

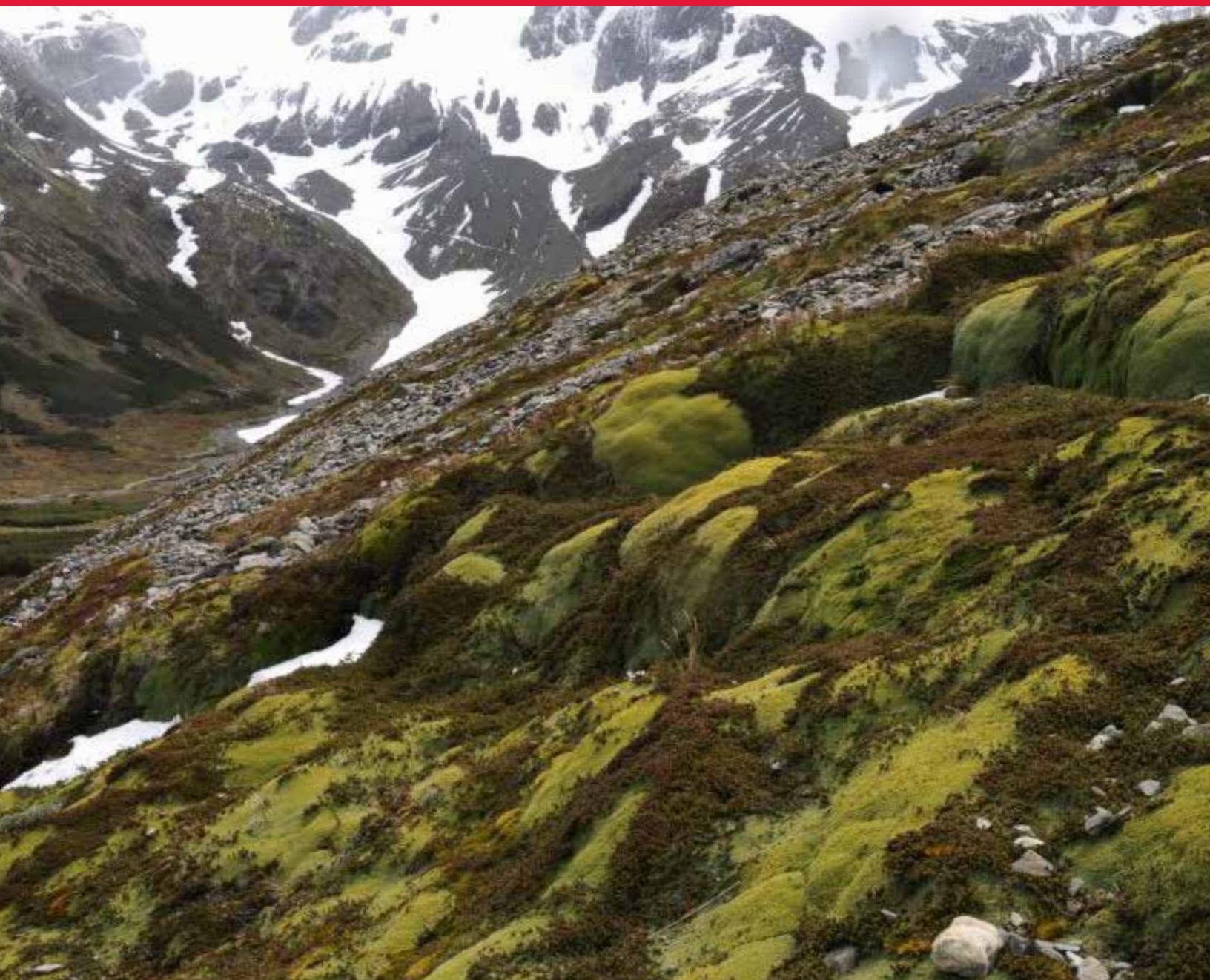


**Carleton**  
UNIVERSITY

Faculty of  
**Graduate and  
Postdoctoral Affairs**

# **FACULTY OF SCIENCE 2018 GRADUATE VIEWBOOK**

CARLETON UNIVERSITY, OTTAWA, CANADA



[science.carleton.ca](http://science.carleton.ca)



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## CONNECTIONS

Sign up for “Connections” — Carleton’s free newsletter for prospective graduate students.

**[graduate.carleton.ca/newsletter](https://graduate.carleton.ca/newsletter)**



# ABOUT US

The Faculty of Science at Carleton University is a thriving community of professors and students who have a passion for learning and exchanging ideas through the creation, dissemination and application of scientific knowledge.

Our Faculty is an important centre of research in the natural sciences, computer science, mathematics and statistics.

This is facilitated by Carleton's location in the National Capital, which offers our students the opportunity to work and study directly within the agencies and organizations that represent Canada nationally and internationally.

As well, via our unique partnership with the University of Ottawa, our students can access a wide range of courses, expertise, research facilities and libraries.

Carleton University is known for its collaborative graduate specializations, which bring together experts and students from a variety of disciplines who approach critical issues from many different perspectives. This is one reason, along with our many professional development opportunities, as to why Carleton University received a high ranking for graduate student experience in the 2016 Canadian Graduate and Professional Student Survey.

All graduate programs at Carleton University fall under the umbrella of the Faculty of Graduate and Postdoctoral Affairs.





## PROFESSIONAL DEVELOPMENT

At Carleton, we are committed to ensuring you succeed in your studies and develop the professional skills needed to set you up for success when you graduate. To help you plot your career course, Carleton offers a range of workshops that are listed on our Grad Navigate website. All graduate students are welcome to attend

these workshops. We also offer special workshops and bootcamps that are designed to provide you with inspiration, dialogue and camaraderie while you work towards your writing and research goals. More information is available at: [gradstudents.carleton.ca/professionaldevelopment](https://gradstudents.carleton.ca/professionaldevelopment)

## THE CAPITAL ADVANTAGE

One of Carleton's greatest assets is its location in the nation's capital. Ottawa is home to most federal government departments, as well as influential non-governmental organizations. It boasts a vibrant

business sector and has one of Canada's largest concentrations of high-tech industries. Many other institutions and companies are headquartered here. This "capital advantage" provides numerous

opportunities for work placements, experiential learning and career opportunities.

Nestled at the junction of three picturesque rivers and the Rideau Canal, Ottawa is one of the world's most beautiful capitals. As Canada's fourth-largest city, Ottawa boasts all the benefits of a large urban area, but has still managed to retain a small-town feel. It is rich in vibrant neighbourhoods, in wide-open green spaces, parks and wilderness areas, including the 365-square-kilometre Gatineau Park, just 15 minutes from Parliament Hill.

Each September, as new and returning students arrive at Carleton from across Canada and around the world, they begin to explore their adopted capital city, discovering the natural beauty surrounding them. Leaving campus, students can head out on bicycles or on foot as they walk next to the historic Rideau Canal, as it sparkles brightly in the sun. In less than 20 minutes, they're following a path that takes them to national landmarks. Surrounded by history, art and an incredible natural environment, students get up close and personal with one of the most unique international cities in the world.





# COLLABORATIVE SPECIALIZATION IN **BIOCHEMISTRY**

Discoveries in biochemistry have been a primary catalyst for many of the advances in modern medicine, pharmacology, toxicology, and in the booming field of biotechnology.

Carleton University offers a Collaborative Specialization in Biochemistry to current or incoming master's and PhD students who are registered in one of the two participating programs (Biology, Chemistry).

