



UNIVERSITY OF
TORONTO

Engineering

DISCOVER ENGINEERING



VIEWBOOK
2018-2019

WELCOME TO U of T ENGINEERING, CANADA'S #1 ENGINEERING SCHOOL

18

Engineering minors
and certificates
available to customize
your degree

100+

Countries our
students call
home

The Green Roof Innovation Testing Laboratory (GRIT Lab) investigates the performance of "green technologies" such as green roofs, green walls and photovoltaic arrays. Pictured here, visiting student Wai Ying Lam works with civil engineering student Gordon Wong to measure the growth of a sedum test bed.

Each of the GRIT Lab's 33 test beds contain thermal and moisture sensors, a rain gauge and an infrared radiometer — all of which help researchers evaluate different aspects of the City of Toronto's Green Roof Construction Standard. The GRIT Lab is a multidisciplinary collaboration, bringing together U of T researchers working in landscape architecture, biology, hydrology and engineering.

*2016 Global Employability University Ranking, Times Higher Education

325+

Companies employ 700+ engineering students through the Professional Experience Year internship program each year

160+

Partner universities with study-abroad opportunities

1873

Year established

110+

Spinoff companies created from U of T Engineering research from 1970 to 2017

40%

Proportion of women in our first-year class

TOP 15

U of T is ranked in the top 15 world universities for global employability*





U of T ENGINEERING: UNPARALLELED OPPORTUNITY IN AN EXCEPTIONAL COMMUNITY

No university in Canada — and perhaps the world — is in a better position to offer an education that will help the brightest students meet the grand challenges facing humanity today.

Here, you'll find a global community of innovators and makers. We are at the forefront of engineering education and research — in the groundbreaking areas we explore, the ways we collaborate beyond traditional disciplines, and the unique experiential opportunities we create for our students.

All international rankings consistently rate U of T Engineering number one in Canada and among the world's best. We're preparing the engineers of tomorrow — like you — to unlock the future's boundless potential.

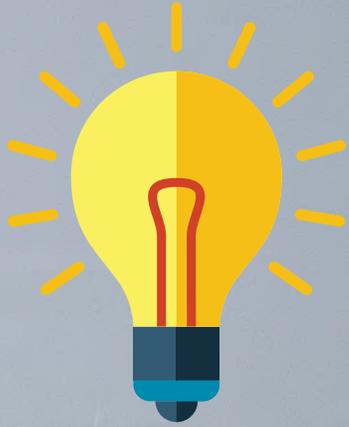
You will study alongside talented students who bring their own perspectives and passions to the mix. Our student body is among the most diverse in the world, with a rich gender spectrum and students from every Canadian province and more than 100 countries. This year, women comprise 40 per cent of our first-year class, which is the highest proportion of any engineering school in Canada.

The U of T Engineering community is known for being especially supportive and closely knit. You'll attend many of your classes with the same group of students, and build strong friendships quickly. We're proud of being one of the oldest and finest engineering schools in Canada, and we look forward to introducing you to our longstanding traditions.

WE ARE CANADA'S PREMIER ENGINEERING SCHOOL.

U of T Engineering placed 21 spots higher than the next Canadian school in the 2016-2017 Times Higher Education World University Ranking for Engineering and Information Technology.

Third-year student and Professional Experience Year (PEY) intern Houssam Abou El Hoda uses a virtual reality headset to validate the performance of a new Advanced Micro Devices (AMD) graphics card with his manager Lejla Bajic. As an intern at AMD, Houssam is an integral part of a team that improves the memory devices of the latest tech, from game consoles to cloud servers. For more on the PEY internship program, see page 12.



INNOVATION STARTS WITH AN IDEA

For that idea to grow into something more, it needs a collaborative network of diverse peers, experienced mentors and an environment that invests in, and nurtures, entrepreneurial thinking.

U of T Engineering fosters the perfect ecosystem to see your ideas come to life, whether you're thinking about new ways to approach research, start a business or create a student team.



Visit www.uoft.me/startup to learn more about engineering entrepreneurship.

“U of T Engineering’s culture of innovation is infectious. In my classes, extracurriculars and in my research, every student and professor I meet is looking to push the boundaries of technology and improve the world in some way.”

MOLLY McGRAIL
First-year Engineering Science student

#1 UofT leads among North American universities in the number of new research-based startups launched.*

\$15M Investment by the Government of Ontario in U of T Engineering's new Centre for Engineering Innovation & Entrepreneurship (CEIE) to strengthen the Innovation SuperCorridor in Ontario. Learn more about the CEIE on page 30.

U of T Engineering is in the heart of **TORONTO'S DISCOVERY DISTRICT**, on the doorstep of some of North America's leading startup incubators and Canada's financial hub.

With companies like Uber, Google and Amazon expanding their operations in Toronto, it's no wonder the city ranks in the **TOP 10 FOR INNOVATION AND OPPORTUNITY IN THE WORLD.****



AUTODRIVE: SELF-DRIVING ELECTRIC CAR

U of T Engineering's newest student team will spend the next year retrofitting an electric vehicle with visual sensors, robotic components and software that enable it to drive itself. The team is one of eight from institutions across North America selected to compete in the first-ever AutoDrive Challenge. Professor Angela Schoellig, the team's primary faculty advisor, is an award-winning researcher in autonomous vehicles and machine learning. The team will participate in its first international intercollegiate competition in 2018.

www.uoft.me/autodrive

THE ENTREPRENEURSHIP HATCHERY

What does a tool that fixes most bike problems have in common with a company working toward an in-space telecommunications network of satellites? TeleHex and Kepler are both successful companies started by students through The Entrepreneurship Hatchery, one of two startup incubators at U of T Engineering and among nine accelerators across U of T. The Hatchery will reside inside U of T's newest building, the Centre for Engineering Innovation & Entrepreneurship (CEIE). Currently under construction and set to open in 2018, the CEIE will provide unparalleled access to prototyping equipment and collaborative design spaces to facilitate your next big ideas.

www.uoft.me/startup

XPOSURE: APP FOR FIREFIGHTERS

Along with axes, ladders and helmets, a group of U of T Engineering students added smartphones to the list of indispensable tools of the firefighting trade. In response to a design challenge proposed by the Hamilton Professional Firefighters Association (HPFA) in a multidisciplinary capstone design course, a team of four engineering students developed an app called Xposure that helps firefighters track hazards they encounter in their jobs. The data collected by the app can support workplace safety and insurance claims if a firefighter experiences health effects based on past exposure. The app is such a success that the HPFA is continuing work on the project.

