Carleton UNIVERSITY | Faculty of Graduate and Postdoctoral Affairs
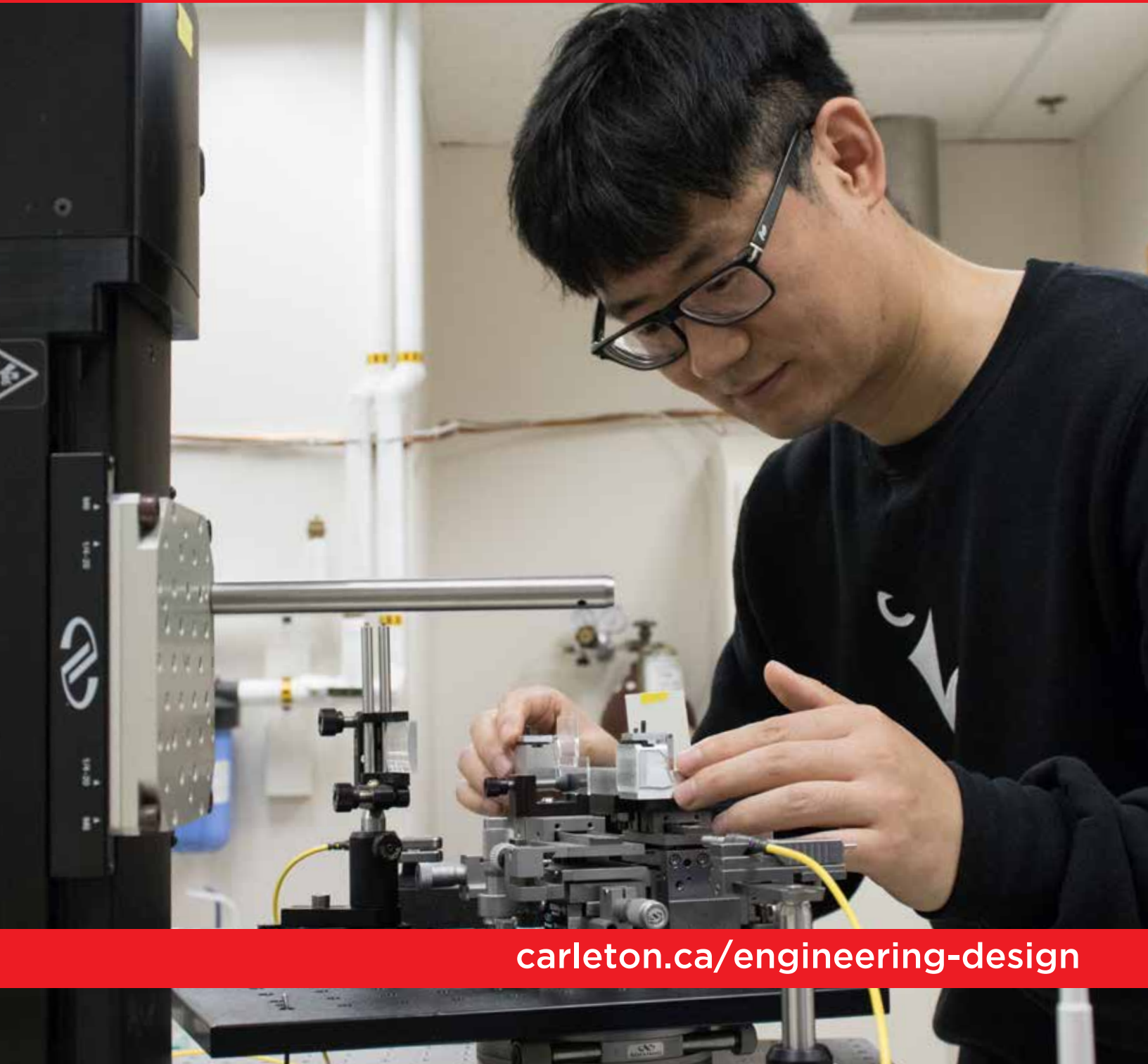
Faculty of Engineering and Design
2022 Graduate Viewbook

Carleton University, Ottawa, Canada

carleton.ca/engineering-design

Faculty of Engineering

Faculty of Engineering & Design

The Faculty of Engineering and Design is a Canadian leader, with an extensive range of graduate programs for you to choose from. For more information, go to our website: **carleton.ca/engineering-design**

Interdisciplinary Programs

Carleton's graduate programs in engineering and design will teach you, that if you can envision it, you can make it a reality. We provide students with the knowledge and skills to design buildings, aircraft, software, telecommunications systems, medical devices, environmental solutions to pollution, and more. Carleton 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.