Students will gain knowledge of key concepts and current advances in biochemistry and expertise in the methodologies and theoretical approaches used in many major areas including proteomics, genomics, genetics, molecular biology, cell biology and physiology.

In addition to the study of human cells and tissues, this unique biochemistry specialization offers a broader perspective to biochemistry, covering areas that biochemistry graduate programs at other Canadian universities would lack (e.g. toxicology, food science, etc.). It also covers cross-species comparisons outside of human biochemistry not found in other, more focused biochemistry programs.

Graduate students have an opportunity to work with our award-winning and renowned faculty. [carleton.ca/biochem/research](http://carleton.ca/biochem/research)

They also will conduct their thesis research in laboratory facilities utilized by their Carleton supervisors or off campus at institutes like Health Canada, Environment Canada, Agriculture and Agri-



Food Canada, the Canadian Food Inspection Agency, the National Research Council Canada, the Royal Canadian Mounted Police or in industry.

## **DEGREES OFFERED**

MSc, PhD (depending on home program)

## **CAREER OPTIONS**

Graduates will acquire transferable skills required for employment in academia, government or industry. Alumni may also consider applying to medicine and other health sciences professional programs.

## **APPLICATION DEADLINE**

The deadline varies according to the deadline of the participating programs. Applicants wishing to apply for this specialization must indicate this in their application to their participating program (home degree).

## **ADMISSION REQUIREMENTS**

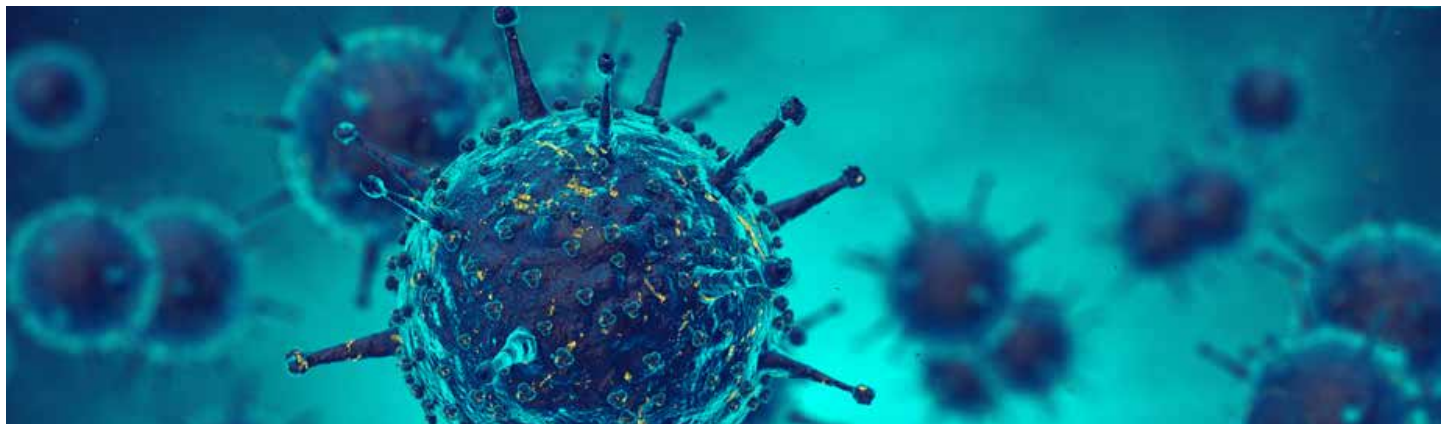
Applicants must be admitted to one of the participating master's or PhD programs.

## **CONTACT INFO**

**Biology**  
613-520-2600 x8814  
[biology@carleton.ca](mailto:biology@carleton.ca)

**Chemistry**  
613-520-2600 x3523  
[chemistry@carleton.ca](mailto:chemistry@carleton.ca)

# COLLABORATIVE SPECIALIZATION IN **BIOINFORMATICS**



Bioinformatics is an increasingly important scientific discipline answering the fundamental questions about the structure, function and evolution of biological entities through the design and application of computational approaches. Fundamental research in these areas is expected to increase our understanding of human health and disease, which will lead to innovation in industry.

As a field of research, bioinformatics crosses traditional disciplinary boundaries such as computer science, chemistry, biology, biochemistry, engineering and the medical sciences. Today, bioinformaticians must be able to appreciate significant research in other fields. Carleton University and the University of Ottawa

established the collaborative specialization in Bioinformatics to meet this very need.

## **PARTICIPATING PROGRAMS**

Biology, Biomedical Engineering, Computer Science, Mathematics and Statistics.

## **DEGREES OFFERED**

MSc in Biology, MSc in Mathematics and Statistics, MCS (computer science) and MASc in Biomedical Engineering with a specialization in Bioinformatics.

## **CAREER OPTIONS**

Carleton's location in Ottawa allows access to many government departments and headquarters for organizations and industries. Many career opportunities are just down the road.

## **FALL APPLICATION DEADLINE**

**March 1**, as per home department application deadline

## **ADMISSION REQUIREMENTS**

The requirements for master's programs that offer the Collaborative Specialization in Bioinformatics are as follows:

- Prior admission to the master's program in one of the supporting units participating in the program.
- A letter of recommendation from the participating faculty member of the collaborative program, which both recommends admission and indicates the willingness of the faculty member to supervise the candidate's research program in Bioinformatics.

## **CONTACT INFO**

Further information can be obtained by writing directly to any of the participating institutes or departments, or the relevant program coordinator.

# GRADUATE PROGRAMS IN BIOLOGY

Carleton University biology programs offer you an opportunity to work closely with renowned scientists in an academically enriching and collegial environment. Faculty members conduct cutting-edge research at all levels of biological organization, from molecular genetics to landscape ecology.

Our programs are research-intensive. The Department of Biology is equipped with state-of-the-art molecular biology laboratories, an aquatics facility, controlled-environment rooms and growth chambers and extensive greenhouses. Students benefit from our membership in the Ottawa-Carleton Institute for Biology, a joint research-intensive collaboration with the University of Ottawa. OCIB is one of the largest centres in Canada for graduate studies and research in the biological sciences.

“My time as a graduate student was academically enriching, rewarding, and provided me with a diverse skill set that is useful in any career. There are many opportunities to become involved in the department, and the staff and faculty members of the Department of Biology are very welcoming and supportive.”

— Dr. Stacey Lee-Jenkins (PhD/12)



## Outstanding opportunities to do leading-edge biological research.

We offer a Master of Science degree in Biology, with optional specializations in Bioinformatics, Biochemistry, Chemical and Environmental Toxicology and Data Science. At the doctoral level, we offer a PhD in Biology, as well as specializations in Biochemistry and Chemical and Environmental Engineering.

### DEGREES OFFERED

MSc, PhD

### CAREER OPTIONS

Our alumni are pursuing rewarding careers all over the world, for example, as biologists, government and industrial scientists, lab managers and research technicians, business development officers and analysts, scientific planners and analysts, bioinformatics programmers, health professionals, school teachers and university professors.

### FALL APPLICATION DEADLINE

**March 1**, to be eligible for funding

### ADMISSION REQUIREMENTS

**MASTER'S:** An honours Bachelor of Science degree with a GPA of at least a B+ (overall GPA or GPA of biology courses in the last two years). For the MSc in Chemical and Environmental Toxicology, you must also have an introductory course in toxicology or take one of the two introductory courses once registered in this specialization.

