



**Carleton**  
UNIVERSITY

Faculty of  
Graduate and  
Postdoctoral Affairs

# FACULTY OF ENGINEERING AND DESIGN 2018 GRADUATE VIEWBOOK

CARLETON UNIVERSITY, OTTAWA, CANADA



[carleton.ca/engineering-design](http://carleton.ca/engineering-design)





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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

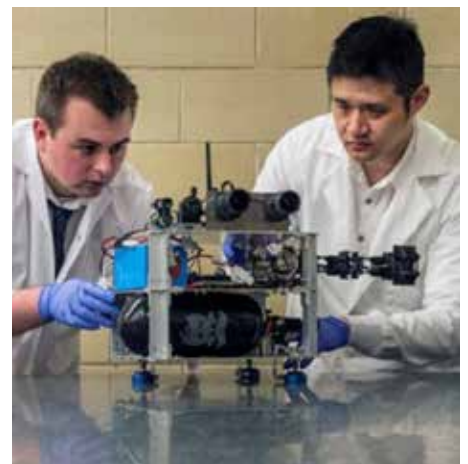
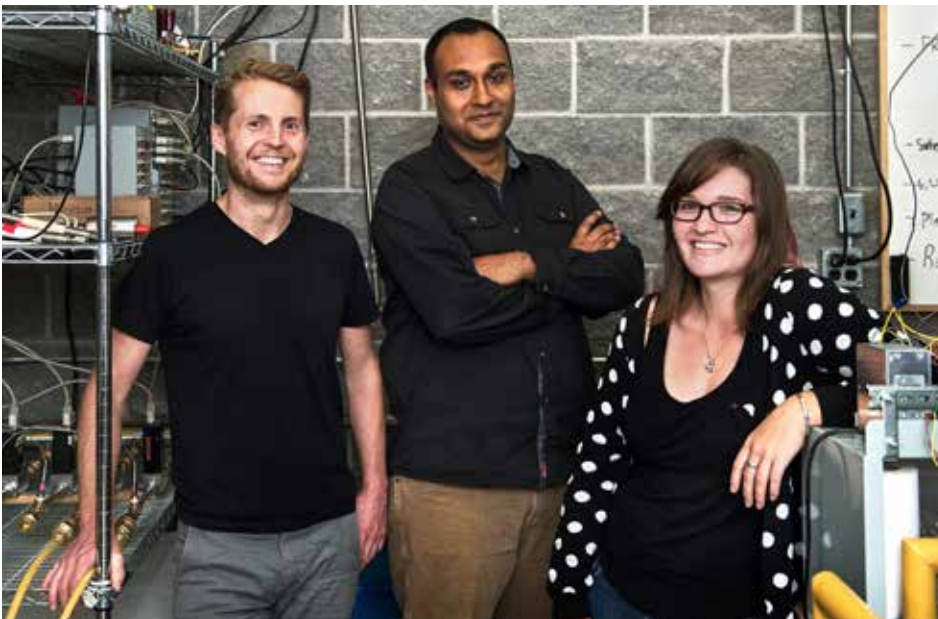
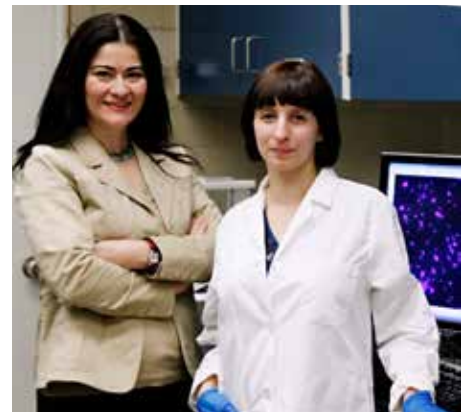
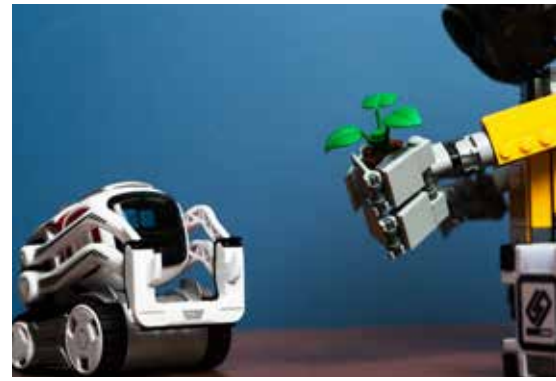
Carleton University's Faculty of Engineering and Design is recognized as one of Canada's leading institutions in the study and research of engineering, architecture, industrial design and information technology. By offering one of the most extensive ranges of graduate programs in the country, we provide students with the knowledge and skills to design buildings, aircraft, software, telecommunications systems, medical devices, environmental solutions to pollution, and more. Carleton's graduate programs in engineering and design will teach you that if you can envision it, you can make it a reality.

Our graduate programs not only offer excellent research and practical applications related to your field of interest – they also prepare you for rewarding careers in the real world by providing you with the skills that are highly desirable in today's fast-paced, technology-driven society.