www.uoft.me/xposure

* Association of University Technology Managers

** PwC's City of Opportunities 7 and 2thinknow's Innovation Cities Global Index

TORONTO: ONE OF THE WORLD'S GREAT CITIES

UofT Engineering is in the heart of Toronto — a vibrant city unparalleled for its diversity. From unique cultural festivals and concerts to unforgettable attractions and delicious food, Toronto offers exciting activities on a daily basis.

www To view an interactive map of Toronto, visit www.uoft.me/toronto



FAST FACTS ABOUT TORONTO



7 SPORTS TEAMS

There's never a dull moment with seven Toronto-based professional sports teams, including the Toronto Blue Jays (baseball), Toronto Maple Leafs (hockey), Toronto FC (soccer), Toronto Rock (lacrosse) and Toronto Raptors (basketball).



305 days of sunshine on average

#1 IN SAFETY

Toronto is North America's safest city according to The Economist Intelligence Unit's Safe Cities Index.



A CELEBRATION OF CULTURE

With more than 140 cultures represented and hundreds of walkable neighbourhoods, Toronto is one of the most diverse cities in the world.

EASY TO NAVIGATE

Toronto is home to North America's third-largest mass transit system and the largest underground pedestrian system in North America.



CITY OF FESTIVALS

Every season brims with celebration from the Toronto Caribbean Carnival in the summer to the renowned Toronto International Film Festival in the fall.

GLOBAL GATEWAY

Our city is served by two airports: Toronto Pearson International Airport (YYZ) and Billy Bishop Airport (YTZ). Toronto is truly a gateway to the world. It's only **1.5 hours** from New York City; **5 hours** from L.A.; **6 hours** from Bogata; **13 hours** from Dubai; **14 hours** from New Delhi; and **15 hours** from Hong Kong.



Roughly **1,500 PARKS**
dot Toronto's urban landscape

VIBRANT STUDENT LIFE

📷 @uoftengineering

University is much more than lectures and labs. Long before you graduate, you'll be enriching your experience through the relationships you form and the activities you pursue outside of the classroom.

Whatever your interests or hobbies, there is a student group or co-curricular activity for you. From rock climbing and volleyball to solar car design and musical ensembles, U of T offers more opportunities to join clubs and teams than any other university in Canada. And if you can't find a club that suits your interests, start a group of your own.

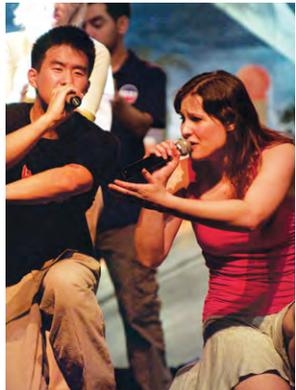
You can also complement your professional development as a future engineer through co-curricular opportunities like The Entrepreneurship Hatchery (see page 5) and the Institute for Leadership Education in Engineering (see page 14).



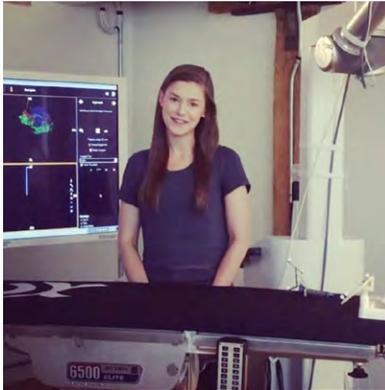
Visit www.uoft.me/engstudentlife and follow us on Instagram (@uoftengineering) to join the conversation.



📷 @Uoftfsae
Welding Wednesday 🔧
#fsae welding #shopwork #weld #shine
#sparks #linchonelectric #becauseacecar



🐦 @tessa_tura
Moving day at Chestnut
#chestnutfamily @ChestnutRes



📷 @uoftengineering
Robin is working at @synapticmedical for her #PEY, helping develop robotic arms for brain and spinal surgeries! 🤖🧠🩺 #myPEY #morethanacoop #ILookLikeAnEngineer





@uoftengineering

Take a break today with the #UofTEngineering Fall PAWS 🐾 in SF2202 with some #furryfriends from the @st_john_ambulance therapy #dog program.



@uoftengineering

Jeremy Wang is one of just ten students joining the @canadianspaceagency official delegation at #IAC2016 in Guadalajara, Mexico <http://UofT.me/180>



@ChiragVariawa

I promised a timbit to any student who figured out the right answer. Everyone did. Time to keep my word! @TimHortons #UofT #uoftengineering



@WISEUofT

Thank you to Dean Amon for being an advisor and mentor for Women in Science and Engineering - University of Toronto



@uoftengineering

"What I really like about engineering is that it helps me be able to make a difference, to effect change in society through math and science." — Samantha Stuart (Year 3 MSE)



PROFESSIONAL EXPERIENCE YEAR (PEY) INTERNSHIP PROGRAM: MORE THAN YOUR AVERAGE CO-OP

What if you could graduate with a job offer in hand? What if that job paid you 15% more than most other new engineering grads?

That's just the start of what you can expect from the Professional Experience Year (PEY), the largest paid internship program of its kind in Canada. Founded in 1978, PEY has established strong relationships with leading industry partners worldwide.

Through your optional PEY internship, you can:

- » Immerse yourself as a full-time employee for 12 to 16 consecutive months
- » Intern after second or third year, if you choose — it's completely optional
- » Earn a competitive salary with top employers
- » Work anywhere in the world, from Seoul to San Francisco
- » Gain valuable experience, contacts and networking opportunities before you graduate
- » Return to your studies after PEY with a fresh perspective on your future

DID YOU KNOW?

The Engineering Summer Internship Program (eSIP) also offers four-month paid placements locally and globally



Explore all that PEY internships offer:
www.uoft.me/peyinternship

PEY QUICK FACTS



325+ hiring employers including Apple, BMW, IBM, Shell and more (see pages 19 to 26 for a sampling of PEY employers by academic program)



1,500+ positions to choose from around the world (that's twice as many jobs as there are students to fill them)



12 TO 16 months of consecutive experience means focusing on professional development without needing to switch between work and school each semester



\$50,000 average 12-month salary (all PEY internships are paid)



700+ students choose PEY each year



Your PEY experience can count toward obtaining your **P.Eng. DESIGNATION** (professional engineering license) after graduation



“It helped me grow into a more successful and responsible worker, while providing a sense of what to expect in the engineering profession.”

