Engineering Science
University of Toronto

Be an EngSci Graduate.

Know an EngSci Graduate.

Choose an EngSci Graduate.
YOU HAVE JUST OPENED THE DOOR TO ENGINEERING SCIENCE.

Engineering Science at the University of Toronto – fondly known as EngSci – is arguably the most rigorous Engineering program in Canada, and unquestionably one of the best in the world. Class entering average: 94%. Class ability and work ethic: second to none.

If you’ve got a burning desire to generate practical solutions to the world’s toughest problems, and if you’ve got quantitative skills, a bent for innovation, a capacity for creativity, and an ability to communicate and work in exciting teams with other outstanding students, EngSci is where YOU belong.

After two demanding years of study that lay a phenomenal foundation in both science and engineering, you then pick one of our cutting-edge Options and prepare yourself to be at the very top of your field – like thousands of world-beating EngSci graduates who have made a difference in the world since the first class left U of T in 1938.

AEROSPACE
The aerospace industry is a major player in Canada’s economy. Our graduates from this Option, with their knowledge in aircraft and spacecraft engineering, including everything from flight dynamics and aerospace propulsion to advanced materials and design, help keep Canadian companies at the forefront of innovation globally. This comprehensive, multidisciplinary program is delivered by professors at the University’s internationally recognized Institute for Aerospace Studies.

BIOMEDICAL SYSTEMS
Unlike any undergraduate program in Canada, the Biomedical Systems Engineering Option prepares students for a career in biomedical engineering by providing an interdisciplinary curriculum that builds strong foundations in engineering and life sciences to quantitatively analyze biomedical systems from the molecular level through to whole organs. Our graduates are building on tremendous conceptual and technological advances in the biomedical sciences to find new ways to understand, diagnose, and treat diseases and other health related issues.

ELECTRICAL AND COMPUTER
This Option embraces the Engineering Science philosophy, delivering a program that provides a strong focus on the foundational principles that form the basis for both disciplines. In our highly integrated world, the two areas are closely linked and this approach will give students the background and flexibility to integrate the knowledge required to develop emerging technologies and invent new ones.

ENERGY SYSTEMS
The Energy Systems Option meets the need for more professionals with expertise in this field in Ontario, Canada and around the world. Energy is central to almost everything in nature, in society and indeed in the universe. Our whole economy is developed around the concept of affordable energy. Students learn to tackle some of the most pressing problems we face today in terms of energy generation, storage, and management, while gaining an understanding of energy issues from a public policy perspective.

INFRASTRUCTURE
Buildings, bridges and transportation networks are some of the largest and most significant products of engineering in the world today. Together with other infrastructure components, they provide the necessary underpinning of civilization and allow people to live together in large cities sustainably and productively. In this unique Option, students develop the engineering skills to tackle projects of this magnitude, going well beyond what is found in conventional engineering programs. Graduates of this Option are equipped with the ability to create unique systems and designs, custom-tailored to both site and function.

MATH, STATISTICS AND FINANCE
The Engineering Math, Statistics and Finance Option, the first undergraduate program of its kind in Canada, provides students with a strong background in mathematics and statistics, and an understanding of how these disciplines apply to practice in quantitative finance through the use of engineering tools such as optimization. Students will learn about financial theory that governs the dynamics of financial instruments and markets, which impact our global community.

ROBOTICS
Responding to recent industry innovations, Engineering Science has created a unique interdisciplinary undergraduate program drawing on the expertise of our world-renowned faculty. The curriculum has a focus on perception, reasoning and acting as the three key functions of intelligent robots, with a special focus on system integration through design and research opportunities.

PHYSICS
The Department of Physics at the University of Toronto, together with the Faculty of Applied Science and Engineering, gave birth to the Engineering Physics program in 1935 (called Engineering Science since 1965). The Physics Option continues to attract students with a keen aptitude for physics who see the creative potential for combining this with an engineering degree. Graduates appreciate the high degree of flexibility provided to them in terms of the design of their program across a wide spectrum of theoretical and experimental physics courses.
TO BE AN ENGINEERING SCIENCE STUDENT, YOU NEED:

Curiosity, stamina, agility, creativity, the ability to grasp both the big picture and the detail. Combine this with a global mindset, social consciousness and a desire to shape the future…and that’s why U of T Engineering Science students are second to none.