Carleton's location in the national capital offers outstanding opportunities for students to engage with government agencies and departments, as well as research institutions and high-tech industry leaders located in the Ottawa region. Our unique partnership with the University of Ottawa also provides our students access to a wider range of courses, expertise, research facilities and libraries.

Carleton University is also known for its collaborative graduate specializations, which bring together experts and students from a variety of disciplines in order to approach critical issues from diverse perspectives. These specializations, along with our many professional development opportunities, are among the many reasons why Carleton University received strong rankings 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

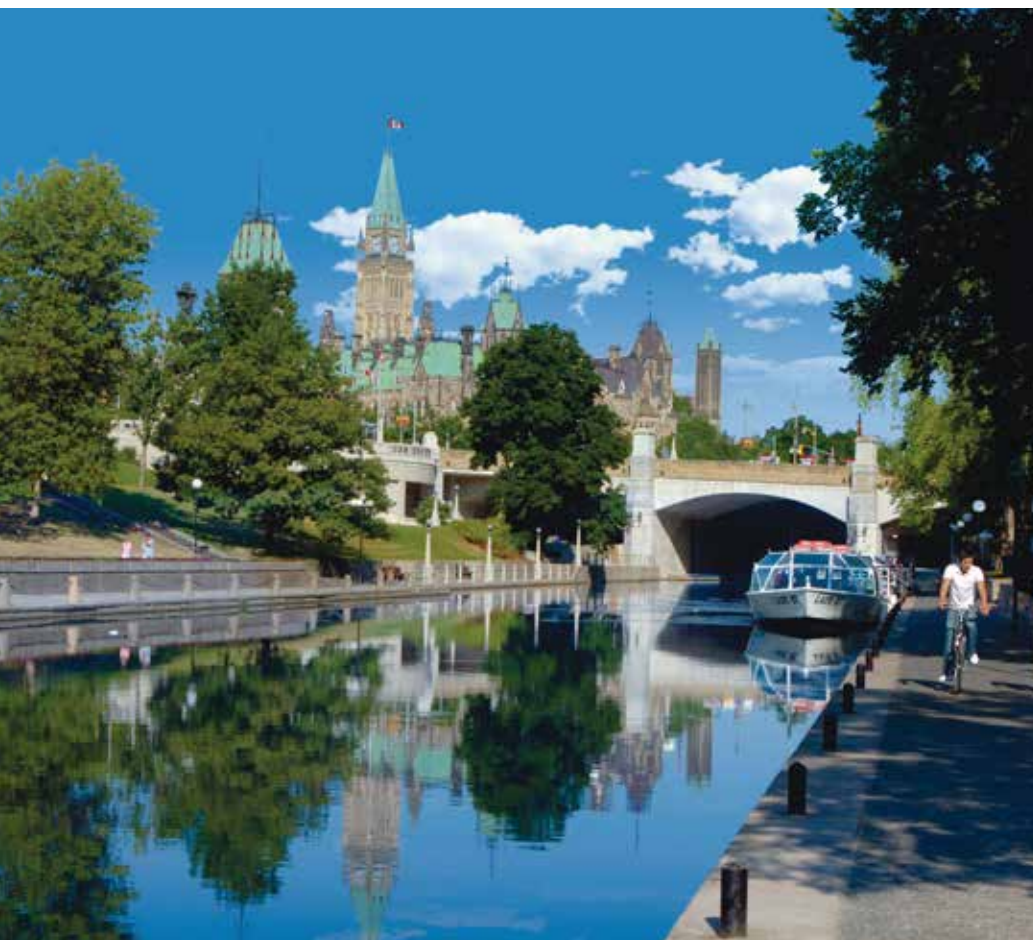
One of Carleton's greatest assets is its location in the nation's capital. Ottawa is home to most federal government departments, as well as influential non-governmental

organizations. It also boasts a vibrant business sector and has one of Canada's largest concentrations of high-tech industries. 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 alongside the historic Rideau Canal. 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.



# GRADUATE PROGRAMS IN ARCHITECTURE

The Azrieli School of Architecture and Urbanism is committed to preparing future architects for a culturally rich, technologically dynamic and globalized world. All of our graduate programs are full-time.

Carleton's Master of Architecture (MArch) is an accredited professional degree program whose curriculum is organized around design studios that foster thoughtful reflection on society and the contemporary built environment. The curriculum is enriched by graduate seminars and courses in advanced building systems, digital design and by studios abroad. In their final year, students undertake a detailed thesis, with the resulting project being pursued either as an independent study or as part of a research group organized under specific faculty interests. The MArch is comprised of two streams. See admission requirements for details.

The Master in Architectural Studies (MAS) and the PhD in Architecture are innovative and comprehensive programs that ask students to engage in critical forms of historical research and architectural practice.

The MAS focuses on in-depth, architectural research and provides a strong foundation for pursuing a PhD. In the winter semester, students have the unique opportunity to spend an entire semester studying abroad under the supervision of renowned architects.

The PhD culminates in a written dissertation on an original research topic.

The Graduate Diploma in Architectural Conservation consists of four credits focusing specifically on the theory and practice of architectural conservation.

