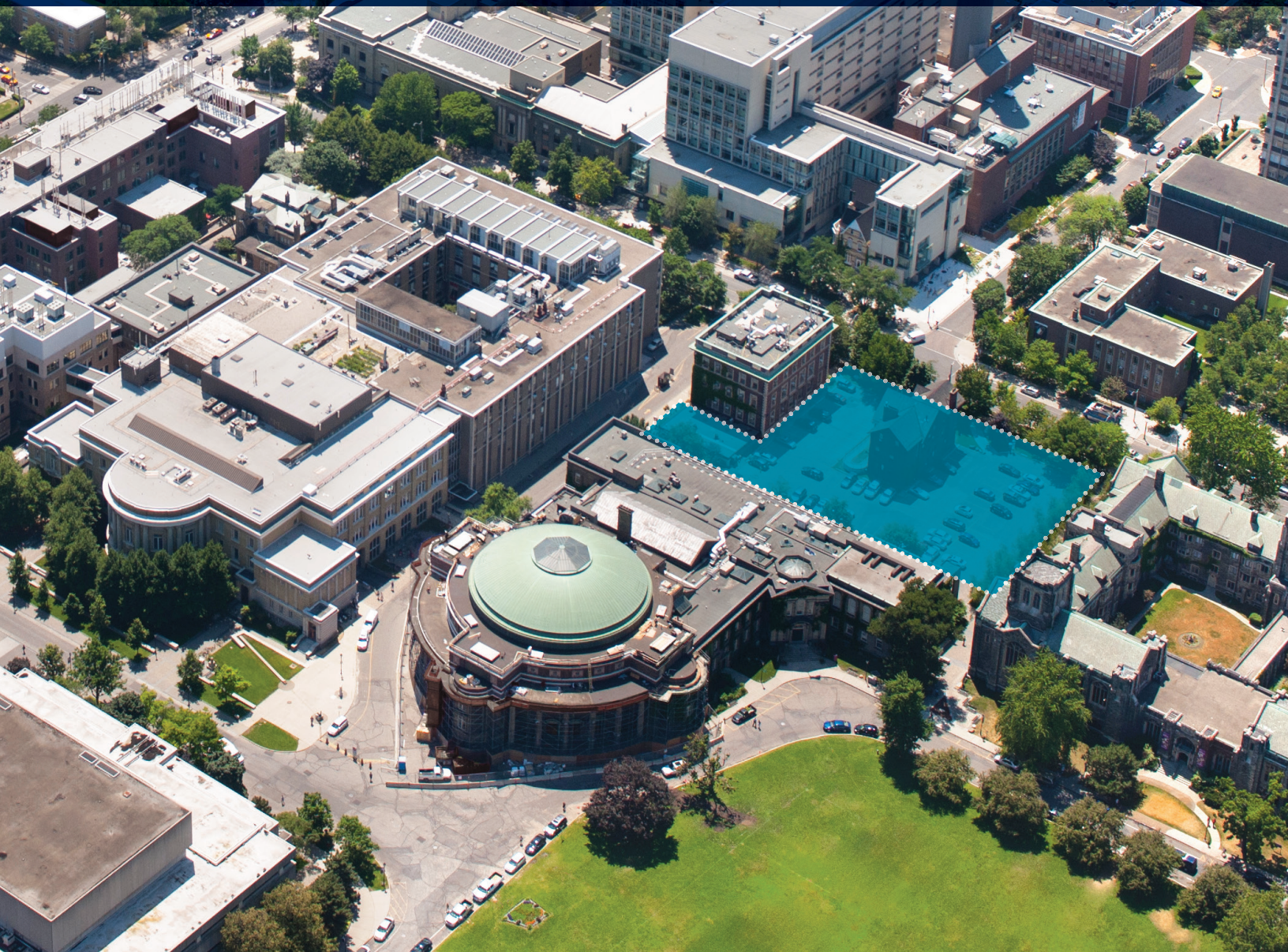
UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING

University of Toronto Engineering

Annual Report 2013

Performance Indicators



Pictured on the front cover:

Targeted to open in 2016, the **Centre for Engineering Innovation & Entrepreneurship** will provide dynamic, flexible environments that foster collaboration, encourage active learning and accelerate innovation. In addition to state-of-the-art instructional spaces, the Centre will house multidisciplinary research clusters comprised of some of the Faculty's most innovative research centres and institutes. Dedicated space for industry partners, alumni and student clubs will enable productive interaction across the entire U of T Engineering community. Located next to Convocation Hall and facing St. George Street, the Centre for Engineering Innovation & Entrepreneurship is destined to become a campus landmark.