Today’s engineering challenges sit on the boundaries of traditional disciplines, demanding a broader understanding of scientific, technical and social issues. The interdisciplinary nature of the University of Toronto’s EngSci Program prepares students to tackle the increasingly complex challenges of today’s world.

“We were required to take fairly advanced math and science courses that really stretched my mind. It was like doing calisthenics in that it stretches your mind, so that when it bounces back, it is never really the same – it is permanently expanded.”

Patricia Burchat, Professor of Physics, Stanford University

Engineering Science graduate 8T1

On the cover: Kristen Facciol 0T9
The EngSci Program at U of T does not simply create world-class technical experts. We also infuse our students with a deep understanding of their responsibilities as future leaders. They graduate with an ingrained appreciation for environmental sustainability, health and safety issues and the long-term impact of technology on society.

This is what distinguishes U of T’s Engineering Science graduates. They acquire unparalleled technical skills through the rigours and intensity of the program, emerging with a honed ability to analyze what appears to be complex problems and to craft elegant solutions that are lucid and actionable. They also adopt a way of learning, working and thinking that will put them in good stead, regardless of their post-graduate pursuits. As one of our students pursuing graduate studies at MIT said, “After EngSci, everything else feels like a walk in the park.”

“Engineering Science is a place for individuals seeking a unique and powerful undergraduate experience. Our mission is to prepare students to make a real impact in a world that faces significant challenges, and they respond with an enthusiasm and ingenuity that is truly remarkable.”

Mark Kortschot
Professor and Chair
Division of Engineering Science
University of Toronto
The EngSci Program is a rich mix of theory and practice, mathematics and physical and life sciences, technology and design, and the humanities. Lectures are delivered by professors and educators who constantly challenge and inspire students, while providing the depth necessary for true understanding.

A TRADITION OF TEACHING EXCELLENCE

The faculty brings together the best of U of T... remarkable educators with an uncanny ability to capture the attention and spark the interest of their students. They promote debate,
provide mentorship and create opportunities for practical laboratory and research experience. A number of them are iconic legends—world-class professors and educators from engineering, mathematics, physics, chemistry and medicine—who have left an indelible mark on our alumni and our society.

Recognized with multiple research and teaching awards, Professor Michael Collins uses storytelling during his lectures to captivate the attention of his students—imparting wisdom that is remembered long after graduation. “The way he pulls history and aesthetics into the study of civil engineering is inspiring,” says Bronwyn Drainie, Editor, Literary Review of Canada.

THE EXPERIENCE OF A LIFETIME

U of T Engineering Science attracts top-performing students from across Canada and, indeed, from around the world. Many of them come because they are seeking a real academic challenge to build on their love for mathematics and science. They quickly find themselves in an intellectually challenging and stimulating peer group. Graduates often reflect back on this life-altering experience that prepared them for so much.
ENGINEERS FOR THE WORLD

EngSci anticipates society’s needs with a continuous evaluation and evolution of its curriculum. This process put us at the leading edge of engineering education when we introduced Biomedical Engineering (1994), Nanoengineering (2002) and Infrastructure Engineering (2002), and continues today with more recent introductions of Options in Energy Systems (2008), and Mathematics Statistics & Finance (2010).

These new, groundbreaking Options combine with other Options – such as Electrical and Aerospace – that have continued to rapidly evolve and have stood the test of time. It is this flexible and nimble nature of the program that allows us to stay ahead of the curve. And our emphasis on leadership development and global citizenship ensures graduates leave with the skills and mindset to succeed locally and globally.

About 60% of EngSci graduates pursue post-graduate degrees in engineering and science at schools such as MIT, Johns Hopkins, Princeton, UC Berkeley, Harvard and Cornell, about 10% go on to graduate studies in medicine, law, business, pharmacy and dentistry at other professional schools, and about 30% move directly into the workforce.
Gold Medal

I chose to study Engineering Science because it was reputed to be a difficult program. My father died very young and I was determined to be successful. In the end, I won a gold medal for finishing first in my class. The challenging nature of the program compelled me to work hard and to be self-reliant. There is a tremendous focus on understanding the material, not simply memorizing it. One comes away from the program with the ability to take on almost anything. My modus operandi is to never give up when faced with a problem until a solution is found. I have developed many products at Apotex – I have approximately 100 patents in my name.