ADAM DE BIASI
PEY intern at Tesla Motors

TO TESLA AND BACK AGAIN

Mechanical engineering student Adam De Biasi was less than a week into his Professional Experience Year (PEY) internship at Tesla Motors in Palo Alto, California when he was asked to design a completely new mechanical component with a software program he had never used before.

Drawing on his problem-solving experience as a UofT Engineering student, Adam took a step back, evaluated what he could already do and what he needed to learn, and made a plan. Not only did he successfully complete the assignment, he was grateful for the opportunity.

“Tesla understands that interns want to learn as much as possible, and that they want the freedom to express their ideas,” said Adam, an aspiring aerospace engineer who went on to design and test many more components related to Tesla’s Model S and Model X electric vehicles. “From the first day, I was in the thick of it.”



When students return to UofT Engineering after PEY internships, they can continue to build experience and expertise through a wide range of student clubs, like the Blue Sky Solar Team.

YOUR SUCCESS IS OUR SUCCESS

Support is woven throughout the U of T Engineering experience. You will find it in the mentorship that upper-year students provide in peer-assisted study sessions, and in the time professors spend during and after class to help students with challenging course content. This tight-knit community thrives because success is a shared goal.

We created several specialized services and programs that address the needs of engineering students from first year to graduation. As a U of T student, you also benefit from university-wide services and resources, including the Academic Success Centre, Health & Wellness Centre and Accessibility Services.

SPECIALIZED SUPPORTS FOR ENGINEERING STUDENTS

The **First Year Office** will facilitate your transition into university and support you throughout your first year. This team of advisors will help you make informed decisions that will shape your academic career. After first year and for the remainder of your degree, your **departmental advisors** will help guide you through your journey at U of T Engineering.

The **Engineering Career Centre** facilitates the Professional Experience Year (PEY) internship program, the Engineering Summer Internship Program (eSIP) and an array of workshops, seminars and events designed to prepare you for your future career.

Successful engineers understand themselves and inspire others toward a common vision. The first centre of its kind in Canada, our **Institute for Leadership Education in Engineering (ILead)** offers courses, certificates and programs to help you excel as an engineering leader.

To succeed in your studies and as an engineering professional, you'll need a strong foundation in both communications and math. To assist you in developing these critical competencies, we created the **Engineering Communication Program** and the **Math Aid Office**.

The **Office of the Registrar** is your resource for all administrative aspects of your education, including financial aid counselling and course scheduling. The office also coordinates specialized counsellors and learning strategists just for engineering students.

Chestnut Residence's dedicated **Engineering Student Success Coordinator** supports the many engineering students who live here.

Your community extends beyond peers and professors. In first year, you'll receive an invitation to join **U of T Engineering CONNECT**, a rich online social network of alumni from all over the world. They can offer you mentorship, industry-specific career advice, work opportunities and more.



Explore U of T Engineering's student support services:
www.uoft.me/engsuccess





U of T Engineering has one of the highest retention rates among Canadian engineering schools.

Your professors are more than teachers and renowned researchers — they are mentors, collaborators and advocates for your success within the U of T Engineering community and beyond.

MEET PROFESSOR JASON BAZYLAK

Professor Bazylak teaches Engineering Strategies & Practice, a first-year design course for students in the Core Programs. This award-winning course brings engineering design to life as student teams develop sustainable and creative solutions to address challenges posed by real clients. In learning about the fundamentals of the engineering design process, Professor Bazylak guides teams toward viable solutions — some of which clients implement at the end of the course.

Professor Bazylak's passion for the engineering community extends well beyond the walls of his class. He is an active member of the Engineering Positive Space committee and serves as the Dean's Advisor on Indigenous Initiatives as co-chair of the Eagles' Longhouse. For his creativity and dedication to enriching the student experience, he was recently named a Hart Teaching Innovation Professor.

CUSTOMIZE YOUR EDUCATION

The engineering profession is exciting and ever-changing. To prepare for a dynamic engineering career, you need a flexible and equally dynamic engineering education. U of T Engineering prepares you to address the world's most pressing challenges beginning in first year.

Through program-specific specializations, multidisciplinary minors and certificates, rich co-curricular experiences and unique professional opportunities, you can customize your U of T Engineering degree to meet your own developing needs at every stage in your academic journey.



During the application process, you'll decide on how to begin your journey at UofT Engineering. There are two pathways you can choose from:

CORE PROGRAMS

DECLARED: If you know what you want to study, you can apply directly to a Core 8 program: **Chemical; Civil; Computer; Electrical; Industrial; Materials; Mechanical;** or **Mineral** (pages 19 to 25).

UNDECLARED: Known as **TrackOne**, this first-year program explores all engineering areas. Upon completion, you will declare which of the Core 8 programs you will join in second year (see page 18).

ENGINEERING SCIENCE

This direct-entry program is for those seeking a unique academic challenge. After two years of building your foundations, you will specialize in one of eight exciting majors for the latter half of your program (see page 26).

Once you become a UofT Engineering student, you'll have an incredible range of opportunities to customize your experience.



Work in a **RESEARCH LAB** on campus or abroad over the summer



Earn a competitive salary through the immersive **PROFESSIONAL EXPERIENCE YEAR INTERNSHIP PROGRAM** (page 12)



SPECIALIZE within your Core 8 program (pages 19 to 25)



Go global by **STUDYING ABROAD** at 160+ partner universities worldwide



Gain professional work experience through the **ENGINEERING SUMMER INTERNSHIP PROGRAM** (page 12)



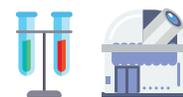
Choose a **MAJOR** within Engineering Science (page 26)



Turn your idea into a startup through **THE ENTREPRENEURSHIP HATCHERY** (page 5)



Strengthen your leadership competencies through the **INSTITUTE FOR LEADERSHIP EDUCATION IN ENGINEERING** (page 14)



Gain complementary perspective on your studies through an **ENGINEERING MINOR OR CERTIFICATE** or through an **ARTS & SCIENCE MINOR** (page 27)



This level of flexibility and customization means graduating with the confidence, experience and marketability to move in any number of career directions — whether you plan to work in industry, start your own business or pursue further studies. All of our programs are fully accredited. Graduates receive a Bachelor of Applied Science (BASc), which is equivalent to a BEng degree.