Message from the Dean

It is my pleasure to share our fifth *Annual Report of Performance Indicators* with you. This report summarizes the tremendous achievements and progress our Faculty has made towards attaining the goals we established in our *2011–2016 Academic Plan,* and helps us to identify new priorities. As this report demonstrates, at the Faculty of Applied Science & Engineering we continue to uphold our commitment to the pursuit of excellence on all fronts.

The exceptional quality of our faculty, alumni, staff and students continues to be recognized on an international scale, and the demand for our undergraduate programs and quality of applicants continues to rise. Our recruitment efforts, accomplishments and visibility, global reputation for excellence and curricular and co-curricular initiatives enable us to attract students of the highest calibre from across the nation and around the world. In 2013, we received more than 10,000 applications for 1,150 places, and the average grade of entering students is over 91.8 per cent. To further enrich our student-learning opportunities, we expanded programming at The Entrepreneurship Hatchery and introduced a multidisciplinary capstone design course that will be offered this coming September, creating a unique, project-based learning environment in partnership with industry through the recently established UT-IMDI.

We developed two new certificate programs in Mineral Resources and Nuclear Engineering, and there are now five distinct minors available to our undergraduates, with the newest minor in Engineering Business gaining significant momentum. These program specializations have become extremely popular, with 30 per cent of our undergraduates now participating in a minor or certificate program. And, to foster innovation in our undergraduate course development and delivery, we established the Engineering Instructional Innovation Program.

Our graduate enrolment numbers are at an all-time high, and we have nearly reached our goal of 2,000 graduate students by 2015 with 1,933 students registered in graduate programs in 2012–2013.

We improved flexibility within our graduate studies programs by adding a flex-time PhD program option, and the extended full-time option for our Master of Engineering students. We are also enhancing our MEng offerings with the addition of the Master of Engineering in Cities Engineering and Management (MEngCEM) and a certificate in Advanced Water Technologies and Process Design, with both to launch in September 2013.

Our professoriate continues to excel, and have garnered 35.6 per cent of all of the major international and national engineering awards open to engineering faculty in Canada. Junior faculty received the majority of the early-career awards available to engineers and natural scientists.

Strong research funding remains a Faculty priority, as this also contributes to every aspect of our graduate education mission. Ensuring a strong funding base moves our collaborative research activities forward in critical areas that translate into innovations that benefit society and the economy, whether by helping to offset costs for research equipment and infrastructure or covering graduate student stipends. I am therefore very pleased to acknowledge that we met many of our targets once again this year, with our funding from CIHR almost doubling and NSERC industrial partnerships growing by 17 per cent. We also received four additional Tier 2 Canada Research Chairs (CRCs), which brings our complement of CRCs to 24.

Our connections to alumni have also been greatly strengthened this year through a series of events we held in Calgary, San Francisco, Mountain View, Shanghai, Taipei, Jakarta, Kuala Lumpur, Singapore and Hong Kong. We also leveraged many of these opportunities to further our recruitment, outreach and public affairs goals.

In fall of 2012, we launched Engineering's part of Boundless: The Campaign for the University of Toronto, with $88.6 million towards a $200-million goal. One of our key campaign priorities is to raise the capital to build the Centre for Engineering Innovation & Entrepreneurship. It is most gratifying that nearly 30 per cent of the new commitments received in the past fiscal year have been made in support of construction of this much-needed and anticipated facility.

Thank you for your continued support, for your remarkable contributions to the Faculty over this past year, and for your unwavering commitment to furthering our pursuit of excellence, which we proudly demonstrate through our *2013 Annual Report of Performance Indicators*. I welcome and value your input, and look forward to receiving your comments.