**PHD:** An MSc from a recognized university is required, as well as a B+ average. A student currently registered for the MSc may be permitted to transfer to the PhD program following a recommendation by the departmental graduate committee and successful completion of the qualifying examination required of PhD candidates.

Prior to applying to a program, applicants must contact individual faculty members to see if they would be willing to act as their research thesis supervisor. A list of faculty is available at: [carleton.ca/biology/facultystaff-listing/faculty](http://carleton.ca/biology/facultystaff-listing/faculty)



# GRADUATE PROGRAMS IN BIOMEDICAL ENGINEERING

There is a rapid increase in the need for new, innovative biomedical and assistive technologies, including smart health homes, wearable technology, biological signal processing, tissue engineering, rehabilitation robotics, orthopaedic biomechanics, patient specific implants and prostheses, real-time biomedical informatics, biomedical image processing, and telehealth. Carleton's master's and PhD programs in Biomedical Engineering provide graduates with the required skills to address this growing demand.

Our degrees are offered through the Ottawa-Carleton Institute for Biomedical Engineering (OCIBME), a multi-disciplinary joint institute with the University of Ottawa.

We offer access to renowned researchers, as well as state-of-the-art labs, equipment and

excellent computer facilities.

Our location in Ottawa allows for proximity to, and collaboration with, area hospitals, relevant government departments such as Health Canada, the National Research Council and, through OCIBME, access to resources and faculty at the University of Ottawa. OCIBME also has close ties with local hospitals, including the Children's Hospital of Eastern Ontario and The Ottawa Hospital, which is one of the largest teaching hospitals in Canada, with specialty centres in cancer, heart, kidney, vision care and rehabilitation services.

At the master's level, we also offer a specialization in Data Science and Bioinformatics, as well as a concentration in Clinical Engineering (MEng only).

## DEGREES OFFERED

MASc, MEng, PhD

## CAREER OPTIONS

Career paths include opportunities in education; the public sector e.g. health care policy, hospitals, regulatory agencies; or in the private sector working with medical device manufacturers, sports/fitness equipment manufacturers, pharmaceutical companies, or in rehabilitation/orthopaedic engineering. There are also opportunities in the non-profit sector. At the PhD level, careers may be more research-focused e.g. biomedical data analysis, novel medical devices research and design, and simulation and modeling of diseases and biological systems. Several students interact with clinicians, healthcare organizations, or industrial partners as part of their research project.

## FALL APPLICATION DEADLINE

**March 1**, to be considered for funding

## ADMISSION REQUIREMENTS

**MASTER'S:** a four-year bachelor's degree in engineering, science, computer science, or a related discipline, with an average of at least B+.

**PHD:** A master's degree with a thesis in engineering, science, computer science, or a related discipline, with an average of at least B+.



## CONTACT INFO

613-520-5659  
[ocibme.ca/contact.php](http://ocibme.ca/contact.php)

[ocibme.ca](http://ocibme.ca)



# CHEMICAL AND ENVIRONMENTAL TOXICOLOGY

Toxicology is the study of the effects of toxic substances on living systems. These toxic substances can either be organic or inorganic and synthetic or natural materials. As a field of research, it crosses the traditional disciplinary boundaries of chemistry, biology and environmental sciences.

Environmental toxicology further extends to aspects of chemical transport, fate, persistence and biological accumulation of toxic substances and their effects at the population and community levels.

Carleton University and the University of Ottawa offer a Master of Science or PhD with a Specialization in Chemical and Environmental Toxicology through the management of a committee of representatives from the Ottawa-Carleton Institute for Biology, the Ottawa-Carleton Chemistry Institute and the Ottawa-Carleton Geoscience Centre.

## PARTICIPATING PROGRAMS

Biology, Chemistry, Earth Sciences

## DEGREES OFFERED

MSc, PhD

## CAREER OPTIONS

The Ottawa area is home to numerous environmental and biotechnology companies. Different 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, provide an unparalleled background for study and career opportunities in this field.

## FALL APPLICATION DEADLINE

**March 1**, to be eligible for funding

## ADMISSION REQUIREMENTS

**MSC:** Applicants should apply to the primary participating unit that is the most appropriate to their research interests. Once accepted and registered in one of the institutes, students must be sponsored into the collaborative specialization in Chemical and Environmental Toxicology by a faculty member involved in the program. This will normally be the student's thesis supervisor. He/she will need to write a letter

of recommendation which both recommends admission and indicates their willingness to supervise the candidate's research program in chemical and/or environmental toxicology.

Application forms and further information can be obtained by writing directly to any of the participating institutes or departments or to the program coordinator.

**PHD:** Prior admission to the PhD program in one of the supporting institutes participating in the program. Plus, applicants need a letter of recommendation from a participating faculty member who is a member of the collaborative program, which both recommends admission and indicates the willingness of the professor to supervise the candidate's research program in Chemical and Environmental Toxicology. They also need to have completed a relevant introductory course in toxicology.

## CONTACT INFO

613-520-2600 x3534  
chemistry@carleton.ca

# GRADUATE PROGRAMS IN CHEMISTRY

Chemistry affects almost all aspects of our lives. Carleton's Department of Chemistry is host to innovative programs in analytical, biological, inorganic, organic and physical chemistry, as well as chemical toxicology, nanoscience and food science.

As a graduate student, you will become part of a vibrant network of scientists and have the opportunity to engage in some of the world-class research conducted at Carleton.

We offer a Master of Science (MSc) and a PhD in Chemistry. We also offer a concentration in

Food Science and Nutrition. Our chemistry programs are offered through the Ottawa-Carleton Chemistry Institute, a unique partnership between Carleton and the University of Ottawa.

This allows our graduate students to access resources, expertise and faculty at both Carleton and the University of Ottawa. As part of the joint institute, we have the largest graduate chemistry program and the third largest PhD program in Ontario.

We also offer specializations in Biochemistry or Chemical and Environmental Toxicology at the MSc level and doctoral levels.

## DEGREES OFFERED

MSc, PhD

## CAREER OPTIONS

Our programs have strong links with government labs specializing in agriculture, natural resources, the environment and health, the National Research Council Canada, world-class libraries and museums, robust high-tech and bio-tech sectors, teaching and research hospitals, industry-sponsored labs, numerous environmental and biotechnology companies, national and international associations and political organizations. All of these have provided our students with a wealth of possibilities for resources, placements and career opportunities.

## FALL APPLICATION DEADLINE

**March 1**, in order to be considered for funding

## ADMISSION REQUIREMENTS

**MSc:** An honours BSc degree in chemistry, with a B+ average in the last two years and a B average overall. Applicants who do not meet this requirement, or whose undergraduate degree is in another closely related degree may be accepted into the program, but may be assigned extra courses.

**PHD:** An MSc degree in chemistry. Students enrolled in the MSc may transfer to the PhD program after successfully completing one year of graduate studies.



“Carleton Chemistry is the best. Working with so many paragons of research is a treat. All members of the department are extremely approachable and fantastic to deal with.”

— Peter Pallister PhD/16

## CONTACT INFO

613-520-2600 x3523  
chemistry@carleton.ca

[carleton.ca/chemistry](http://carleton.ca/chemistry)



# GRADUATE PROGRAMS IN COMPUTER SCIENCE

The School of Computer Science provides a professional and friendly environment where you can gain knowledge, expertise and skills required to excel in the fast-paced and competitive high-tech sector. The school offers a number of challenging graduate programs, which can accommodate new graduates and experienced professionals. Our small class sizes provide more time with the professors.

