Neuroscience
Neuroscience and Mental Health
How does stress affect the brain? What causes depression or Parkinson’s disease? What are the long-term effects of receiving a concussion? Can we reverse brain damage? Can we prevent chronic pain?

If these questions intrigue you, you should consider Neuroscience. This dynamic, multidisciplinary field combines and integrates a wide range of research disciplines including medical research, molecular biology, animal behaviour, immunology, genetics, psychology, chemistry and epidemiology to determine how the brain works and understand the biological basis of mental illness.

So how does the brain work? The exciting response is that for many aspects of brain function, we simply do not know. The field of Neuroscience is making the most extraordinary advances every single week, yet our knowledge of the brain is still in its infancy. That is what makes the discipline so fascinating, and that is why Neuroscience is one of the fastest-growing programs at Carleton University.

As a neuroscience student at Carleton you will have the opportunity to learn in an environment where cutting-edge research is being conducted by some of Canada’s renowned neuroscientists. This research will further our understanding of how the brain functions and how brain dysfunction is linked to neurological and psychiatric diseases, which could lead to future treatments for a variety of mental health disorders.

The Carleton advantage

World-class faculty

As a student in Carleton University’s Department of Neuroscience, you will be studying with first-class faculty that include two prestigious Canada Research Chairs as well as other faculty members who run highly successful research programs and are committed to teaching excellence.

Our faculty includes two prestigious Canada Research Chairs, as well as other faculty members who run highly successful research programs and are committed to teaching excellence.

Carleton professors are internationally recognized for their expertise:

- Dr. Alfonso Abizaid assesses the processes that influence feeding and those that are related to satiety.
Dr. Hymie Anisman researches stress, and his work could eventually lead to new therapies and drugs for depression, anxiety and other stress-related conditions.

Dr. Amedeo D’Angiulli’s research is in the field of cognitive neuroscience, with a focus on literacy, numeracy, mental imagery and perception in both children and adults.

Dr. Shawn Hayley’s research concerns the interaction between the immune system and the brain, and how the immune system may contribute to neurodegenerative diseases such as Parkinson’s disease.

Dr. Kim Hellemans, a recipient of the 2010 Capital Educators Award, is an instructor with active research interests in both motivation and mental illnesses including depression and addictions.

Dr. Mike Hildebrand’s research includes recording electrical activity directly from neurons in the spinal cord in order to identify new treatments for chronic pain.

Dr. Matthew Holahan researches the multiple processes that govern learning and memory, as well as the neurological changes that accompany concussions.

Dr. Natalina Salmaso explores how changes in the brain shortly after birth and throughout life can result in mental illnesses such as anxiety and mood disorders.

Dr. Patrice Smith focuses on the molecular mechanisms mediating repair of the damaged central nervous system.

Dr. John Stead investigates the genes associated with a number of mental health disorders including depressive illness and pathological gambling.

Dr. Kim Matheson seeks to understand the social determinants of mental and physical health among marginalized populations in Canada, and to identify how we can work with communities to improve conditions.

Dr. Melissa Chee uses electrophysiological approaches to understand how the brain controls appetite and body weight, and the impact of these systems on obesity.

Dr. Hongyu Sun explores how early life experience impacts brain development, with the consequences for individuals throughout the lifespan.

Prime laboratory facilities and equipment
The Department is located in the University’s Life Sciences Research Building, which houses
state-of-the-art facilities for fluorescent and confocal microscopy, histology, neurochemistry, electrophysiology, genomics and the study of animal behaviour.

Co-op opportunities
Both the Neuroscience and Mental Health (Honours) and the Neuroscience (Combined Honours) programs offer students the chance to gain practical work experience and new skills through co-op employment.

The capital advantage
Carleton’s location in Ottawa provides an excellent environment for neuroscience research and training.

The Department of Neuroscience is part of a larger community of neuroscientists with active research groups at the Ottawa Hospital Research Institute (Civic and General campuses), the University of Ottawa’s Departments of Psychology and Cellular and Molecular Medicine, the Royal Ottawa Hospital Institute of Mental Health Research, Health Canada and National Research Council Canada.

Choosing the right program

Bachelor of Science (Honours, Major, General) in Neuroscience and Mental Health
Neuroscience and Mental Health is the flagship program offered by the Department of Neuroscience and can be taken as an Honours, Major or General program. As a Neuroscience student, you will learn about the biochemical and cellular organization of the nervous system; the anatomy, physiology, and pharmacology of neural structures; brain systems and their relationship to behaviour; and the mechanisms involved in various neurological diseases and mental disorders. You will also have the opportunity to carry out research in neuroscience for your thesis. This program offers considerable flexibility of course selection for students, including opportunities for students in the Honours and Major programs to pursue an exceptionally wide range of minors.