KATHARINE ARMSTRONG

Graduation Year: 2020

Memorable Experience: As part of an annual tradition of friendly pranks between programs, Katharine and a group of fellow TrackOne students built a giant wooden sculpture of one of their favourite professors.

Fun Fact: Katharine balances life as a student with her active role in Queer Sphere, an LGBTQ+ club she founded in first year for engineering students.

TrackOne, UNDECLARED ENGINEERING

TrackOne is an undeclared first year, designed for students interested in exploring all fields of engineering before joining a Core 8 program in second year. Students in this program spend their first year taking a wide range of courses. This approach helps you discover your interests within UofT Engineering while developing a strong foundation in key engineering principles. After successfully completing TrackOne, you are guaranteed* a spot in the Core 8 program of your choice — Chemical, Civil, Computer, Electrical, Industrial, Materials, Mechanical or Mineral — for the remaining three years of your BASC degree.

DID YOU KNOW?

The TrackOne community organizes game nights, study groups, beach parties and an annual dinner-dance called the Eight Ball. Alumni of the program often sew a TrackOne patch onto their coveralls or jackets.

HELPING YOU DECIDE

The *Introduction to Engineering* course explores how each engineering field contributes to society, helping you choose your best fit within the Core 8 programs at the end of first year. Support from a dedicated TrackOne advisor will also help you with your decision.

“I chose TrackOne because I didn’t have a concrete sense of my academic interests. I wanted to understand all the disciplines before making a decision about my studies. The TrackOne seminars and courses allowed me to explore topics I hadn’t encountered before. Ultimately, I fell in love with programming during my second semester, and knew Computer Engineering is where I belonged.”

*TrackOne students who achieve a minimum average of 60% in both semesters are guaranteed entry to the Core 8 program of their choice in second year.





CHEMICAL ENGINEERING

Chemical engineers combine chemistry, biology, math and design to solve global challenges and create innovative processes and products. As one of the top chemical engineering programs in Canada, U of T Engineering is at the forefront of research to develop renewable fuels, use biotechnology to clean up pollution, manufacture products sustainably, create artificial organs, and fortify foods to address malnutrition. You'll put theory to practice in innovative courses and laboratories, including the unique Unit Operations Lab, filled with large-scale industrial equipment and a two-storey distillation column.

SPECIALIZATIONS

- » Biomolecular and Biomedical Engineering
- » Bioprocess Engineering
- » Chemical and Materials Process Engineering
- » Environmental Science and Engineering
- » Informatics
- » Pulp and Paper
- » Surface and Interface Engineering
- » Sustainable Energy

DID YOU KNOW?

In your fourth year, you'll get to design an industrial processing plant in just 10 weeks.

SAMPLE PEY EMPLOYERS

- Agfa Graphics (Belgium)
- Ministry of the Environment and Climate Change
- Peel Plastic Products Ltd.
- Sanofi Pasteur

SAMPLE CAREER TRAJECTORIES

- Advanced Manufacturing
- Bioprocessing
- Finance
- Food Fortification
- Management Consulting

"Chemical engineering stood out to me because it addresses large-scale challenges in society in a wide range of industries. The opportunity to attain professional experience as an intern in a variety of industries — water, mining and nuclear energy in my case — really helped guide me toward my interests in renewable energy. I ultimately want to apply my research toward creating a sustainable world for future generations."

JASON MARTINS

Graduation Year: 2017

PEY Internship: He worked on energy-related projects at Amec Foster Wheeler and Hatch. He also did a summer internship at Toronto Water.

Memorable Experience: For his fourth-year capstone project, he worked with NASA's Ames Research Centre on a system for converting carbon dioxide into acetic acid.

Fun Fact: Jason polished his public speaking skills at U of T Engineering's Toastmasters Club, and served as president in his third year.

Current Job: Master's student at MIT, after which he will continue his graduate work in energy technologies at the University of Cambridge as a Gates Cambridge Scholar.



ANGELA HU

GRADUATION YEAR: 2017

PEY INTERNSHIP: Angela worked for international consulting firm Arup where she helped design two subway stations in Saudi Arabia and a school in Haiti.

MEMORABLE EXPERIENCE: Her undergraduate research on fibre-reinforced concrete will be incorporated into the next Canadian Highway Bridge Design Code.

FUN FACT: In third year, Angela formed a team and travelled to Montreal to participate in the Troitsky Bridge Competition, where they built a metre-long bridge made of popsicle sticks that held 88 times its own weight.

CURRENT JOB: Structural engineering master's student at the University of California, Berkeley



“I’ve always had a passion for structural engineering, but I ultimately chose UofT because of the strong sense of community and longstanding traditions within the program (like survey camp at Gull Lake), and the renowned professors who continue to make inspiring advances in my areas of interest. I felt like I was part of something special when I joined the civil engineering program.”

CIVIL ENGINEERING

Civil engineering focuses on the design, infrastructure and sustainability of the structures and systems that support our daily lives, from the deepest tunnels to the tallest buildings. You will learn from global experts in some of the world’s most advanced and unique facilities. Your courses in applied structural mechanics, fluid mechanics, geology and engineering ecology will prepare you to create solutions that will directly impact quality of life, from designing disaster-resistant structures to building systems that supply clean water to remote communities.

SPECIALIZATIONS

- » Building Science
- » Construction Management
- » Environmental Engineering
- » Mining & Geomechanics
- » Structural Engineering
- » Transportation Engineering & Planning

DID YOU KNOW?

To learn the art and science of land and water surveying, civil and mineral engineering students take part in a two-week camp at beautiful Gull Lake, located three hours north of Toronto.