The school also offers a wide range of research areas and a low ratio between faculty and graduate students enabling students to have close research interaction with their supervisors. Our wide range of research areas includes bioinformatics, computational geometry, computer security, big data analytics, databases and information systems, graphics, human-computer interaction (HCI), high-performance computing, and networks and distributed computing.

The Master of Computer Science (MCS) and PhD degrees are both joint programs offered by the School of Computer Science (SCS) at Carleton University and the School of Electrical Engineering and Computer Science at the University of Ottawa under the auspices of the Ottawa-Carleton Institute for Computer Science (OCICS).

The MCS program is two years in length. Typically, MCS students engage in a one-year, in-depth research project, in which they specialize in their area of interest. A co-op option is also available to MCS students.

The School of Computer Science also offers an MCS degree in Human-Computer Interaction, an MCS with a specialization in Data Science, an MCS with a specialization in Bioinformatics and an MASc in Biomedical Engineering.

The PhD program provides graduate students with an opportunity to conduct in-depth research in their area of specialization and become technical experts in that domain. Typically, students will engage in research for three to four years leading to a PhD thesis in their area of interest.

## DEGREES OFFERED

MCS, PhD

## CAREER OPTIONS

A large number of high technology companies (e.g. Alcatel, IBM, Mitel, Thales, Cognos, Shopify) and a large number of Government of Canada departments are located in the Ottawa-Gatineau area. The technology cluster provides students with an opportunity to conduct joint research with the private and public sector. Graduating students have a large range of employment opportunities from research to development in areas such as designing new software security products, creation of computer games, designing animation software, and data mining and business intelligence.



## FALL APPLICATION DEADLINE

**February 1**, to be eligible for funding (MCS); **March 1** (PhD)

## ADMISSION REQUIREMENTS

**MCS:** An honours bachelor's degree in computer science or the equivalent (an honours degree in a program that includes at least 12 computer science half-credits, two of which must be at the 4000-level, and seven half-credits in mathematics and theoretical computer science.)

**PHD:** Admission to the PhD in Computer Science requires a Master of Computer Science with a thesis or equivalent including demonstrated significant research ability. In exceptional cases, students who are currently in the MCS program and who have completed all course requirements with a grade of no less than A in each course may be permitted to transfer into the PhD program.

# COLLABORATIVE SPECIALIZATION IN DATA SCIENCE

Join our hub of data science experts and shape the future.

Carleton's Collaborative Specialization in Data Science is geared at graduate students and high-tech professionals who are interested in understanding how to analyze and use 'big data' sets collected by governments, NGOs and industry for purposes ranging from generating personal recommendations for online shopping to improving the efficiency of health care delivery or predicting national security threats.

Students will earn their degree from a participating master's program with a specialization in Data Science (or an MBA concentration in Business Analytics) through research or coursework that addresses a data science challenge.

More than 130 researchers are working on 'big data' projects at Carleton ranging from artificial intelligence and sensor data analytics to improving health care delivery.

Depending on availability, students may also gain real-world experience through internships.

## PARTICIPATING PROGRAMS

Biology, Biomedical Engineering, Business, Cognitive Science, Communication, Computer Science, Economics, Electrical and Computer Engineering, Geography, Health Sciences.

## CAREER OPTIONS

Over the next five years in North America, it is predicted that there will be more than four million jobs involving data science. Working with its partners and Ottawa's tech sector, Carleton is poised to become a national hub for data science research and training, educating a highly skilled workforce for local, national and international communities, and creating the next generation of IT leaders.

## APPLICATION DEADLINE

The deadline dates for applications vary according to the deadline of each participating program. Those wishing to apply for the Collaborative Specialization in Data Science must indicate their intent when applying to their participating program (home degree).

## ADMISSION REQUIREMENTS

Applicants must be admitted to one of the participating master's programs. Requirements vary according to which program a student chooses.



### CONTACT INFO

[datascience@scs.carleton.ca](mailto:datascience@scs.carleton.ca)  
613-520-2600 x3244

[carleton.ca/datascience](http://carleton.ca/datascience)



# GRADUATE PROGRAMS IN EARTH SCIENCES



The Department of Earth Sciences is one of the foremost centres for the study of earth sciences in Canada. A broad spectrum of research is carried out by its professors and graduate students and, over the years, they have made significant contributions across a spectrum of research e.g. new mineral resources and minerals, including Carletonite; a new species of dinosaur; new awareness of the geologic record of environmental change in the rapidly changing Canadian Arctic; and increased integration of earth sciences and applied geophysics.

Graduate students in the department conduct fieldwork spanning a wide range of settings, including both urban and remote regions in Canada and internationally; and, on land, beneath the surface in mine environments, or aboard research vessels studying lake and ocean sediments. Topics range widely too, including many aspects of Earth's development through geological history, climate change and/or mineral/petroleum resources; analysis of global seismic data related to earthquake and seismic-risk assessment; and development of new geophysical technology

related to earth resources or risk assessment. Many students collaborate with industry and government scientists in mineral exploration, the petroleum industry or in urban or industrial water resource programs. Throughout graduate work, there is ample opportunity to master field and laboratory techniques, with laboratory analyses including an array of state-of-the-art tools related to microscopy, radiogenic isotopes, elemental and mineralogical analyses, geophysics, hydrology and geochronology.

Carleton offers MSc and PhD degree programs in Earth Sciences, as well as a specialization in Chemical and Environmental Toxicology.

Our graduate programs fall under the auspices of the Ottawa-Carleton Geoscience Centre, a joint research initiative of Carleton University and the University of Ottawa. Students have the opportunity to enrol in courses at both universities and benefit from the pooling of academic resources and research instrumentation in earth sciences from both institutions. Graduate students are enrolled in the university where their faculty supervisor holds an appointment.

The large size of the centre and its location in the nation's capital offer unique opportunities for collaborative research projects with the federal government, and in particular the Canadian Museum of Nature and the Geological Survey of Canada.

## DEGREES OFFERED

MSc, PhD

## CAREER OPTIONS

Our students have found fulfilling careers in government departments, private industry and as teaching/research academics here in Canada and internationally.

## FALL APPLICATION DEADLINE

**March 1**, to be eligible for funding

## ADMISSION REQUIREMENTS

**MSC:** An honours BSc degree, with at least a B+ in geology or a related discipline.

**PHD:** An MSc degree in earth sciences or a related discipline.

# GRADUATE PROGRAMS IN HEALTH: SCIENCE, TECHNOLOGY AND POLICY

This pioneering program focuses on solving real-world health problems.

The Master's degree in Health: Science, Technology and Policy (HSTP) was created to meet a growing demand in the health sector for specific health-related skills and knowledge. Close association with external partners in public, private and community organizations is a core element of the program and provides networking opportunities for students.

The program is designed to provide students with the training and skills they need to be highly marketable in the health and/or policy sectors. The 20-month program focuses on the critical assessment of research

and policy information, as well as the ability to integrate information from diverse sources and to communicate effectively with diverse audiences, including experts from different disciplines.

The five core courses required by the program are designed to provide students with a foundation in research methods and policy; an understanding of the broad, interdisciplinary nature of the research-policy interface in the health sector; and the leadership, communication and knowledge mobilization skills to work effectively as a member of an interdisciplinary team.



“I was given the opportunity to develop leadership and teamwork skills. Looking at the prevalence of interdisciplinary team-based work environments, I believe HSTP has allowed me to become better equipped to excel in my future career.”

— Owen McMorrie (MSc/15)

“This degree uniquely emphasizes interdisciplinary approaches to real world challenges. The program has provided me multiple opportunities to engage with a diversity of professionals.”