Bachelor of Science (Combined Honours) in Neuroscience
The Neuroscience (Combined Honours) program is offered jointly between the Departments of Biology and Neuroscience. While less flexible than the Neuroscience and Mental Health program, the Combined Honours program is aimed at students interested in a greater emphasis on core Biology courses and lab-based courses.
Core courses
Your first year of neuroscience studies is composed of basic science courses, including biology, chemistry and physics. You will also take introductory courses in both neuroscience and psychology.

As you progress in the program, you will take more specialized courses, including required courses that focus on core concepts in neuroscience and psychopharmacology. You will also be able to select from a wide range of optional neuroscience courses, including courses on consciousness, sex and the brain, addictions, immune-brain interactions, stress and mental health, environmental toxins and mental health, neurodegeneration and aging, or neurodevelopmental determinants of mental health.

Research project
In addition to your course work, qualified students will have the opportunity to undertake a major independent research project conducted in a faculty member’s laboratory in your final year. Working closely with the faculty member, you will have the opportunity to play an active role in the exciting process of research and discovery. You will graduate with valuable hands-on laboratory experience, as well as a defined area of expertise.

Your first-year experience

A sample first year
- 0.5 credit in Introduction to Mental Health and Disease
- 1.0 credit in Introductory Biology / and Introductory Biology II
- 1.0 credit in Introduction to Psychology / and Introduction to Psychology II
- 1.0 credit in General Chemistry / and General Chemistry II
- 1.0 credit in Elementary University Physics / and Elementary University Physics II
- 0.5 credit in either Elementary Calculus / or Linear Algebra I
- 0.5 credit in Seminar in Science (NSCI 1000)
Future opportunities

Professional programs
Many professional programs, including medicine, dentistry and veterinary science, encourage well-rounded applicants from a variety of backgrounds to apply. Neuroscience provides a strong foundation for such programs, and you are encouraged to pursue interests you may have in these fields after completing an undergraduate degree in Neuroscience.

Graduate studies
Graduates of our program are well qualified to go on to graduate studies not only in neuroscience but in a variety of related fields including biochemistry, pharmacology, physiology and chemistry. If you think that you may wish to pursue an advanced degree, you are encouraged to investigate graduate programs early, to ensure that your program meets the relevant requirements.

The workplace
MA Bachelor of Science degree in Neuroscience and Mental Health of Neuroscience provides the basic knowledge and experience for a wide range of employment opportunities.

Many of our Neuroscience students have found careers as researchers in a wide range of government, industrial and medical laboratories, as teachers, and in publishing, advertising, marketing, sales and private business consultancies.

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?
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, we have many options for academic advising. The Academic Advising Centre offers a range of services including academic advising and free study-skill development workshops. [carleton.ca/academicadvising](http://carleton.ca/academicadvising)

You can also take advantage of our new Science Student Success Centre, which was created specifically to address the needs of science students. [carleton.ca/sssc](http://carleton.ca/sssc)

Finally, if you are a Neuroscience student then you are a member of the Department of Neuroscience and we want to know who you are. The department has faculty and staff available to provide you with academic advice and help you progress through your degree. We are looking forward to meeting you.

Admission requirements

For admission to the Neuroscience and Mental Health (Honours) program or the Neuroscience (Combined Honours) program, you must have an 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. 4U Calculus and Vectors is also strongly recommended.

For admission to the Neuroscience and Mental Health Major and General programs, you must have an 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.

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](http://admissions.carleton.ca/requirements) for the current admission requirements.
Do you want more information? Please contact us at:

**Department of Neuroscience**
Carleton University
325 Life Sciences Research Building
1125 Colonel By Drive
Ottawa ON K1S 5B6
Canada
Tel: 613-520-4020
Fax: 613-520-4052
Email: neuroscience@carleton.ca
Website: carleton.ca/neuroscience

**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: admissions.carleton.ca

This document is available in a variety of accessible formats upon request. A request can be made on the Carleton University website at: carleton.ca/accessibility/request.
For more information on all of Carleton’s undergraduate programs, visit

admissions.carleton.ca

where you can browse program descriptions, career possibilities, and electronic versions of all of our program guides. You can also check out financial aid options, book a tour, sign up for our monthly newsletter, watch Carleton videos, and connect with us on social media.

You may also wish to consult our current

Admissions Viewbook

We look forward to hearing from you!