SAMPLE PEY EMPLOYERS

Aecon Construction
Cadillac Fairview
Ferrovial Agroman (U.S.)
Toronto Hydro
Toronto Transit Commission

SAMPLE CAREER TRAJECTORIES

City Planning
Energy Use and Supply
Environmental Management
Transportation and Infrastructure
Water Treatment and Sustainable Use



ELECTRICAL & COMPUTER ENGINEERING

Electrical and computer engineers deal with many pressing challenges of our time, including the communication and control of digital information, and the creation and distribution of energy. In the first two years of both programs, you'll study design, math, digital systems, electronics, communication systems, computer architecture and software. In your upper years, you'll focus on two of six cutting-edge specializations. The electrical and computer engineering (ECE) programs are housed within the same department, giving you access to 79 professors with expertise in both disciplines.

SPECIALIZATIONS

- » Analog & Digital Electronics
- » Communications, Signal Processing & Control
- » Computer Hardware & Networks
- » Electromagnetics & Energy Systems
- » Photonics & Semiconductor Physics
- » Software

DID YOU KNOW?

Our ECE department is the highest-ranked and one of the largest in Canada. It's also where multi-touch sensing technology was pioneered.

SAMPLE PEY EMPLOYERS

- Apple (U.S.)
- IBM
- Intel
- Hospital for Sick Children
- Rapyuta Robotics (Switzerland)

SAMPLE CAREER TRAJECTORIES

- Artificial Intelligence
- Big Data
- Computer Architecture
- Medical Device Design
- Sustainable Energy

"I chose ECE because I always wanted to invent something that would have an impact. In addition to the strong technical foundation needed to explore new ideas, ECE — just as importantly — taught me how to solve complex challenges. This combination is what makes ECE an incredible basis for a career, both as an engineer, and also as an entrepreneur."

NATASHA BAKER

GRADUATION YEAR: 2008

MEMORABLE EXPERIENCE: She learned about system design, analysis and optimization by designing a vending machine as part of a digital logic course.

FUN FACT: Natasha played the part of a mechanical engineer, nurse and meteorologist in Skule™ Nite, the annual sketch comedy musical run entirely by engineering students.

CURRENT JOB: Founder of SnapEDA, the Internet's first parts library for circuit board design, based in San Francisco



DIMPHO RADEBE

GRADUATION YEAR: 2015

PEY INTERNSHIP: She analyzed and improved processes and systems to enhance performance at Canadian Imperial Bank of Commerce (CIBC).

MEMORABLE EXPERIENCE: Celebrating four years of hard work and accepting the responsibility of the engineering profession at her Iron Ring ceremony before graduation.

FUN FACT: Dimpho played a leadership role in many student organizations, including the National Society of Black Engineers and Women in Science and Engineering. She also taught at a children's engineering summer program on campus.

CURRENT JOB: Project Manager, Process Engineering at CIBC in Toronto



INDUSTRIAL ENGINEERING

Industrial engineers improve the way people interact with technologies and systems. They help organizations run safely, efficiently and profitably. You will begin your program by learning the foundations of industrial engineering: operations research and human-centered design. In your upper years, you'll take courses in engineering psychology and human performance, scheduling and health-care systems. For their ability to see "the big picture," you'll find industrial engineers applying their expertise to every environment, from streamlining operating rooms to distributing products worldwide more efficiently.

SPECIALIZATIONS

- » Human Factors
- » Information Engineering
- » Operations Research

DID YOU KNOW?

Industrial engineering is closely tied to business and health care. U of T's connections to Toronto's financial district and hospitals give you a significant career advantage.

SAMPLE PEY EMPLOYERS

Environment Canada
Ernst & Young
Healthcare Human Factors
Toronto Hydro
Royal Bank of Canada

SAMPLE CAREER TRAJECTORIES

Big Data Analytics
Health-care Engineering
Financial Analysis and Planning
Management Consulting
Project Management

"I chose industrial engineering because it focuses on human interaction with technologies and systems, placing engineering in a human context. I wanted to join a program that integrated human elements into its curriculum, which I found at U of T. The ability to gain immersive, long-term work experience through the PEY internship program also played a big role in my choice of universities. Ultimately, PEY and engineering leadership courses helped me define a clear career pathway."





MATERIALS ENGINEERING

Materials engineers focus on improving what things are made of and how they are made. This is where advanced engineering and cutting-edge science meet. You'll study how to manipulate the structure and properties of materials at molecular and atomic levels from professors who create advanced materials for everything from energy storage to automotive applications. With a foundation in chemistry, physics and math, you'll be poised to choose an area to specialize in for the latter half of your program.

SPECIALIZATIONS

- » Biomaterials
- » Design of Materials
- » Manufacturing with Materials
- » Sustainable Materials Processing

DID YOU KNOW?

With 200 undergraduates, 100 graduate students, 20 professors and 2,000 alumni, ours is one of the largest materials science departments in North America.

SAMPLE PEY EMPLOYERS

Air Liquide Laboratories (Japan)
General Electric Canada
MIT's Koch Institute (U.S.)
Ontario Power Generation
Synaptive Medical

SAMPLE CAREER TRAJECTORIES

Clean Technologies
Forensic Engineering
Manufacturing
Mining and Mineral Processing
Transportation and Infrastructure

"Materials science touches on every aspect of life and is closely intertwined with other disciplines — which suited me well because my interests as a student were varied, from medicine to forensic science. In my current job, I review designs for devices like rollercoasters. With my educational background, I can quickly recognize proposed designs where certain materials won't work together under all conditions, thereby preventing problems in the long run."

JOELLE JAVIER

GRADUATION YEAR: 2010

MEMORABLE EXPERIENCE: For one of her manufacturing projects, she studied the heat treatment of chocolate. Joelle reports it was a very fulfilling project.

FUN FACT: In the annual Chariot Race during U of T Engineering's Godiva Week, Joelle and her friends built and raced a chariot made from a dishwasher — and won.

CURRENT JOB: Elevating and Amusement Devices Safety Engineer with the Technical Standards and Safety Authority in Toronto



HARRISON CHEN

GRADUATION YEAR: 2016

PEY INTERNSHIP: He improved and streamlined testing and validation processes for medical device startup Conavi Medical.

MEMORABLE EXPERIENCE: For his fourth-year capstone project, Harrison developed a polymer-based imaging transducer for minimally invasive heart surgeries.

FUN FACT: Harrison completed an engineering minor in robotics and mechatronics.

