

# CHALLENGE

what's possible

**Engineering and Design**

Ottawa, Canada

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

**Carleton**  
University





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# Welcome to Carleton

**We live up to our reputation for being a compassionate, connected and caring community. Our students, faculty and staff are united in driving real change for a brighter, more inclusive and sustainable tomorrow.**

The Faculty of Engineering and Design at Carleton offers a unique and rewarding university experience from our beautiful campus overlooking the Rideau River and the Rideau Canal in Ottawa, Canada's national capital.

With a comprehensive range of innovative and unique engineering and design programs from which to choose, you have the flexibility to select the degree that best reflects your interests, aptitudes and career goals. Many of our programs offer additional opportunities for specialization through concentrations and streams. They can also be enhanced with Co-operative Education and fieldwork, providing real-world experience with industry that allows you to establish and develop your CV before you graduate.

You will be trained by professors who are renowned experts in their fields and engaged in research on both the national and international stage. You will have access to world-class facilities, including state-of-the-art wind tunnels and strong floors, microchip fabrication facilities and the latest in laboratories, design studios and advanced computer and networking platforms.

With your future in mind, Carleton provides a stimulating and supportive community for your studies in engineering and design. You will work on challenging and rewarding team projects, be inspired by industry guest speakers and express your creativity and innovation in preparation for a rewarding career in a highly desired field.

Welcome to Engineering and Design at Carleton.



Now an Engine Performance Analyst at Pratt & Whitney Canada, Carleton Aerospace Engineering grad Turner Strang (BEng/16, MASc/18) landed a 16-month co-op placement with the National Research Council's Flight Research Laboratory in Ottawa during his undergraduate studies.

# Gain Real-World Experience

Learning by doing is a rewarding enhancement to your academic studies in classrooms and laboratories. Combine your academic studies with periods of paid employment in your field through Co-operative work terms. You will gain valuable experience in your field of study, develop professional contacts and earn money to help pay for your studies.

## Co-op program

Co-operative Education provides you with the opportunity to gain practical experience, solve real-world problems and apply classroom theory and knowledge to practical work situations. Each of our engineering and design programs includes a Co-op option with work terms of 4, 8, 12 or 16 months, with one or multiple employers.\*

Co-op work terms typically begin at the end of your second year, when you have developed the knowledge and confidence to make a substantial contribution to the organization. The Co-op program at Carleton is an invaluable investment — three or four work terms (depending on your program) add a Co-op designation to your degree and will kick-start your career.

## Recent employers

Carleton's Co-operative Education program offers outstanding national and local opportunities for rewarding, real-world

experience in well-known organizations and government agencies such as:

- Amazon
- Blackberry QNX
- Bombardier
- BGIS
- CAE
- Canadian Space Agency
- Canopy Growth Corporation
- Ciena
- Department of National Defence
- DRS Technologies Canada
- Electronic Arts Canada
- EllisDon
- Environment and Climate Change Canada
- Ericsson
- Flex
- Ford Motor Company of Canada
- GasTops
- General Dynamics Mission Systems—Canada
- GM Canada
- Google

- Health Canada
- Honeywell
- IBM
- J.L. Richards & Associates
- Lockheed Martin
- National Research Council Canada
- Nokia
- Mattamy Homes
- MDS Aero Support Corporation
- Method Studios
- Modern Niagara
- Natural Resources Canada
- Parkin Architects Limited
- PCL
- PSPC, Heritage Conservation Directorate
- Ross Video
- Stantec
- Shopify
- Suncor Energy Inc
- Transport Canada
- WSP

The National Capital Region is home to one of Canada's largest concentrations of government research agencies and high-tech companies. Opportunities are also available right here at Carleton, including working in a research lab for the summer, supported by federal research grants from agencies such as the Natural Sciences and Engineering Research Council.

You'll find Carleton grads at some of the hottest companies around the world such as Apple, Instagram, Twitter, Microsoft, and many more in addition to those listed above.

## Career Development

Career Development and Co-operative Education provides free career planning and advice, and helps connect you with potential employers through networking events, job postings and career fairs. From the first year of your studies, you can access services and programs that will help you make a successful transition from school to work.

\* To participate in the Co-operative Education program, you can apply directly on your program application through [ouac.on.ca](http://ouac.on.ca) or once you are at Carleton. You must apply to Co-op and meet the entrance requirements. For more information, visit [carleton.ca/co-op](http://carleton.ca/co-op).



Learn more about mentorship, networking and soft-skill development opportunities for our women students.

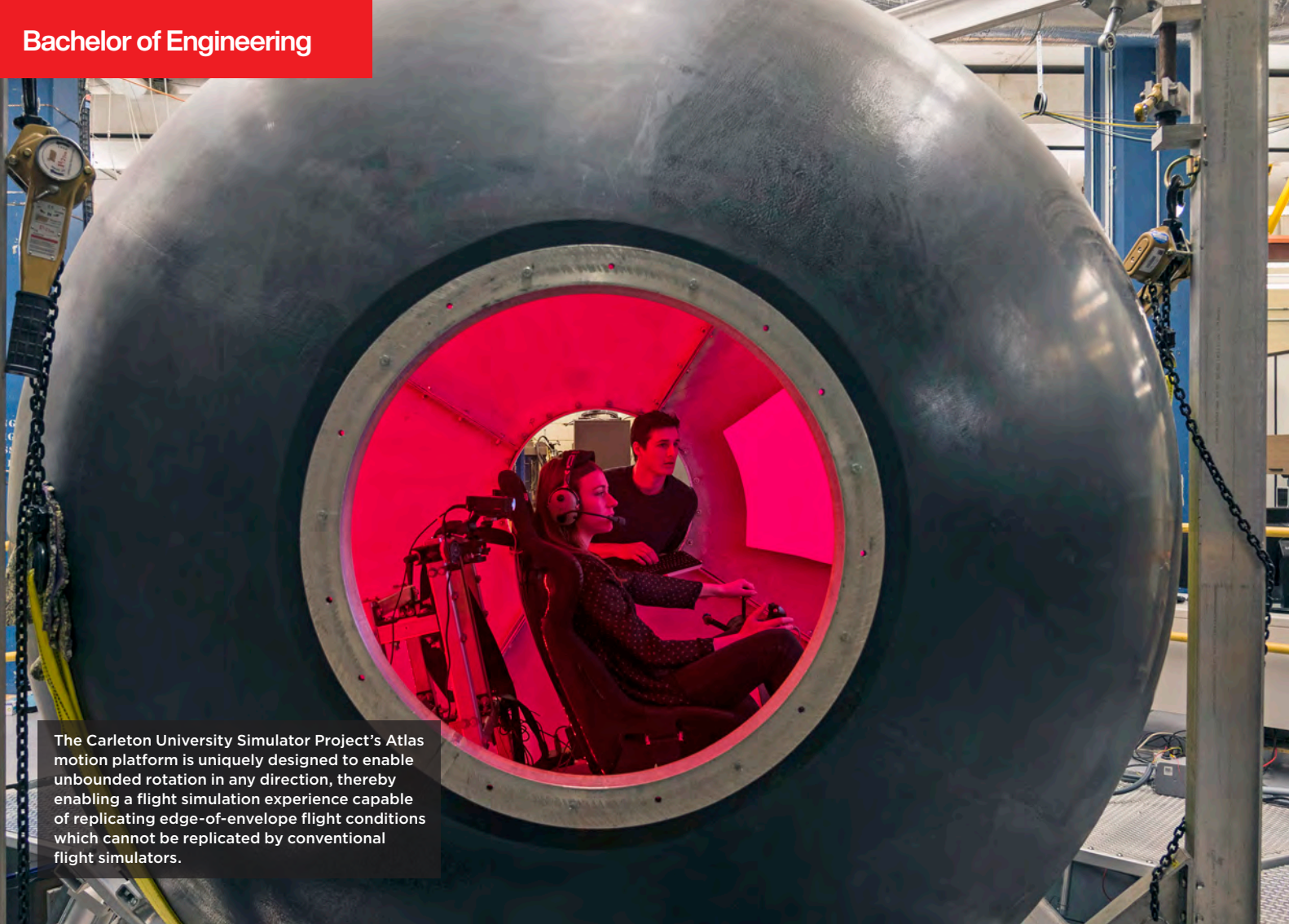
# Women in Engineering and Information Technology

The Faculty of Engineering and Design at Carleton University is committed to initiatives which support you as a woman in engineering and information technology (IT) at every step along your journey. Far too often, women students in high school do not view STEM as a viable academic and career path, which is why we are dedicated towards changing perceptions and fostering interest in engineering, technology and innovation among youth within our community. Carleton is continuing to expand its support for women in STEM through new awards for women students and partnerships with industry who want to foster and hire talented women.



**22%**

Percentage of undergraduate students currently enrolled in our engineering and IT programs who are women.



The Carleton University Simulator Project's Atlas motion platform is uniquely designed to enable unbounded rotation in any direction, thereby enabling a flight simulation experience capable of replicating edge-of-envelope flight conditions which cannot be replicated by conventional flight simulators.

# Aerospace Engineering

Carleton University is home to Canada's first established Bachelor of Engineering degree program in Aerospace Engineering. In the 20th century, humans realized the age-old dream of flying. Today, Canada's aerospace sector represents a highly innovative, dynamic and competitive industry.

Generating more than \$22 billion in annual revenue and employing close to 85,000 people, the Canadian aerospace industry has a worldwide reputation for leadership in fields including commuter and business aircraft, gas turbines for propulsion and power generation, aircraft simulators, communications satellites and guidance systems.

## Your opportunities

- Specialize in aerodynamics, propulsion and vehicle performance; aerospace structures, systems and vehicle design; aerospace

electronics and systems; or space systems design.

- Gain experience through Co-op work placements, a final-year design project that emulates a design office setting at an aerospace firm, and a program that emphasizes problem-solving skills and hands-on laboratory and design work.
- Access unparalleled laboratory and computer facilities, including subsonic and supersonic wind tunnels; facilities for machining and 3D printing metallic materials; model satellites; thermal and vibration testing of satellite sub-structures;

structural testing of aircraft components; material processing equipment; equipment for the study of heat transfer phenomena; and training on avionics systems.

- Develop contacts for future employment through Carleton's close association with government research organizations such as the National Research Council Canada and the Canadian Space Agency.

## Your program

The program begins with a common set of courses in engineering and science to

You might also be interested in **mechanical engineering or computer systems engineering.**

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Following his studies at Carleton, Aerospace Engineering grad Quinn Murphy (BEng/10) joined high-end electric automaker Tesla Inc. as an aerodynamicist, where he spent four years designing vehicle exteriors to eliminate inefficiencies and minimize air resistance — key factors in extending the range of electric vehicles. Quinn went on to join Virgin Orbit as a Senior Aerodynamics Engineer, leading aerodynamic design and analysis of the company's LauncherOne rocket, before landing his current role at Apple as a Product Design Engineer.



provide a foundation in the key disciplines of dynamics, thermofluids, solid mechanics and materials essential to the design of airframes, space platforms, propulsion and control systems. These are followed by specialized courses according to your stream:

- **Stream A:** Aerodynamics, Propulsion and Vehicle Performance specializes in aircraft aerodynamics, performance, control and propulsion technologies
- **Stream B:** Aerospace Structures, Systems and Vehicle Design focuses on lightweight

structures and materials for aircraft and spacecraft

- **Stream C:** Aerospace Electronics and Systems concentrates on modern aircraft and spacecraft electronics for navigation, guidance, communication and remote sensing
- **Stream D:** Space Systems Design emphasizes spacecraft design and mission planning, with courses dedicated to orbital mechanics, spacecraft design, communication, propulsion and dynamics

### Your future

You will be prepared for a challenging career in the aerospace design and manufacturing industry, airline and space operations, government research laboratories, and aircraft certification and accident investigation authorities.



### Soaring to New Heights

Carleton's Blackbird UAV (uninhabited aerial vehicle) team has been taking to the skies for over a decade, developing and constructing fixed-wing and rotocraft UAVs to compete at the national level. Comprised of over 30 students from a wide variety of engineering disciplines — including aerospace, communications and electrical engineering — the extracurricular group participates annually in the national Unmanned Aerial Systems Student Competition hosted by Unmanned Systems Canada, which challenges teams with diverse aerial scenarios and real-world applications. In 2023, the team was awarded top prize at the Aerial Evolution of Canada National Drone Competition.



Architectural Conservation and Sustainability Engineering students travelled to Ouarzazate, Morocco to perform an architectural survey of the Kasbah of Taourirt — a 1.6 hectare, four-level complex that is considered part of the country's national heritage. The architectural drawings prepared by the Carleton team are being used as part of a Getty Conservation Institute project to develop and apply a methodology for documentation, emergency stabilization and integrated conservation planning for the rehabilitation of earthen architecture settlements.

# Architectural Conservation and Sustainability Engineering

Whether by designing new high-performance buildings or retrofitting heritage structures — economic, social and environmental sustainability has become a top global priority. By combining building engineering and architectural studies, Carleton's Architectural Conservation and Sustainability Engineering program — the first of its kind in Canada — is educating experts in sustainable building design and heritage conservation throughout the building life cycle.

Architectural conservation and sustainability engineers apply their knowledge in sustainability to the design of new and retrofit of existing buildings and structures, considering life-cycle costs, impacts of selected materials, and energy needs and consumption. They also bring their expertise to the burgeoning field of conservation — repairing and adapting structures with various levels of heritage designation.

## Your opportunities

- Explore conservation of heritage structures and sustainable building design with a program that emphasizes problem-solving skills and hands-on laboratory and field work.
- Benefit from the multi-disciplinary program that draws on the resources of and collaboration with a top-notch engineering faculty and renowned architecture program.
- Gain experience by collaborating on projects with architecture students and through a challenging and hands-on final-year project that brings together your knowledge, skills and expertise.
- Access computer facilities and engineering laboratories with state-of-the-art equipment including laser scanners to develop 3D images of heritage sites and a fully instrumented building to evaluate energy use.





Students involved with the Carleton Immersive Media Studio (CIMS) helped to develop a virtual tour of Canada's Senate by capturing and merging 360-degree photographs, laser scans and photogrammetry.

- Develop contacts for future employment through Carleton's close association with advanced research institutions, such as the National Research Council Canada, Natural Resources Canada and Environment and Climate Change Canada, and key industry and government partners, such as the Heritage Conservation Directorate, Public Works and Government Services Canada, the Canada Green Building Council, and Canada Mortgage and Housing Corporation.

### Your program

First year begins with a common core of fundamental courses in engineering, mathematics and science, followed by

introductory architecture and domain-specific courses in second year. In the third and fourth years, students study green building design and rehabilitation of heritage buildings and complete a specialized design project.