— Lisa Carroll (MSc/15)

During their second year, students have a choice of doing an individual research project or collaborating with a multidisciplinary research team to solve pressing problems facing employers in the health sector.

Carleton also offers two graduate diplomas in this area, one for current students and one for professionals.

## DEGREES OFFERED

MSc, Graduate Diplomas

## CAREER OPTIONS

Career opportunities range from working at the health research-policy interface to working for organizations and agencies that seek to influence government policy and priorities, such as NGOs, public agencies, industry, hospitals and community health centres.

## FALL APPLICATION DEADLINE

**March 1**, to be eligible for funding

## ADMISSION REQUIREMENTS

An honours bachelor's degree or equivalent; a university-level statistics course; show evidence of commitment to a career in the broadly defined health sector.

### CONTACT INFO

520-2600 x7099  
HSTP@carleton.ca

[carleton.ca/healthsciences/hstp-2](http://carleton.ca/healthsciences/hstp-2)



# GRADUATE PROGRAMS IN HEALTH SCIENCES



Carleton's MSc and PhD in Health Sciences are research-based thesis programs. These programs provide advanced disciplinary learning and hands-on, interdisciplinary research in health sciences in new, state-of-the-art facilities. Students develop a deep appreciation for, and understanding of, the complexities of health problems and solutions through a health research thesis and core courses developed to explore interdisciplinary health topics and health science communication.

These programs are designed to meet a growing need for interdisciplinary health research and skills in knowledge translation and data analysis. The interdisciplinary nature of the programs ensures research theses span health disciplines, are informed by expert faculty and external partners across health sectors and fields of research, and that knowledge is communicated to stakeholders across scientific and broader health communities.

Core courses include advanced topics and seminars in interdisciplinary health sciences, and grant proposal writing and ethics (for PhD candidates).

We also offer a specialization in Data Science for MSc candidates.

## DEGREES OFFERED

MSc, PhD

## CAREER OPTIONS

The disciplinary expertise and interdisciplinary skills gained through the MSc and PhD in Health Sciences open the door for diverse career paths in education and academia (including scientific research), clinical health careers, the public sector (including public health agencies and non-governmental organizations), the private sector (including pharmaceutical and medical research companies), and with non-profit agencies (including health research institutions, charities, health communications and advocacy).

## APPLICATION DEADLINE

Students can commence their program in the spring, fall, or winter. Application deadlines (to be considered for funding) are **February 1** for the spring and fall, and **October 1** for the winter.

## ADMISSION REQUIREMENTS

**MSC:** An Honours BSc or BHSc undergraduate degree in a relevant field (e.g., science, life/health sciences, psychology, biostatistics or related discipline). Candidates must hold a minimum B+ overall average (9.0 GPA), but will generally hold an A- overall average (10.0 GPA).

**PHD:** An MSc graduate degree in a relevant field (e.g., science, life/health sciences, psychology, biostatistics, or related discipline). Candidates must hold a minimum B+ overall average (9.0 GPA), but will generally hold an A- overall average (10.0 GPA).

Prior to applying, prospective students must seek out a thesis supervisor from the Department of Health Sciences who will commit to supervising the student. The application process requires that the prospective student and supervisor draft a proposal of the research thesis project, to be included in the application package.

# GRADUATE PROGRAMS IN HUMAN-COMPUTER INTERACTION

There is no other program like it in Canada.

The Human-Computer Interaction (HCI) program helps students from a variety of backgrounds make sense out of the rapidly changing world of technology. It focuses on ways computer systems support people at work, at home and at play. What makes this Carleton program distinctive is that it is so unique in its interdisciplinarity, which allows students to tailor their program based on a common core. Students can specialize in one of three programs: a Master of Arts (MA) for emphasis on human factors, a Master of Applied Science (MASc) for emphasis on new media technology and design, or a Master of Computer Science (MCS) for emphasis on software design. Students in all of these programs collaborate across all disciplines.

Our research laboratories are outfitted with the most advanced high-tech equipment. Here, you will be able to collaborate with close to 30 researchers on projects as diverse as:

- HCI for crime simulation
- Interactive video games that can be used for exercise or adapted for occupational therapy
- Interactive facial animation
- Teamwork and situational awareness in complex and extreme circumstances
- Biochemical exploration and simulation environment

## DEGREES OFFERED

MA, MASc, MCS

## CAREER OPTIONS

Students graduating from this program can pursue jobs in diverse fields. From designing cockpits for aircraft, to working on video games or designing cell phone interfaces — all the way to exploring e-commerce purchasing — if you can dream it, this degree can help prepare you for a job in that area. No technology is off limits.

Students who have studied HCI at Carleton have found jobs at places like Google, Microsoft, Amazon, RIM, IBM, CNR, Charles Schwab and various federal government departments.

High-quality students completing a master's in HCI may also be qualified to pursue a PhD in their respective fields of study.

## FALL APPLICATION DEADLINE

**March 1**, to be eligible for funding

## ADMISSION REQUIREMENTS

**MA:** An honours undergraduate degree, or equivalent, in arts, social sciences, business or related areas with at least a B+ average.

**MASc:** An honours undergraduate degree in engineering, architecture, design or related areas with at least a B+ average.



**MCS:** An honours undergraduate degree in computer science with at least a B+ average.

Applicants with a background in cognitive science will be considered for whichever of the three programs is appropriate to their academic background. Applicants may be asked to complete additional coursework in addition to the program requirements. All applications will be considered by the HCI Graduate Committee.

## CONTACT INFO

613-520-2600 x3244  
hci@scs.carleton.ca

[hcidegree.carleton.ca](http://hcidegree.carleton.ca)



# GRADUATE PROGRAMS IN MATHEMATICS AND STATISTICS

Our graduate programs are collaborative, creative and insightful.

For decades, graduate alumni from our School of Mathematics and Statistics have been impacting peoples' lives. Join our team and make a difference! We offer two distinguished graduate mathematics degrees: a Master of Science (MSc) and a PhD. There are three pathways at the master's level: coursework, research project and thesis.

You can choose from the following program and research areas: Applied Mathematics (through the Applied Analysis or the Combinatorics Research Groups), Pure Mathematics (through the Algebra and Number Theory or the Theoretical and Functional Analysis Groups), or Probability and Statistics. A specialization in Bioinformatics (MSc only) and a specialization in Biostatistics (MSc only) are also available.

Our professors are internationally recognized for their research expertise and leadership. More information about individual faculty is available on our website.

As proud sponsors of the Fields Institute for Research in Mathematical Sciences, our students participate in lectures sponsored by the institute, including the Fields-Carleton Distinguished Lecture Series.

The School is a member of the Ottawa-Carleton Institute for Mathematics and Statistics (OCIMS), a joint institute with the University of Ottawa. Together, we offer one of the largest grad programs in math and stats in Canada. Students can take courses at both universities, while benefiting from the expertise and resources at both institutions.

Our location in the nation's capital provides easy access to paid internships in government departments and private industry. Our students have interned at Corel, Health Canada, the Loeb Research Institute, Canadian Border Services Agency, the Canadian Institute for Health Information and Generation V, among others. Placements are competitive and not guaranteed.

The school hosts the Centre for Quantitative Analysis and Decision Support (COADS), which offers a myriad of analytical services to clients on a cost-recovery basis. As part of its activities, the centre provides funding, training and on-the-job consulting experience to qualified grad students and recent alumni. Students work with clients such as the Canadian Air Transport Security Authority, Ottawa Integra-

tive Cancer Centre, United Way Centraide Canada, Public Health Agency of Canada, Nordicity Group Ltd. and Transport Canada.