Ottawa 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 also headquartered here. This "capital advantage" provides numerous opportunities for work placements, experiential learning and career opportunities.

Innovative Research

Our professors are experts in their fields. They conduct cutting-edge research in world-class facilities that helps change peoples' lives.

Professional Development at Carleton

The Faculty of Graduate and Postdoctoral Affairs offers a range of professional development resources to help you establish your career narrative. These include workshops, career planning tools, one-on-one support and consultation and opportunities to learn from the experiences of Carleton alumni. You can also develop new transferable skills through our skill-focused workshops and professional writing modules. We strive to create a culture of professional development that you can take part in while pursuing all your writing, research and career goals. More information is available at: **carleton.ca/gradpd**

Meet your Professional Development Team: David Lafferty and Karim Abuawad

Career Possibilities

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.

Hands-on
Experience

At Carleton, we offer several opportunities to our students to gain real-world experience that complements their classroom learning.

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 the winter semester of their penultimate year, students have the unique opportunity to spend a half semester studying abroad under the supervision of renowned architects and academics. 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 (3 year and 2 year). 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.

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, to be eligible for funding

Admission Requirements

MASTER OF ARCHITECTURE (MArch) 15.5-credit (3 year) stream: Applicants who hold a four-year undergraduate degree in a discipline other than architecture (with 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
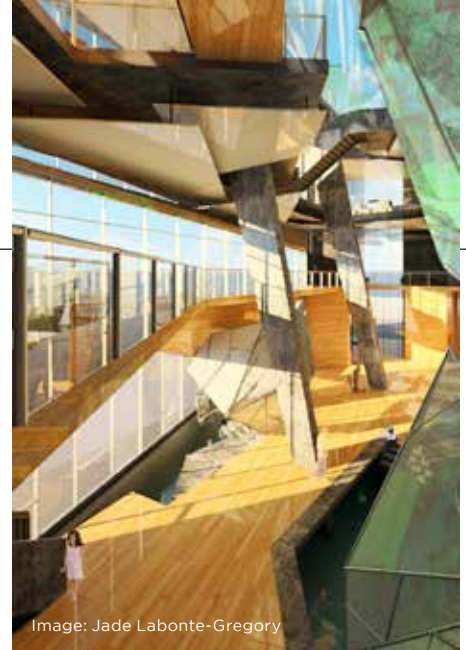
technologies, visual representation, digital design and professional practice. These students will join the 8-credit stream upon completion of their first year.

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

Please note that 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 recognized equivalent in a related discipline) with 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.
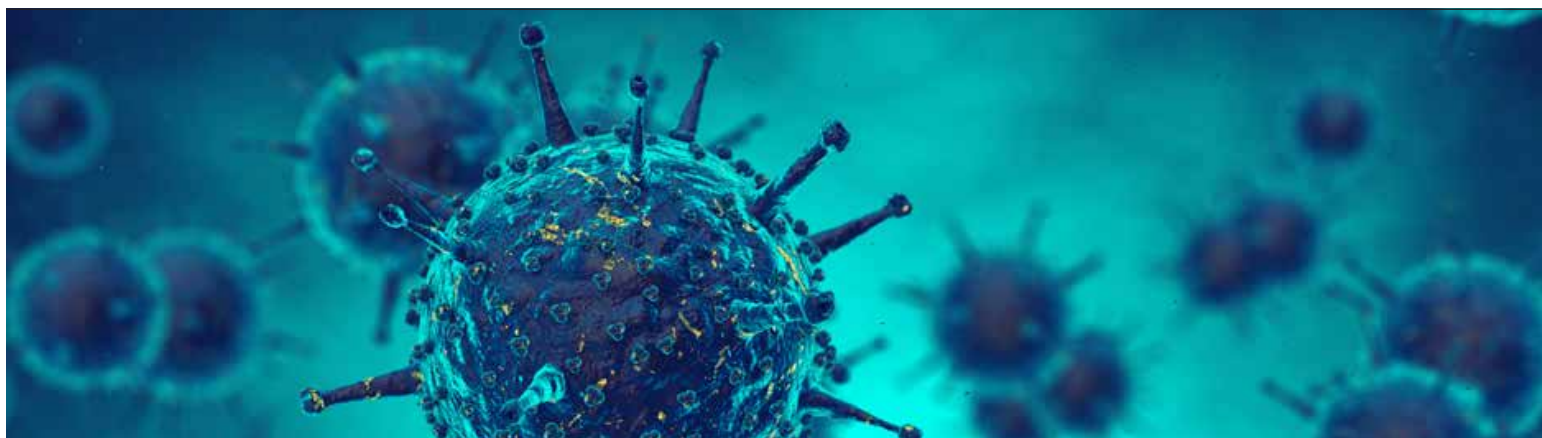
carleton.ca/architecture