## DEGREES OFFERED

MArch, MAS, PhD, Graduate Diploma in Architectural Conservation

## CAREER OPTIONS

Our master's programs prepare graduates for a career in architecture and related professional fields. Our PhD program prepares graduates for teaching and practice in global academic and professional fields.

## FALL APPLICATION DEADLINE

**January 15**, if space and funds are still available

## ADMISSION REQUIREMENTS

**MASTER OF ARCHITECTURE (MArch) 13-credit (3 year) stream:** Applicants who hold a four-year undergraduate degree in a discipline other than architecture and have a minimum GPA of B+ must complete a tailored year which includes an intensive series of three studios and courses in architectural history and theory, buildings technologies, visual representation, digital design and professional practice. These students will then join the 8-credit stream.

**8-credit (2 year) stream:** A four-year undergraduate degree in architecture or architectural studies with significant studio experience and a minimum GPA of B-.



Placement in the 2-year or 3-year curriculum is at the discretion of the faculty admissions committee.

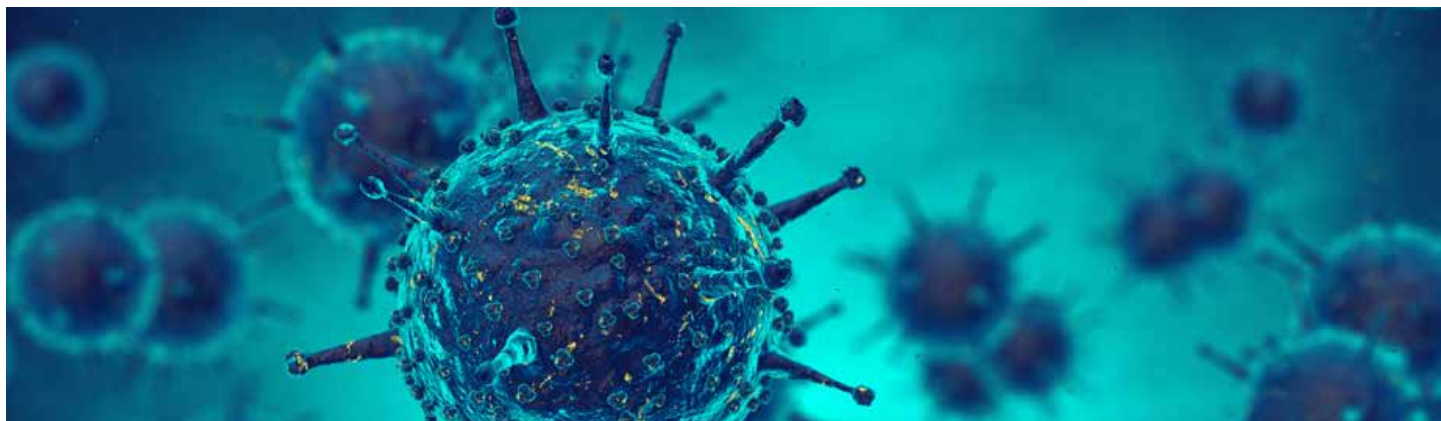
**MASTER IN ARCHITECTURAL STUDIES (MAS):** A four-year undergraduate degree in architecture or a recognized equivalent in a related discipline and a minimum GPA of B-. Professional experience may be taken into consideration.

**PHD:** A Master of Architecture or recognized equivalent in a related discipline with a minimum average of A-.

**DIPLOMA IN ARCHITECTURAL CONSERVATION:** For direct entry, BAS or equivalent degree in Architecture with an average of B+ or higher. Students currently in the MArch program are also eligible.



# 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 innovations that will transcend industries.

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 the nation's capital allows for access to many government departments, as well as 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 BIOMEDICAL ENGINEERING

Rapid advances in new, innovative biomedical and assistive technologies have led to an increasing need for experts in areas such as 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, telehealth, and more. 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 computer facilities. Our location in Ottawa allows for collaboration with numerous area hospitals and relevant government departments such as Health Canada and the National Research Council, as well as access to additional resources and faculty at the University of Ottawa through OCIBME. This joint institute 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 and vision care research and rehabilitation services.

At the master's level, we also offer specializations 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 or 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 for our graduates in the non-profit sector. At the PhD level, careers may be more research-focused in areas such as 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 eligible 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+.



# GRADUATE PROGRAMS IN CIVIL ENGINEERING

Carleton University is recognized for its advanced research in civil and environmental engineering, with expertise in structural, materials and earthquake engineering; infrastructure protection and international security; fire safety; transportation engineering; geotechnical engineering; water resources and wastewater; air



pollution; hydrogeology and waste management; and heritage and sustainable buildings.

The Department of Civil and Environmental Engineering is home to a high concentration of accomplished and internationally-recognized researchers, including an NSERC Industrial Research Chair in Fire Safety Engineering and the Jarislowsky Foundation Research Chair in Water and Global Health. Carleton is also home to a wide assortment of world-class research facilities. As a result, our graduate students gain hands-on research experience while developing state-of-the-art theory.