## DEGREES OFFERED

MSc, PhD

## CAREER OPTIONS

Our alumni are leaders, pursuing successful careers with most of the above organizations, and elsewhere.

## FALL APPLICATION DEADLINE

**March 1 (January 31 for Biostatistics)** in order to be eligible for funding.

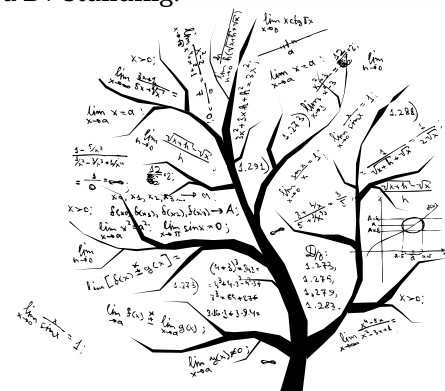
## ADMISSION REQUIREMENTS

**MSC:** An honour's bachelor's degree in mathematics, or the equivalent, with at least B+ in the honours subject and a B- overall. Applicants holding a three-year degree, with at least a B+ average, may be admitted to a qualifying-year program.

**PHD:** A master's degree in mathematics, or the equivalent, with at least a B+ standing.

“I remained at Carleton for my PhD because of the undeniable learning experience it had to offer. Being a joint institute with the University of Ottawa and having close ties to the Fields Institute, there are a multitude of high-level courses, seminars and colloquia available on a continuous basis.”

— Jason Crann, PhD/15, Carleton Assistant Professor  
School of Mathematics and Statistics



# GRADUATE PROGRAMS IN NEUROSCIENCE



## Our students are our top priority.

The brain is the body's most mysterious and complicated organ. Discovering how the brain works holds the key to understanding behaviours as basic as breathing or as complex as thinking. Recent advances have helped unlock the puzzle of how molecular and cellular processes impact behaviour and yet scientists have just scratched the surface in understanding brain function.

We offer two degrees: a Master of Science (MSc) and a PhD. Our students gain a combination of technical, theoretical and interpersonal skills which will equip them for related careers in academia, industry and health care.

Neuroscience research is not only critical for understanding our daily behaviours — it also reveals insights into how changes in the structure and function of the brain lead to neurological and psychiatric diseases. Identification of the key players in these pathological processes is essential for finding cures for brain disorders ranging from depression to Parkinson's disease to brain injury to chronic pain.

Our faculty members have individual research programs covering memory processes, motivation, hormonal involvement in behavior and pathology, molecular biological processes in disease, inflammatory and neurotransmitter processes in psychological and neurodegenerative disorders, brain-immune interactions and the contribution

of stressors. This work is mostly done on a collaborative basis within the department, as well as through widespread collaborations both within and outside of Carleton.

The MSc degree trains students to design, perform and communicate innovative neuroscience research in a nurturing and supportive environment. Students have access to a diverse range of hands-on training opportunities using behavioral, genetic, anatomical, electro-physiological and molecular approaches, which is combined with a comprehensive foundation in underlying neuroscience principles.

Our PhD students work alongside top researchers in state-of-the-art facilities in microscopy, histology, neurochemistry, behavioural analysis, electrophysiology and molecular genetic analysis. They have an opportunity to develop research projects aimed at finding the answers to mental health diseases including addiction, depression, Parkinson's disease, obesity, dementia and traumatic injury.

## DEGREES OFFERED

MSc, PhD

## CAREER OPTIONS

Graduates from both of our programs can pursue career opportunities in academia, health, business/industry, education or government. PhD alumni interested in academia can potentially pursue careers as research scientists/postdoctoral

fellows or biologists in universities, Health Canada or the National Research Council Canada.

Students interested in health professions could consider careers (in some cases following further education) in medicine, as rehabilitation counsellors, behavioural therapists, speech-language pathologists, public health officers, neurologists, microbiologists, genetic counsellors, biomedical lab technicians, health planners/consultants, toxicologists, or mental health workers.

Within business or industry, career paths may include technical writer, pharmaceutical sales, consultant, researcher or analyst.

Within education, graduates may find positions in journalism, teaching, as instructors, or as policy developers. Government positions include patent officer, forensic scientist and management positions within health-related organizations.

## FALL APPLICATION DEADLINE

**February 1**, in order to be eligible for funding

## ADMISSION REQUIREMENTS

**MSc:** A Bachelor of Science (Honours) degree in neuroscience, psychology, biology or a related field with a completed bachelor's thesis or equivalent, a minimum B+ average and research experience.

**PHD:** A master's degree in neuroscience, psychology, biology or related field with a minimum A- average.

## CONTACT INFO

613-520-4020  
gradneurosci@carleton.ca

[carleton.ca/neuroscience](http://carleton.ca/neuroscience)



# GRADUATE PROGRAMS IN **NORTHERN STUDIES**



The interdisciplinary Northern Studies graduate program at Carleton emphasizes northern environments and societies, and the policies that are developed to govern them.

There are four pathways for graduate students: MA and MSc degrees and Graduate Diplomas (Type 2 or 3) for current graduate students and working professionals.

All of the programs are designed to give interdisciplinary training and experience in Northern studies and all students are required to begin their studies with a field course of about one week. This is a residential field course that will take place too far from Ottawa for daily commuting. The introductory field course is a prerequisite for the core courses that are integral to the degrees and diplomas. Students in the degree program are required to take a work placement in Ottawa or the North, a second field course in northern Canada, and a comprehensive examination.

Both master's programs are one full year in length while the diplomas are two terms.

The Northern Studies program is a collaboration of six departments: Biology, Earth Sciences, Geography and Environmental Studies, the Institute of Indigenous and Canadian Studies, the School of Public Policy and Administration and Sociology and Anthropology. This collaboration allows for a variety of faculty research interests which can be viewed on the Northern Studies website.

## **DEGREES OFFERED**

MA, MSc, Graduate Diplomas

## **CAREER OPTIONS**

The program aims to assist students and northern professionals who need further academic experience to advance their career ambitions. Career possibilities range from government to private business and non-profit organizations.

## **APPLICATION DEADLINES**

**February 1** (priority placement);  
**July 15** (final deadline)

## **ADMISSION REQUIREMENTS**

**MA, MSc AND GRADUATE DIPLOMA (TYPE 3):** An Honours degree (or four-year degree) with B+ standing. Customarily, applicants will have degrees in the environmental sciences, sociology, anthropology, political science, economics, geography, or a related field. Applicants with degrees in other disciplines, or without an honours degree, must demonstrate equivalent experience that may have prepared them for the program.

**GRADUATE DIPLOMA (TYPE 2):** Enrolment in a master's or doctoral program; letter of support from your supervisor; and a 500-word letter outlining the reasons you want to enrol in the program.

# GRADUATE PROGRAMS IN PHYSICS

Medical physicists improve the understanding, diagnosis and treatment of disease using the tools of physics. Particle physicists study the nature of particles that make up matter and radiation. Carleton's Department of Physics offers master's and PhD degrees in both medical and particle physics.

In medical physics, our national capital community is closely networked. Thesis projects are available both on and off campus with adjunct faculty in clinical and government institutions. Topics range from MRI, PET, SPECT and x-ray imaging through cancer radiation therapy treatment delivery, verification and dosimetry to biophotonics and radiation biology. Our PhD program was the first in Ontario to be internationally accredited ([campep.org](http://campep.org)).