BARRY SHERMAN
Chairman and CEO, Apotex
Engineering Physics graduate 6T4

A Way of Thinking

I went into Engineering Science because I wanted something practical but at the same time wanted something very different. I wanted to challenge myself and see how good I was. For the EngSci experience, a parent should never choose the program – the student must choose it for themselves. I knew I wanted to do some sort of graduate work after EngSci and decided on going to Harvard for an MBA. I have found that as the world evolves, EngSci is more relevant than ever before. For instance, the mathematics of finance is so dependent on the principles underpinning EngSci. EngSci taught me the discipline of applying these principles and solving problems and business problems are solved in the same way. It provided me with a way of thinking.

RICHARD VENN
Senior Executive Vice-President
Corporate Development, CIBC
Engineering Science graduate 7T3

Just Like Me

I distinctly remember my first day in EngSci finding a classroom filled with people like me – people that I could relate to and talk to – people who shared similar goals and aspirations. I quickly developed a real sense of pride and loyalty to the program and a kinship with my classmates. I chose to study EngSci because I knew it would give me the broadest set of tools to pursue almost any path. I have come to realize that to find the best solution to a problem requires people to look at the bigger picture and optimize across boundaries. EngSci is one of the few paths for people who aspire to be a renaissance person like Leonardo da Vinci who knew lots about many things – mathematics, science, philosophy, ethics, and art. Society needs more people like this who can cross boundaries and find solutions.

ROB BICEVSKIS
Former Vice-President Engineering and Chief Technology Officer
Genesys Microchip
Currently Self-Employed Private Consultant
Engineering Science graduate 8T3

I Was Challenged

I chose EngSci because of the challenge – and it did challenge me to a large extent. The nice thing about EngSci was that it tested your potential to see how far you can go. When I founded Aastra and Tony, my brother, joined me a little later, it was a small consulting firm that focused on aircraft modification. We switched to telecom equipment looking for alternative opportunities and we have redefined ourselves several times over. From aerospace to telecom is not that much of a leap – remember that Alexander Graham Bell went to aerospace after inventing the telephone! EngSci challenged me to learn about all kinds of things and to learn the fundamentals behind the concept. When you understand the concept behind what makes things work, you can apply this approach to anything, from accounting to legal to technology.

FRANCIS SHEN
Founder, Chairman and Co-CEO
Astra Technologies
Engineering Science graduate 8T1

ANTHONY SHEN
President and Co-CEO
Astra Technologies
Engineering Science graduate 8T0

Art of Science

My dad was an engineer and he thought Engineering Science would be a good challenge for me. The most valuable thing I got from the program was an understanding of how to interpret and manipulate equations – if you can do this, you can understand almost any science. When I started studying some of the applications of math in engineering school, mathematics took on a whole new meaning – I discovered I could apply them to something tangible that I could see. It was like looking at artwork – I could enjoy it from an elegance point of view. I spent nine years at Celestica, inventing, mentoring teams of inventors, and managing a global intellectual property portfolio. In 2003, I got a business degree and later started my own company to help research organizations and companies commercialize their innovative biomedical technology.

JACKIE CSONKA-PEEREN
Founder and Commercialization Consultant
BioAlliance Associates
Engineering Science graduate 8T8
There is something about EngSci that inspires many of its alumni to become professors. “EngSci is helped tremendously by the fact that many faculty members at U of T are EngSci grads or have worked closely with the program. It’s as though there are many ‘guardian angels’ who truly care about the program and the students,” says Joyce Poon, winner of the prize for the top PhD thesis at Caltech in 2007, and now a faculty member in Engineering at U of T.