Cristina Amon, Dean
August 2013

Faculty Leadership, 2012–2013

Dean
Cristina Amon

Vice-Dean, Graduate Studies
Chris Damaren

Vice-Dean, Research
Edward (Ted) H. Sargent

Vice-Dean, Undergraduate
Susan McCahan

Associate Dean, Cross-Disciplinary Programs
Bryan Karney

Chair, First Year
Micah Stickel

Director, University of Toronto Institute for Aerospace Studies
David Zingg

Director, Institute of Biomaterials & Biomedical Engineering
Paul Santerre

Chair, Department of Chemical Engineering & Applied Chemistry
Grant Allen

Chair, Department of Civil Engineering
Brenda McCabe

Chair, The Edward S. Rogers Sr. Department of Electrical & Computer Engineering
Farid Najm

Chair, Division of Engineering Science
Mark Kortschot

Chair, Department of Mechanical & Industrial Engineering
Jean Zu

Chair, Department of Materials Science & Engineering
Jun Nogami

Chief Financial Officer
Brian Coates

Executive Director, Advancement
Jim Dawson

Executive Director, Communications & Public Affairs
Madelyn Herschorn

Faculty Registrar
Barbara McCann

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Selected Achievements Under the Academic Plan

U of T Engineering pursues this goal: to continue to be a leader among the world's very best engineering schools in our discovery, creation and transfer of knowledge and technological innovation through teaching and research.

The Academic Plan is the blueprint for achieving this goal. It was developed during a highly consultative process starting in 2009 and approved by Faculty Council in October 2011. Here, we highlight the progress we have made in 2012–2013 towards achieving the goals of the Academic Plan.

The full *Academic Plan* is available here: uoft.me/academicplan

Read our *Year One: Progress and Achievements* report here: uoft.me/yearoneprogress

Positioning

U of T Engineering endeavours to be a leader among the world's very best engineering schools. To share the Faculty's message and stories highlighting our educational and research mission and achievements, we have established a number of key communications objectives to guide our outreach to a diverse group of stakeholders, which encompasses students, alumni, faculty, research collaborators, and corporate partners. This includes developing a robust media relations program, rolling out communications strategies to our target audiences as often as possible, using a variety of communications tools incorporating new media platforms and technologies, and developing targeted communications plans to facilitate our dialogue with each of these audiences.

Progress Highlights

- Excelled in all major international rankings and placed #1 in Canada in all of them. Fared particularly well in the 2012 Academic Ranking of World Universities (ARWU) in Engineering/Technology and Computer Sciences; for the sixth consecutive year, U of T Engineering was identified as the top engineering school in Canada, and our international ranking at 13 represented a jump of eight positions from 2011.
- Developed a strategic communications framework to guide our activities for the next three years, positioning U of T Engineering as one of the leading engineering schools in the world, especially with regard to research, innovation and education.
- Made increasing use of technological tools to heighten U of T Engineering's visibility, including video coverage and live-tweeting of key research initiatives and events.
- To further enhance our online presence, developed new websites for The Entrepreneurship Hatchery, Engineering Graduate Studies and Centre for Global Engineering, and renewed sites for the Engineering Career Centre and The Institute for Robotics and Mechatronics.
- Increased the range of media through which our great stories are told.
- Established closer working relationships with key national and international STEM media through personalized outreach to learn their needs and preferences.
- Strengthened ties with the University's central communications teams to realize brand-defining stories for the Faculty and the University. Consulted with senior University officials to ascertain U of T Engineering's role in crisis communications response. This is a first step in developing a Faculty-written protocol by fall 2013.
- Instituted regular meetings of the Engineering Communications Network (ECN), a group of 30-plus professionals responsible for communications across the Faculty. To further share ideas, successes and initiatives, revamped the ECN online hub in response to feedback.

Culture of Excellence

Fostering a culture of excellence is central to the vision of the Faculty of Applied Science & Engineering. We strive to be a leader among the world's very best engineering schools in our discovery, creation and transfer of knowledge and technology through teaching and research. Our overarching vision, our students, faculty and staff, systems and processes, and our resource management enable us to strengthen the foundations of our Culture of Excellence. Together, we contribute towards U of T Engineering's education and research mission and create a diverse and rich environment in which students, faculty and staff can flourish.