In particle physics, students benefit from Carleton's membership in TRIUMF, Canada's national centre for particle and nuclear physics. Our theoretical particle physics group is active in Higgs physics, dark matter and physics beyond the Standard Model. We are a participant in major international experiments, including



Our alumni are making a difference in the worlds of medical and particle physics.

ATLAS at CERN's Large Hadron Collider, one of two experiments to confirm the existence of the Higgs boson. We are building on our success with the SNO experiment with the Enriched Xenon Observatory (EXO) to understand the nature of the neutrino and the DEAP experiment to understand the nature of dark matter.

We are a research-intensive department. Our degrees include a substantial research project which builds on the courses taken. Our programs are linked with the University of Ottawa through the Ottawa-Carleton Institute for Physics ([ocip.ca](http://ocip.ca)) which allows both universities to offer a broad spectrum of complementary programs.

## DEGREES OFFERED

MSc, PhD

## CAREER OPTIONS

Our alumni are found across Canada, the U.S. and overseas. Particle physics alumni work in particle physics in government labs, academia, or with industry. Medical physics alumni hold positions as clinical physicists, researchers and academics, physicists in regulatory agencies, and in industry.

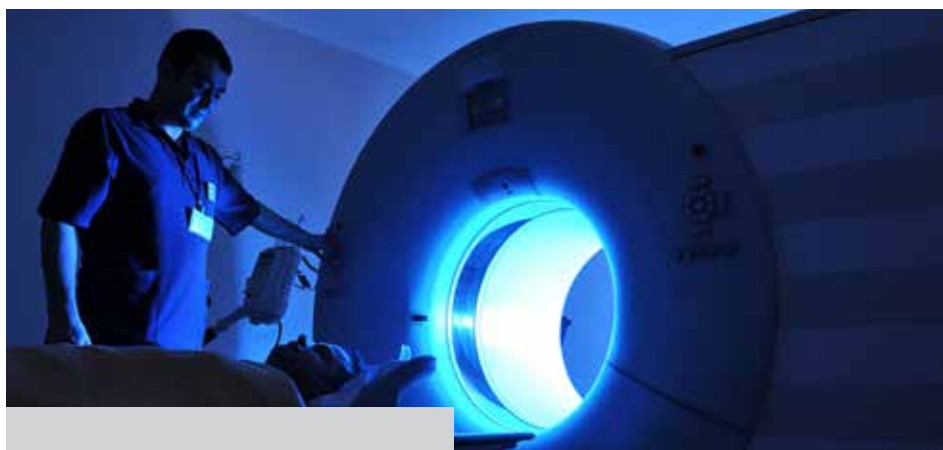
## FALL APPLICATION DEADLINE

**January 15** (late applications will be considered if openings remain)

## ADMISSION REQUIREMENTS

**MSC:** An Honours BSc in Physics or a closely related field with at least a B+ average. It is strongly recommended that all students have had at least one course in computing.

**PHD:** An MSc in Physics, or a closely related field, with at least a B+ average. Students holding an MSc in a discipline of physics outside of medical or particle physics will be considered. Students who have been admitted to the MSc program may be permitted to transfer into the PhD program if they demonstrate academic abilities for advanced research in their field.



## CONTACT INFO

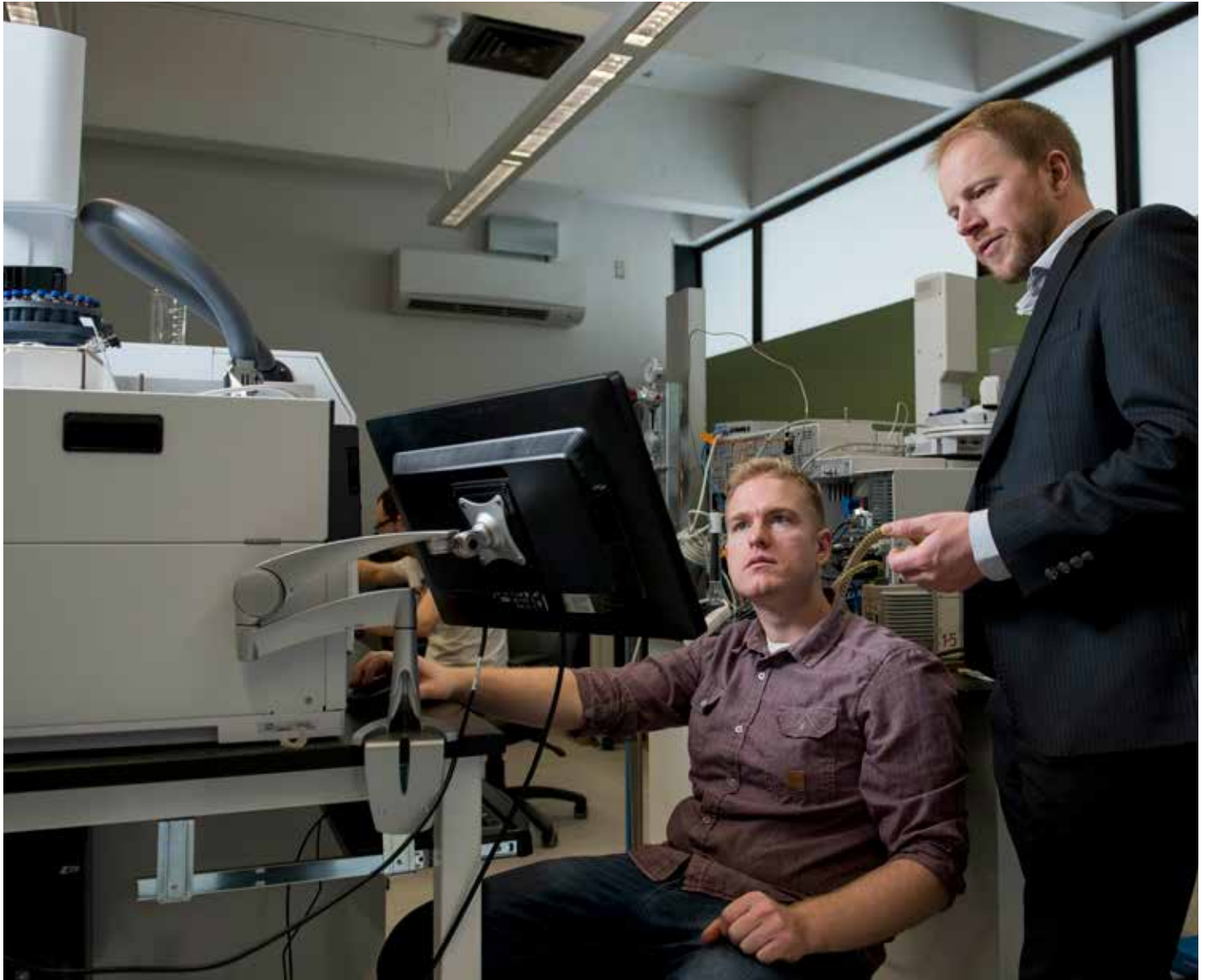
613-520-4320  
[grad-supervisor@physics.carleton.ca](mailto:grad-supervisor@physics.carleton.ca)

[physics.carleton.ca](http://physics.carleton.ca)



# RESEARCH

At Carleton, graduate students work alongside faculty and industry, government and other community leaders who are recognized for their research excellence.



Graduate student John McFarlan and Jeff Smith, Director of the Carleton Mass Spectrometry Centre, a multi-million dollar lab, are helping Bridgehead Coffee produce better coffee.