Our alumni maintain strong connections to EngSci. Beyond following what today’s students and graduates are doing, our alumni participate in the curriculum development, act as mentors and advocates, provide guest lectures, and serve as our colleagues, donors and friends.
STATS AND FACTS

EnSci STUDENTS IN THE 13 YEAR PERIOD 1997-2009 WON THE GOVERNOR GENERAL’S SILVER MEDAL AWARDED FOR THE HIGHEST ACADEMIC STANDING UPON GRADUATION FROM U OF T

AVERAGE ENTRANCE GRADE 94%

STUDENTS COME FROM NINETEEN DIFFERENT COUNTRIES

Bangladesh, Belgium, Canada, China, England, France, Hong Kong, Italy, Japan, Kenya, South Korea, Kuwait, Lebanon, Malaysia, Mauritius, Pakistan, Trinidad & Tobago, USA, UAE.

INSIDE ENGINEERING SCIENCE

EngSci is like my benchmark. In my postgraduate studies, academia and in my current research, I know that if I can achieve 80% of the level of efficiency I had in my EngSci days, I will be successful.

TOM CHAU
Professor and Canada Research Chair in Pediatric Rehabilitation Engineering, University of Toronto
VP Research, Holland Bloorview Kids Rehabilitation Hospital and Director of the Bloorview Research Institute

No matter how much someone can tell you, you can’t understand it, know what it’ll be like, until you do it. If you’re looking for a challenge, you probably won’t be disappointed – you will be with the brightest and most diverse group you could hope for in North America.

NICOLE DICARLO
Engineering Science graduate ’07 + PEY

In EngSci, I learned that the point is not to attain perfection but to try to attain it – it is the process that matters, not the ends.

JENNY HE
PhD candidate, Princeton University
Engineering Science graduate ’05 + PEY

Even after AER201, I still can’t build and design a robot on my own – but at least I can look at the design and understand basic circuitry, components, and motors. Through EngSci, I learned that theoretical physics was my strength.

BRIAN SHUVE
PhD in Physics, Harvard University
Postdoctoral Fellow of the Perimeter Institute, University of Waterloo

I recall a PHYS 211 class on Dirac notation wherein the professor explained why rotations were not commutative. By way of demonstration, he stood on a table and proceeded to rotate himself around various axes. The finishing touch was when he rotated around the axis “coming out of the board” by keeping himself rigid and falling forward into a perfect pushup position. I believe he works out.

MABEL LAI
Barrister, Addario Law Group
Engineering Science graduate ’06

I grew up in a small town in Ontario – Barry’s Bay. Back then, when researching different universities you didn’t have the web, so you had to go to the guidance office and read course bulletins. I remember reading a sentence in the EngSci one that said “only those with above average ability in math and science need apply” – this sentence challenged me – that’s the one I wanted to do.

PATRICIA BURCHAT
Professor of Physics, Stanford University
Engineering Science graduate ’81

I learned how to ask a good question – that is the start to finding an interesting answer.

MARK PEARSON
Former CEO, NeuroMedix
Engineering Physics graduate ’02

Engineering Science taught me to think on a systems-wide level. When examining the circulatory system in medical school, many of my classmates have been inclined to memorize what happens in the system in order to understand it. I tend to think of it as an electrical circuit and try to understand how it responds to certain things.

DANICA LAM
3rd year Internal Medicine resident at the University of Toronto
Engineering Science graduate ’05

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3rd year Internal Medicine resident at the University of Toronto
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“EngSci students are multitalented. Beyond academics, these students excel at music, dance, drama, graphic design, and more. My experience is that EngSci students take it upon themselves to do their best in whatever they attempt. And we have Isabel Bayrakdarian to look up to, who graduated from EngSci and went on to become a world famous opera singer!”

GEOFFREY SIU, SOFTWARE DEVELOPMENT ENGINEER AT MICROSOFT, ENGINEERING SCIENCE GRADUATE B79+PEY

It’s not all hard work for Engineering Science students – they know how to play too!

Of an orchestra made up entirely of U of T Engineering students, more than half are EngSci students. This is true for the pit orchestra and many other smaller ensembles playing in and around campus. Other students take art appreciation, a music credit course, and participate in one of many student-led clubs and initiatives.

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KNOW an EngSci Graduate.
CHOOSE an EngSci Graduate.

Program details are in the cover overleaf of this brochure. Additional program information is on our web site www.engsci.utoronto.ca.

We invite you to get to know us.
Tel: 416.978.8634 or Email: engsci@ecf.utoronto.ca

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