CURRENT JOB: Junior Member Technical Staff at MDA (MacDonald, Dettwiler and Associates) in Brampton, Ontario



MECHANICAL ENGINEERING

Mechanical engineers understand the world as parts in motion: from cars to medical devices, all design uses mechanical engineering principles. Our program is renowned for its applied approach, where you'll put theory to practice through unique experiential opportunities both in the lab and in the field. You'll take courses in physics, risk assessment, thermodynamics, biomechanics and sustainable energy. You'll also learn about the physical principles of design: how individual components come together, and how to manufacture objects to make them safe, economical and easy to use.

SPECIALIZATIONS

- » Bioengineering
- » Energy & Environment
- » Manufacturing
- » Mechatronics
- » Solid Mechanics & Design

DID YOU KNOW?

Our Energy Lab has state-of-the-art equipment for studying thermodynamics, but also some important pieces from our rich and longstanding history — including engines more than 100 years old.

SAMPLE PEY EMPLOYERS

BMW (U.S.)
Bombardier
Defence Research and Development Canada
General Motors Canada
IBI Group (U.S.)

SAMPLE CAREER TRAJECTORIES

Advanced Manufacturing
Artificial Intelligence
Communications Systems
Robotics
Sustainable Energy

"I chose mechanical engineering because of its versatility across industries. During my PEY internship at Conavi, I was involved in mechanical-electrical systems development, micro-machining and assembly manufacturing process, device testing and more. These experiences, combined with my coursework, helped me move into the aerospace industry at MDA after graduation. Now I help to design and manufacture robotics systems for the space and medical industries."





MINERAL ENGINEERING

Everything that humans use is either caught, grown or mined. Mineral engineering is the applied science of our interaction with the planet. What sets the Lassonde Mineral Engineering program apart is our broad approach to the discipline. Here, you'll learn mineral exploration, mine design and management, mineral processing and mining finance from researchers at the Lassonde Institute of Mining, as well as industry professionals. Your degree will give you the expertise to lead the way in making mining more sustainable, safe and productive.

SPECIALIZATIONS

- » Applied Geology
- » Geological Engineering
- » Geotechnical
- » Mining & Geomechanics

DID YOU KNOW?

Toronto is the mining finance capital of the world and home to more than 1,600 mining company headquarters.

SAMPLE PEY EMPLOYERS

- EllisDon
- Fugro Peninsular Services (Qatar)
- Kinross Gold Corp.
- Suncor Energy
- Vale

SAMPLE CAREER TRAJECTORIES

- Consulting
- Mine and Business Management
- Sustainable Mining Practices
- Transportation
- Tele-mining

"I always had an interest in solving real-world problems, so engineering was a natural fit. Being at U of T meant an incredible opportunity to experience life in an exciting city while being at the best engineering school in the country. Since the Lassonde Mineral Engineering program is small, I got to know everyone really well. I made some amazing lifelong friends here."

MARINA RENY

GRADUATION YEAR: 2017

PEY INTERNSHIP: She optimized mine operations at Imperial Oil's Kearsy Oil Sands Project in Alberta.

MEMORABLE EXPERIENCE: The two-week course in mapping and land surveying she took with her classmates at U of T's Gull Lake cottage located north of Toronto.

FUN FACT: In her fourth year, Marina served as U of T's team captain at the Canadian Mining Games where they won second place.

CURRENT JOB: Mine Engineer-In-Training at Imperial Oil in Calgary



KRAMAY PATEL

ENGSCI MAJOR: Biomedical Systems Engineering (with a minor in robotics and mechatronics)

GRADUATION YEAR: 2016

MEMORABLE EXPERIENCE: In second year, he travelled to Turkey as a National Science Foundation Fellow to learn about the intersection of bioinformatics and systems biology.

FUN FACT: Kramay turned an idea for a smart showerhead into a patent and startup through The Entrepreneurship Hatchery.

CURRENT JOB: Vanier Scholar and MD-PhD candidate at U of T, focusing on neuroprosthetics, brain-machine interfaces and human memory augmentation



ENGINEERING SCIENCE

One of the most distinguished engineering programs in the world, Engineering Science (EngSci) is designed for ambitious students who are looking for an intense academic challenge. In your first two years, you'll be immersed in engineering, math, science, computing and humanities. In your last two years, you'll choose from one of eight majors for accelerated, discipline-specific learning. Our students thrive in a close-knit community of exceptional individuals, creating an enriched and unique learning environment.

ENGINEERING SCIENCE MAJORS

- » Aerospace Engineering
- » Biomedical Systems Engineering
- » Electrical & Computer Engineering
- » Energy Systems Engineering
- » Engineering Mathematics, Statistics & Finance
- » Engineering Physics
- » Machine Intelligence (starting in 2018)
- » Robotics

DID YOU KNOW?

U of T is one of the few institutions worldwide to offer a program that integrates enriched science fundamentals with engineering. The EngSci curriculum is nimble with dynamic majors that evolve and anticipate emerging technologies.

SAMPLE PEY EMPLOYERS

Airbus (France)
Amazon
Harvard-MIT Science & Technology (U.S.)
Scotiabank
Verity Studios (Switzerland)

SAMPLE CAREER TRAJECTORIES

Half of EngSci grads pursue graduate studies or professional degrees such as law and medicine. The other half enter the workforce in a wide range of careers across all industries, or start their own companies.



ENGINEERING MINORS & CERTIFICATES

Choosing an engineering minor or certificate is a powerful way to graduate with an extra set of credentials, or just explore an area of interest, while earning your degree. As an engineering student, you can also pursue a minor through the Faculty of Arts & Science such as French, Geography or Psychology.

To obtain an engineering minor or certificate, you complete a set number of specified and optional courses — six for a minor and three for a certificate. For example, if you're interested in the Engineering Business minor, you would take courses in engineering economics, accounting and finance, competitive strategy and people management, plus two courses from a set of electives. When you graduate, your minor or certificate will appear on your transcript.

More than half of our students graduate with an engineering minor or certificate

ADVANCED MANUFACTURING MINOR

The most intensive research and development sector in Canada is manufacturing. Courses in this minor cover an array of competencies, all of which can be broadly applied to areas like biomedical, automotive, aerospace and energy.

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING MINOR—PLANNED FOR 2018

From self-driving cars to algorithms that improve medical diagnoses to deep consideration about AI implementation, you'll learn to leverage the latest techniques in machine learning and AI to address critical challenges in a variety of fields.

BIOENGINEERING MINOR

With topics extending across life sciences, from forestry and ecology to biological waste treatment and health care, this minor offers you a breadth of possibilities, from biofuels to pharmaceuticals.

BIOMEDICAL ENGINEERING MINOR

This highly focused minor examines engineering's intersection with medicine and biomedical technology. Courses cover physiological control systems, bioinstrumentation, biomechanics and a choice of lab or design experience.

ENGINEERING BUSINESS MINOR

This minor represents a powerful collaboration between UofT Engineering and the Rotman School of Management. Our most popular minor, it provides knowledge of finance, economics, business management and marketing from an engineering perspective.

ENVIRONMENTAL ENGINEERING MINOR

Delve into topics such as ecological impact, risk assessment, environmental microbiology, hydrology, preventive engineering, climate change, and the social and environmental impact of technology.

NANOENGINEERING MINOR

Reflecting a growing focus on engineering materials and devices at the nano scale, this minor is applicable to many sectors including electronics, communications, energy and medical diagnostics.

ROBOTICS & MECHATRONICS MINOR

Explore robotic and mechatronic systems involved in consumer products, industrial uses and adaptive technologies. Courses cover topics such as micro-electromechanical systems and new system-level principles underlying embedded systems.

SUSTAINABLE ENERGY MINOR

The need for greener, more sustainable energy resources is critical. Topics in this minor focus on the sustainable use of energy, energy-demand management and public policy related to sustainability.

ENGINEERING CERTIFICATES

- » Communication
- » Engineering Business
- » Engineering Leadership
- » Entrepreneurship
- » Forensic Engineering
- » Global Engineering
- » Mineral Resources
- » Nuclear Engineering
- » Renewable Resources Engineering

HOW TO APPLY

When you apply to U of T Engineering, we carefully consider both your academic performance and activities outside of the classroom. Visit www.uoft.me/engapply for details.

1

APPLY ONLINE PRIOR TO JANUARY 10

Submit your application online via the Ontario Universities' Application Centre (OUAC) at www.ouac.on.ca, starting in early October. Shortly after you submit your application we will send you an email acknowledgement with instructions on how to access your Engineering Applicant Portal.

2

SUBMIT YOUR ONLINE STUDENT PROFILE AND DOCUMENTS BY FEBRUARY 1

Log in to your Engineering Applicant Portal to complete all sections of the Online Student Profile and upload transcripts for all studies to date, completed and in progress, from the start of high school¹. English proficiency test results must be sent electronically directly from the testing service. Your application will be reviewed once it is complete.

3

APPLY FOR RESIDENCE BY MARCH 31

Residence is guaranteed for all new full-time students entering their first year of study.

To qualify for the guarantee, complete the University's common residence application (MyRes) by March 31. For full details, please visit www.uoft.me/engresidence

4

TRACK THE STATUS OF YOUR APPLICATION

Check your Engineering Applicant Portal regularly to see what documents have been received in support of your application, confirm that your Online Student Profile is complete, and track your admission status. When a decision is made, it will be posted online first!

¹ If you are a current Ontario high school student, your grades will be automatically sent to us from your school.

ACADEMIC REQUIREMENTS

Before you apply, make sure you meet the admission requirements. For details visit www.uoft.me/engapply

CANADA

ONTARIO: English (ENG4U); Advanced Functions (MHF4U); Calculus and Vectors (MCV4U); Chemistry (SCH4U); Physics (SPH4U); and an additional U or M course

ALBERTA/NW TERRITORIES/NUNAVUT: Math 30-1; Math 31; Chemistry 30; Physics 30; and English 30 or ELA 30-1

BRITISH COLUMBIA/YUKON: Pre-Calculus 12; Calculus 12 or AP Calculus; Chemistry 12; Physics 12; and English 12

MANITOBA: Pre-Calculus Math 40S; AP Calculus; Chemistry 40S; Physics 40S; and ELA 40S

NEW BRUNSWICK: Calculus 120; Pre-Calculus B120; Chemistry 121 or 122; Physics 121 or 122; and English 120, 121 or 122

NEWFOUNDLAND/LABRADOR: Math 3200; Math 3208; Chemistry 3202; Physics 3204; and English 3201

NOVA SCOTIA: Pre-Calculus; Grade 12 Calculus/AP Calculus; Chemistry 12; Physics 12; and English 12 (competitive candidates will be considered with Math 12/Advanced Math 12 if Calculus is not offered by your school)

PRINCE EDWARD ISLAND: Mathematics 621A or 621B; Mathematics 611B; Chemistry 611 or 621; Physics 621; and English 621

SASKATCHEWAN: Pre-Calculus 30; Calculus 30; Chemistry 30; Physics 30; and English ELA A30 + B30

QUEBEC CEGEP: 12 academic courses including one course in Algebra, and two courses each in Calculus, Chemistry, Physics and English. 24 courses with prerequisites will be considered for advance standing credit.

*Please contact us if your school does not offer Calculus

MONEY MATTERS

For a more complete picture of financing your U of T Engineering education, please visit www.uoft.me/engfinances

SCHOLARSHIPS & AWARDS

All high school applicants to U of T Engineering are automatically considered for most admission scholarships on the basis of their academic achievements and extracurricular involvement (as detailed in the Online Student Profile). Some scholarships and awards require a separate application. Engineering applicants are also eligible for a number of University-wide scholarships. Major U of T scholarships requiring nomination include the **National Scholarship** for Canadian high school students and the **Lester B. Pearson International Scholarship** for international students. Please visit www.uoft.me/engscholarship for more information.

FINANCIAL AID

UNIVERSITY OF TORONTO ADVANCE PLANNING FOR STUDENTS

We are committed to ensuring that no admitted domestic student¹ is unable to enrol in or complete their studies due to lack of financial means. This commitment led to the creation

of a unique financial aid program called **University of Toronto Advance Planning for Students (UTAPS)**. Through a grant, UTAPS covers unmet financial need after a student has received a maximum amount of support through government assistance (e.g., OSAP for Ontario students).

U.S. STUDENT AID

U.S. citizens can apply for financial assistance from the U.S. William D. Ford Federal Direct Loan Program. U of T is a recognized post-secondary institution for Federal Direct Loans (PLUS/Subsidized/Unsubsidized). Education Savings Plans and U.S. Federal Education Tax credits are also applicable. Visit www.uoft.me/usloans for details.

SPONSORED STUDENTS

As a top-ranked world institution, the University of Toronto is an approved destination for most countries' national mobility scholarship programs.

COSTS

Fees for full-time studies are in Canadian dollars.

	DOMESTIC	INTERNATIONAL
Tuition	\$15,760 ²	\$54,840 ²
Incidental Fees	\$1,599.60 ³	\$1,599.60 ^{3,4}
Residence & Meal Plan	\$10,755– \$15,686	\$10,755– \$15,686
Books & Supplies	\$1,500– \$2,000	\$1,500– \$2,000

1. International students are not eligible for need-based financial aid
2. 2018–2019 academic fees
3. 2017–2018 incidental fees; 2018–2019 fees are subject to change
4. International students are also required to purchase health insurance through UHIP (approximately \$612 per year)

INTERNATIONAL

AMERICAN SYSTEM: Excellent CGPA, Senior Year/Grade 12 GPA at an accredited high school with a high grade point average and high scores on SAT Reasoning/Redesigned SAT (including Essay) or ACT exams (including Writing Test Component). Excellent results in senior level courses, including Math, Chemistry and Physics. Competitive applicants are encouraged to have two years of Chemistry and Physics as well as Calculus completed or in progress by their senior year. AP or SAT Subject Test results in Calculus, Chemistry and Physics are recommended, but not required. Applicants who have written AP exams should present minimum scores of at least 4; SAT Subject Tests in Math, Physics or Chemistry should be at least 650. Please note that U of T Engineering does not grant advanced standing credit for AP courses.

BRITISH PATTERNED: Three A-Levels including Mathematics and Physics. Chemistry is strongly recommended as the third A-Level. Applicants are required to present at least AS-Level Chemistry. U of T Engineering does not grant advanced standing for A-Level subjects.

INDIAN SYSTEM: Mathematics, Chemistry and Physics at the Grade 12 level. Completion of the All India Senior School Certificate awarded by CBSE, or the Indian School Certificate awarded by CISCE, or Year 12 State Board Exams with excellent results.

INTERNATIONAL BACCALAUREATE (IB) DIPLOMA: Mathematics recommended at Higher Level; Physics and Chemistry at either level. U of T Engineering does not grant advanced standing for Higher Level subjects.

ENGLISH FACILITY REQUIREMENTS

If your first language is not English, you must present proof of English facility prior to admission consideration, unless you have completed four years of full-time study in an English language school in a country where the predominant language is English. For applicants who are required to present proof of English facility and are taking Grade 12 English (i.e., ENG4U), you must achieve at least 70% in this course. For details on required scores and acceptable tests, please visit www.adm.utoronto.ca/efl.

INTERNATIONAL FOUNDATION PROGRAM (IFP)

The IFP is available to academically qualified international students graduating from an international high school with English facility test scores just below the required minimum. For details, visit www.uoft.me/engifp.

FIRST NATIONS, MÉTIS AND INUIT APPLICANTS

Indigenous students who are applying to U of T Engineering are encouraged to contact us at Indigenous@ecf.utoronto.ca.



NEW ADDITION TO OUR WORLD-CLASS FACILITIES

From the labs where innovation happens every day to the spaces where students unwind, UofT Engineering's classrooms, services and research span 15 buildings on campus — all within walking distance of each other — and one off campus (UofT's Institute for Aerospace Studies). In June 2015, we broke ground on the **Centre for Engineering Innovation & Entrepreneurship (CEIE)**. It's opening in 2018 and you will be among the first students to use these cutting-edge facilities. The CEIE sets a new standard for collaborative and multidisciplinary engineering education and research. Here, you'll benefit from technology-enhanced learning spaces, design studios, designated areas for student clubs to meet and innovate, an interactive auditorium, a two-storey robotics lab (pictured above), makerspaces with prototyping and fabrication facilities, 3D printers, and much more.



For details about the CEIE, please visit www.uoft.me/CEIE



GET A TASTE OF ENGINEERING THROUGH DEEP SUMMER ACADEMY

Each July, high school students from around the world travel to Toronto for DEEP Summer Academy. Taught by UofT Engineering professors, researchers and PhD students, week-long courses tackle some of today's most interesting topics in everything from robotics and nanotechnology to engineering business and bioengineering. DEEP is also a great way to get to know UofT before you begin your undergraduate studies. www.deepsummeracademy.com

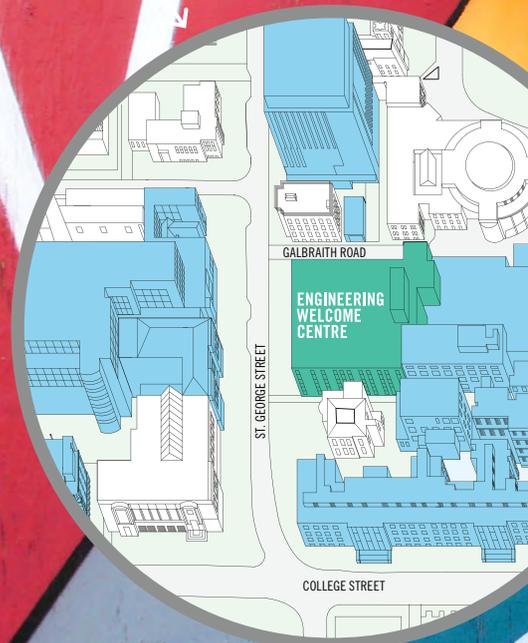


UofT Engineering is home to Toronto's longest single graffiti installation: www.uoft.me/ceiexskam

TAKE A TOUR

The best way to experience UofT Engineering is to visit in person. We invite you to explore our facilities and meet our students on a guided tour. Your tour will start in the **ENGINEERING WELCOME CENTRE**. We are located in the Galbraith Building, 35 St. George Street, in room 173.

Visit www.uoft.me/touengineering to sign up for a tour.





NO
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UNIVERSITY OF
TORONTO

Engineering

**UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING**

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STATEMENT OF ACKNOWLEDGEMENT OF TRADITIONAL LAND

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years it has been the traditional land of the Huron-Wendat, the Seneca, and most recently, the Mississaugas of the Credit River. Today, this meeting place is still the home to many Indigenous people and we are grateful to have the opportunity to work on this land.