## CONTACT INFO

To find out about other graduate student research at Carleton University, go to [gradstudents.carleton.ca/grad-research](https://gradstudents.carleton.ca/grad-research)

For more information about faculty research at Carleton, go to [research.carleton.ca](https://research.carleton.ca)

# APPLY NOW FOR GRADUATE SCHOOL AT CARLETON!

Carleton offers more than 100 programs, pathways and initiatives. In the Faculty of Science, we offer the following degrees:

- Master of Science (MSc)
- Master of Applied Science (MASc)
- Master of Computer Science (MCS)
- Graduate Diplomas
- Collaborative Specializations
- PhD



## FEES AND FINANCIAL ASSISTANCE

Tuition fees are based on your program, your status as a full- or part-time student and your status as a domestic or international student. Fees are paid to the Student Accounts Receivable department after you have been admitted to Carleton and have registered for classes. For more information visit: [carleton.ca/fees](https://carleton.ca/fees)

Generous funding is available in the form of teaching assistantships, research assistantships, and/or scholarships based on academic excellence. Applicants who apply after the stated deadline may be considered for admission and funding, if funding is still available.

You may also qualify for awards from various donor-funded scholarships provided by Carleton's magnanimous alumni and sponsors.

You should also consider applying for an external financial award.

More information on financial assistance is available at: [graduate.carleton.ca/financial-assistance](https://graduate.carleton.ca/financial-assistance)

## DEADLINES

Deadlines for applications vary according to the program. Some programs have several deadlines depending on their intake process. Deadlines for the fall term normally occur between December and March, to be guaranteed consideration for admission and funding.

## ADMISSION REQUIREMENTS

While each program has its own minimum requirements, our master's programs typically require a four-year honours bachelor's degree, with a B+ or better in your major subjects and B- or better overall. Our PhD programs typically require a master's degree, with a B+ or better in your courses (including your thesis) and no grade below a B. Please note that meeting the minimum requirements does not guarantee admission into a graduate program.

## ADMISSION PROCESS

In addition to meeting the grade and prerequisite requirements of the program in which you are interested, you will need to submit several required documents with your application. Typically, these include a copy of transcripts from all of the post-secondary institutions you have attended, a Statement of Intent, emails for two or more references (typically academic) and, if applicable, a copy of your English-language test results. Only after you are accepted into one of our programs will you be required to submit official copies of your transcripts and test scores (if applicable). [graduate.carleton.ca/apply-online](https://graduate.carleton.ca/apply-online)

## GRADUATE CALENDAR

For more information about general regulations for Carleton's graduate school, go to: [calendar.carleton.ca/grad/gradregulations](https://calendar.carleton.ca/grad/gradregulations)

## CONNECTIONS

Sign up for our free newsletter for prospective grad students. [graduate.carleton.ca/newsletter](https://graduate.carleton.ca/newsletter)

[graduate.studies@carleton.ca](mailto:graduate.studies@carleton.ca)



# WITH OVER 100 GRADUATE PROGRAMS, YOU'LL FIND YOURS AT CARLETON

## MASTERS

### Master of Accounting (MAcc)

### Master of Applied Science (MASc)

- Aerospace Engineering\*
- Biomedical Engineering\*
- Civil Engineering\*
- Electrical and Computer Engineering\*
- Environmental Engineering\*
- Human-Computer Interaction
- Mechanical Engineering\*
- Sustainable Energy Engineering and Policy
- Technology Innovation Management

### Master of Architecture (MArch)

### Master of Architectural Studies (MAS)

### Master of Arts (MA)

- Anthropology
- Applied Linguistics and Discourse Studies
- Art History
- Canadian Studies
- Communication
- Economics
- English
- European, Russian and Eurasian Studies†
- Film Studies
- French & Francophone Studies
- Geography
- History
- Human-Computer Interaction
- International Affairs†
- International Affairs/Juris Doctor\*\*
- Legal Studies
- Music and Culture
- Northern Studies
- Philosophy
- Political Economy
- Political Science†
- Psychology
- Public History
- Religion and Public Life
- Sociology†
- Sustainable Energy†
- Women's and Gender Studies

### Master of Arts/Master of Business Administration (MA-MBA)

### Master of Business Administration (MBA)

### Master of Business Administration (MBA) in Bogota

### Master of Business Administration (MBA) in Shanghai

### Master of Cognitive Science (M.Cog.Sc.)

### Master of Computer Science (MCS)†\*

- Computer Science
- Human-Computer Interaction

### Master of Design (MDes)

### Master of Entrepreneurship in Technology Innovation Management

### Master of Engineering (MEng)

- Aerospace Engineering\*
- Biomedical Engineering\*
- Civil Engineering\*
- Electrical and Computer Engineering\*
- Environmental Engineering\*
- Infrastructure Protection and International Security
- Mechanical Engineering\*
- Sustainable Energy Engineering and Policy
- Technology Innovation Management

### Master of Information Technology

- Network Technology
- Digital Media

### Master of Infrastructure Protection and International Security (MIPIS)†

### Master of Journalism (MJ)

### Master of Philanthropy and Nonprofit Leadership (MPNL)

### Master of Political Management (MPM)

### Master of Public Policy and Administration (MPPA)†

### Master of Science (MSc)

- Biology\*
- Chemistry\*
- Earth Sciences\*
- Geography (Physical Geography)
- Health Sciences
- Health: Science, Technology and Policy
- Mathematics and Statistics\*
- Neuroscience
- Northern Studies
- Physics\*

### Master of Social Work (MSW)

## COLLABORATIVE SPECIALIZATIONS

- African Studies (Master's)
- Biochemistry (Master's and PhD)
- Bioinformatics (Master's)
- Biostatistics (Master's)
- Chemical and Environmental Toxicology (Master's, PhD)
- Data Science (Master's)
- Digital Humanities (Master's)
- Political Economy (PhD)

## DOCTOR OF PHILOSOPHY (PHD)

- Aerospace Engineering\*
- Anthropology
- Applied Linguistics and Discourse Studies
- Architecture
- Biology\*
- Biomedical Engineering\*
- Canadian Studies\*\*\*
- Chemistry\*
- Civil Engineering\*
- Cognitive Science
- Communication
- Computer Science\*
- Cultural Mediations
- Earth Sciences\*
- Economics\*
- Electrical and Computer Engineering\*
- English
- Environmental Engineering\*
- Ethics and Public Affairs
- Geography
- Health Sciences
- History
- Information Technology (Digital Media)
- International Affairs
- Legal Studies
- Management
- Mathematics and Statistics\*
- Mechanical Engineering\*
- Neuroscience
- Physics\*
- Political Science
- Psychology
- Public Policy
- Social Work
- Sociology

## GRADUATE DIPLOMAS

- Architectural Conservation
- Conflict Resolution
- Curatorial Studies
- Ethics and Public Affairs
- European Integration Studies
- Health: Science, Technology and Policy
- Indigenous Policy and Administration
- Infrastructure Protection and International Security (IPIS)
- Northern Studies
- Philanthropy and Nonprofit Leadership
- Public Policy and Program Evaluation (online)

† Co-operative education available

\* Joint program between Carleton University and the University of Ottawa

\*\* Program requires application and registration at both Carleton University and the University of Ottawa

\*\*\* Joint program between Carleton University and Trent University





**Carleton**  
UNIVERSITY

Faculty of  
**Graduate and  
Postdoctoral Affairs**



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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](https://carleton.ca/accessibility/request).

## CONTACT INFO

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