Contact Info

613-520-2600 x8226
architecturegrad@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

Bioinformatics specialists collect, store, analyze, and present complex biological data that can include DNA and genome information, protein sequencing and pathways. They can work in areas such as pharmaceuticals, computer information science and medical technology, designing and manipulating complex databases, creating web-based analytical tools and algorithms and developing new software for project and research needs.

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.carleton.ca/programs/bioinformatics-collaborative-masters

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 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, hospitals and 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+.

ocibme.ca

Contact Info

613-520-5659
gradadmineng@carleton.ca

GRADUATE PROGRAMS IN
Civil Engineering

Carleton University is recognized for advanced research in civil engineering, with expertise in structural, materials and earthquake engineering; infrastructure protection; fire safety; transportation engineering; geotechnical engineering; environmental engineering; 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 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).

" 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

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

PhD, MASc, MEng

CAREER OPTIONS

Our location in the nation's capital allows for collaboration and employment with major regional organizations, e.g., the National Research Council Canada, Natural Resources Canada, Environment and Climate Change Canada, Heritage Conservation Directorate, and the Canada Green Building Council. Our graduates also find employment in the private sector and the consulting industry across the country. Our graduates design and construct buildings, bridges, dams, highways and water treatment plants to name a few. Whether you like to work in an office or out in the field, career opportunities are just around the corner.

FALL APPLICATION DEADLINE

March 1, recommended deadline for international students for more funding opportunities.

The Department of Civil and Environmental Engineering guarantees a **Minimum Doctoral Funding of $35,000/year** to successful domestic doctoral candidates. Applicants are encouraged to discuss the exact level and the details of their funding package with potential

supervisors as early as possible during the application process. Note that the actual funding level can be higher than the above-mentioned Minimum Doctoral Funding amount if the student receives external awards or higher Research Assistantship.

ADMISSION REQUIREMENTS

MASTER'S: An honours bachelor's degree, or academic equivalent, in civil engineering or a related discipline, with an average of B+ or higher in discipline specific courses, and overall average of B- or higher.

PHD: A master's degree with a thesis in civil engineering or a related discipline, and at least a B+ average, with no grade below a B- in any graduate courses.

carleton.ca/cee

Contact Info
613-520-2600 x1228
CEEGradInfo@carleton.ca

COLLABORATIVE SPECIALIZATION IN
Climate Change

The climate crisis is the most pressing issue of our time, and our ability to address it will be a defining challenge for society. Bringing together the humanities, sciences, engineering, business, and public policy, Carleton's new Collaborative Specialization in Climate Change brings a distinctive interdisciplinary and collaborative approach to this crisis.

This unique specialization draws on Carleton's many internationally recognized climate change researchers and on its commitment to interdisciplinary studies. Working directly with professors and students across all five faculties, students will receive both a firm foundation in interdisciplinary approaches to climate change and have opportunities for experiential learning and conducting case studies of climate change in their areas of interest.

Participating Programs

MBA and MSc in Management

MA in English, Anthropology, Sociology and Communication

MASc in Aerospace Engineering, Materials Engineering, Mechanical Engineering, Electrical & Computer Engineering and Environmental Engineering

MEng in Electrical & Computer Engineering, Environmental Engineering and Sustainable Energy.

Career Options

Students will graduate with a deeper appreciation of how other disciplines, outside their own, think about climate change and how they can work together in the quest for a sustainable and equitable future. The multidisciplinary skills gained from this specialization will be highly valued across various career paths (such as industry, business, non governmental organizations (NGOs), government, communication and media, and academia).

Degrees Offered

Students will earn their degree in one of the academic disciplines with a specialization in Climate Change. Degrees include: MA, MASc, MBA, MEng, and an MSc.

Application Process

Applicants do not apply directly to the specialization. Instead, they apply to the participating programs and, in that application, they can express their interest in the specialization.

Fall Application Deadline

Varies according to home program.

Admission Requirements

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

carleton.ca/climatechange

Contact Info
**613-520-2600, ext. 5703
climatechange@carleton.ca**

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, project work 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 (thesis), Biomedical Engineering (thesis), Business (concentration), Cognitive Science (research project, thesis), Communication, Computer Science (thesis), Economics (thesis or coursework), Electrical and Computer Engineering, Geography (MSc and MA), Health Sciences, History (research essay), Information Technology (Digital Media), International Affairs (MA), Physics (thesis), Psychology, Public Policy & Administration (MA).

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.

carleton.ca/datascience

Contact Info

613-520-2600 x8751
CUIDS@carleton.ca

Onita Basu

Mentorship

Robert Teather

Looking for Support During Your Grad Studies?

Carleton prides itself on being a close knit community that offers caring support to its students. Each year, seven faculty members receive a Faculty Graduate Mentoring Award for going above and beyond in assisting their students. This year, two professors from the Faculty of Engineering and Design were chosen.

Winners of the 2021 Faculty Graduate Mentoring Awards accepted their awards virtually.

Meet Onita Basu

Dr. Basu, an associate professor in Environmental Engineering, researches sustainable water solutions and practices. One of her award nominators shared:"I could not have found a more caring, empathetic and knowledgeable mentor than Dr. Onita Basu." Another said:"She makes classes more fun and interactive." While a third noted that: "She always inspires us to be motivated towards our goals and brings out the best in us."

Meet Robert Teather

Dr. Teather is an associate professor in the School of Information Technology. One of his nominators said: "In addition to forming caring relationships with each student, he fostered healthy and mutually respectful relationships between the students and created a little community in his classroom." Another student shared: Dr. Teather is highly respected by all of his students." A third pointed out that he created a template for incrementally creating a publishable paper, section by section.

Research

Are You Interested in Health & Wellness Research?

Carleton is known for its extensive research in the health and wellness field. This past year, the university funded 59 COVID-19 related projects through its new Rapid Response Research Grants.

Saving Babies' Lives

For new parents, there can be nothing as frightening as coping with a newborn suffering from critical health issues. These babies are placed in a Neonatal Intensive Care Unit or NICU and receive around-the-clock care from a team of experts.

Engineering Prof. James Green is overseeing two projects that could lead to even better outcomes in the NICU. One is being conducted by Yasmina Souley Dosso, a PhD Candidate in Biomedical Engineering, who is using computer vision and machine learning to create a non-invasive monitoring system for NICU patients.

Contact Info

To find out about other graduate student research at Carleton University, go to **gradstudents.carleton.ca/grad-research**

For more information about faculty research at Carleton, go to **research.carleton.ca**

Meet Yasmina Souley Dosso

Having a BSc in Biology and a BMath in Statistics, Souley Dosso chose to do an MASc and now fast-tracked to a PhD in Biomedical Engineering at Carleton. She likes the multidisciplinary nature of the program and enjoys the opportunity to work with clinicians and patients in an actual hospital setting to improve neonatal care.

MASTER OF
Design

The Master of Design, offered by the School of Industrial Design, is an interdisciplinary 2-year program focused on research for, on and through design. The School of Industrial Design provides a collaborative graduate studio space, a variety of prototyping and experimental labs, and more. A key aspect of the program is an interdisciplinary thesis co-supervised by a professor from the School of Industrial Design and a professor in another discipline from Business, Anthropology, Psychology, Music, Engineering, Science, Architecture and other disciplines depending on the faculty member's area of interest and research.

Students examine and incorporate multi-faceted design principles and practices that contribute to the strategic value of design. Areas of research include:

- Accessibility, Inclusion, Universal Design
- Advanced Materials and Manufacturing
- Design Education
- Design Management
- Entrepreneurship
- Extreme Environments
- Health and Wellness
- Human-Centered Design
- Interaction Design
- Product Design
- Service Design (Public and Corporate)
- Social Innovation
- Strategic Design
- Sustainable Design
- User Experience (UX) Design

Degrees Offered

MDes

Career Options

Ottawa, as Canada's capital and high-tech hub, is an ideal place to study design. Our faculty and students work in collaboration with a variety of organizations including technology companies such as IBM; healthcare research institutes and hospitals such as Bruyère Research Institute, the Children's Hospital of Eastern Ontario; regional and federal museums such as the Ottawa Art Gallery and the Canada Science and Technology Museum (Ingenium); the National Research Council of Canada; Transport Canada; the National Capital Commission, and more. 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

April 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 is required. Applicants may be considered who have a background related to design, without a professional degree in design. However, applicants will need to demonstrate significant links between their academic background and professional experience within the design development process.

id.carleton.ca

Contact Iinfo

613-520-2600 x5672
industrial_design@carleton.ca

Electrical and Computer Engineering

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

Carleton's renowned researchers work in areas such as:

- Cloud/distributed computing
- Software engineering
- Cyber security
- Speech/signal/image processing and telecommunications
- Modeling and simulation
- Machine learning
- Nanotechnology
- Quantum/optical computing
- Sensor nets
- Robotics
- Artificial intelligence
- Integrated circuit design
- Microwaves and RF
- And many others

Our graduate electrical and computer engineering programs are offered jointly by the Department of Systems and Computer Engineering (**carleton.ca/sce**) and the Department of Electronics (**doe.carleton.ca**) at Carleton, in conjunction with the University of Ottawa via the Ottawa-Carleton Institute for Electrical and Computer Engineering (OCIECE). This grants our students access

to the largest selection of courses in electrical, systems, computer, and software 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, and concentrations in Software Engineering and Modeling and Simulation. Moreover, at the PhD level, we offer a concentration in Software Engineering. Both the MASc and MEng programs in Electrical and Computer Engineering also offer a specialization in Climate Change.

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, automotive, and service industries, for example. Your proximity to these facilities ensures that your potential career is just around the corner.

Fall Application Deadline

Before **March 1**

Admission Requirements

MASTER'S: A bachelor's degree with an average of at least B+ or higher in electrical engineering, computer science, systems, software engineering, or a closely-related discipline from a recognized university.

PhD: A master's degree with a thesis in electrical engineering, computer science, systems, 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
doe.carleton.ca

Systems and Computer Engineering
613-520-2600 x1511
gradinfo@sce.carleton.ca
carleton.ca/sce

carleton.ca/ece

GRADUATE PROGRAMS IN
Environmental Engineering

Carleton University is recognized for its advanced research in environmental engineering, with expertise in water resources, water and wastewater treatment, groundwater management, contaminant transport, air pollution, hydrogeology and mine waste management, 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. 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 Environmental Engineering (OCIENE). The MASc and PhD require the completion of a thesis while the MEng is predominately course-based with the option of a research project. Both the MASc and MEng programs offer a specialization in Climate Change.

Degrees Offered

PhD, MASc, MEng

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 and Climate Change Canada, Heritage Conservation Directorate, Canada Green Building Council, Parks Canada, as well as public works and consulting at the municipal, provincial and federal levels. Career opportunities are just around the corner.

Fall Application Deadline

March 1, recommended deadline for international students for more funding opportunities

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 in discipline specific courses, and overall average of B- or higher.

PhD: A master's degree with a thesis in environmental engineering, or a related discipline, and at least a B+ average in five graduate courses, with no grade below a B- in any graduate courses.

66 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. 99

— Natalie Linklater, PhD/17, MASc/10, BEng/08

carleton.ca/cee

Contact Info
613-520-2600 x1228
CEEGradInfo@carleton.ca

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
- Human factors in Cybersecurity

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.

MSc: 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.

carleton.ca/hci

Contact Info

613-520-2600 x8751
hci@carleton.ca

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. The NET program offers a research-based option, where students will produce a research thesis, or a project-based option, where students will develop skills mainly 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. DM students can also pursue a specialization in Data Science.

The PhD program focuses on advanced interdisciplinary research in Information Technology and related applications and topics.

Degrees Offered

MIT (Digital Media, Network Technology), PhD

Research & Career Options

Research opportunities in the school have direct application to the industry and can lead to many fascinating careers in areas such as:

DIGITAL MEDIA: Media production (movies and commercials), new educational technologies, the gaming industry, natural human-computer interaction methods, digital media for healthcare, and exhibitions for national museums and government or organizations requiring digital media content and technologies.

NETWORK TECHNOLOGY: Network security and privacy, cellular mobile networks, cloud computing, the Internet of Things and Apple iPhone networking subsystems.

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 multi-disciplinary groups.

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

www.csit.carleton.ca

Contact Info

613-520-2600 x5644
gradinfo@csit.carleton.ca

GRADUATE PROGRAMS IN

Infrastructure Protection and International Security

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

Applications received before **January 31** will be reviewed and considered for admission and funding. Applications received after January 31 will only be considered if space still remains.

Admission Requirements

MIPIS: A four-year bachelor's degree (or equivalent) with an average of B+ or higher, though relevant work experience will be taken into consideration.

MEng (IPIS): A bachelor's degree in engineering with an average of B+ or higher, though relevant work experience will be taken into consideration.

Graduate Diplomas: A bachelor's degree (or equivalent) with a minimum average of B+. Applicants with significant professional qualifications and experience may also be considered.

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 (NPSIA). 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

carleton.ca/ipis

Contact Info

613-520-2600 x6651
ipis@carleton.ca

Mechanical and Aerospace Engineering

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.

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 techn-ologies; 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. We offer a climate change specialization in the MASc programs in Aerospace, Materials and Mechanical Engineering.

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.

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 to the MASc and PhD programs, as well as winter admission to the MEng program.

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 mech-anical or aerospace engineering or a related discipline.

carleton.ca/mae

Contact Info

613-520-2600 x5683
gradadmineng@carleton.ca

Sustainable Energy Engineering and Policy

Energy transition is inevitable. Canada needs to be ready.

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 integrates both engineering and public policy.

In practice, the field of sustainable energy consists of two distinct disciplines: engineering and policy. A lack of mutual understanding between these fields hinders the progress of sustainable energy. Recognizing this barrier, Carleton created a program which involves learning across and between these two disciplines. Regardless of their chosen degree, students in the sustainable energy program take courses that provide them with an understanding of both disciplines. Policy students thus gain an understanding of the engineering aspects of sustainable energy and engineers gain an understanding of what constitutes 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 and MEng programs. 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: The MA in Sustainable Energy Policy examines the building blocks of 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.

MASc, MEng: There are two fields associated with the MASc and MEng degrees of the program: Mechanical Energy Conversion and Efficient Electrical Energy Systems. The former provides broad, in-depth exposure to the design, development, implementation and improvement of energy conversion methods and systems while the latter focuses on the design, optimization and realization of electricity distribution systems.

Fall Application Deadline

February 1 (MA); **March 1** (International MASc and MEng applicants); **August 15** (Domestic MASc and MEng applicants).

Funding

Last year, Carleton graduate students received over $46M in student support funding! Though external awards must be applied for, administrators will automatically consider you for a possible admissions funding offer when you submit your application. If you are eligible for this funding, you will be notified on your Offer of Admission.

Admission Requirements

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.

MASc and MEng: A bachelor's degree, or equivalent, in a discipline relevant to engineering disciplinary foundations. Normally, an average of B+ or higher is required for admission.

"The program has given me the opportunity to develop the interdisciplinary skills and tools required to realize a cleaner and brighter world."