Progress Highlights

- Garnered 35.6 per cent of all major international and national awards open to engineering faculty in Canada. Our younger faculty received several of the major awards available to early-career engineers (e.g., Engineers Canada Young Engineer Achievement Award, the Steacie Prize and two Steacie Fellowships) and one of our professors was named one of the Top 35 Innovators Under 35 by the MIT Technology Review. Our more senior faculty members also continued to receive top international and national honours, including the Synergy Award, induction into the Royal Society of Canada and election as Fellows of the American Association for the Advancement of Science.
- Created two new internal awards: the Sustained Excellence in Teaching Award and the Research Leader Award. Both were conferred at our sixth annual Celebrating Engineering Excellence reception in April 2013.
- Welcomed 14 new faculty members in 2012–2013, with at least one in each of our seven academic areas and strengthening all of the Faculty's core research priorities. Of our new hires, four are women.
- Increased the percentage of women faculty across all tenure-stream ranks over the last year: 34.8 per cent Assistant Professors; 21.7 per cent Associate Professors; and, 6.7 per cent Professors. 2012–2013 marks the highest percentage of women faculty in our history, at 16.7 per cent.
- Showcased our newest researchers and educators with a dynamic microsite that helps our ongoing faculty recruitment efforts, bringing wider attention to the diverse and leading-edge research undertaken by our new professors.
- Continued towards our goal of increasing female representation with women comprising 25.4 per cent of our first-year undergraduate class in 2012–2013.
- Held our second Girls' Leadership in Engineering Experience (GLEE) recruitment event in spring 2013. Once again, the event was very successful, with 71 of the 74 attendees accepting their offer to U of T Engineering.
- Sponsored and helped facilitate the first-ever, student-led Women in Science and Engineering (WISE) national conference in May 2013.
- Produced our fifth annual report of performance indicators with data that demonstrates our progress over the past decade, helping Faculty leadership to critically analyze metrics and benchmarks. Also developed our first annual report for donors, peers and other external audiences.

Educating Future Engineers

We currently offer nine fully accredited, highly rated and internationally competitive undergraduate programs and two undergraduate degrees, along with seven highly sought-after graduate programs and four graduate degrees. These programs attract academically strong, culturally diverse students from across Canada and the world. Our goals include: continuing to assess our programs and curricula to ensure we remain relevant and visionary; integrating professional competencies into curricula; increasing flexibility in undergraduate curriculum; supporting opportunities for self-directed learning and participation in extracurricular activities; attracting diverse, outstanding students; reducing dwell time for MASc and PhD students; developing vibrant MEng courses; and, increasing graduate student enrolment to 2,000 by 2015 while reducing undergraduate enrolment to 4,000.

Progress Highlights

- Established a task force to review the first-year curriculum.
- Underwent a full CEAB review of all of our undergraduate programs, resulting in accreditation renewal for every program.
- Created two new undergraduate certificate programs in Mineral Resources and Nuclear Engineering, further strengthening our cross-disciplinary offerings.
- Piloted a Facilitated Study Group program in our T-Program Linear Algebra course.
- Increased scholarship opportunities for undergraduate students and supported the new University-wide President's Scholars of Excellence Program by establishing a $5,000 second-year scholarship partnered with an opportunity to participate in a Faculty mentorship program. Nine exceptional U of T Engineering students received the scholarship in 2012–2013.
- Increased international applicants by 12.7 per cent and applications from women candidates by 10.7 per cent. Applications in 2012 increased by 5.6 per cent overall.
- Welcomed a very strong first-year undergraduate class with an Ontario secondary school entrance average of 91.3 per cent.
- Introduced a MEng in Cities Engineering and Management (MEngCEM) and MEng emphases in Advanced Water Technologies & Process Design and Financial Engineering.
- Increased flexibility for our PhD students with the introduction of a flex-time registration option, and for MEng students with the addition of an extended full-time option.
- Grew the graduate applicant pool by 9 per cent over 2011–2012, sustaining a four-year rising trend.
- Moved closer to achieving our goal of 2,000 graduate students by 2015 with a growth in graduate enrolment to 1,933.
- International students account for 22.5 per cent of our graduate students and 43 per cent of our master's students (full-time equivalent) are in the MEng program.
- Established a minimum stipend rate for all graduate students within the Faculty.
- Furthered our connections to industry through hiring four PEng practitioners to teach four of our MEng courses.