You will complete the same structural design courses as a Civil Engineering student, with additional focus on conservation and sustainability in the design of new structures and the assessment and retrofit of existing structures.

### Your future

As a graduate in this field, you will have acquired a skill set that industry has identified as lacking in current post-secondary school education in Canada. Graduates are trained with a comprehensive understanding of the complexities of buildings, considering aspects of structures, energy performance, materials, mechanical and electrical equipment, and architectural design. You will also be prepared to continue studies in graduate programs in conservation and sustainability or a professional designation as an architect through Carleton's Master of Architecture program.



An interdisciplinary group of students from Architectural Conservation and Sustainability Engineering, Mechanical Engineering, Civil Engineering, Electrical Engineering, Sustainable and Renewable Energy Engineering, and Architectural Studies worked together in their fourth year Capstone design project to create Northern Nomad — a tiny house that is now serving as an innovative experimental facility at Carleton. At 220 square feet, Northern Nomad was built to be a net-zero energy building, meaning that in a calendar year it produces as much energy as it consumes.

You might also be interested in civil engineering or environmental engineering.

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Fourth year Biomedical and Electrical Engineering students Maryam Kaka and Victoria Madge display their Integrated Concussion Assessment System (I-CAS) mobile application, which aims to migrate clinical concussion testing and recovery monitoring to the home environment. By assessing a specific brain signal through electroencephalography (EEG), tracking eye gaze, testing patient balance and integrating the combined results with the Sport Concussion Assessment Tool 3 (SCAT3) questionnaire, I-CAS helps to track and monitor concussion recovery in an objective and comprehensive manner.

# Biomedical and Electrical Engineering

Increasingly, the field of health care relies on technology. Biological signals, such as those from the heart and brain, are routinely used for both diagnostic and therapeutic purposes. Computer tools are used to collect and analyze data, such as gene sequence databases that contain millions of entries.

Sensors, actuators and electronics make medical devices work — and can even be used to deliver drugs inside the human body. Advances in medical imaging techniques such as MRI and PET scans lead to the early diagnosis, and better treatment and prevention, of disease. Medical informatics, telemedicine and electronic health records help improve the delivery of health care.

Biomedical and electrical engineering is a fast-growing field that uses technology to design and build new components and systems for biomedical solutions to problems in medicine and biology.

## Your opportunities

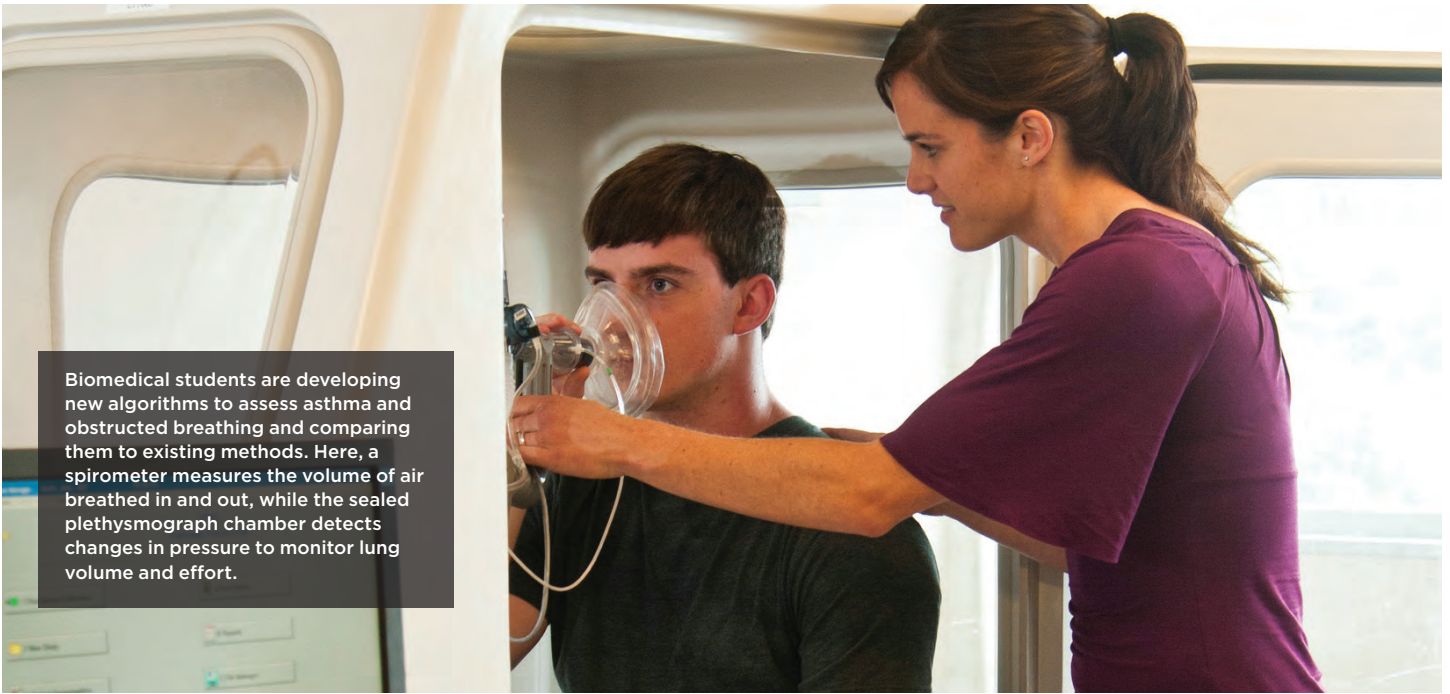
- Establish a foundation in electrical engineering and go on to focus on bioinformatics, bio-signal processing, information technology in biomedicine, micro-technology for sensors and micro-electro-mechanical systems (MEMS), instruments and measurements, and cardiovascular devices.
- Access state-of-the-art biomedical research facilities, including a biological signals laboratory and medical imaging laboratory, telemedicine and tele-operations facilities, a superb undergraduate computing network, portable biological signal acquisition

equipment, and prototyping workstations.

- Develop contacts for future employment through Carleton's close association and collaboration with prominent professors from the medical field and local hospitals, such as the Children's Hospital of Eastern Ontario and the University of Ottawa Heart Institute, among other health care establishments.

## Your program

Learn the fundamentals of science and mathematics, including chemistry and physics in first year. Second year introduces courses in electronic circuit design, numerical analysis and programming. In third year, specialize



Biomedical students are developing new algorithms to assess asthma and obstructed breathing and comparing them to existing methods. Here, a spirometer measures the volume of air breathed in and out, while the sealed plethysmograph chamber detects changes in pressure to monitor lung volume and effort.

in digital and analog circuit design, semiconductor device physics, electromagnetics and bioelectrical and biomedical systems. Senior courses involve advanced study in biomedical engineering, including signal processing and medical instrumentation, with opportunities to apply your knowledge to the biomedical and health care fields. You will gain hands-on practice through supervised project work, extensive laboratory and clinical field experience, and oral and written presentations.

**Your future**

You can find employment in health-care establishments and medical facilities, working with computers, medical equipment or medical devices or developing health care technologies such as electronic implants, safer medical materials and devices, or superior data management and diagnostic systems. You will be well prepared for continued studies at the graduate level or in medicine.

You might also be interested in electrical engineering or computer systems engineering.

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A team of fourth year Biomedical and Electrical Engineering students displays a specialized vein locator system that they developed for their final year Capstone design project.



Biomedical and Mechanical Engineering student Johana Forero Rondon aligns a calf femur in a servo-hydraulic testing machine to assess its fracture strength.

# Biomedical and Mechanical Engineering

Biomedical engineers apply engineering principles to aspects of medicine to improve healthcare diagnosis, monitoring and therapy. They help create prostheses, artificial organs, drug delivery systems and a range of surgical and life-support systems. By combining a foundation of mechanical engineering with the rapidly growing discipline of biomedical engineering, biomedical and mechanical engineers analyze and solve problems related to biomechanical engineering, biotechnology and medicine.

## Your opportunities

- Access well-equipped laboratories and computer facilities for experiments and design projects that emphasize problem-solving skills and hands-on experience with artificial devices for bone repair or replacement, cardiovascular systems, biomaterial testing and gait measurement.

- Develop contacts for future employment through Carleton's close association and collaboration with medical researchers and local hospitals, biotechnology firms, research institutions and government agencies.
- Benefit from an interdisciplinary academic approach and opportunities to work with,

and learn from, students in other engineering programs.

## Your program

In your first year, you will learn key fundamentals of engineering and mathematics, including courses in chemistry and physics. Second year offers

introductory courses in fluid mechanics, solid mechanics, thermodynamics, materials and biology. In third year, specialized biomechanical courses dealing with biofluids and biomaterials are offered along with mechanical engineering design courses and organic chemistry. Fourth year allows you to further specialize in biomechanics and biomechanical device design. You will participate in a major biomedical Capstone design project that further develops your quantitative and experimental skills in a team setting and provides outstanding practical experience.

### Your future

With well-rounded training in mechanical engineering with a focus on biomedical applications, you will be qualified to work in the fields of medical devices, health services, diagnostic equipment, medical instruments, medical information systems and more. These industries are growing, in Canada and globally, and the demand for specialists is expected to increase. You will be well prepared for continued studies at the graduate level or at a medical school.



A team of fourth year Biomedical and Mechanical Engineering students created a pediatric laparoscopic surgery simulator for their final year capstone design project.

You might also be interested in biomedical and electrical engineering.

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The Carleton University Crash Dummy (CUCD) fourth year project has students design and build a crash dummy and subject it to various collision scenarios. With sensing capabilities beyond those of commercially-available crash test dummies, CUCD can predict a wider range of injuries, enabling the simulation and analysis of accidents such as automotive, bicycle, low-impact and high-impact falls, and sports impacts such as hockey cross-checks and football head-on collisions.



# Civil Engineering

Everything in our built environment — from towers reaching to the sky, to bridges spanning provinces, to dams holding back rivers — is the work of civil engineers who plan, design, build, maintain, rehabilitate and manage the infrastructure that houses people, moves goods and supplies power and water. Whether working on one-of-a-kind structures or the roads we drive every day, civil engineers make meaningful contributions to the development, evolution and safety of our physical world.

## Your opportunities

- Explore structural, geotechnical and transportation engineering with a program of study that emphasizes problem solving skills, laboratory experience, design and advanced computer methods for civil engineering.
- Access to excellent computer facilities and laboratories, such as a materials lab to assess properties of steel, concrete or soil, and a state-of-the-art strong floor facility for the testing of large-scale specimens.
- Develop contacts for future employment and access additional research and resource facilities through collaborative design projects with industry, government and other research

agencies in the Ottawa region, including the National Research Council Canada.

## Your program

You will develop a broad background in engineering in your first two years of study before specializing in one of the following areas:

- **Structural engineering:** the construction and functioning of safe, reliable buildings and bridges, as well as the analysis and assessment of existing structures
- **Transportation engineering:** the planning and design of safer systems and facilities for travelling and transportation on land, by water or in the air

- **Geotechnical engineering:** the evaluation of soil and rock behaviour as a foundation for roads, bridges, buildings, tunnels and mines, and use as a construction material
- **Municipal engineering:** the range of tasks handled by municipal governments, such as road or bridge maintenance, water and waste water treatment, waste management and urban planning

## Your future

You will be a highly skilled professional with the expertise in analysis, computer applications and design that is in demand from government and consulting engineering firms. You can plan and



Civil Engineering students showcase their entry for the annual Troitsky Bridge Building Competition at Concordia University in Montreal. Competitors use their skill and imagination to construct bridges from dental floss, popsicle sticks and glue. Entries are judged on aesthetics, originality, presentation and strength — some bridges can support a load of more than 2,300 kg.

execute technically advanced civil engineering projects such as building and bridge construction, design and construction of runways and seaports, energy resource development and engineering for cold climates.

**The capital advantage**

The National Research Council Canada (NRC) is the country’s scientific and industrial research agency. Based in Ottawa, the NRC helps turn ideas and knowledge into new products, processes

and services. Outstanding government scientists and engineers work directly with partners from Carleton University and from industry. These collaborations mean that Carleton students enjoy access to the latest technology and research, especially in the areas of aerospace, hydraulics, information technology, transportation and micro-structural sciences.

You might also be interested in architectural conservation and sustainability engineering.

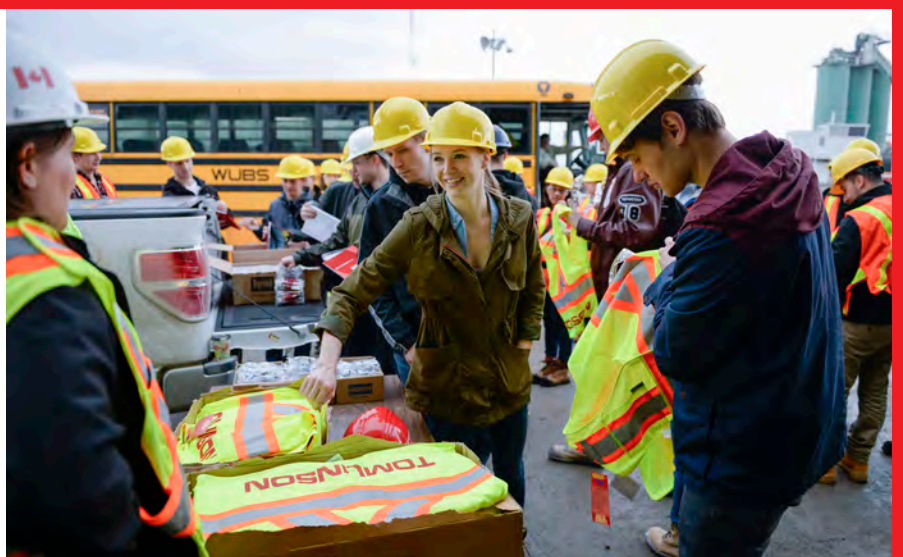
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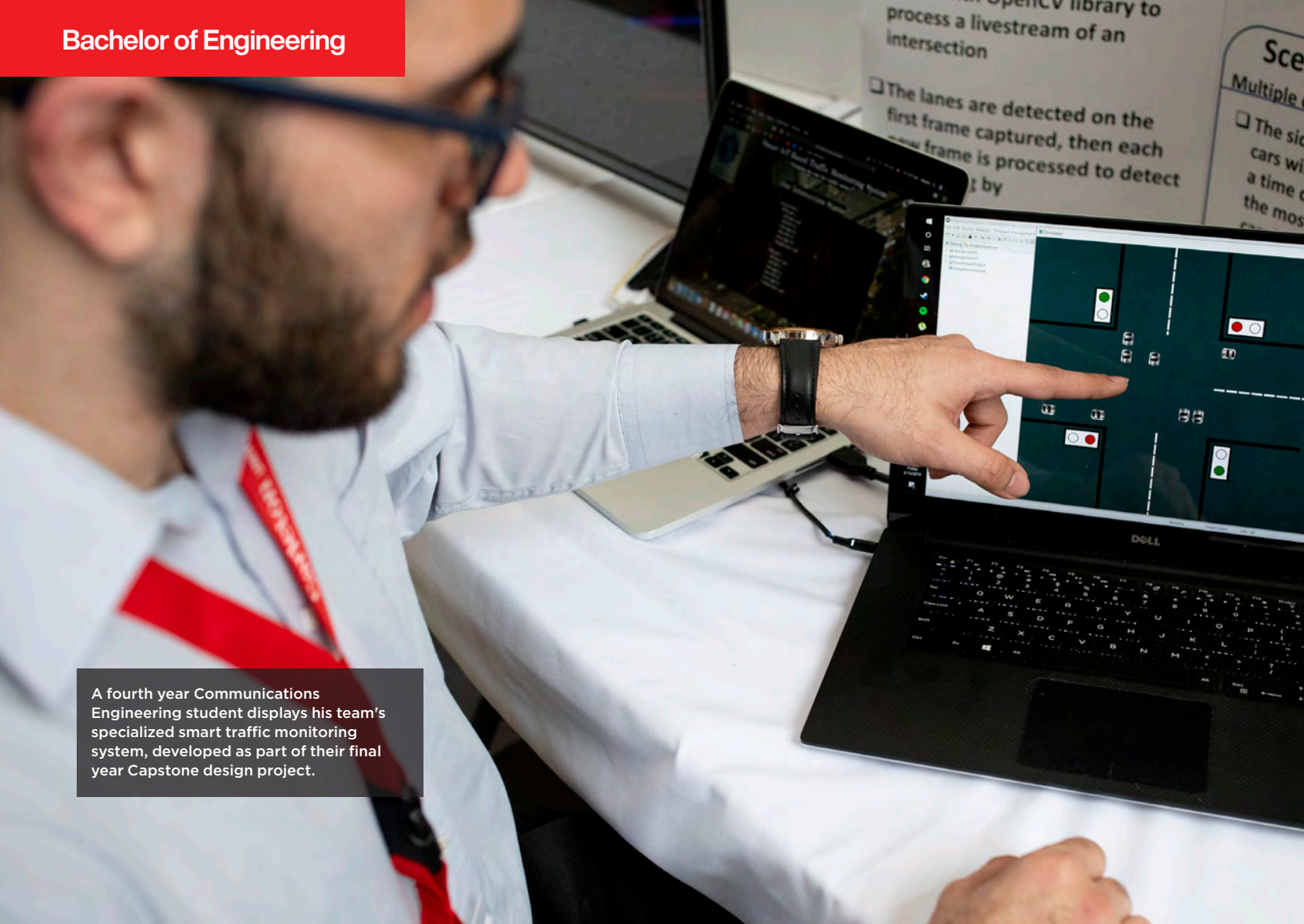
- Progressive Co-op education option
- Scholarships for high-standing students
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**Experience Industry**

Student experience and engagement engineering tours provide Carleton engineering students with the opportunity to experience industry in an on-site setting.

Students from the Department of Civil and Environmental Engineering visited the TOMLINSON Group, where they were given the opportunity to engage with engineers in the field while touring TOMLINSON’s facilities, including their aggregate operations and rock crushers, their asphalt plant, their material testing labs and their waste management facilities.





A fourth year Communications Engineering student displays his team's specialized smart traffic monitoring system, developed as part of their final year Capstone design project.

# Communications Engineering

Communications engineers play an integral role in developing the world as we know it. They are the architects of cloud computing, satellites, smart phones, internet applications, social networking technologies, wireless systems, and integrated voice, data and video communications.

Communications experts have engineered the ever-present interconnectivity of our devices, vehicles and city infrastructure, permitting our everyday lives to be enhanced by the internet of everything. They are responsible for designing, building and operating the robust and secure telecommunications and networked information systems that have permeated our culture and determined the future of business and entertainment.

### Your opportunities

- Gain real world experience through Co-op work placements, a final-year design project

and integrated studies in the principles and practice of telecommunications and related computer technologies.

- Access state-of-the-art laboratories and facilities for design work that emphasizes problem-solving skills and hands-on experience.
- Develop key contacts for future employment through Carleton's close association with laboratories of the federal Communications Research Centre, the National Research Council Canada and many technology companies located in the national capital.
- Learn from university, industry and government lecturers who are experts

in information and communication technologies.

### Your program

You will gain a broad foundation in the basics of mathematics, physical sciences, and engineering sciences and technology. You will also develop a strong background in communication systems through the study of communications theory and practice, design and analysis of communications components, systems, software, applications, cybersecurity, regulatory and social issues, and enabling technologies such as artificial intelligence and machine learning.



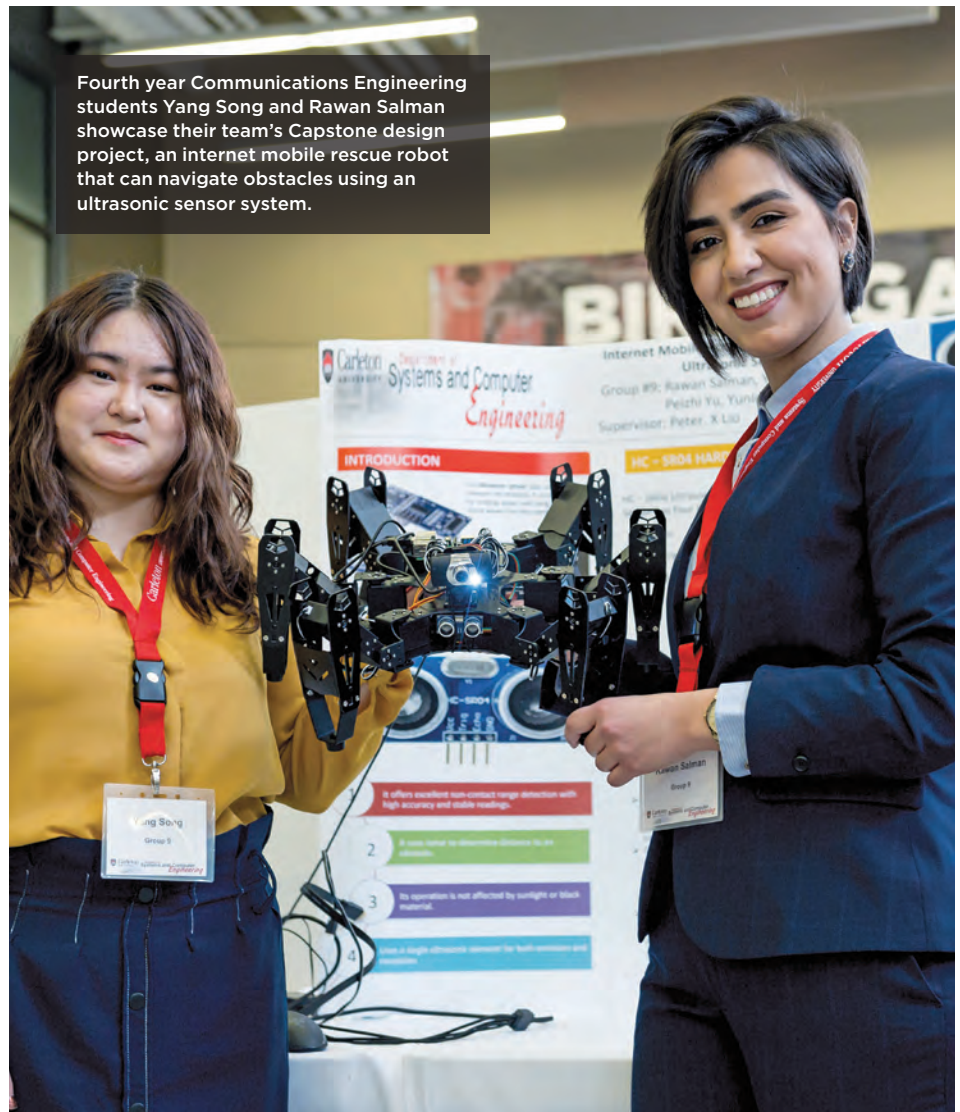
The program provides you with the flexibility required to practice in a world of rapidly changing technology, alongside the specific knowledge and skills that are highly valued by employers in the telecommunications and information industries.

### Your future

As a graduate of the Communications Engineering program, you will be well equipped for many positions that are in high demand. Within the telecommunications industry, you can find yourself in research and development for new network system architectures, protocols and services, manufacturing, installation, and operational maintenance.

For the computer industry, you will have the tools to engineer communications products, distributed computer networks and multimedia systems, as well as the knowledge to interface them with communications engineering facilities.

Communications engineers are also essential to the financial, transportation, hospitality and defence industries, government research and development laboratories, regulatory and licensing agencies, standards organizations and communication and connectivity service providers.



Fourth year Communications Engineering students Yang Song and Rawan Salman showcase their team's Capstone design project, an internet mobile rescue robot that can navigate obstacles using an ultrasonic sensor system.

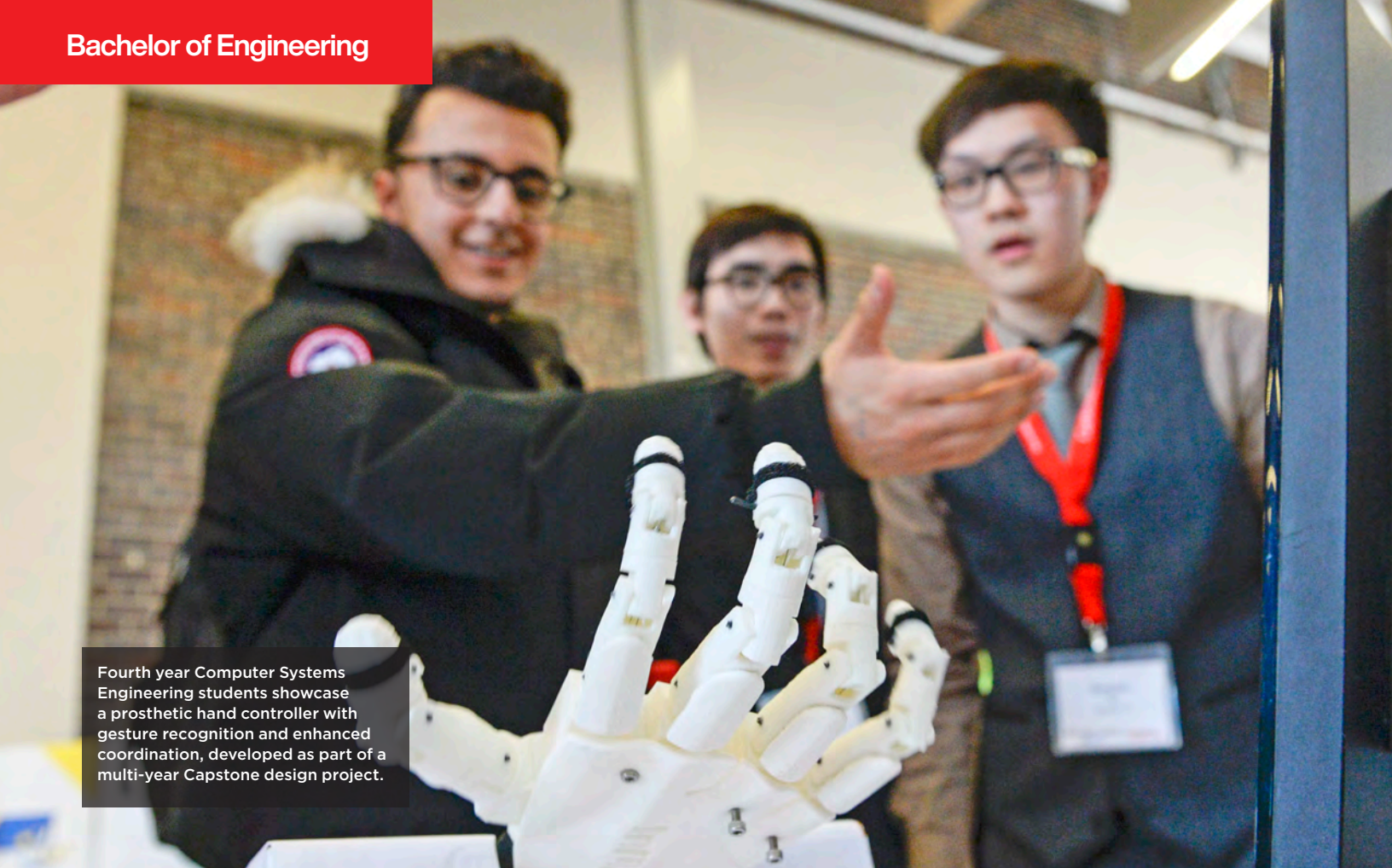


You might also be interested in computer systems engineering, electrical engineering or network technology.

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Fourth year Communications Engineering students developed a semi-automated Internet of Things Greenhouse. The project maintains the health and growth of generic garden plants, with the hopes for the technology to be applied on a larger scale to green house operations.



Fourth year Computer Systems Engineering students showcase a prosthetic hand controller with gesture recognition and enhanced coordination, developed as part of a multi-year Capstone design project.

# Computer Systems Engineering

Computer systems, particularly embedded microcontrollers and digital signal processors and related hardware, have become essential components in almost every area of modern life, from telecommunications and information networks to multimedia applications and real-time control systems, and from aerospace and satellite systems to mechatronics and autonomous vehicles.

Computer systems engineers design complex computer systems — such as smart phones and communication networks, cloud and Internet of Things (IoT) based systems, intelligent cars and smart highways — that can interact with one another to solve problems or improve productivity and keep us connected to the world around us.

## Your opportunities

- Integrate studies in computer systems organization, software engineering, real-time systems, electronics, distributed systems, networking and general systems design.

- Engage in lab and design projects that emphasize problem-solving skills and hands-on experience in real-time systems or computer architecture in state-of-the-art laboratories, including the labs in Carleton's Real Time & Distributed Systems (RADS) Research Centre.
- Develop contacts for future employment through Carleton's close association with the laboratories of the Communications Research Centre, the National Research Council Canada and the local technology companies that make Ottawa a hub of high-technology. Companies and organizations tap into Carleton as a rich source of talent, ideas and expertise for research partnerships and future employees.

## Your program

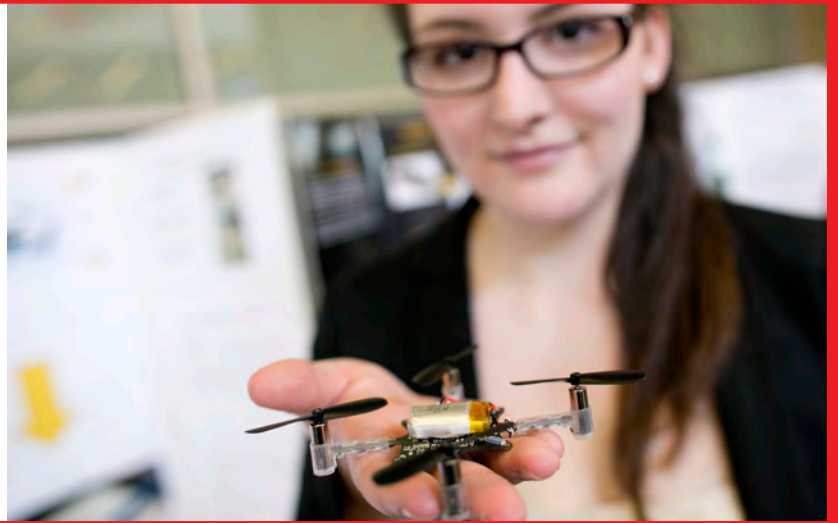
First year begins with a common core of key fundamentals in engineering, mathematics and science. Over the next three years of the program, you will learn to engineer computer systems and acquire a deep understanding of computers as integrated software/hardware systems. You will become adept in object-oriented programming, real-time systems, software engineering, digital and analog electronics, linear systems, communications systems and networks, and telecommunications. Specialized topics (such as a focus on robotics or artificial intelligence) and an

### Control in Real-Time

Carleton students at the Advanced Real-Time Simulation Lab have been working on an improved method that will allow smart devices, cars and drones to be brought to life easily and quickly.

Students are using a new technique to develop controllers for software systems embedded in hardware platforms, such as robots and drones, in order to improve response time and efficiency.

They are currently applying their new approach to a miniature self-driving car and a radio-controlled quadcopter among other smart devices.



advanced research project round out the program.

### Your future

As a computer systems engineer, you will work at the interface of hardware and software — and be able to design both — especially in the area of embedded and autonomous systems, microcontroller applications, telecommunications, and the engineering of computer-based systems. Graduates of the program are the founders of, and active leaders in, several high-

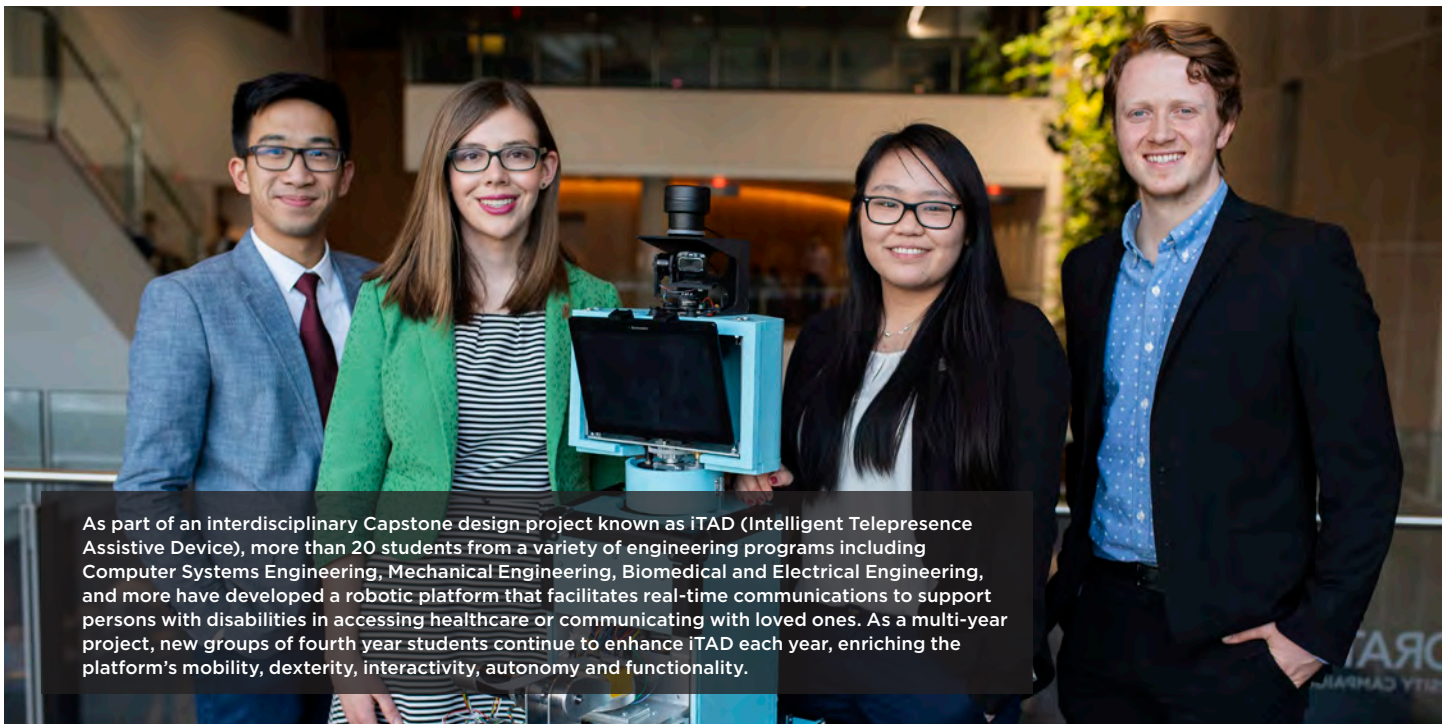
tech companies specializing in computer systems and information networks.

Canada's computer-based systems industry is a significant contributor to the economy and is recognized worldwide for its technical and commercial success. Challenging career opportunities continue to be created as computer systems are integrated in new products and processes.

You might also be interested in software engineering.

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As part of an interdisciplinary Capstone design project known as iTAD (Intelligent Telepresence Assistive Device), more than 20 students from a variety of engineering programs including Computer Systems Engineering, Mechanical Engineering, Biomedical and Electrical Engineering, and more have developed a robotic platform that facilitates real-time communications to support persons with disabilities in accessing healthcare or communicating with loved ones. As a multi-year project, new groups of fourth year students continue to enhance iTAD each year, enriching the platform's mobility, dexterity, interactivity, autonomy and functionality.



# Electrical Engineering

Electrical engineers are transforming civilization and society. Working in industry, government and academia, they create the light we read by, the devices we use to play our music and the computers on which we work, game and socialize.

This revolution in lifestyle is achieved through the design of the largest and the smallest structures ever built by humans. Working with nano-scale devices smaller than most living cells, electrical engineers design the microchips used in larger devices from cellphones to satellites and supercomputers. This vast array of networked devices is powered by the largest man-made structure in the world: a massive grid, designed by electrical engineers, moves energy all over the world, creating light and heat, transporting people, irrigating land and powering phones and computers.

## Your opportunities

- Specialize in wireless electronics, integrated circuit design and fabrication, nanotechnology, green energy, biomedical sensors and technologies, antennas, light-wave devices, aerospace electronics or design automation.
- Design your own integrated circuits in Carleton's on-campus fabrication facility — one of the few such facilities at a Canadian university.
- Access a superb undergraduate computing network with state-of-the-art workstations and computer-aided design tools in modern, well-equipped laboratories.
- Develop contacts for future employment through Carleton's close association with the largest government electrical engineering laboratories in Canada (including the Communications Research Centre Canada and the National Research Council Canada) and access to Ottawa's concentration of telecommunications and high-tech companies and leading hospital and medical research facilities, such as the University of Ottawa Heart Institute and the Children's Hospital of Eastern Ontario.



Undergraduate student developed compact and flexible antennas to help prevent mid-air drone collisions, as part of their Capstone design project.

### Your program

The first year of the Bachelor of Engineering program in Electrical Engineering emphasizes fundamentals in math and science. Second year introduces you to network analysis, electronic circuit design, object-oriented programming and numerical analysis, while continuing to develop a strong base of math and computer skills. Third year courses provide specialization in digital and analog circuit design, semiconductor device physics, electromagnetics and real-time programming.

Fourth year offers options for further development in areas such as wireless electronics, antennas, integrated circuit design, layout and fabrication, fibre

optic communications, nano-electronics, sensors and sensing technology, solar cell/ photovoltaic technology, power systems, aerospace electronics and computer-aided design for electronics engineering. A Capstone project lets you apply your knowledge in a hands-on group research project.

### Your future

You can find employment with companies developing products and services in wireless electronics, biomedical electronics, instrumentation, mobile electronics, electrical power and smart grids, renewable energy systems, computer/game hardware, telecommunications and aerospace electronics.

You might also be interested in biomedical and electrical engineering, engineering physics or optical systems and sensors.

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### Co-op Experience & Career Development

During her third year in Carleton's Electrical Engineering program, Megan McEwen (BEng/20) and a team of students developed a microcontroller robot capable of detecting and extinguishing small fires. Drawing from micro-soldering experience she acquired during her first of two Co-op terms at Nokia, McEwen designed the robot's motor control circuit, helped with the power regulation system, and made the water transportation system.

McEwen was also a member of Carleton University Women in Science and Engineering (CU-WISE) and Carleton's Chapter of Engineers Without Borders — both organizations of engineering students that identify opportunities for young women and girls, effect positive social change and champion global development initiatives.

Following Co-op roles with Nokia, McEwen joined Ross Video's robotics team for her final Co-op term. After graduation, McEwen went on to join Ross Video full-time as a member of its Camera Motion Systems team.





A Carleton student examines a silicon wafer in our on-campus clean room, a microfabrication laboratory that facilitates integrated circuit design and testing.

# Engineering Physics

A challenging and elite field that combines the strengths of physics and engineering, Engineering Physics applies fundamental physical science to the solution of technological problems and the development of new technology. Engineering physicists use a broad foundation in material science, applied physics, electronics and nanotechnology to develop new semiconductor devices, optical systems and nano-scale integrated devices for telecommunication, biomedical and renewable energy applications.

## Your opportunities

- Specialize in integrated semiconductor devices and technology or optical devices and systems.
- Design your own integrated circuits in Carleton's on-campus fabrication facility — one of the few such facilities at a Canadian university.
- Gain experience collaborating with a senior

professor on a team project to design and implement an optical system.

- Access superb computer networks and resources and modern, well-equipped laboratories such as the Canadian Photonics Fabrication Centre for the design, fabrication and testing of state-of-the-art photonics and optoelectronics components and systems.
- Develop contacts for future employment through Carleton's close association with

Ottawa high-tech companies and the laboratories of the National Research Council Canada and the Communications Research Centre.

## Your program

In your first year, you will learn key fundamentals of engineering and mathematics, including courses in chemistry and physics.



Engineering Physics students have access to a wide variety of electronics labs and facilities on campus.

The second and third years of the program provide you with a strong background in physics and engineering, with courses in programming, electronics and modern physics. Fourth year allows you to specialize in either semiconductor device technology or applied optics. Electives are also available in integrated-circuit (IC) design, telecommunications electronics, computer-aided design, microwave engineering, integrated sensors and other areas.

### Your future

As an engineering physicist, you will be well equipped to work in the renewable energy and telecommunications high-technology sectors including IC fabrication, microelectronic devices, nanotechnology, microwave and optical systems, and sensor technology.

Some engineering physicists build careers in biomedical engineering and medical physics. This degree prepares you for graduate studies in electrical engineering or physics.

You might also be interested in electrical engineering or optical systems and sensors.

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### Finding Big Solutions with Tiny Tech

Using silicon chips and photonics to detect and treat infectious diseases, Professor Winnie Ye is developing tomorrow's health and medical technologies today. Dr. Ye is a Carleton University graduate (BEng/00, PhD/07) who holds the Canada Research Chair in nano-scale IC design for reliable optoelectronics and sensors.

She makes Carleton her research home for some of the same reasons engineering and design students do: the university's partnerships with neighbouring technology companies and government institutions committed to advancing R&D, and one of the only campus clean rooms in Canada, which gives students firsthand experience in learning to fabricate semiconductor devices for biomedical, telecommunication and renewable energy applications.





# Environmental Engineering

Environmental engineers ensure that we have clean water to drink, clean air to breathe, clean soil in which to grow crops and clean energy to sustain our growth. From global challenges like climate change to local issues such as a safe and secure supply of drinking water, the goal of environmental engineering is to offer sustainable and green solutions, and to provide a clean and healthy environment.

By using engineering and science principles, environmental engineers design innovative treatment technologies to minimize our environmental footprint, develop clean energy sources and protect our ecosystem, resources and public health.

## Your opportunities

- Gain real experience through Co-op work placements, a challenging final-year design project, and courses that emphasize problem-solving skills and hands-on laboratory work.

- Access modern computer facilities and well-equipped laboratories that allow students, for example, to analyze the water quality of the Rideau River that flows past campus or assess the air quality in a classroom or bus stop on campus.
- Develop contacts for future employment by participating in collaborative design projects with industry, government and research agencies in the Ottawa region and through Carleton's close association with the laboratories of Environment and Climate Change Canada, Health Canada and Natural Resources Canada.

## Your program

One of only a few such programs in Canada, Carleton's program covers a range of topics from life-cycle analysis and environmental impact assessment to the design process in four broad areas: air pollution control; groundwater flow and contaminant transport; solid and hazardous waste management; and water and waste water treatment.

The program mixes fundamental concepts and theory with analysis and design. In





Environmental Engineering students simulate the flow of contaminants as they move through a water system, assessing the dilution and dissemination of pollutants in order to develop clean water solutions.

first year, you study common core courses. In the second year, you begin program-specific courses and take additional courses in biology and chemistry. Third year teaches the unifying fundamental principles for the four areas outlined above. Fourth-year courses are applied and provide in-depth study and design in these areas.

### Your future

As an environmental engineer, you will find employment opportunities in industry, municipalities, consulting firms, federal and provincial regulatory agencies, and research establishments. Your many career options include designing treatment technologies and facilities, developing clean energy alternatives, providing safe drinking water, improving air quality and assessing waste management strategies.

You might also be interested in sustainable and renewable energy engineering.

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### Interdisciplinary and International Experiences

An interdisciplinary group of students and professors from Carleton's Faculty of Engineering and Design and Sprott School of Business recently completed a site visit to Longido, Tanzania as part of their final year Capstone project. Commonly known as From Buckets to Rain Barrels, the project involves a multi-year, multi-discipline team aimed at addressing chronic water shortage issues within the rural community.

After developing their prototypes over a four-month period, students were given the opportunity to bring them to Tanzania for site-specific testing and feedback from members of the community. Recent additions and enhancements to the project include a small scale solar still design, the introduction of drip irrigation as a water saving measure, improvements to brick making, a ceramic filter for water treatment, and the development of a local weather app for the community.





Each year, Carleton's Ravens Racing competes against hundreds of teams from around the world in the international Formula SAE series. The team's newest Formula SAE vehicle, designed and constructed by students from a variety of engineering disciplines and powered by a 50 horsepower engine, can accelerate from 0 to 100 in 4.5 seconds and reach speeds of up to 120 km/h. During the 2019 season, the team found record success, earning multiple podium and top ten finishes.

# Mechanical Engineering

Almost anything that is built to move can be considered mechanical. Mechanical engineers use their understanding of science and engineering to analyze, design, manufacture and maintain mechanical systems in vehicles, aircraft, heating and cooling systems, manufacturing, energy plants, machinery, medical devices and terrestrial and extraterrestrial exploration.

One of the most versatile of the engineering disciplines, mechanical engineering opens the door to a vast range of career possibilities.

## Your opportunities

- Gain experience through challenging laboratory and design work, including a final-year design project that emphasizes problem-solving skills, hands-on experience and adaptation to changing technologies.
- Access outstanding computer facilities and campus laboratories, including wind tunnels, equipment for structural and material testing, laboratories to study thermodynamic and heat transfer phenomena, facilities for machining and 3D printing metallic materials, mechatronics prototypes equipment and fully equipped computer-aided design facilities.
- Develop contacts for future employment through Carleton's close association and collaboration with National Research Council Canada laboratories and research institutes in the Ottawa region.

## Your program

Your comprehensive study in one of Canada's largest mechanical engineering departments begins with a common core of fundamentals in engineering, mathematics and science, followed by courses in dynamics, thermodynamics, solid mechanics, materials, fluid mechanics, heat transfer, and control systems and robotics throughout second, third and fourth year. Elective courses are available in noise control, energy conversion and power generation, manufacturing and production



Carleton's Mechanical Engineering program provides students with a broad understanding of fundamental engineering concepts and emphasizes hands-on experience through challenging laboratory, design, and machining work.

processes, aerodynamics and flight mechanics, vehicle engineering, spacecraft design, propulsion and biomedical engineering.

**Your future**

You will be able to adapt to changing technologies and work effectively in interdisciplinary team settings. Employment

possibilities are broad, with challenging and rewarding opportunities in the manufacturing industry, energy utilities, industry and government laboratories, building services and plant engineering, the transportation industry and a variety of consulting engineering firms.

**You might also be interested in biomedical and mechanical engineering.**

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**Out of this World**

The Carleton Planetary Robotics Team is a student-run group comprised of over 30 members from a variety of engineering programs, such as mechanical, electrical, software, and communications.

Each year, the team designs, programs and constructs a planetary rover for entry into international competitions, which are designed to test their unit's navigation, research and service capabilities in an environment that simulates conditions on Mars.

In 2017, the team placed second at the first-ever Canadian International Rover Challenge in Drumheller, Alberta. In 2016, the team travelled to the United Kingdom's Mars Society University Rover Challenge in Manchester, England, securing a fourth place finish among teams from across the world.





# Software Engineering

The phenomenal growth in computing, and the related information technology industry, has resulted in a tremendous demand for software engineers — people who are qualified to develop reliable, economical and high-quality software systems that provide the “brains” for hardware and bring to life the modern computer infrastructure that affects all aspects of our lives.

Much more than computer programming, software engineering offers comprehensive study in software security, reliability and quality, and creative solutions to meet the requirements of end users. Software engineers help software to evolve, add new features and merge isolated software systems into cooperating systems in industries such as aircraft, satellite and air traffic control, banking, medical and imaging devices, e-commerce, web and portable applications and gaming.

## Your opportunities

- Learn essential discipline components such as programming paradigms and design notations through integrated studies in the principles and practice of software systems development and related computer technologies.
- Access well-equipped laboratories and computer facilities for lab and design work that emphasizes problem-solving skills and hands-on experience, such as state-of-the-art software modelling and engineering techniques.
- Develop contacts for future employment

through Carleton's close association with government-led laboratories, the National Research Council Canada and many local technology companies such as Shopify, IBM, BlackBerry QNX, Ford and Ericsson.

## Your program

You will learn fundamental computing theory and practice; processes, methods and tools for developing software systems; and regulatory and social aspects of development. You will acquire a solid foundation in mathematics, physical sciences, engineering principles and



During his third year Co-op placement with DRS Technologies Canada, Software Engineering student Shashtra Ranasinghe helped to develop software for an all-new deployable “black box” flight recorder. Working as part of a small team tasked with developing the recorder’s ground support equipment, Ranasinghe helped create a specialized laptop-based application, which will connect to the recorder itself in order to recover and display its flight data.

You might also be interested in computer systems engineering.

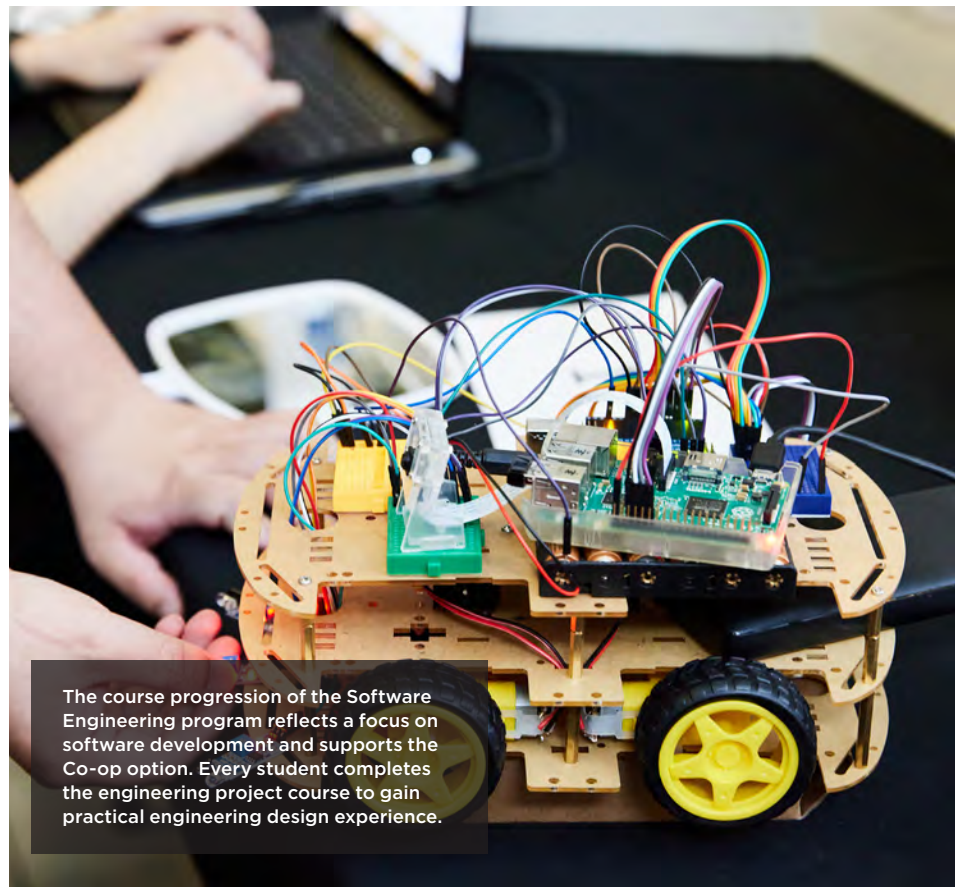
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design. You will learn to design software rapidly — while maintaining the flexibility needed to accommodate future changes — and become increasingly specialized in object-oriented modelling (using the standard Unified Modeling Language notation) and programming (using Python, C++ and Java), and real-time computer systems. A challenging final-year design project lets you apply your knowledge.

### Your future

Prepared to design, implement and maintain complex software systems, you will be in demand from public and private sectors in the areas of health care, aerospace, manufacturing, multimedia, information technology and telecommunication. You will be able to manage the development and deployment of software products such as embedded real-time systems in aircraft or medical devices, computer graphics and animation, online banking or e-commerce applications, multimedia and mobile computing systems, telephone switches and networks, routers, and database systems.



The course progression of the Software Engineering program reflects a focus on software development and supports the Co-op option. Every student completes the engineering project course to gain practical engineering design experience.



Carleton's Urbandale Centre for Home Energy Research, designed as a two-storey single-family home, enables ongoing research in energy efficiency enhancement through solar power and zero-carbon technologies. The 1,600-square-foot facility acts as a test bed for innovative concepts that challenge the traditional way houses are designed and built, focusing largely on seasonal thermal storage.

# Sustainable and Renewable Energy Engineering

Our planet is in need of clean and renewable sources of energy such as wind, solar, geothermal, tidal and biomass – and we need to generate, distribute and use non-renewable energy resources more effectively, by minimizing environmental impact and ensuring they make a positive contribution to sustainable development.

As a field of study, sustainable and renewable energy engineering examines the challenges confronting modern society as it attempts to meet energy needs in an economically efficient, socially responsible and environmentally-friendly manner.

## Your opportunities

- Access state-of-the-art laboratories for combustion and air emissions, fuel cell development, wind turbines, thermodynamics/energy conversion, power electronics and smart grids; a micro-fabrication facility for photovoltaics and power harvesting; and a wind tunnel for wind-farm performance studies.
- Gain experience through a final-year team design project, optional Co-op work terms, and a program that emphasizes problem-solving skills, a professional focus, and hands-on laboratory work.
- Develop contacts for future employment through Carleton's close association with Hydro Ottawa, Natural Resources Canada, Siemens, and housing developers.



Melina Jefferson, now a graduate of Carleton's Sustainable and Renewable Energy Engineering undergraduate program and Mechanical Engineering master's program, helped analyze flare-generated pollutant emissions as part of the Natural Sciences and Engineering Research Council Canada (NSERC) FlareNet Strategic Network, led by Carleton professor Matthew Johnson.

You might also be interested in mechanical, computer systems, electrical, or environmental engineering.

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- For a focus on electrical engineering aspects of the field, specialize in **Stream A: Smart Technologies for Power Generation and Distribution**. If your interest lies more with mechanical engineering aspects, you can choose **Stream B: Efficient Energy Generation and Conversion**.

### Your program

Both program streams provide a solid core of courses and laboratory work that prepare you for a successful professional career in industry and the public sector,

or for further studies at advanced levels. Courses in basic and applied science, in combination with stream-specific topics such as electronics, smart-grid systems, heat transfer and thermodynamics, technology for generating and converting energy, and environmental issues will give you the technical and professional tools to deal with the challenges of the energy field.

### Your future

You will be well prepared for challenging positions in energy-intensive industries and

related government agencies, including power utilities, generation facilities, distribution networks, smart grids and the construction industry. You will be in demand by manufacturers of materials and equipment for renewable energy projects, the hybrid vehicle design industry and emerging service industries specializing in energy efficiency, to name a few.

### Sustainable Design

In 2019, an interdisciplinary group of fourth year students known as the Boreal Builders dedicated their Capstone design project towards creating sustainable housing solutions in partnership with Kiashke Zaaging Anishinaabek — Gull Bay First Nation.

Comprised of students from Carleton's Sustainable and Renewable Energy Engineering, Architectural Conservation and Sustainability Engineering, Civil Engineering, and Environmental Engineering programs, the team explored and developed an affordable eco-home design in collaboration with Gull Bay First Nation, incorporating the community's knowledge, goals and vision for its sustainable future.





# Architectural Studies

Architecture is society's most public, visible art. It reflects culture and participates in shaping it. Architects have deep concern for society, culture and the urban environment, a passion for turning ideas into reality, the ability to think critically, and an appreciation for art and technology.

The study of architecture involves an exploration of many disciplines. Our Architectural Studies program is organized into three Majors. Whether you choose Design, Urbanism, or Conservation and Sustainability, you will learn to balance the demands of function, aesthetics, technology and economics. Developing skills in drawing, model-making, photography, video, digital media, writing and oral presentation will be central to your education experience.

## Your opportunities

- Access state-of-the-art facilities including: design studios with personal work space; wood, sheet metal and welding workshops; laser cutting, 3D printing and CNC routing fabrication facilities; and a large assembly room.
- Benefit from extensive computer facilities and academic resources such as the Barbara Humphreys Reading Room and the Architecture Building's Lightroom Gallery, along with research labs such as the Carleton University Immersive Media Studio – a research centre for modelling and visualization using immersive, digital and hybrid media, the Carleton Sensory Architecture and Liminal Technology Laboratory for the study of materiality in architecture, the Carleton Climate Futures Design laboratory, which combines design and scholarly research to explore and prototype climate futures in the built environment, and the Carleton Urban Research Lab, which promotes design thinking about water, cities and equity.
- Learn from the world's great architecture and architects through Directed Studies
- Abroad (two to four-week excursions), visiting critics' studios and lectures, and the Forum Lecture Series featuring distinguished architects from around the world.
- Explore areas such as furniture design, stage design, and advanced drawing and fabrication through workshop courses.

## Your program

In your first year of the Bachelor of Architectural Studies (BAS) program, key courses including Drawing, Design Studio, Multimedia Applications, and Art History will lay the foundation for subsequent years. In years two and three, students work towards their majors before coming back together to share studio in the fourth year.





Second-year students learn to formulate creative answers to architectural problems through hands-on learning.



Fourth-year students prepare an end of year showcase of their work.

**A brief description of each major:**

- **Design:** for a professional career in architecture with an emphasis on building design.
- **Urbanism:** to explore design at the scale of the block, neighbourhood and city, and promote stewardship of the built environment.
- **Conservation and Sustainability:** for the adaptive re-use of the existing building stock, the conservation of historic buildings, and the principles of sustainable design.

Each of these majors include Studio and is supported by a sequence of core courses in technology and environment, history, theory and electives from other disciplines offered at Carleton.


**Your future**

In addition to laying a solid foundation for later study in a range of design fields, the BAS degree prepares you for the accredited Master of Architecture program required to practice architecture in North America.

Graduates of the Azrieli School of Architecture and Urbanism are working in exciting careers around the world in fields as varied as building design, urban design, planning, landscape architecture, fashion design, filmmaking, computer animation, environmental/sustainable building consultation, project management and historical architectural preservation, community advocacy and public policy.

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- Progressive Co-op education option
- Scholarships for high-standing students
- Educational requirements that qualify you for professional studies at the master's level



During her final year in Carleton's Industrial Design program, Sofia Parra (BID/23), created Hesper, a winter jacket that lights up when activated by human body heat. Sofia worked with Na-Cho Nyak Dun First Nation women to design the jacket that would protect its wearer from dark days and nights of winter.



# Industrial Design

The form and function of almost all of the objects that surround us are the result of an elaborate process of design.

Industrial designers use a process-oriented approach to design products, systems, services and experiences. Often working in interdisciplinary teams, their focus is to research the needs of the end users to gain insights about how products and services can be improved through design. Students learn to create innovative solutions that consider the manufacturing process, human factors, environmental impacts and market potential. Students will develop professional skills in sketching, model-making and prototyping as well as graphics and computer-aided design.

### Your opportunities

- Access excellent facilities including design studios, digital laboratories, modelling and testing laboratories, rapid prototyping equipment, and a mass-production/mould simulation laboratory.

- Benefit from access to world-class tech companies and government laboratories, which offer excellent opportunities for Co-op and internship placements, as well as a high number of prospects for future employment.
- Gain valuable real-world experience by working with a wide variety of private companies and public sector partners through internships, Co-op education and collaborations in design courses. Examples include Adidas, Autodesk, IBM, The Luminares Group, Mountain Equipment Company, Reebok, Spin Master Toys, Starfish Medical, Teknion, Umbra, the Government of Canada, and many more.

### Your program

This unique and hands-on program blends design studio with applied and social sciences. Industrial designers are

visual thinkers: you will learn how to use your drawing and modelling abilities to communicate product concepts. Through progressive stages of design development, you will learn how these concepts evolve in relation to materials, technologies and manufacturing processes, ecological issues, and the users' abilities and perceptions.

The program begins with an introduction to the theory and practice of design, and courses in mathematics, physics, psychology and economics. In second year, topics such as mass-production technology, ergonomics, perception and computer applications are presented, along with electives from architecture, business, computer science or engineering.

In third and fourth year, you will focus on



During his final year at Carleton, Rob Shudra (BID/18) focused his Studio project on making air travel more accessible for seniors, leading to the development of ELEVATE, a specialized economy class active seating system that aims to reduce the risk of deep vein thrombosis (DVT) during flight.

While developing his prototype, Shudra benefited from access to the National Research Council Canada's Aerospace Flight Lab, whose resources include a reconfigurable simulation cabin that is capable of emulating a variety of specific aircraft models currently being used throughout the industry.

Shudra's ELEVATE went on to win gold in the student design category at the Industrial Design Society of America's prestigious International Design Excellence Awards.

design projects, which can include almost any imaginable commodity, from medical equipment and transportation devices to building components, tools and furniture.

A highlight of the year is the School of Industrial Design's annual graduation exhibition in April. Open to the public, the exhibition showcases the projects of all Industrial Design students, and illustrates their incredible range of design diversity and skill. The exhibition attracts potential employers from different facets of industry.

### Your future

Graduates of the Bachelor of Industrial Design program work around the world in varied fields, where they are involved in designing equipment and products for consumer electronics, sports and recreation, exhibit design, furniture, health care, industrial machinery, lighting, special effects, transportation and toy manufacturing, amongst others. Graduates are also gaining positions in software companies, service and the public sector where they work as interface or user

experience designers to develop software apps, websites and customer experiences. Graduates also continue their studies in master's programs around the world including Carleton's own Master of Design.



You might also be interested in interactive multimedia and design.

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# Information Resource Management

Organizations have evolved to generate and use an unprecedented amount of digital data, which has fundamentally changed the ways in which we work, communicate and provide services. Advances in information technology have created a pressing need to organize, manage and present digital information and services. Carleton's Information Resource Management (IRM) program provides the ideal opportunity to learn about information systems both in the classroom and work world.

## Your Opportunities

- IRM is a unique data-focused program that enables students to graduate with both a Bachelor of Information Technology degree and a Library and Information Technician diploma.
- This blended university and college program combines a strong theoretical education with practical experience. Students registered in the program are enrolled at both Carleton University and Algonquin College and will benefit from excellent

facilities, teaching staff, resources and expertise at both institutions.

- Up-to-date computer labs specifically maintained for the program provide access to the latest technology in the field.
- Develop a marketable skill set. Both institutions regularly consult with representatives from industry to track current, emerging and future trends in information technology. Regular consultation keeps the IRM program in sync with the skills and competencies desired by employers.

## Your Program

This multidisciplinary program includes courses in information management, metadata, web interface development, data analytics, programming, data visualization, business, database theory and development, legal issues in information technology, communication skills, library software, marketing, special collections and network technology. The flexible structure of the program also enables students to incorporate a minor of their choice to develop a subject area specialty.



Benefit from opportunities for practicum and experiential learning including completion of projects at Carleton's MacOdrum Library. IRM also includes a flexible Co-op option which enables students to gain up to five terms of work placement related to the field of information technology.

A bridge program is available for students who already have a LIT diploma, typically reducing the time to obtain a BIT degree in half.

### Your future

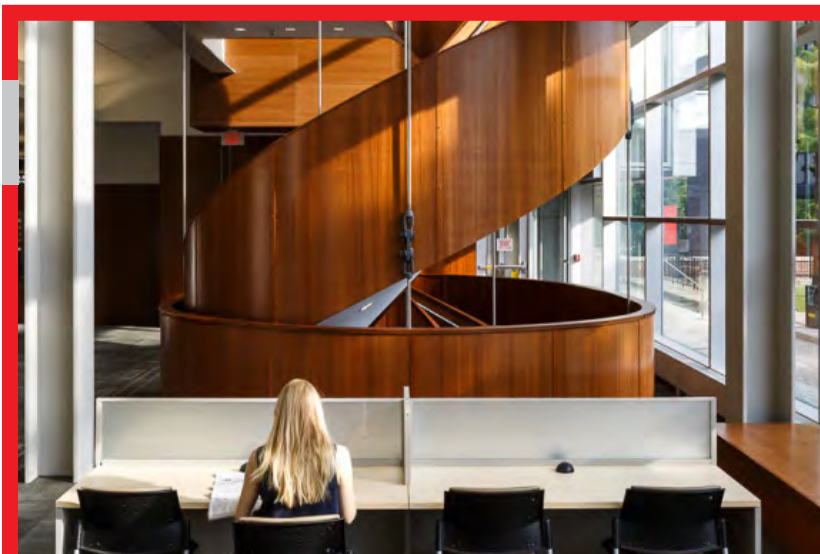
Graduates of the IRM program earn both a degree and a diploma, opening the door to a broad range of career opportunities to manage digital resources and services including:

- Information management
- Research data management
- Research institutes
- Libraries: public libraries, academic libraries, special libraries and school libraries
- Web design
- User interface design and construction
- E-commerce

You might also be interested in **interactive multimedia and design or media production and design.**

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### Real-World Experience

Students in the IRM program will benefit from opportunities for practicum and experiential learning, including hands-on projects at Carleton's MacOdrum Library — winner of the prestigious Ontario Library Association Library Building Award in 2015.

The library provides a number of state-of-the-art facilities including the Discovery Centre for Undergraduate Research and Student Engagement which includes a gaming laboratory, 3D printing centre and multimedia laboratory. The library provides a designated space for IRM students to research, collaborate and study.



# Interactive Multimedia and Design

From video games and animated shorts to visual effects and interactive websites, interactive multimedia and design professionals determine the shape of digital media, design interfaces and script the way that users will interact with the products they create.

Specialist areas in the multimedia sectors are growing rapidly in North America, Asia and Europe, resulting in an increased demand for people with the expertise and skills that combine creativity, imagination and technology to create the next generation of multimedia-rich applications and products.

## Your opportunities

- Blend college and university styled approaches in this joint program between Carleton University and Algonquin College. You will graduate with a Bachelor of Information Technology Degree and a Diploma in Applied Arts.

- Benefit from professors and instructors that have a strong understanding of the industry, track current, emerging and future trends, and are engaged in research on the leading edge of interactive multimedia.
- Access state-of-the-art studios and laboratories, along with the latest industry-standard equipment at both institutions.
- Develop contacts for future employment through Co-op work and industry collaboration and showcase your talent at the popular annual exhibition that attracts a wide range of visitors including industry employers.

## Your program

Suitable for students who are both creatively inclined and technologically adept, the Interactive Multimedia and Design program provides multidisciplinary education in digital media covering subject areas such as web design, 2D and 3D computer animation, game design and development, visual effects, interface design, human-computer interaction (HCI) and project management.

Your education will focus on the entire design process: taking an idea from concept to design, prototyping, testing and delivery. As a student of today



### Big Screen Success

During her time as a student in Carleton's Interactive Multimedia and Design program, Taryn Laurendeau gained first-hand experience and a behind-the-scenes look at the magic of feature films. After joining the Moving Picture Company (MPC)'s Montreal office through Carleton's Co-op program, Laurendeau landed the role of effects department coordinator for the 2015 film *Fantastic Four*, as well as the position of show coordinator for Disney's *The Finest Hours*. Post-graduation, Laurendeau continued working with MPC as a production coordinator on blockbuster films such as *Pirates of the Caribbean: Dead Men Tell No Tales* and *Justice League*, and later joined Method Studios in Montreal as a VFX Production Manager, where she worked on a variety of projects such as *Welcome to Marwen*, *Pacific Rim: Uprising* and selected episodes of Netflix's *A Series of Unfortunate Events*. In 2021, Laurendeau shifted her focus to the video game industry, joining Electronic Arts (EA) as a Development Manager.

and a designer of tomorrow, you will gain practical experience and a strong theoretical foundation. You will learn how to realize the ideas that you imagine today, and determine what products are needed, how they are built and how people will use them.

Interactive Multimedia and Design is a streamed program. Available streams include:

- Animation & Visual FX
- Game Design & Development
- Web & User Experience/Interfaces

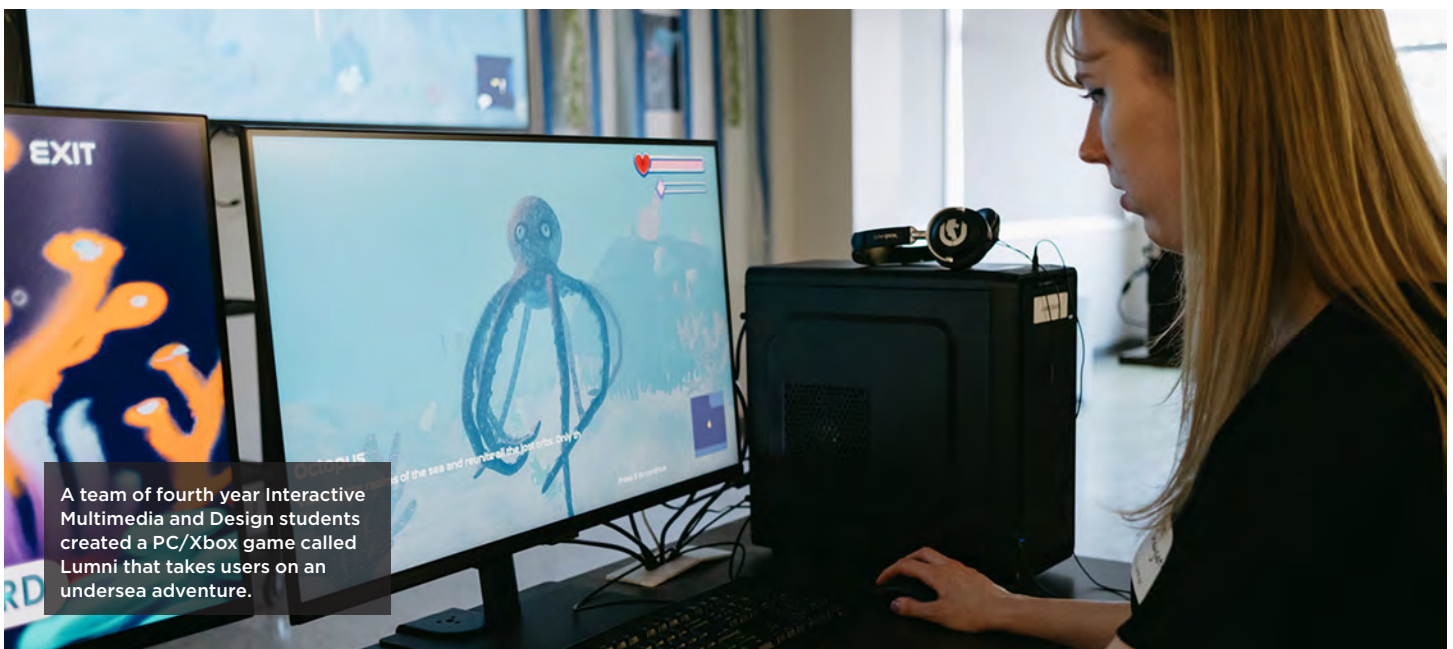
### Your future

Upon graduation you will be well equipped to work in and shape the digital world of the 21st century. With a degree-diploma combination, you have career opportunities in areas such as computer animation, video game design and development, user interface/experience design, digital video and audio effects, multimedia development, dynamic web application design, graphic design, and e-commerce.

You might also be interested in industrial design, architectural studies or media production and design.

Visit [calendar.carleton.ca/undergrad](https://calendar.carleton.ca/undergrad) for information on course and Co-op education options.

- Progressive Co-op education option
- Scholarships for high-standing students





# Network Technology

The information technology industry is fast-paced and constantly evolving. Computer networks that share resources and information are rapidly advancing and are crucial for every type of business enterprise and our daily lives. Networking professionals develop the theoretical knowledge and practical skills needed to address the IT issues of today — as well as those of the future.

A multidisciplinary education and practical experience in mobile networking, IT security issues, cloud computing, social networking and network management, and the physics of communications prepares students to design, install, operate and manage complex information networks such as those that make up the Internet.

## Your opportunities

- Blend college and university styled approaches in this joint program between Carleton University and Algonquin College. You will graduate with a Bachelor of Information Technology degree and an Advanced Diploma in Technology.
- Develop analytical problem-solving and hands-on practical skills in current IT systems and technologies in a program with a strong theoretical and industrial background.
- Benefit from professors and instructors who

have a strong understanding of the industry and are engaged in research on the leading edge of networking.