— Travis Dagg, MA/18

Contact Info

MASC, MEng: 613-520-2600 x6009
MA: 613-520-2600 x2548
sustainableenergy@carleton.ca

carleton.ca/sustainable-energy

Technology Innovation Management

The Technology Innovation Management (TIM) program is a joint initiative of the Sprott School of Business and the Faculty of Engineering and Design. It offers four graduation pathways:

- 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 Applied Business Analytics** (MABA) degree is project-based — students use advanced business analytics to solve technology innovation management and technology entrepreneurship problems.

- The **Master of Entrepreneurship** (MEnt) degree is project-based — students apply research results to improve the business ecosystems that support founders of new companies or new lines of business at existing companies.

TIM courses are scheduled in the evenings, making the TIM program ideal for busy professionals. Our students complete most coursework in the classrooms and collaboration spaces on the Carleton campus, and use our **BigBlueButton** web conferencing system to participate online from anywhere over the Internet when travel is required.

At Carleton, we actively practise entrepreneurship with the TIM program serving as an important component of Carleton's entrepreneurial focus. We offer opportunities for experiential learning, including **internships** with other TIM-based businesses, involvement with Carleton-based projects that build new platforms and systems, participation in applied industry research projects in analytics and scaling companies, and in-depth access to the flagship *Technology Innovation Management Review* online journal (**timreview.ca**) and the 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**), ranked by UBI Global as one of the top 10 university business incubators in North America, and the Carleton-led Accelerator for student entrepreneurs.

Degrees Offered

MASc, MEng, MABA, MEnt

Career Options

More than one third of our graduates finish with both a degree and a new technology company.

Our graduates are also equipped for management careers in a variety of business and engineering 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 with degrees in other areas may also be considered by the admissions committee.

timprogram.ca

Contact Info

613-520-2600 x8659
timprogram@carleton.ca

Apply Now for
Graduate School at Carleton!

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**

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**

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 deadlines are subject to change. For the most up-to-date deadlines, visit **graduate.carleton.ca**.

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 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). International students who have received an Offer of Admission are required to submit a course-by-course evaluation (WES ICAP) from World Education Services. **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**

graduate.studies@carleton.ca

With over 100 graduate programs, you'll find yours at Carleton

MASTER'S

Master of Accounting (MAcc)

Master of Applied Business Analytics in Technology Innovation Management (MABA)

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
- Art and Architectural History
- Canadian Studies
- Communication
- Economics
- English
- European, Russian and Eurasian Studies†
- Film Studies
- French and Francophone Studies
- Geography
- History
- Human-Computer Interaction
- International Affairs†
- International Affairs/Juris Doctor**
- Legal Studies
- Linguistics
- Linguistics (Applied) and Discourse Studies
- Migration and Diaspora 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 Business Administration (MBA)

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
- Management
- 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)
- Chemical and Environmental Toxicology (Master's, PhD)
- Climate Change
- Data Science (Master's)
- Digital Humanities (Master's)
- Latin American and Caribbean Studies
- 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
- International Affairs
- Legal Studies
- Mathematics and Statistics*
- Mechanical Engineering*
- Neuroscience
- Physics*
- Political Science
- Psychology
- Public Policy
- Social Work
- Sociology

GRADUATE DIPLOMAS
- Architectural Conservation
- Curatorial Studies
- Economic Policy
- Ethics and Public Affairs
- European Integration Studies
- Health: Science, Technology and Policy
- Indigenous Policy and Administration
- Infrastructure Protection and International Security (IPIS)
- Linguistics
- Migration and Diaspora Studies
- Northern Studies
- Philanthropy and Nonprofit Leadership
- Public Policy and Program Evaluation (online)
- Work and Labour

graduate.carleton.ca

Carleton University Faculty of Graduate and Postdoctoral Affairs

† 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

Faculty of Graduate and Postdoctoral Affairs
Carleton University

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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/equity/accessibility**.

Cover Photo: Fu Liu, a PhD alumnus from the Electrical and Computer Engineering program researched ultrafast switching of light by special optical fiber components. These are used in multiple areas such as the monitoring of civil engineering structures, high capacity telecommunication systems and medical diagnostics.

Photo credits: Special thanks to Fangliang Xu and Ottawa Tourism..

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