Our degree programs in Civil Engineering are jointly taught with the University of Ottawa through the Ottawa-Carleton Institute for Civil Engineering (OCICE). The MASc and PhD require the completion of a thesis while the MEng is predominately course-based with the option of a research project.

## DEGREES OFFERED

MASc, MEng, PhD

## CAREER OPTIONS

Our location in the nation's capital allows for proximity to and collaboration with the National Research Council Canada, Natural Resources Canada, Environment Canada, Heritage Conservation Directorate, Canada Green Building Council, Parks Canada and many heritage sites including the Parliament Buildings, Rideau Canal, Royal Canadian Mint, etc. Career opportunities are just around the corner.

## FALL APPLICATION DEADLINE

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

## ADMISSION REQUIREMENTS

**MASTER'S:** An honours bachelor's degree, or academic equivalent, in civil or environmental engineering, or a related discipline, with an average of B+ or higher.

**PHD:** A master's degree with a thesis in civil engineering and at least an A- or higher in 2.5 credits of coursework.

“During my MASc and PhD in Civil Engineering, I learned advanced engineering techniques, developed and implemented cutting-edge technologies, travelled the world and collaborated with internationally-renowned researchers. Carleton's professors are passionate about teaching and research and continually strive to equip students with state-of-the-art skills and critical thinking.”

— Burak Gunay, PhD/16 and MASc/11

## CONTACT INFO

613-520-2600 x1228  
gradinfo@cee.carleton.ca

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



# 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 improve 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 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.

# MASTER OF DESIGN

The Master of Design, offered by the School of Industrial Design, takes a strong research approach and is normally completed in two years. The School of Industrial Design provides a collaborative graduate studio space, a sensor lab and prototyping labs, and more.

Students examine and incorporate multi-faceted design principles and practices that contribute to the strategic value of design, with particular research focus on the following key areas: advanced materials and manufacturing

processes, advance visualization, design and culture, design management, extreme environments, human-oriented design, product interaction design, sustainable design and strategic design research. They are also offered interdisciplinary interactions with faculty and students from a diverse range of disciplines within the university — all linked to the design development process.

## DEGREES OFFERED

MDes

## CAREER OPTIONS

Ottawa is an ideal place to study industrial design with many industry and world-class government research and development laboratories which engage with our MDes students on a regular basis. This includes the Natural Research Council Canada and National Capital Commission, as well as various medical institutions and a multitude of federal and private museums only found in the national capital region. Many career opportunities are just down the road, positioning our graduates to play a strategic role in championing design in a variety of enterprises, including academic institutions.

## FALL APPLICATION DEADLINE

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

## ADMISSION REQUIREMENTS

A bachelor's degree in a design discipline, or the academic equivalent, with at least a B+ standing. Applicants with a design-related background, but not a professional degree in design, will be required to demonstrate significant links between their academic background and professional experience working with designers in the design development process.



Cover artwork: Maria Gabriela Sanches

“Taking the Master of Design program while I was a professor of interior design at Algonquin College helped to strengthen my broader view of the design industry as a whole.”

— Tamara Phillips MDes/12, Professor, BAA Interior Design, School of Media and Design, Algonquin College

## CONTACT INFO

613-520-2600 x5672  
industrial\_design@carleton.

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



# ELECTRICAL AND COMPUTER ENGINEERING



Carleton is recognized as a world leader in electrical and computer engineering.

Carleton's renowned researchers work in areas such as computing, electrical engineering, engineering systems and analysis, interactive multimedia systems, software engineering, speech/signal/image processing and telecommunications, machine learning, nanotechnology, quantum/optical computing, sensor nets, robotics and artificial intelligence, biomedical engineering, and many others. Students may find themselves building circuits and interfacing microcontrollers, designing central processing units, programming AI systems, designing telecommunications protocols, and more. For additional information, visit our departmental websites ([doe.carleton.ca](http://doe.carleton.ca) and [carleton.ca/sce](http://carleton.ca/sce)).

Our graduate electrical and computer engineering programs are offered jointly by the Department of Systems and Computer Engineering and the Department of Electronics at Carleton, in conjunction with the University of Ottawa via the Ottawa-Carleton Institute for Electrical and

Computer Engineering (OCIECE). This combination of resources in three departments at two universities grants our students access to the largest selection of courses in electrical and computer engineering at any Canadian University.

We offer an MASc which requires the completion of a research thesis, an MEng which is coursework-only or coursework plus a project, and a PhD. At the master's level, we also offer a specialization in Data Science.

## DEGREES OFFERED

MASc, MEng, PhD

## CAREER OPTIONS

Our location in the nation's capital allows for collaboration with relevant government departments, the National Research Council Canada, the Communications Research Centre Canada, and high-tech industries in the aerospace, telecom and service industries, for example. Your proximity to these

facilities ensures that your potential career is just around the corner.

## FALL APPLICATION DEADLINE

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

## ADMISSION REQUIREMENTS

**MASTER'S:** A bachelor's degree with an average of at least B+ or higher in electrical engineering or a related discipline.

**PHD:** A master's degree with a thesis in electrical engineering, computer science, software engineering, or a closely-related discipline from a recognized university. Your master's thesis topic must be in an appropriate area and of acceptable quality.

## CONTACT INFO

### Electronics

613-520-2600 x5754  
[info@doe.carleton.ca](mailto:info@doe.carleton.ca)  
[doe.carleton.ca](http://doe.carleton.ca)

### Systems and Computer Engineering

613-520-2600 x1511  
[info@sce.carleton.ca](mailto:info@sce.carleton.ca)



In the Advanced Cognitive Engineering Laboratory, Carleton graduate students research human perception and cognition and how to apply these principles to the design, implementation and evaluation of advanced human-machine systems.



# GRADUATE PROGRAMS IN ENVIRONMENTAL ENGINEERING

Carleton University is recognized for its advanced research in civil and environmental engineering, with expertise in structural, materials and earthquake engineering, infrastructure protection and international security, fire safety, transportation engineering, geotechnical engineering, water resources and wastewater, air pollution, hydrogeology and waste management and heritage and sustainable buildings, and more.

The Department of Civil and Environmental Engineering has a high concentration of accomplished and internationally-recognized researchers, including the Jarislowsky Foundation Research Chair in Water and Global Health and an NSERC Industrial Research Chair in Fire Safety Engineering. Carleton is also home to a wide assortment of world-class research facilities. As a result, our graduate students gain hands-on research experience while developing state-of-the-art theory.

Our degree programs in Environmental Engineering are jointly taught with the University of Ottawa through the Ottawa-Carleton Institute for Civil Engineering (OCICE). The MASc and PhD require the completion of a thesis while the MEng is predominately course-based with the option of a research project.



## DEGREES OFFERED

MASc, MEng, PhD

## CAREER OPTIONS

Our location in the nation's capital allows for proximity to and collaboration with the National Research Council Canada, Natural Resources Canada, Environment Canada, Heritage Conservation Directorate, Canada Green Building Council, Parks Canada, and many heritage sites including the Parliament Buildings, Rideau Canal and the Royal Canadian Mint. Career opportunities are just around the corner.

## FALL APPLICATION DEADLINE

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

## ADMISSION REQUIREMENTS

**MASTER'S:** An honours bachelor's degree, or academic equivalent, in civil or environmental engineering, or a related discipline, with an average of B+ or higher.

**PHD:** A master's degree with a thesis in environmental engineering and at least an A- or higher in 2.5 credits of coursework.

“What I like most about my time at Carleton is the larger skill set I've been able to develop over the years. I came in a bright and enthusiastic student who was able to master coursework and now leave a capable leader able to take on some of the larger environmental challenges we are facing today.”

— Natalie Linklater, PhD candidate, MASc/10, BEng/08

# 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 so unique is its interdisciplinary structure, 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 INFORMATION TECHNOLOGY

Carleton's master's and PhD degrees in Information Technology provide students with the skills they will need to succeed in what has become an ever-evolving industry.

The master's degree consists of two programs: Network Technology (NET) and Digital Media (DM). Those pursuing the NET program will cover the design, management and operation of computer networks. They will develop research skills through courses and a project framework. DM students will focus on areas dealing with the development of content and technology for areas such as entertainment, education and communication. The DM program is research-based and students will produce a thesis as a requirement of the program.

The PhD program focuses on advanced interdisciplinary research in Digital Media and related applications and topics.

Research in the Carleton School of Information Technology has direct application to industry and has led to many achievements in digital media and network technology.

## DEGREES OFFERED

MIT (Digital Media, Network Technology), PhD (Digital Media)

## CAREER OPTIONS

Many of our DM graduates will go on to work with enterprises in the entertainment, media and communication industries, which have strong research and development activities. They may pursue working for government

agencies and organizations that require digital media content and technologies.

Advances in mobile technologies and the requirements for security and privacy will afford opportunities for our NET graduates. They will be prepared to work with network operators and Internet service providers, as well as to pursue careers with networking equipment manufacturers and government agencies.

PhD graduates will be ideal for private sector companies with strong R&D departments, government agencies in need of advanced digital media solutions and strategies, as well as universities that offer digital media-related programs.

## FALL APPLICATION DEADLINE

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

## ADMISSION REQUIREMENTS

**NETWORKING (MASTER'S):** An undergraduate degree in network technology, electrical engineering, computer science, engineering, or a closely-related discipline.

**DIGITAL MEDIA (MASTER'S):** An undergraduate degree in one of the related three primary disciplines of Technology (e.g. computer science/engineering and information technology), Content (e.g. design, arts and humanities), and People (e.g. psychology, communication and business). Intermediate undergraduate-level computer

programming skills are required as proper technical background. Applicants who have gained these skills through relevant professional experience will also be considered but may be required to take additional courses (stipulated on a case-by-case basis).

**PHD:** A master's degree in one of the three related disciplines (Technology, Content, and People). Applicants not holding a master's degree in a related discipline will also be considered, but all applicants will be required to demonstrate that they have some general technology (digital media) background, as well as the ability to work in multidisciplinary groups.

**ALL PROGRAMS** An average of B or higher is expected for admission to the master's and PhD programs.







International graduate students tour the Carleton campus during fall Orientation.



## GRADUATE PROGRAMS IN

# INFRASTRUCTURE PROTECTION AND INTERNATIONAL SECURITY

### Ottawa offers strategic resources and facilities for our IPIS students.

Our Infrastructure Protection and International Security (IPIS) programs combine the unique resources of The Faculty of Engineering and Design and the Norman Paterson School of International Affairs. IPIS students are trained to understand critical infrastructure systems and their interconnections and to assess risks from natural and human hazards.

Graduates are prepared for working in multidisciplinary teams to develop and evaluate cost-effective and socially responsible strategies for improving the resilience of critical infrastructure systems using both engineering design and policy alternatives and to assess options for the management and recovery of critical infrastructure assets.

The MIPIS and MEng (IPIS) programs offer a co-op option for eligible students, which can provide invaluable professional experience and bridging opportunities.

We also offer two graduate diplomas in this area — one is for professionals and another is for students who are currently enrolled in graduate programs at Carleton.

### DEGREES OFFERED

MIPIS, MEng, Graduate Diplomas

### CAREER OPTIONS

Graduates are prepared for careers in government agencies and departments. They are also equipped for strategic opportunities within Canada's private sector in fields such as engineering, energy, information technology, telecommunications and transportation.

### APPLICATION DEADLINE

**January 31**, to be considered for admission and funding in the first round, but applications will be reviewed all year

### ADMISSION REQUIREMENTS

**MIPIS:** A four-year bachelor's degree (or equivalent) with an overall average of B+ or higher.

**MEng (IPIS):** A bachelor of engineering with an overall average of B+ or higher.

#### GRADUATE DIPLOMAS:

A bachelor's degree (or equivalent) with a minimum average of B+.

Applicants who do not meet these requirements but who have significant academic or professional qualifications and experience may also be considered.



### CONTACT INFO

613-520-2600 x6651  
[ipis@carleton.ca](mailto:ipis@carleton.ca)

## GRADUATE PROGRAMS IN

# MECHANICAL AND AEROSPACE ENGINEERING



All of our graduate programs in mechanical and aerospace engineering are offered through the Ottawa-Carleton Institute for Mechanical and Aerospace Engineering (OCIMAE), which combines the research strengths and resources of Carleton University and the University of Ottawa.

Our researchers are leaders in advancing aerodynamics; vehicle dynamics and simulation technologies; biomedical engineering and design of devices, health monitoring and management systems; design optimization of advanced materials and structures; convective heat transfer characteristics in super critical fluids with application to

nuclear-reactor cooling; robotics; navigation; combustion; and the development of sustainable energy sources. Our graduate students are an essential part of our research enterprise.

We offer a thesis program (MAsc) which typically takes two years to complete and coursework or project options (MEng) which can be completed in one year, as well as a PhD degree.

## DEGREES OFFERED

MAsc, MEng, PhD

## CAREER OPTIONS

Our research benefits from strong relationships with external research centres locally and

globally. These strong relationships offer our students diverse research and career opportunities.

Research collaborations and funding arrangements exist with several institutes of the National Research Council Canada, Environment Canada, Natural Resources Canada, National Defence, the Ottawa Hospital and the Canadian Space Agency. Major industry partners include Pratt & Whitney Canada Inc., United Technologies, Siemens Corp., Deloro-Stellite, Indal Technologies, Liburdi Engineering, Magellan Aerospace, Augusta SpA., Atomic Energy of Canada Ltd., Rolls-Royce Canada and the Petroleum Technology Alliance of Canada, among many others.

## FALL APPLICATION DEADLINE

Applications may be submitted at any time. However, for fall admission, the deadline is **August 31**, to be considered for admission and funding if space and funds remain. We also offer summer and winter admissions.

## ADMISSION REQUIREMENTS

**MASTER'S:** A bachelor's degree with at least a B+ in mechanical or aerospace engineering or a related discipline; B- or higher overall.

**PHD:** A master's degree in mechanical or aerospace engineering or a related discipline.

## CONTACT INFO

613-520-2600 x5659  
gradadmineng@carleton.ca

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



# GRADUATE PROGRAMS IN SUSTAINABLE ENERGY ENGINEERING AND POLICY

Sustainable energy is critical to Canada's economic future.

Carleton University has well established strengths in the sustainable energy field in regards to both engineering and policy. Our master's program in sustainable energy addresses crucial challenges related to sustainable energy production and use in a unique interdisciplinary fashion that involves both engineering and public policy.

The program involves learning across two distinct disciplines, with students specializing in either engineering or public policy before graduating with either an engineering degree (MAsc or MEng in Sustainable Energy) or a public policy degree (MA in Sustainable Energy). Once a specialization is chosen, students take courses that engage with the program's disciplinary component: public policy for those specializing in sustainable energy engineering; and engineering for those specializing in sustainable energy policy.

The MA degree advances the understanding of what constitutes sustainable energy policy, how sustainable energy policy is developed and implemented and what challenges and barriers it faces. A co-op option is available in the MA program. Both the MAsc and MEng degrees in Mechanical Energy Conversion provide broad, in-depth exposure to the design, development,

implementation and improvement of energy conversion methods and systems. The MAsc and MEng degrees in Efficient Electrical Energy Systems focus on the design, optimization and realization of electricity distribution systems.

## DEGREES OFFERED

MA, MAsc, MEng

## CAREER OPTIONS

The program prepares students for career opportunities related to sustainable energy in government, business, and the civil society sector, and/or to serve as a foundation for further graduate education at the doctoral level.

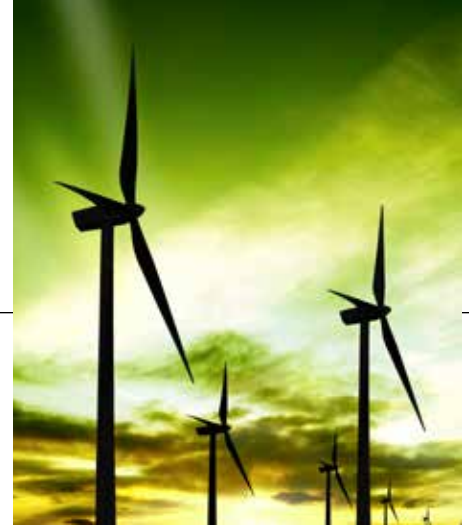
## FALL APPLICATION DEADLINE

**February 1** (MA); **March 1** (MAsc and MEng), in order to be eligible for funding. Final application deadline is **July 15**.

## ADMISSION REQUIREMENTS

**MASC AND MENG:** A bachelor's degree, or equivalent, in a discipline relevant to engineering disciplinary foundations. Typically, an average of B+ or higher is required for admission.

**MA:** A bachelor's degree, or equivalent, with at least a B+ average. Students are accepted from a wide variety of backgrounds in the social sciences, humanities, sciences



and engineering. Mid-career applicants who do not have a bachelor's degree, but who have demonstrated professional excellence over a number of years in the public sector will also be considered.

Applicants must have completed a university course in micro- and macroeconomic theory and at least a second-year political science course dealing with institutions and processes by which governments legitimize and exercise power, ideally in a Canadian setting. A working knowledge of algebra is also expected. In some cases, applicants may be admitted to the program without having completed one of the prerequisite courses in economics or political science on the condition that the course be completed with a grade of B- or higher in the first year of the program. However, it is strongly recommended that students complete the prerequisites before starting the program to ensure that their progress through the core courses is unimpeded.

“The Sustainable Energy program has given me both knowledge and practical experience.”

— Sarah Gibb, MA/12

# GRADUATE PROGRAMS IN TECHNOLOGY INNOVATION MANAGEMENT

The Technology Innovation Management (TIM) program, a joint initiative of the Sprott School of Business and the Faculty of Engineering and Design, offers three different degrees in Technology Innovation Management.

- The Master of Applied Science (MASc) degree is thesis-based — students undertake original research under the supervision of an experienced faculty member.
- The Master of Engineering (MEng) degree is project-based — students employ applied research to solve a client problem.
- The Master of Entrepreneurship (MEnt) degree is also project-based — students employ applied research to improve the health of the business ecosystems that deliver specialized services to founders of new companies or new lines of business at existing companies.

All of our students undertake the majority of their coursework in an informal face-to-face university setting. Occasional group study sessions and lectures use our **BigBlueButton** conferencing system. All TIM courses take place in the evening, making the TIM program ideal for busy people.

At Carleton, we actively practise entrepreneurship with the TIM program serving as an important component of Carleton's entrepreneurial focus. We offer several opportunities for advanced learning, including internships with other TIM-based businesses, involvement with Carleton-based projects that build new platforms and systems, and in depth access to the flagship TIM Review online journal ([timreview.ca](http://timreview.ca)) and TIM Lecture Series.

We also provide our students and graduates with access to unique resources in Canada's capital

region including Lead To Win ([leadtowin.ca](http://leadtowin.ca)), ranked by UBI Global as one of the top 10 university business incubators in North America, the Carleton-led Accelerator for student entrepreneurs and the VENUS Cybersecurity Corporation ([venuscyber.com](http://venuscyber.com)).

## DEGREES OFFERED

MASc, MEng, MEnt

## CAREER OPTIONS

More than one third of our graduates leave with both a degree and a brand new technology company. Our graduates are also equipped to follow career paths in a variety of business settings.

## FALL APPLICATION DEADLINE

**March 1**, to be eligible for funding. Applicants may apply for the fall or winter terms.

## ADMISSION REQUIREMENTS

A bachelor's degree in engineering, business, or science, with at least a B+ average. Candidates are typically required to have two years of technical work experience prior to admission. Candidates applying for admission with degrees in other areas will also be considered by the admissions committee that is responsible for establishing criteria for degree equivalencies.



### CONTACT INFO

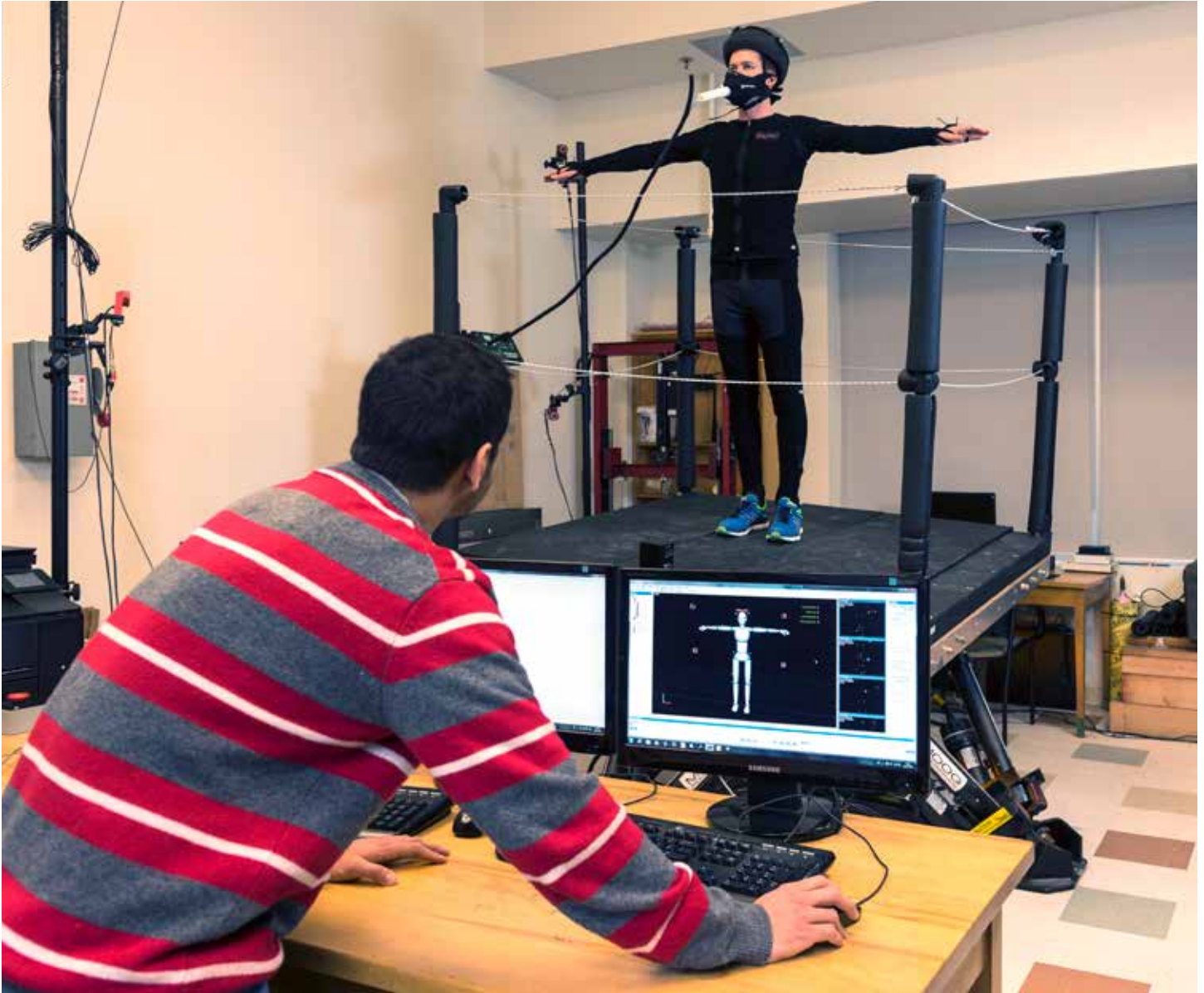
613-520-2600 x8659  
[timprogram@carleton.ca](mailto:timprogram@carleton.ca)

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



# RESEARCH

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



As part of his master's degree, Burhan Terai researched how we can measure and predict biomechanical forces to prevent injury experienced by rescue and military personnel when using high speed marine crafts.

## 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 graduate programs, pathways and initiatives. In the Faculty of Engineering and Design, we offer the following degrees:

- Master of Applied Science (MASc)
- Master of Architecture (MArch)
- Master of Architectural Studies (MAS)
- Master of Design (MDes)
- Master of Engineering (MEng)
- Master of Entrepreneurship (MEnt)
- Master of Information Technology (MIT)
- Master of Infrastructure Protection and International Security (MIPIS)
- 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 generous 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 higher in your major subjects and B- or higher overall. Our PhD programs typically require a master's degree, with a B+ or higher 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**



@CUGradStudies



youtube.com/GradsAtCarleton



Sign up for our Newsletter: [graduate.carleton.ca/newsletter](https://graduate.carleton.ca/newsletter)

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).

Cover Photo: Several graduate students have been involved in the creation of Carleton's Urbandale Centre for Home Energy Research, a specially-designed solar-powered house which acts as a test bed for innovative concepts that challenge the traditional way houses are designed and built, focusing largely on seasonal thermal storage.

## CONTACT INFO

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