.0 credit in *Elementary University Physics I* and *Elementary University Physics II*
- 1.0 credit in *Elementary Calculus I* and *Linear Algebra I*
- 0.5 credit in *Seminar in Science* (NSCI 1000)
- 0.5 credit in an arts or social sciences elective

Future opportunities
The workplace
Carleton Biochemistry graduates go on to a wide range of careers. Many work in Ottawa's growing biotechnology sector or in pharmaceutical companies, government and private-sector labs, research institutes and industry.

Others use their background to prepare for graduate school or for studies in medicine, dentistry and pharmacy.

Computational Biochemistry graduates are prepared for careers in the growing field of bioinformatics, working in areas such as drug design, the synthesis of new biomaterials, the mapping of brain function and genomic research.

Graduate studies
Graduates of any of our Honours programs are generally well qualified to go on to graduate studies. If you think that you may wish to pursue an advanced degree, you are encouraged to investigate graduate programs early in order to ensure that your program is suited to meet the relevant graduate-level requirements.
Professional programs
Many professional programs, including medicine, dentistry, teaching and veterinary science, encourage applicants from a variety of backgrounds to apply. Biochemistry can provide a strong foundation for many of these programs.

Christopher Mattice
Fourth-year Biochemistry student
The Institute of Biochemistry at Carleton University is welcoming and exhilarating, with a consistent sense of belonging from day one. By combining my interests in the fields of molecular biology and chemistry, I have been able to build a program that appeals most to my interests. The classes are engaging, and the hands-on laboratories present new learning strategies, while the research labs provide you the opportunity to work on groundbreaking research alongside world class researchers. My Biochemistry degree will serve me well as I further explore the world of research and potentially pursue a medical degree.

FAQs
1. Why would I choose an Honours program?
   Honours programs have many advantages including offering more courses in your chosen field and access to co-op and internship opportunities where available, as well as preparing you for graduate studies, professional programs and employment.

2. When do I have to declare a major discipline?
   You will need to choose a major by the end of your first year. Course registration is generally easier for students who have declared a major, so even if you are not 100 per cent certain, it is best to choose a major upfront and change it later if you need to.

3. Where can I go for academic advice?
   Once you are studying at Carleton, you can visit our Student Academic Success Centre which offers a range of services including academic advising and free study-skill development workshops. carleton.ca/sasc
You can also take advantage of our new Science Student Success Centre, which was created specifically to address the needs of science students. Personnel from the Centre advise students on how to manage their workload, prepare for class, take good notes, and study for exams. They also are available to meet one-on-one with students to help them draft an individual study plan, discuss career goals, or answer any questions. carleton.ca/sssc

**Admission requirements**

For admission to the Biochemistry (Honours) programs at Carleton, you must have the Ontario Secondary School Diploma (OSSD) or equivalent including a minimum of six 4 U/M courses. Your six 4 U/M courses must include Advanced Functions and two of Biology, Chemistry, Earth and Space Science, or Physics. Calculus and Vectors is also strongly recommended.

For admission to the Biochemistry (Major) program at Carleton, you must have the Ontario Secondary School Diploma (OSSD) or equivalent including a minimum of six 4 U/M courses. Your six 4 U/M courses must include Advanced Functions and two of Calculus and Vectors, Biology, Chemistry, Earth and Space Science, or Physics. Calculus and Vectors is recommended.

It is Carleton University policy to consider your best performance in any eligible course in the admissions assessment.

Since the number of qualified applicants may be greater than the number of available spaces, cut-off averages and required marks may vary. Please refer to our website at admissions.carleton.ca/requirements for the current admission requirements.

**For more information**

...about Carleton’s undergraduate programs in Biochemistry, visit our website at carleton.ca/biochem or consult the Carleton University Undergraduate Calendar website at carleton.ca/cuuc.
Do you want more information? Please contact us at:

Department of Biochemistry
Carleton University
209 Nesbitt Biology Building
1125 Colonel By Drive
Ottawa ON K1S 5B6
Canada
Tel: 613-520-2478
Fax: 613-520-3539
Email: biochem@carleton.ca
Website: carleton.ca/biochem

Undergraduate Recruitment Office
Carleton University
315 Robertson Hall
1125 Colonel By Drive
Ottawa ON K1S 5B6
Canada
Tel: 613-520-3663
Toll-free in Canada: 1-888-354-4414
Fax: 613-520-3847
Email: liaison@carleton.ca
Website: carleton.ca/admissions

More information you might be interested in: