

FUTURE GRADUATE STUDENTS

Why pursue graduate studies?



McGill

Faculty of
Engineering

Research and
Graduate Education



The McGill Community

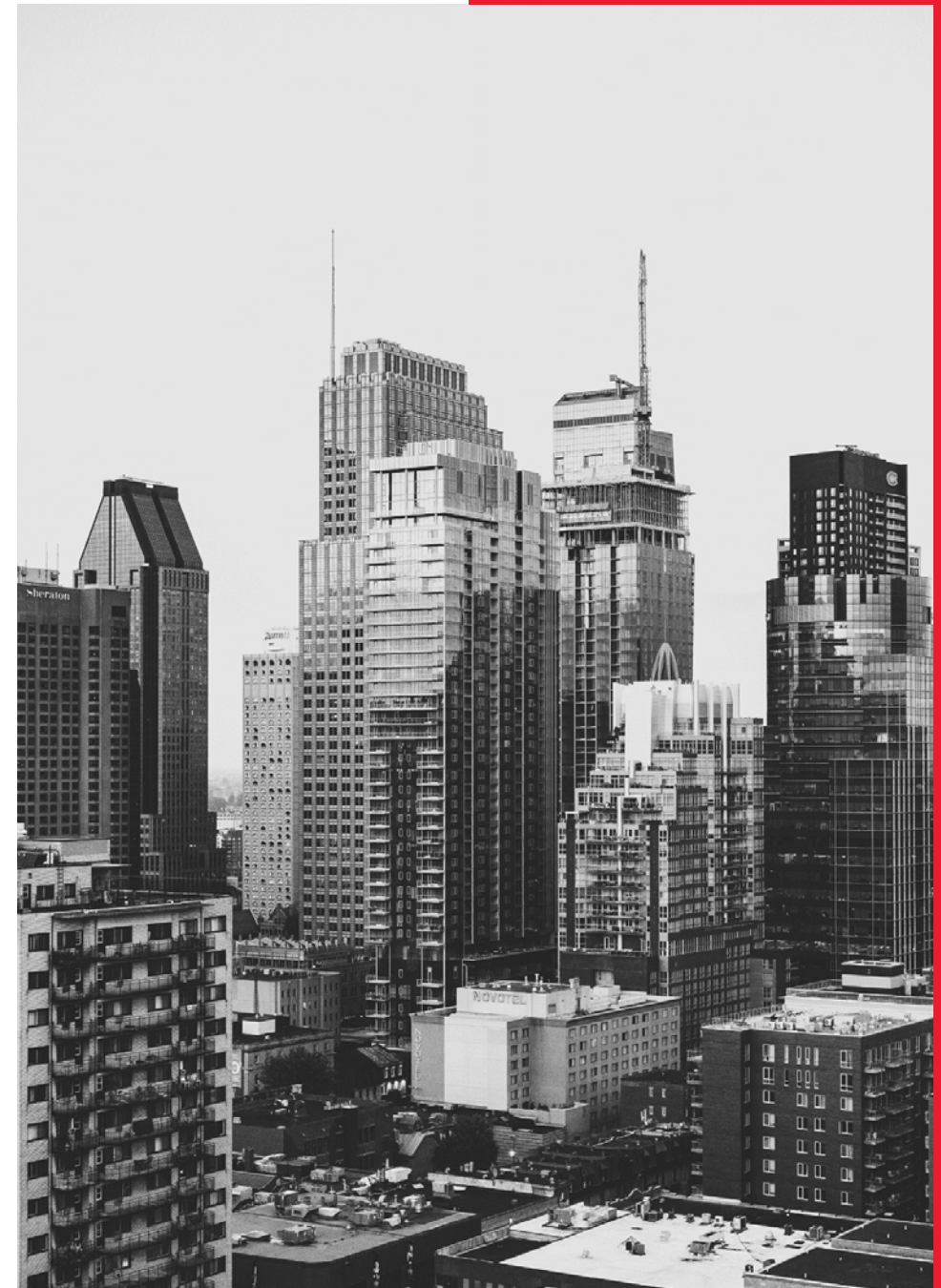
Ranked 32nd in the world

(QS World University Rankings 2018)

Montreal ranked 1st for best city in the world to be a student

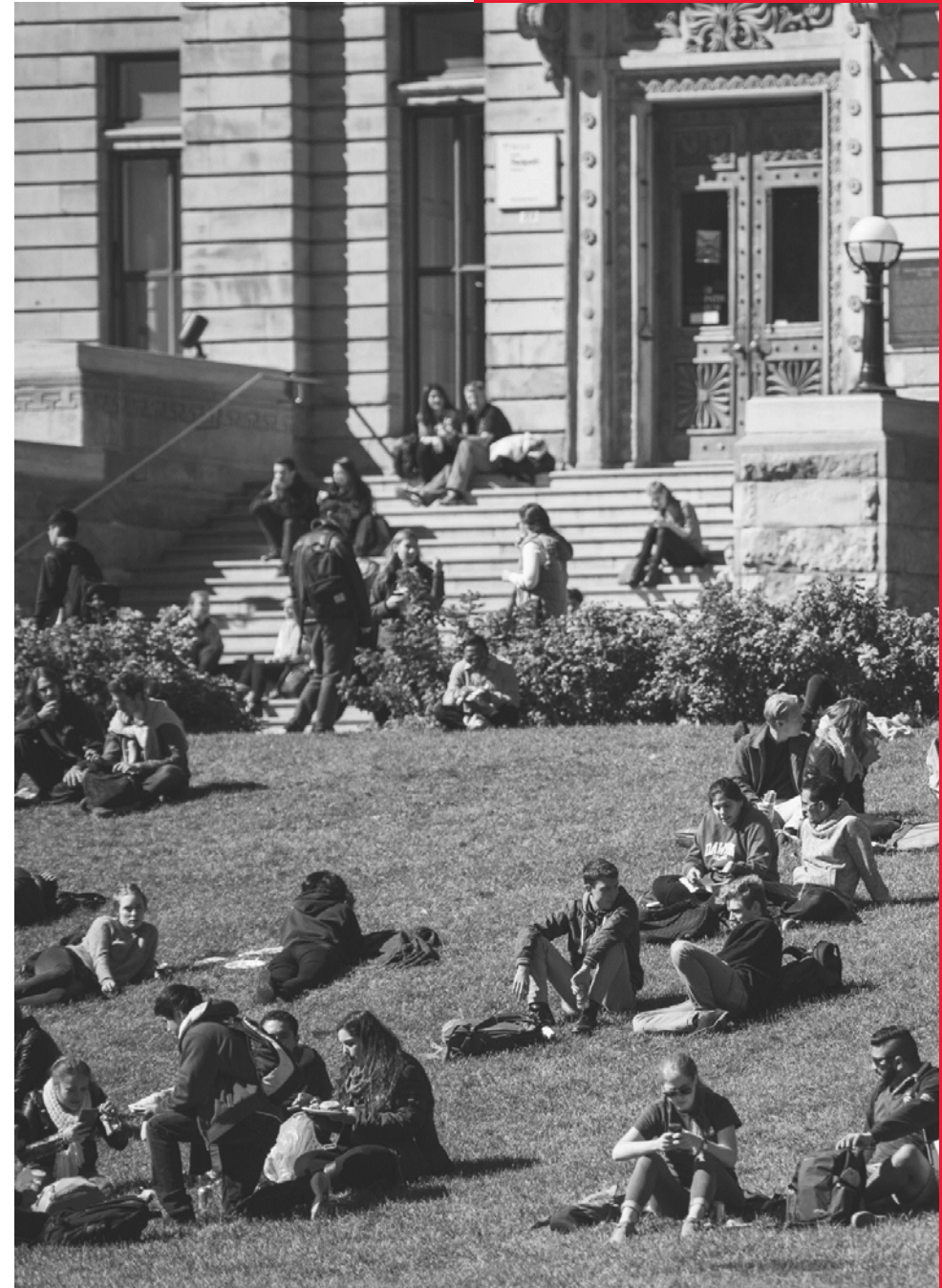
(QS Best Student City Rankings 2017)

As a French-speaking city in a largely English-speaking nation that has experienced mass immigration from across the world, Montréal is known for its multicultural makeup and inclusive ethos. It's also renowned for its laidback yet lively lifestyle, attractive boulevards, thriving creative industries, café culture, and eclectic range of arts venues, live performances and nightlife.



The McGill Community

- Graduate students make up 26% of McGill's students, the highest proportion among Canada's top ten research universities
- International students comprise 26% of McGill's student body, making it the most diverse in Canada
- McGill Alumni live in 180 countries
- On average full-time McGill professors publish more peer-reviewed articles than colleagues at any other Canadian university



The Faculty of Engineering



- Over 550 doctoral students and 500 Masters students enrolled
 - Graduate: 31.2% female in Fall 2017
- Approximately 3,100 Undergraduate students
 - Undergraduate: 30.9% female in Fall 2017 (compared to 17% Canadian average)
 - 32% of newly admitted students are female in Fall 2017
 - 41% growth in the number of female students (compared to 7% growth in the number of male students)
- Female professors: 18% female professors in Fall 2017 (compared to 14% Canadian average in 2015)

<https://www.youtube.com/watch?v=KgbxqCsJpI>

Faculty Initiatives

eIDEA

Engineering Inclusivity,
Diversity and Equity
Advancement

Empower

Leadership, personal
& professional
development

EngInE

The Faculty of
Engineering
Innovation and
Entrepreneurship Hub

eLATE

Enhancing Learning
and Teaching in
Engineering

Academic Units

Departments

- Bioengineering
- Chemical Engineering
- Civil Engineering & Applied Mechanics
- Electrical & Computer Engineering (ECE)
- Mechanical Engineering
- Mining & Materials Engineering (MME)

Schools

- Architecture (Arch)
- Urban Planning (UP)



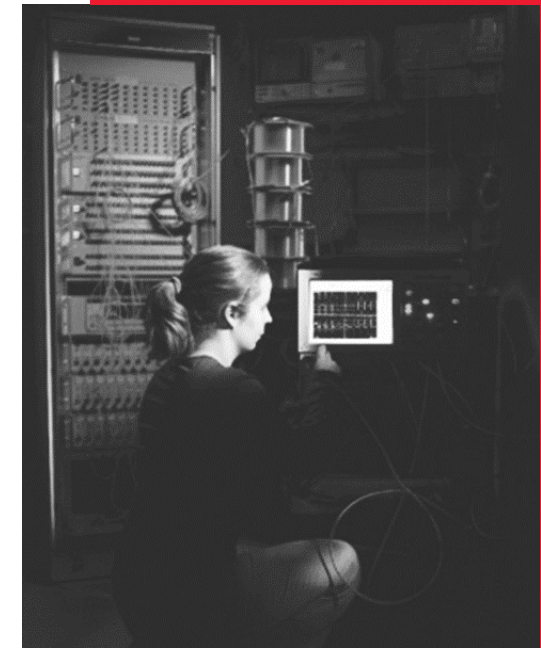
Institutes, Centers & Networks

Institutes

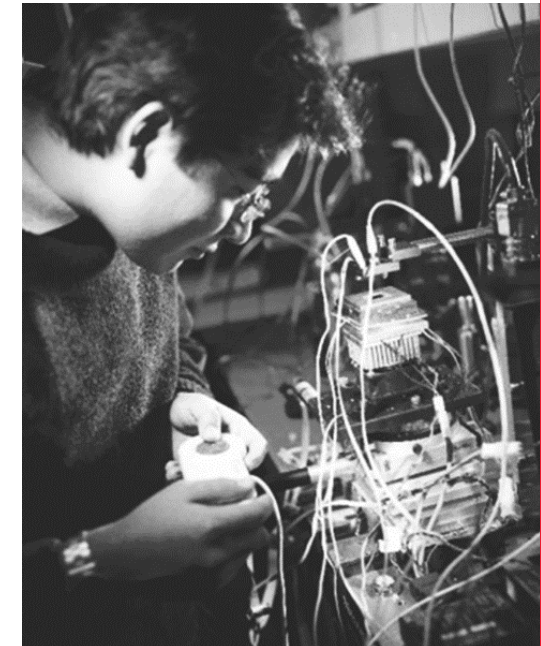
- McGill Institute for Advanced Materials (MIAM)
- McGill Institute for Aerospace Engineering (MIAE)
- Trottier Institute for Sustainability in Engineering and Design (TISED)

Research Centers

- Center for Advanced Systems & Technologies in Communications (SYTACom)
- Center for Intelligent Machines (CIM)
- Brace Center for Water Resource Management
- Plasma Technology Research Center
- Center for Orebody Modeling and Strategic Mine Planning (COSMO)
- McGill Aerospace Materials & Alloys Development Center (MAMADC)



SYTACom labs



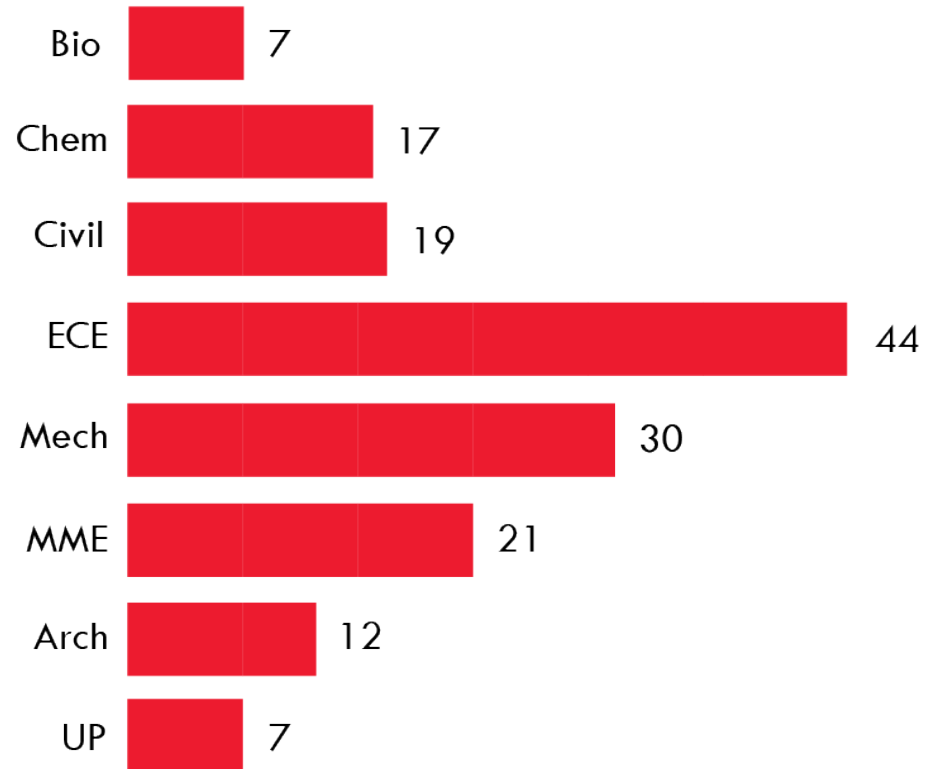
Related Units outside the Faculty



- Dept. of Bioresource Engineering
(Agricultural & Environmental Sciences)
- Dept. of Biomedical Engineering (Medicine)
- School of Computer Science
(Science)

Professors

Academic Staff: 157



The Graduate Student Experience

- Interdisciplinary Research
- Research Funding
- Innovating Together
- Fostering Entrepreneurship



Graduate students perform Dust Combustion Experiments on board NASA KC-135 parabolic flight aircraft

Strategic Interdisciplinary Research Areas



Bioengineering



Aerospace Engineering



Broadband Communications



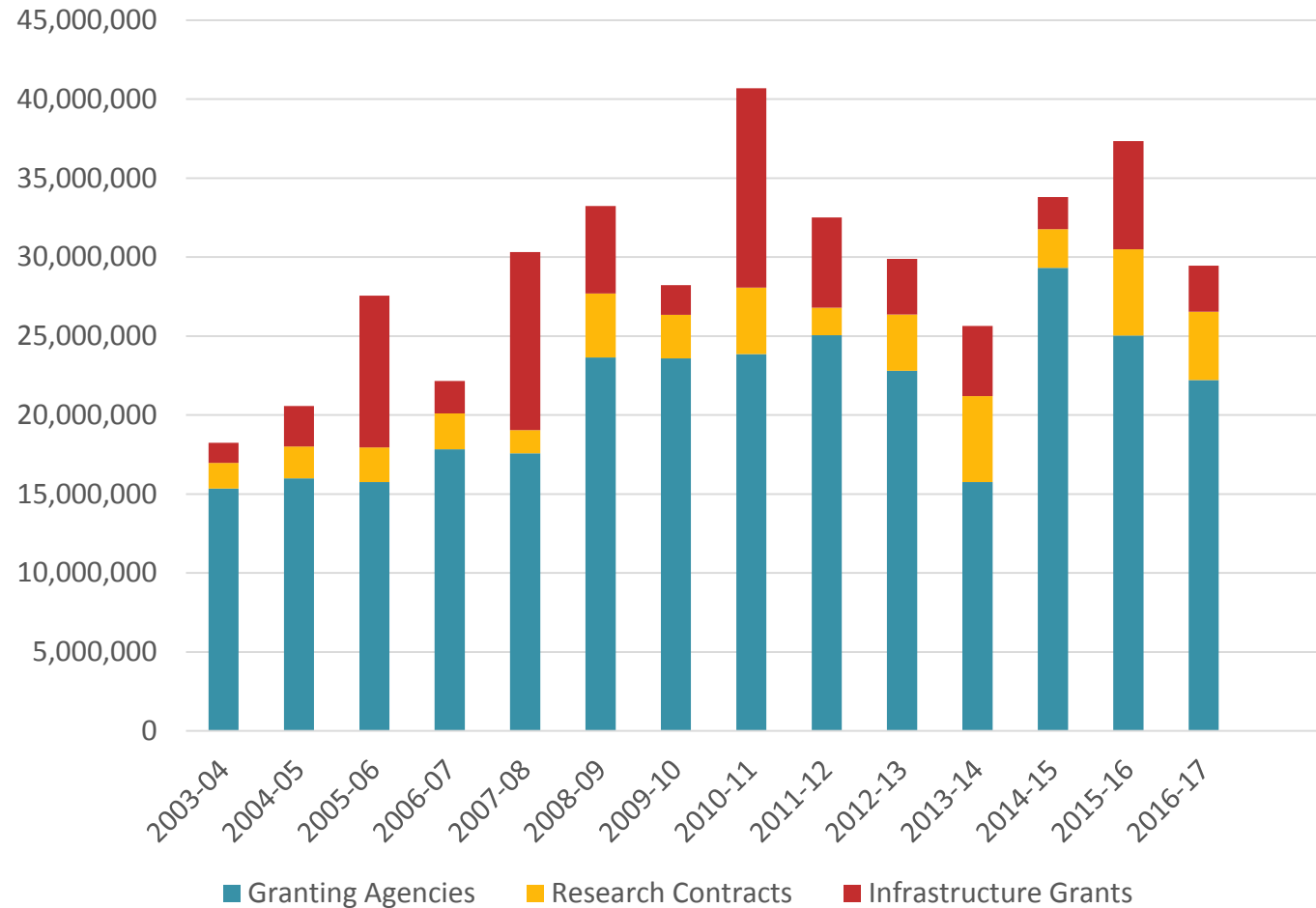
Engineering and Design for Sustainability



Advanced Materials and Nanotechnology

Research Funding

Since 2003-2004 Total research funding has increased by **61.4%**



Innovating Together (1) BG Technologies

Winner of the Inaugural L'Oréal-Dobson Startup 2017 Award Winner is BG Technologies, a start-up launched by Faculty of Engineering Professor Showan Nazhat and graduate student William Lepry (PhD'17).

Their business plan will leverage their patented technology in sol-gel derived bioactive borate glass for use in toothpaste. The following reprint from the 2016 report “Redefining the possible” explains the science behind this amazing new technique.



Innovating Together (2) New hip replacement design

Winner of the 2014-2015 William and Rhea Seath Awards Competition are Professor Damiano Pasini, Mechanical Engineering, Dr. Sajad Arabnejad, Mechanical Engineering, Dr. Michael Tanzer, MD, Department of Surgery, and Burnett Johnston, Mechanical Engineering for their *“Fully Porous Hip Replacement Implant Capable of Eliminating Bone Resorption”* project.

Their novel implant uses a fully porous structural biomaterial that avoids bone resorption by seamlessly matching the properties of the local host bone tissue. In addition, the new design can be adopted with no modifications to existing surgical technique and hospital infrastructure. Existing hip replacement procedures often require follow-up surgery that can increase the risk of complications and even death. Current hip implants in the market are incapable of preventing long-term stress-related bone loss, which is a risk factor for the success of revision hip surgery. The award is contributing to the cost of the animal studies.



Innovating Together (3) Carbicrete

Startup Carbicrete, a Montreal-based company founded in July 2016 by a team of McGill University graduates, soaks up CO₂ instead of releasing it into the atmosphere.

The team is composed of Mehrdad Mahoutian, a research associate in the Department of Civil Engineering and Applied Mechanics; Chris Stern, a Mechanical Engineering graduate who previously ran a successful solar-power business; Yuri Mytko (BA'98); and Mario Venditti, a Mechanical Engineering and MBA graduate. Members of the team were also among the winners in the "Innovation-Driven Enterprise" category of the 2016 McGill Dobson Cup competition.

Mahoutian worked on the technology as a PhD student with McGill engineering professor Yixin Shao, with whom he shared a 2015-2016 William and Rhea Seath Award in Engineering Innovation from the Faculty of Engineering's Innovation and Entrepreneurship hub.



Innovating Together (4) *Maple Syrup Extract to Reduce Antibiotic Resistance*

Winners of the 2015-2016 William and Rhea Seath Awards Competition:

Professor Nathalie Tufenkji and Dr. Vimal Maisuria, postdoctoral fellow, both Chemical Engineering, for their “*Maple Syrup Extract to Reduce Antibiotic Resistance*” project.

They have showed that an extract from maple syrup can make disease-causing bacteria more susceptible to common antibiotics. This is a simple and effective approach for significantly reducing antibiotic usage (up to 97%), thus slowing the spread of antibiotic-resistance

They envision the extract being incorporated, for example, into antibiotic capsules or creams as an antibiotic-boosting agent. The award will be used to conduct necessary in vitro and in vivo experiments with maple syrup extracts to confirm the efficacy of this non-obvious and potentially disruptive technology.



Fostering Entrepreneurship



- William & Rhea Seath Awards in Engineering Innovation
 - Business plan competitions
 - Translational research and proof-of-concept funding
- One-on-one advising on :
 - Commercial potential
 - IP protection
 - Business model creation
 - Profiling potential technology receptors and end-users
- Entrepreneur speaker series
- Networking events



Rendering of the EngInE centre planned for construction in 2018



Winners of the 2014 William & Rhea Seath Awards in Engineering Innovation: Prof. S. Nazhat (Assoc. Dean Research & Graduate Educ., Prof. Mark Trifiro, Prof. Andrew Kirk, and Dr. Philip Roche.

Considering Graduate Studies (1)

What is your motivation?

- Be honest with yourself!
- \$\$\$
- A particular career path: e.g., research, academia
- Increasing your knowledge of a specific topic
- Desire to specialize your skills

A common concern... [the imposter syndrome]

– “I’m not smart enough to go to graduate school...”

YES. YOU ARE.

Considering Graduate Studies (2)



What paths are available?

Masters degrees (~ 2 years):

Project Option (like an extension of your undergrad)

- Lots of courses + a relatively short project
- Normally, no financial support available
- Specializations possible: e.g., Environmental

Thesis Option (a research focused path)

- Few courses + more extensive research project
- Normally, full or partial financial support provided
- A more natural path to the Ph.D., but not necessary to go that far

Direct Entry to Ph.D. (~4-5 years):

- Very common in top U.S. programs
- Less common in Canadian universities (now possible at McGill)

Considering Graduate Studies (3)

What paths are available at *McGill Engineering*?

Degree Programs

- Doctor of Philosophy (Ph.D.)
- Master of Engineering (M.Eng.)
 - Both Thesis and Non-Thesis
- Master of Science (M.Sc.)
- Master of Urban Planning (M.U.P.)

Professional Programs

- Master of Aerospace Engineering (M.Eng.)
- Master of Architecture (M.Arch)

Considering Graduate Studies (4)

How to choose a grad school:

The Research Supervisor

The person is more important than the project itself

- Make contact well in advance and meet the person (*if possible*)
- Meet his/her graduate students, ask questions
- What is his/her track record for graduating students on time?
- Are you interested in his/her research projects?
- Is he/she actively publishing research in respected journals?
- Does he/she support students to attend and present at conferences?
- Is the supervisor well funded?
- Is he/she regularly available?
- What is his/her management style?

Considering Graduate Studies (5)

How to choose a grad school:

The School

- A prestigious school can create many opportunities
- Do you like the location?
- Try to meet/chat with some other students
- Does it offer the program you want?
- In some institutions, you get accepted to the program and choose a supervisor after the first term. In other institutions, someone has to agree to supervise you before you are admitted.
- You may need to write specialized exams (e.g., GRE)
- Don't sell yourself short – *Aim high! ...but always have a backup plan.*

Preparing for Graduate Studies



What else should you think about?

Undergraduate Research Experience

- Gives you a very good idea of what to expect in graduate school
- Allows you to “test” different research areas and laboratory environments
- The experience will give you an edge in your graduate school applications and will strengthen your CV
- Your supervisor may become a strong reference for your future job, scholarship or graduate school applications

Summer Undergraduate Research in Engineering (SURE)

- Program where undergraduate students assist a professor with their research
- Give students exposure to the research career path
- Approximately 120 placements each summer (May-August)
- Open to non-McGill students
- Apply online in January

www.mcgill.ca/engineering/sure

Funding your graduate studies (1)

What is a stipend?

- As a Masters (Thesis Option) or PhD student, you may be offered a stipend (monetary support or *funding*) to help support your progress towards degree completion and your research work
- Faculty of Engineering distributed over \$18 million dollars in funding to graduate students in 2015-16 (internal and external funding)
 - The average support for full-time Masters (Thesis) students \$17,500/year
 - The average support for full-time Ph.D. students was \$30,400/year

Funding your graduate studies (2)



Internal and external funding opportunities

What if you are awarded an **external scholarship**?

- NSERC Masters: \$17,500 for 1 year
 - NSERC Doctoral: \$21,000/year or \$35,000/year
 - FQRNT Masters: \$15,000/year for 2 years
 - FQRNT Doctoral: \$20,000/year for 3 years
- + you may be offered a generous top-up above this award !

External Scholarships to carry out research with industry:

- Find a supervisor who is interested in a research collaboration with a company
- MITACS Accelerate Program
- FQRNT: Industrial Innovation Scholarships \$21,000 - \$27,000/year

Funding your graduate studies (3)

Become familiar with the funding agencies and their scholarship application procedures

http://www.nserc-crsng.gc.ca/Students-Etudiants/PG-CS/index_eng.asp



The screenshot shows the website of the Natural Sciences and Engineering Research Council of Canada (NSERC). The header includes the NSERC logo, the name in English and French, and the Canadian flag. Below the header is a navigation bar with links for Français, Home, Contact Us, Help, Search, and canada.ca. The main content area is titled "Postgraduate Programs" and includes a sidebar with links for Undergraduate Programs, Postgraduate Programs (highlighted), Postdoctoral Programs, Summary of Changes, Eligibility, How to Apply, Direct Deposit, Resource Videos, and Contact Newsletter. The main text area contains a section titled "Who should read this?" and a section titled "Aboriginal Ambassadors in the Natural Sciences and Engineering Supplement Program".

Natural Sciences and Engineering Research Council of Canada
www.nserc-crsng.gc.ca

Home > Students and Fellows > Postgraduate Programs

Students and Fellows

- Undergraduate Programs
- Postgraduate Programs**
- Postdoctoral Programs
- Summary of Changes
- Eligibility
- How to Apply
- Direct Deposit
- Resource Videos
- Contact Newsletter

Postgraduate Programs

Who should read this?

You should read this if you are interested in obtaining financial support for studies in a master's or doctoral program. The information and types of awards outlined here are relevant **only** to graduate students, or those considering graduate studies within the next year.

Aboriginal Ambassadors in the Natural Sciences and Engineering Supplement Program

The Aboriginal Ambassadors in the Natural Sciences and Engineering Supplement (AANSE) Program promotes interest and participation in natural sciences and engineering, through the visits of Aboriginal students and fellows to Aboriginal communities and schools. NSERC encourages qualified Aboriginal students and fellows to apply for this supplement.

Funding your graduate studies (4)



- **McGill Engineering Doctoral Award (MEDA) - Domestic**
 - For new domestic doctoral students
 - Valued at \$24,000/year for 3 academic years
 - Candidates are automatically considered during the PhD application process
- **MEDA - International**
 - For new international doctoral students
 - Valued at \$32,000/year for 3 academic years
 - Candidates are automatically considered during the PhD application process
- **MEDA-Leveraged**
 - *Guaranteed* top-up awards to all successful National Science and Engineering Research Council (NSERC) doctoral scholarship and FQRNT provincial scholarship recipients accepted to McGill Engineering
- **MEDA International-Leveraged (MIL)**
 - *Guaranteed* top-up of \$5,000 to International students who are recipients of a fellowship from their home government

Funding your graduate studies (5)



Les Vadasz Doctoral Fellowships
Lorne M. Trottier Doctoral Fellowships
Werner Graupe Graduate Fellowships
John Bonsall Porter Scholarship
Geoff Hyland Fellowships in Engineering
John Adjeleian Graduate Fellowships
Heller Family Fellowships in Engineering
Benedek Graduate Fellowships in Engineering
Joseph S. Stauffer Fellowship
HydroQuebec Graduate Fellowships
Sheryl and David Kerr Graduate Fellowships
Hatch Graduate Fellowships in Engineering
Lars & Alberta Firing Graduate Fellowships
Eric L. Alder Fellowships in Electrical Engineering
Alfred Guenkel Fellowship in Engineering
Tomlinson Fellowships
BMO Fellowships
Gar Lam Yip Memorial Fellowship
Rio-Tinto - Richard Evans Graduate Fellowships

Norbert Schoenauer Fellowships in Architecture
ACDEG Fellowship in Sustainable Engineering
J.M. Bishop Award for Environmental Engineering
Ciro Robert Martoni Fellowship in Sustainable Engineering
Brace Water Resource Fund
Jeanne M. Wolfe Fellowship in Urban Planning
The Brenda & Samuel Gewurz Fellowships in UP
Dr. Y. Lin – Alexander Fellowships in Engineering
CAE Award in Engineering Excellence
Engineering Class of 1936 Award
Robert G. H. Lee Fellowship
Roger Boudreault Fellowships in Engineering
Antje Graupe Foundation Fellowships
Cooke Fellowship in Bioengineering
SR Telecom Award
William H. Gauvin Fellowship in Chemical Engineering
Louis C. Ho Fellowships in Engineering
Emil Nenniger Memorial Fellowship
And more...

Funding your graduate studies (6)



MEDA International PhD1

- International PhD applicants who are subject to the international PhD supplement fee and admitted to PhD1
- awarded in the amount of \$32,000 each year for three academic years, and in the amount of \$27,000 for a fourth academic year, a total value of \$123,000

McGill Engineering International Tuition Award (MEITA)

- For new international doctoral students
- Valued at a minimum of \$27,000/year for up to 3 years
- Candidates are automatically considered during the PhD application process
- Only available to students of Engineering Departments

Masters to PhD Fast-Track

- For Masters students who plan to fast-track to a PhD program after 12 months in the Masters program
- Minimum of \$15,000 for 12 months of Masters study and \$24,000 (domestic) or \$32,000 (international) each year over 3 academic years of PhD study

Funding your graduate studies (7)



Masters Top-up Award

- *Guaranteed* top-up award of \$5,000 to successful NSERC (PGSM, CGSM), CIHR, SSHRC, FQRNT, FRSQ, and FQRSC Masters scholarship recipients at McGill Engineering

McGill Engineering Undergraduate Masters Student Award (MEUSMA)

- Funding available to McGill Engineering undergraduate students who wish to enter directly into a Research Master's program within the Faculty
- Must have graduated with a 3.5 CGPA or higher, and have participated in specified undergraduate research activities with a McGill Engineering professor.

Funding your graduate studies (8)



- **Top-up MITACs Globalink Graduate Scholarship Recipients**

- The Faculty of Engineering covers the international tuition supplement for Masters recipients of the *Mitacs Global link Scholarship*, valued at \$13,000

- **Graduate Excellence Fellowships (GEF) - Engineering**

- Funding available to new and continuing Masters & PhD students, in support of their graduate studies

- **Engineering Recruitment Travel Voucher**

- Maximum of \$1000 towards expenses (travel, lodging, and meals) associated with a recruitment visit with an prospective engineering supervisor/professor.

During your Graduate Studies (1)



- **Graduate Research Enhancement and Travel Award (GREAT Award)**
 - Funding in support of graduate student travel to conferences and research-enhancement activities
- **Graduate Mobility Award (GMA) & Voucher**
 - Funding to encourage graduate students to study and conduct research abroad as part of their McGill degree program, including cost associated with visits to research stay at a lab abroad, field work abroad or participation in a formal bilateral exchange/research partnership abroad

Graduate Research Traineeship (GRT)

Graduate students enrolled at another universities can attend McGill for up to 12 months to conduct research. Must be supported by a McGill professor and have approval of their home university.

www.mcgill.ca/gps/students/graduate-research-trainee

During your Graduate Studies (2)

- Each department/school has individual PhD program rules for:
 - Qualifying exams
 - Thesis proposal exams
 - Thesis defense
 - Other requirements
- Your supervisor and department/school Graduate Program Director or Coordinator will be happy to explain/assist you



Professor Tal Arbel: Image guided neurosurgery
(Center for Intelligent Machines)

Applying for Graduate Studies (1)



1. Identify a supervisor

- Search the McGill department websites for your research interests using the 'People' page search function
- Contact prospective supervisors directly by email
- Ask for assistance from the graduate program coordinator

2. Review application requirements on Department/School website

3. Collect supporting documents

- Write tests which may be required (e.g. TOEFL/IELTS, GRE)
- Request transcripts from previous institutions
- Contact references for their approval and current contact details

4. Submit online application

- <http://www.mcgill.ca/gradapplicants/apply>

5. Submit supporting documents

•

Applying for Graduate Studies (2)

Deadlines:

Winter Semester (January)

August 1st for International Students

October 15th for Domestic Students

Summer and Fall Semesters (May and September)

December 15th (Department of Electrical and Computer Eng. only)

- both International and Domestic Students

January 15th for all other departments

- both International and Domestic Students

Accepting your Graduate Offer (1)



Questions you should you ask yourself before accepting your offer for graduate studies!

- What is the reputation of the research program and/or research institution?
- Have I been offered a funding package?
- What makes up my funding package?
- Is the funding package competitive when compared to the cost of living?
- Will I have a high quality of life/student life?
- What support is available for future employment after degree completion?

Accepting your Graduate Offer (2)



What is the reputation of the research program and/or research institution?

On average full-time McGill professors publish more peer-reviewed articles than colleagues at any other Canadian university.

- Ranked 32th overall in 2018 by the US News & World (QS World Universities) Report.
- No. 1 or no. 2 for Research University of the Year for the past 14 years amount Canada's top Research Universities (research infosource 2016)
- No 1 in % of a university's budget spent on scholarships and bursaries, for the 7th year in a row. Maclean's University ranking 2016.

Accepting your Graduate Offer (3)



Have I been offered a funding package? What makes up my funding package?

McGill Engineering graduate funding packages can include:

- Internal fellowships (cash)
- External fellowship Top-ups (cash)
- Differential Fee Waivers

Additional funding is available through Teaching Assistantships (TA), Grader-ships, invigilator positions, graduate research travel awards, conference travel awards, external fellowships, etc.

		Student Residency	Cost of Living	Annual Tuition & Student fees	Total
McGill University	Master's	Quebec	\$18, 868	\$4, 015	\$22, 883
		Non-Quebec Canadian		\$8, 915	\$27, 783
		International		\$18, 381	\$37, 249
	PhD	Canadian		\$4, 015	\$22, 883
		International		\$16, 748	\$35, 617
	Additional Session (After 6 Full-Time terms)	Canadian		\$3, 410	\$22, 279
		International		\$4, 161	\$23, 029
Canadian Competitor University	Master's & PhD	Canadian	\$23, 233	\$7, 030	\$30, 263
		International		\$20, 530	\$43, 763
American Competitor University	Master's & PhD	Year 1 & 2	\$37, 268	\$58, 752	\$96, 020
		Year 3 & 4 (PhD only)		\$14, 905	\$52, 172

Accepting your Graduate Offer (5)



Will I have a high quality of life/student life?

McGill offers...

- One of the most cosmopolitan and diverse cities in the world
- Post-Graduate Students' Society (PGSS)
 - Source of support throughout your academic graduate work
 - Subsidized social activities and events
 - Thompson House
- Department specific graduate student associations

Accepting your Graduate Offer (6)



What support is available for future employment after degree completion?

- GPS doctoral internship program (post-dissertation)
 - Internship of a period of 1 to 3 months.
 - Doctoral Internship Program database provided.
 - This Program aims to enrich doctoral education and not detract from it, so the internship should take place in the period between submitting their initial thesis, and defending it.
- PhD Innovation fellowship (will be published soon)
- Engineering Career Centre (ECC) & Career Planning Services (CAPs) Advising for graduate students
- Post Graduation Employment
 - The Government of Canada offers a three-year post-graduation work permit for international student graduates of Canadian universities
 - The 2016 Times Higher Education Global Employability Survey ranked McGill University 18th in the world

Contact Us



Faculty of Engineering
Research & Graduate Education
McGill University

graduatestudies.engineering@mcgill.ca

<http://www.mcgill.ca/engineering/future-students/graduate-programs>

Resources



Admissions, Official Documentation

- Contact your department through uApply
<https://www.mcgill.ca/gradapplicants/apply/contactus>
- Enrolment Services
<https://www.mcgill.ca/gradapplicants/apply/ready/submit/send>

Immigration

- International Student Services
<https://www.mcgill.ca/internationalstudents/international-student-services>
- Or relevant government agencies

MEDA

- Refer to your MEDA offer letter
- Questions: graduatestudies.engineering@mcgill.ca

Program, Registration

- Contact your department's graduate program coordinator