Student Experience

Engineering students' gender and cultural diversity, academic strengths, interests and experiences enrich our dynamic learning and research environment, both in and outside the classroom. We continue to enhance the co-curricular and extracurricular experiences of our students through research, internships, international student exchanges and summer and professional work opportunities. We also continue to strengthen our teaching effectiveness, infrastructure, communications and counselling, as well as academic and personal support systems.

Progress Highlights

- Launched our "First Year Foundations" program in which incoming students have the opportunity to gain exposure to concepts they may not have had in high school, helping them to develop the skills to succeed in university.
- Held our first Exam Jam prior to winter exams to give first-year undergraduates an opportunity to review course material, interact with peers and de-stress.
- Instituted "Just ASK Engineering!" a student-inspired online resource that answers questions on a wide range of topics such as University services, facilities and finances.
- Rolled out a cross-Faculty digital sign initiative, strategically placing 13 VDT boards in various locations throughout the Engineering precinct to proactively inform our students of the many events and activities taking place within the Faculty throughout the year.
- Created an Engineering Career Portal to help students manage their work-term records, applications, interviews and registrations, and developed a communications plan to enhance the profile of the PEY program.
- Pioneered the use of an 'animated whiteboard' video as well as a promotional campaign to encourage international exchanges for U of T Engineering students. As a result of the campaign, applications for international exchanges increased by 68 per cent over the previous academic year.
- Welcomed 123 Brazilian students to U of T Engineering as part of the Science Without Borders program.
- Established the Globex (global) exchange program with Peking University and other consortium partners such as Stanford University and the University of Cambridge, which allows for reciprocal educational exchanges and research collaborations.
- Hosted a meeting of the Community of Practice for Leadership Education for Twenty-First-Century Engineers in October in which more than 35 North American educators and industry professionals shared ideas and best practices on how to develop a leadership culture in engineering. This pivotal two-day symposium was an initiative of the Faculty's Institute for Leadership Education in Engineering (ILead).

Research Foci

U of T Engineering supports a vibrant research community, situated within a research-intensive, preeminent university. Our faculty members attract funding, participate in major research initiatives, build and lead spin-off companies and collaborate with key industrial sectors. Through our research endeavours, we create knowledge and technologies and share these results with local, national and international research communities, and with industry, through publications, patents and technology transfer. Our goals include creating and supporting research centres around strategic themes, increasing our research funding base through Tri-Council and other competitive funding sources, increasing our complement of Canada Research Chairs, Industrial Research Chairs and Endowed Chairs, and supporting our junior faculty and emerging research leaders through raising awareness and promoting their research contributions. Particular emphasis is placed on expanding our partnerships with industry and solidifying our leadership role within the research community.

Progress Highlights

- Generated a series of peer-to-peer panel discussions to exchange ideas, insights and guidance, in order to help investigators maximize potential funding opportunities.
- Increased operating research funding to its highest level yet at $57.1 million.
- Established the role of Director of Corporate Partnerships to further our engagement with industry and organized our first annual Faculty-wide reception for industry partners in November 2012.
- Secured four new Tier 2 Canada Research Chairs (CRCs).
- Launched the Research Impact Narratives, a special seminar series in which U of T Engineering researchers share their research stories and discuss the impact of their work with other U of T faculty and staff. Through this series, we are also developing a library of stories of tangible research impacts for broader dissemination to both internal and external audiences.
- Created a research communications plan to assist the Faculty to effectively tell the stories of initiatives that have a deep impact, which includes a podcast series and media training for faculty.

Outreach, Collaboration & Influence

Our reach and influence extend beyond the Faculty and the University. From Toronto communities to peer international institutions, Canadian high schools to industry, or professional journals to alumni and donors, U of T Engineering continues to develop broad collaborative circles. Our outreach efforts, research and teaching collaborations, recognized achievements, and meaningful innovations strengthen our ability to recruit top scholars and academically strong students. Our goals to guide and keep us on our upward trajectory include the constant assessment and refinement of our pre-university outreach activities, and developing mechanisms for engagement and for crystalizing our relationships with cognate Faculties, industry partners, alumni and peer institutions, both across Canada and internationally.