- Access state-of-the-art laboratories and new facilities at both institutions, featuring the best technology available — such as smart classrooms and up-to-date networking equipment from Cisco.





Carleton's state-of-the-art networking labs offer hands-on training with real-world equipment.

**Your program**

In this multidisciplinary program you will build a strong theoretical foundation in networking technologies and learn all aspects of modern information networks, including the theory of, and hands-on experience with, the design, analysis and operation of various networks incorporating many transmission technologies.

You will study topics in network security, wireless mobile networks, network growth and evolution, and the role that information networks play in modern organizations. Additionally, you will take business and elective courses to round out your knowledge of the role of technology in society.

**Your future**

With a degree-diploma combination, you have career opportunities in a variety of interesting work environments in government, network design and management companies, finance companies, system integrators, telecom operators, educational institutions, and business enterprises requiring network design, management and operation. You will be prepared to write the Cisco Certified Network Associate and Professional certification exams, giving you industry-recognized certification that is in high demand in the job market.

**You might also be interested in communications engineering or optical systems and sensors.**

**Visit [calendar.carleton.ca/undergrad](http://calendar.carleton.ca/undergrad) for information on course and Co-op education options.**

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- Scholarships for high-standing students
- Certification exam preparation for Cisco Certified Network Associate (CCNA) and Cisco Certified Network Professional (CCNP)

**Get Noticed by Employers**

Carleton provides its students with many prospects for professional networking, including the opportunity to showcase their skills in international competitions involving the top students across North America and overseas. During his third year, BIT - Network Technology student Craig Labute earned second place in the Cisco Networking Academy's NetRiders competition. After receiving a Cisco Certification voucher, Craig was sent to the company's headquarters in California on an all-expense paid study trip. Upon graduating with high distinction, Craig landed a position with Nokia, where he now works as a Software Development Engineer.





Students in the Optical Systems and Sensors (OSS) program explore a range of the latest optical sensors, including this LIDAR remote sensing method used for autonomous vehicles.

# Optical Systems and Sensors

The science of generating and harnessing light has affected virtually all segments of modern society and industry, including the way we communicate, harness energy from the sun, enable autonomous cars to navigate our streets, manufacture automobiles and aircraft, measure our world (including important new medical instruments and laser-based therapies) and entertain ourselves with colourful displays in all sizes and shapes. The impact of optical systems in the 21st century will unquestionably surpass the effect the Electronics Age held over the last 100 years.

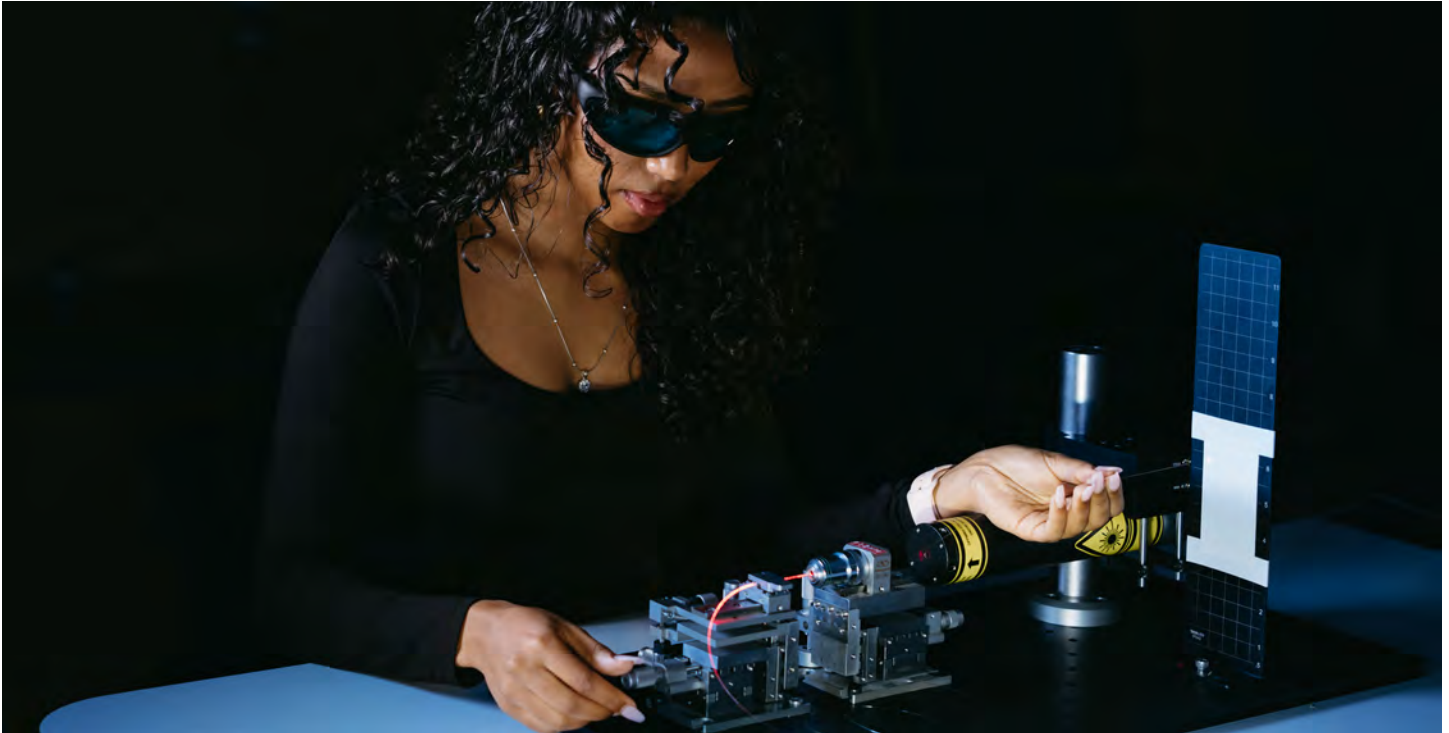
## Your opportunities

- Blend college and university styled approaches in the Optical Systems and Sensors (OSS) program, a joint venture between Carleton and Algonquin College. You will gain knowledge that is applicable in a variety of industries and graduate with both a Bachelor of Information Technology degree and an Advanced Diploma in Technology.
- Develop analytical problem-solving and hands-on practical skills in a program with a strong theoretical and industrial background.
- Benefit from professors and instructors who have a strong understanding of the industry and are engaged in research on the leading edge of photonics.
- Access state-of-the-art laboratories and computer facilities at both institutions,

including an optical and semi-conductor fabrication facility, the Centre for Nanoscale Sensor Interfaces, Algonquin's Advanced Technology Centre, and Algonquin's Optophotonics Lab — the only student lab of its kind — supported by Ciena.

## Your program

You will begin the program by developing a strong foundation in mathematics and



physics, followed by learning all aspects of optical systems and lasers. Subjects covered include fundamentals of optics, theory of lasers, optical biosensors, laser machining, holography, and fiber optic communications systems. You can expect extensive hands-on experience with image processing, computer vision and remote sensing equipment.

### Your future

With a degree-diploma combination, you will have unparalleled career flexibility. Optical systems and sensor technologies permeate education, research and private industry to the degree that the possible career paths available to you would be endless. Your future could be as varied as designing displays for next generation smart phones to developing life-changing laser-based surgical equipment.

You might also be interested in electrical engineering.

Visit [calendar.carleton.ca/undergrad](http://calendar.carleton.ca/undergrad) for information on course and Co-op education options.

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### Global Opportunities

During his third year as an Optical Systems and Sensors (OSS) student, Jeff Zhao (BIT/19) secured a four-month international internship in Japan with Mitsubishi Electric with the help of Carleton's Global Academy. Working out of Mitsubishi's Optical Communication Research and Development Center in the coastal city of Kamakura (south of Tokyo), Zhao focused on the development of cutting-edge algorithms that can optimize the structure of mesh networks and enable signals to find the most efficient path by which to travel.

"The theoretical knowledge in embedded systems and computer systems I developed through Carleton's OSS program allowed me to be extremely versatile in my role with Mitsubishi Electric," says Zhao. "OSS also provided me with a huge boost in optical networks experience with hands-on learning opportunities in Algonquin's Optophotonics Lab."

Having now completed his degree at Carleton, Zhao has returned to Japan as a Research and Development Engineer with Mitsubishi Electric.





# Media Production and Design

The Bachelor of Media Production and Design will teach you to operate across all facets of narratives – designing, programming and telling non-fiction stories online. You will learn to engage, inform, entertain and ultimately contribute to a broader and deeper understanding of how we connect with each other to build stronger societies.

## Your opportunities

- Carleton's Media Production and Design (MPD) program is offered jointly between the Faculty of Public Affairs' School of Journalism and Communication and the Faculty of Engineering and Design's School of Information Technology, providing students with diverse skills and experience.
- Benefit from small class sections in your first year, with abundant opportunities for hands-on work and in-depth feedback.
- As you develop expertise in the program's core elements, your coursework will diversify into areas such as ethics and digital

media law, emerging media industries and practical aspects such as freelancing.

- MPD students may choose to pursue a 12 month Co-op option after the fall term of their third year, gaining valuable career experience with media companies, online design and production houses, government agencies, not-for-profit and nongovernmental organizations, and various other corporations both within Ottawa and across the country.

## Your Program

A combination of intensive hands-on workshops and lecture courses provides students with a strong foundation writing

and narrative abilities across digital media formats, such as text, photography, 360 video, graphics, augmented reality as well as skills in computer programming, data management and research. The classroom experience will build fundamental production and online design skills and thinking into the development and application of narratives, with the understanding that design shapes how and what information is delivered to audiences, making "story" and "design" inseparable.

As well as acquiring editorial and technical skills, you will develop the theoretical



knowledge and understanding of the power of “story” through coursework in ethics, law, civic institutions and citizen interactions via policy, data and information technology theory and the history of persuasive narration and imagery. You will learn how to combine storytelling skills traditionally taught to journalists with the design skills that come from information technology, exploring where the two intersect to engage audiences in distinctive ways.

### Your future

MPD graduates will apply creative production and design thinking to information strategies and narratives that help empower citizens, strengthen communities and help organizations of all sorts tell their stories online:

- data analysts/conceptualizers
- digital communications experts
- information-based producers/designers of online content for not-for-profits, NGOs,

corporations and governments, museums, research institutes

- media producers of online content for mainstream and new digital media

With your Bachelor of Media Production and Design degree, you will also be able to pursue studies in master’s programs such as Journalism or Digital Media.

You might also be interested in interactive multimedia and design or information resource management.

Visit [calendar.carleton.ca/undergrad](http://calendar.carleton.ca/undergrad) for information on course and Co-op education options.

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# Co-op and Career Opportunities

All undergraduate programs in the Faculty of Engineering and Design include Co-operative Education (Co-op) or work-study opportunities, which allow you to take theoretical concepts from the classroom and apply them to solving real-world problems in your field of study.

Co-op work opportunities allow you to develop the tangible and interpersonal skills that are highly valued by employers. The strong industry and government connections that Carleton has built over the years have helped us create valuable work opportunities for our students within the National Capital Region and beyond.

Our Co-op students work with a wide variety of top employers, such as Ciena, the City of Ottawa, EllisDon, Ericsson, Four DRobotics, Gastops, General Dynamics Mission Systems–Canada, Honeywell, Hydro Ottawa, Kinaxis, Lockheed Martin Canada, Mitsubishi Heavy Industries Canada, Nokia, Ontario Power Generation, PCL Construction Canada, Ross Video, Telesat and many more.

Typically, you will take an additional year of study to complete all academic and Co-op program requirements, develop your work skills and acquire relevant industry experience. Co-op work opportunities are full-time, paid working opportunities.



Students in Carleton's Co-op program are granted exclusive access to Flex's Kanata-based location.



Architectural Conservation and Sustainability Engineering student Hailey Todd worked as an assistant project manager on Parliament Hill's East Block rehabilitation project during her Co-op placement with Public Services and Procurement Canada.



Software Engineering student Shasthra Ranasinghe and Computer Science student Kevin Guy developed software for an all-new deployable flight recorder during their Co-op with DRS Technologies Canada.

### Admission to Co-op

You can select the Co-op option at the same time as you are applying to your academic program. Once you're at Carleton and have earned a sufficient number of credits towards your degree, the Co-op office will formally assess you for admission to the program. If you did not request Co-op when you applied to Carleton, you may still apply during your first year of study. Deadlines may vary, depending on the degree program.

### Other Work Experience

Co-op programs are an option for gaining work experience during your university studies. Many of our programs offer practicum or internship opportunities, both of which allow you to gain work experience, learn new skills and make important connections.

### International Internships

Career Services also leads an International Internship Program, which connects students in all degree programs with a wide range of internship opportunities around the world for academic credit.

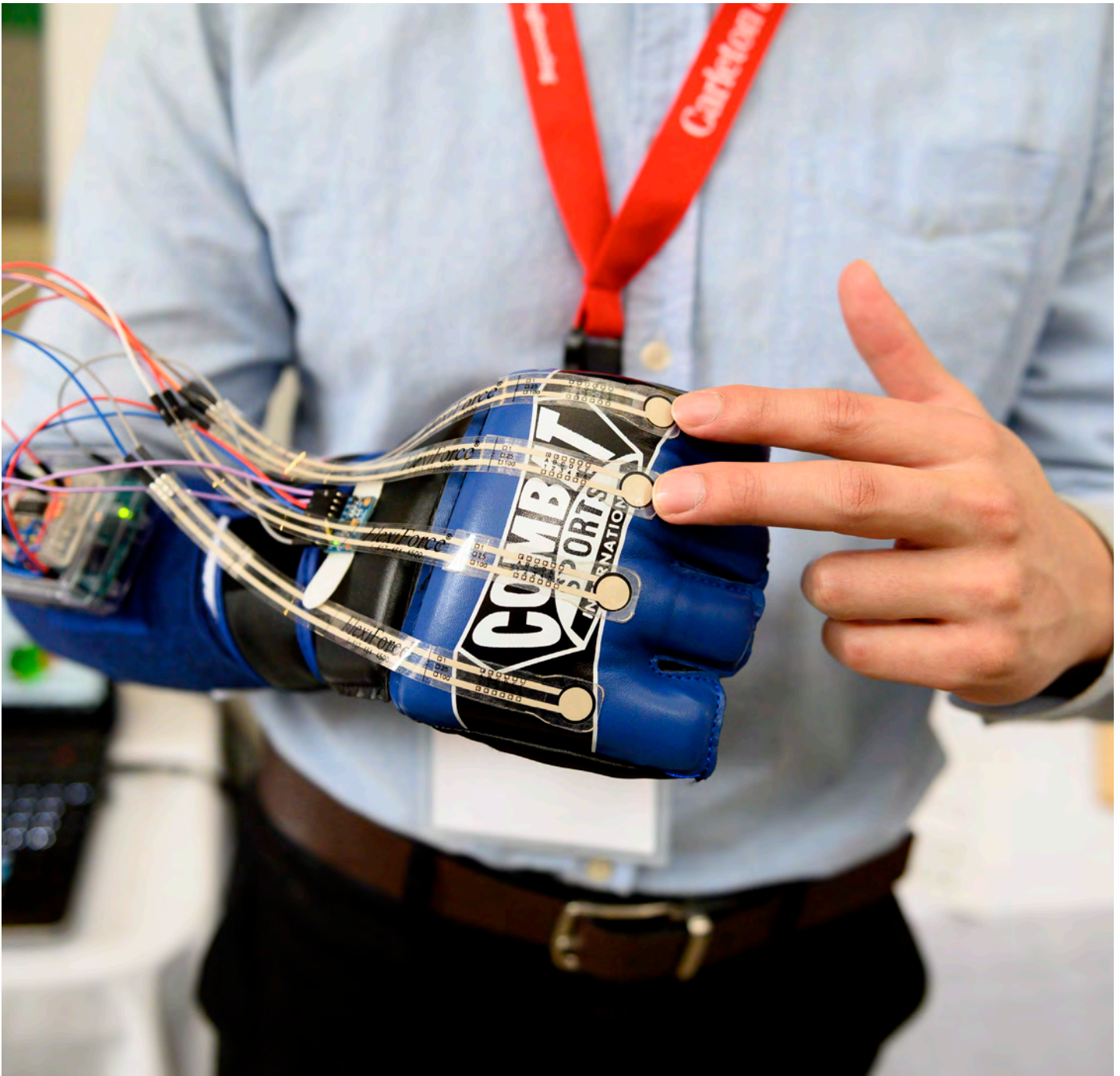
[carleton.ca/career/international-internship-program](http://carleton.ca/career/international-internship-program)



## Fourth Year Projects

Carleton's fourth year Capstone design projects provide undergraduate engineering students with a platform to implement the theory, practice and skills they have developed over the course of their program. By culminating your education with the design of a professional-level project, you will integrate your knowledge with real-world experience in a manner that prepares you for an exciting career in engineering and design.





The best learning environments unite theory and practice. Research shows that experiential learning contributes to student engagement, deeper learning, improved academic outcomes, and enhanced work and life skills.

Capstone projects are often considered the hallmark of undergraduate engineering and design degrees. While engineering students at Carleton engage in hands-on design projects throughout their years

of study, fourth year students work in teams to produce a design innovation that incorporates everything they have learned over the course of their studies. Capstone projects also foster an entrepreneurial spirit and passion for real-world problem solving. For students, fourth year projects are much like working on a startup, serving as an opportunity to explore new ideas which require ongoing commitment, critical thinking and improvisational skill. The defining element of Capstone projects

is their real-world application, such as developing web-based medical image processing software or utilizing uninhabited aerial vehicles (UAVs) for advanced high-resolution geomatic surveys. Many projects focus on serving the community as a whole, such as developing printable radiation detection devices or designing smart home energy systems capable of monitoring and adjusting power usage.



## Capital Living

Consistently ranked as one of Canada's most livable and safe cities, Ottawa is part big city, part small town. Ottawa is also one of the most beautiful capital cities in the world, with plentiful neighbourhood parks and tranquil green spaces, waterways that wind through the city, and historical and architectural landmarks. Elegant shops, international restaurants and a bustling market flourish in a dynamic downtown core situated in the shadow of Canada's majestic Parliament buildings.

For students who choose to study here, Ottawa offers invaluable research facilities and work opportunities via Co-op placements (as well as post-graduation) at the numerous agencies, institutions and businesses located in the National Capital Region.

Ottawa also plays host to many visiting dignitaries, authors, artists, festivals and sporting events, allowing students access to events not always available elsewhere. There are also extensive walking and biking trails that span from downtown Ottawa to Carleton University's campus and beyond.

With all Ottawa has to offer — no matter where your tastes and interests lie, you'll find something here for you!



# Discover campus

## Join us for a tour

One of the best ways to get to know Carleton is to explore our campus in-person or online. Plan your perfect visit today:



## Don't miss our events

There are so many ways to connect with Carleton! We offer several events throughout the year to connect you to Carleton and answer your questions.  
[admissions.carleton.ca/events](https://admissions.carleton.ca/events)

## We are here

Ottawa is a 2-hour drive from Montreal, 4.5-hour drive from Toronto and a 1-hour drive to the state of New York. Ottawa is home to an international airport, a train station and is serviced by local public transit.





# Making the Transition

Carleton University offers a network of support services to help you make a successful transition to university.

Our priority is to see you achieve your academic and personal goals. We can help you develop effective study skills, understand the university's academic regulations, choose or change programs and find answers to your questions. You can participate in orientation sessions, meet with academic advisors, attend workshops on study strategies, sign up for leadership development programs and access Carleton's resource material.

## Asking for help and advice

Support services are in place specifically for Faculty of Engineering and Design students:

- The Undergraduate Academic Support Office provides new first year engineering students with academic advising, peer tutoring (through the Elsie MacGill Learning Centre) and course registration assistance. It also provides upper-year engineering students with support and advice on schedules, regulations, registration and more. The comprehensive website [carleton.ca/engineering-design/beng-first-year](https://carleton.ca/engineering-design/beng-first-year) is a resource for all first-year engineering students.
- Bachelor of Information Technology students can access [bitdegree.ca](https://bitdegree.ca) for information on their program. Academic advisors from both Algonquin College and

Carleton University are available to help.

- Bachelor of Architectural Studies students can find information on registration, suggested electives, announcements and events at [carleton.ca/architecture](https://carleton.ca/architecture). Staff are available to answer program questions and help with registration. Academic advisors are available by appointment.
- Bachelor of Industrial Design students can access [carleton.ca/id](https://carleton.ca/id) for important information on registration, computer requirements, suggested electives, Orientation Week activities and more. Staff are available to assist with questions and can direct you to academic advice.

## Centre for Student Academic Support

Programs offered through Carleton's centralized learning support centre [carleton.ca/csas](https://carleton.ca/csas) can help you with academic reading and note-taking, time and stress management, and multiple-choice and general exam preparation.

## Student Experience Office

Helping you adjust to university life and providing support throughout your degree, the Student Experience Office [carleton.ca/seo](https://carleton.ca/seo) offers a variety of programs, such as:

- Summer, Fall and Winter Orientation to bring students to campus for tours, information

gathering and to meet other students;

- Community Service Learning initiatives to help students link what they learn in class to what they experience in the community;
- Leadership Development to provide opportunities to enhance your leadership skills; and
- Parent and Family Outreach to keep families informed of news and events.

## University Registrar's Office

The Registrar's Office manages records, transcript requests, course registration and more. [carleton.ca/registrar](https://carleton.ca/registrar)

## Supportive facilities

### MacOdrum Library

The library houses more than 3.4 million books, journals, government documents, maps, newspapers, music scores, CDs, microforms, archives and rare materials. Much of the collection is available online. In the library, you can connect to the wireless network or use the Laptop Loan program. In 2023, Carleton launched its new Future Learning Lab and its Experiential Learning Hub. The Hub features three new spaces: a teaching studio, a creation studio, and an experience studio. The three studios will support experiential learning through the use and the development of XR media and enhancement of Carleton's students' skills in new media and digital literacies. During

the Fall/Winter term, the library hours are extended to better accommodate students' needs. [library.carleton.ca](https://library.carleton.ca)

### **Paul Menton Centre for Students with Disabilities**

The centre coordinates academic and support services for students with disabilities. Services include academic accommodations, attendant services, alternate formats, adaptive technology, note-taking, sign language interpretation, and learning support and services specific to individual educational disability needs. [carleton.ca/pmc](https://carleton.ca/pmc)

### **Health and Counselling Services**

Carleton's multidisciplinary on-campus health care facility provides medical, counselling and health education services to the university's students, faculty and staff. [carleton.ca/health](https://carleton.ca/health)

### **Future opportunities**

#### **The workplace**

A Carleton education prepares you for a career that will help to improve our society. Graduates of our well-recognized programs in engineering and design can be found living and working in Canada and around the globe.

We make sure you can graduate with work experience and a competitive edge. All of our programs have Co-op options that provide 4, 8, 12 or 16 months of work



experience with more than 2,500 possible employers. In addition, our fourth-year projects provide unparalleled opportunities to explore your interests and creativity, and test your ideas and knowledge in real-world applications.

#### **Professional programs**

Many programs, including law, teaching, medicine and business attract well-rounded applicants from a variety of academic backgrounds. The Faculty of Engineering and Design's programs are excellent preparation for such professional studies.

#### **Graduate studies**

Many of our graduates continue with advanced university study at Carleton, in Canada or abroad for a master's degree or PhD. More information on Carleton's programs can be found at [graduate.carleton.ca](https://graduate.carleton.ca).



### **Great Grad: Jasmine Shaw (BEng/16, MASc/20)**

Since the beginning of her post-secondary career in Carleton's Biomedical and Mechanical Engineering program, Jasmine Shaw has been actively engaged within the Carleton community and beyond. During her undergraduate studies, Shaw represented engineering students at EngFrosh, Carleton's Senate and the Carleton University Students' Association, and served as a leader in improving mental health and student services as President of the Carleton Student Engineering Society. Following graduation, Shaw joined General Dynamics Mission Systems — Canada's Maritime Helicopter Program, working on essential systems that are installed in Canadian Forces CH-148 helicopters.

While continuing her engineering career, she completed a Master of Applied Science in Carleton's Technology Innovation Management program. In 2021, Shaw joined Solace as a Technical Project Manager, where she enables teams across the organization — from engineering to marketing to sales — to efficiently develop and deploy event-driven architecture to companies around the world. Shaw also runs a career coaching business to help women in STEM achieve their full potential. She is a national community builder within STEM, a changemaker with the Global Shapers Ottawa Hub, and a passionate advocate for diversity, equity and inclusion in STEM.



## Clubs and Societies

Clubs and societies are a vital part of student life at Carleton. With over 150 active clubs and societies, Carleton has many ways for you to explore new interests, pursue new ideas and meet people who share your creativity and curiosity. No matter what you're interested in, at Carleton there is something for everyone!

Extracurricular activities can be tracked using Carleton's Co-Curricular Record System, which records your involvement outside the classroom and can be used to complement a resumé, academic transcript, bursary, scholarship or post-graduate application.

A full list of Carleton's clubs and societies can found online at [cusaonline.ca](http://cusaonline.ca).

# Ontario admission requirements

For admission to undergraduate programs, Ontario students must have the Ontario Secondary School Diploma (OSSD) with six 4U/M courses. 4U English is recommended. 4U/M credits for Co-op courses will not be considered as part of the six courses. Higher averages are required for admission to programs for which the demand for places by qualified applicants exceeds the number of places available. The overall average required for admission is determined each year on a program by program basis. All programs have limited enrolment. Admission is not guaranteed and all requirements are subject to change. The admission average required for entry to the Co-op option of the programs listed below may be higher than the cut-off range listed for the program itself. [admissions.carleton.ca/apply](https://admissions.carleton.ca/apply)

## How to apply

All interested students must apply online through the Ontario Universities' Application Centre (OUAC) website at [ouac.on.ca](https://ouac.on.ca).

If you are from outside Ontario, or outside Canada, see Carleton University's website at [admissions.carleton.ca/apply](https://admissions.carleton.ca/apply) for specific program requirements for all bachelor programs.

Degree program	Areas of study	Required prerequisite courses	Minimum cut-off range	2022 incoming class average
Bachelor of Architectural Studies*	<ul style="list-style-type: none"> <li>Architecture♦</li> </ul>	<ul style="list-style-type: none"> <li>English (ENG4U)</li> <li>Physics (SPH4U)</li> <li>Advanced Functions (MHF4U)</li> </ul>	75-77%	89%
Bachelor of Engineering	<ul style="list-style-type: none"> <li>Aerospace♦</li> <li>Biomedical and Mechanical♦</li> </ul>	<ul style="list-style-type: none"> <li>Mechanical♦</li> <li>Sustainable and Renewable Energy♦</li> </ul>	82-86%	89%
	<ul style="list-style-type: none"> <li>Architectural Conservation and Sustainability♦</li> <li>Biomedical and Electrical♦</li> <li>Civil♦</li> <li>Communications♦</li> </ul>	<ul style="list-style-type: none"> <li>Computer Systems♦</li> <li>Electrical♦</li> <li>Engineering Physics♦</li> <li>Environmental♦</li> <li>Software♦</li> </ul>	75-85%	
Bachelor of Industrial Design* ♦		<ul style="list-style-type: none"> <li>Advanced Functions (MHF4U)</li> <li>Physics (SPH4U)</li> </ul>	75-77%	90%
Bachelor of Information Technology	<ul style="list-style-type: none"> <li>Information Resource Management (IRM)♦</li> </ul>	<ul style="list-style-type: none"> <li>English (ENG4U)</li> <li>One Math credit (4U)</li> </ul>	75-77%	83%
	<ul style="list-style-type: none"> <li>Interactive Multimedia and Design (IMD)**♦</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Functions (MHF4U)</li> </ul>		
	<ul style="list-style-type: none"> <li>Network Technology (NET)♦</li> </ul>	<ul style="list-style-type: none"> <li>One Math credit (4U)</li> </ul>		
	<ul style="list-style-type: none"> <li>Optical Systems and Sensors (OSS)♦</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Functions (MHF4U)</li> </ul>		
Bachelor of Media Production and Design♦		<ul style="list-style-type: none"> <li>English (ENG4U)</li> <li>One Math credit (4U)</li> </ul>	75-77%	87%

♦ Co-operative education available

\* The following deadlines apply to select programs for the fall term (September to December). Additional admission material may be required.

Application deadline: March 1  
Portfolio deadline: March 3



Explore 200+ programs  
[admissions.carleton.ca](https://admissions.carleton.ca)

Discover these and many other reasons why Carleton is your best choice:



150+

programs with co-op available



TOP 5

for COMPREHENSIVE UNIVERSITIES in Canada\*



300

active clubs and societies

### Undergraduate Admissions

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1125 Colonel By Drive

Ottawa Ontario K1S 5B6

Canada

Email: [info\\_engdesign@carleton.ca](mailto:info_engdesign@carleton.ca)

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



@carleton\_engdesign



@CarletonEngDesign



@CarletonEngDesg

Carleton  
University



\*Maclean's University Rankings, 2023