Progress Highlights

- Hosted "An Afternoon of Engineering Innovation" to showcase the wide range of innovative, visionary and entrepreneurial ideas of our students and faculty. The event was attended by more than 600 alumni, donors, corporate partners, students, faculty and staff.
- Launched the Engineering component of Boundless: The Campaign for the University of Toronto in September, and a partner faculty and staff campaign initiative entitled Boundless Dedication in April 2013.
- Renewed our Engineering Alumni & Friends website using a mobile-friendly platform and social media to enhance our ability to engage alumni.
- Developed a corporate brochure and integrated series of department-centric and research inserts, scheduled for release in mid-2013.
- Hosted a record of 52 alumni events across the world, which included events in Singapore, Kuala Lumpur, Hong Kong and the San Francisco Bay Area, providing alumni, students, parents and supporters with an opportunity to meet or become reacquainted with the Dean and other faculty members.
- Honoured 13 Engineering alumni with Arbor Awards in recognition of their outstanding volunteer service to U of T.

Resource Allocation

Adequate resources are an integral part of achieving the goals outlined in our *Academic Plan*. Enhancing and creating efficiencies in academic time, physical space, administrative and technical staff, and budgets are key to the process that must, at all times, support our academic goals.

Progress Highlights

- Increased total revenues by 7 per cent to $170.3 million in fiscal year 2012–2013.
- Raised $12.2 million in philanthropic support during the 2012–2013 fiscal year, which includes $9 million in gifts and $3 million in grants.
- Hired Montgomery Sisam Architects (MSA) in partnership with U.K.-based Feilden Clegg Bradley Studios to design the Centre for Engineering Innovation & Entrepreneurship, the capstone aspiration of our Boundless campaign.
- Expanded space functionality through classroom upgrades and lab renovations, including making upgrades to the Pratt Building cleanroom, lab renovations in the Mechanical Engineering, Rosebrugh and Wallberg buildings as well as for the Drinking Water Research Group, and completed renovations to create new facilities to better accommodate BioZone on St. George campus, and the Centre for Industrial Application of Microcellular Plastics in Mississauga.
- Added 1,889 net assignable square metres (NASMs) to our total footprint. Much of the additional space is attributable to the Microsatellite Science and Technology Centre, which opened at UTIAS in 2012.
- Embarked on an evaluation of our undergraduate teaching laboratory spaces. This is the final stage of our facilities audit, having completed audits of our student club and study spaces and meeting rooms in previous years.
- Instituted the Engineering Instructional Innovation Program (EIIP). As an extension of the Dean's Strategic Fund, EIIP supports initiatives that enhance our undergraduate courses on a broad scale. EIIP funds can be utilized to develop resources, acquire additional teaching assistance, undertake limited re-modeling of space to facilitate course delivery, or to acquire training, equipment or supplies.

Comparison of U of T Engineering with Ontario and Canada, 2012–2013

The table below compares U of T Engineering metrics against those of engineering Faculties in Ontario and Canada for 2012–2013. Within Canada, we awarded approximately 8 per cent of all undergraduate engineering degrees and 10 per cent of all engineering PhD degrees this past year.

While our provincial and national percentage of faculty members remains relatively low, our internationally renowned scholars have garnered the single largest portion of Natural Sciences and Engineering Research Council (NSERC) engineering funding, and received more than 60 per cent of the major awards granted to Ontario institutions, and over 35 per cent of those awarded to Canadian engineering schools in 2012–2013.

	U of T Engineering	Ontario	U of T % of Ontario	Canada	U of T % of Canada
Undergraduate					
Enrolment (FTE)	4,488	28,863	15.5%	69,701	6.4%
Degrees Awarded	962	5,326	18.1%	12,191	7.9%
% Women	23.6%	18.8%		18.2%	
Master's (MEng, MASc and MHSc)					
Enrolment (FTE)	870	4,715	18.5%	12,594	6.9%
Degrees Awarded	482	2,262	21.3%	5,157	9.3%
% Women	22.2%	21.7%		22.5%	
Doctoral (PhD)					
Enrolment (FTE)	751	3,027	24.8%	8,555	8.8%
Degrees Awarded	115	494	23.3%	1,156	9.9%
% Women	27.0%	23.7%		20.6%	
Faculty					
Tenured and Tenure-Stream	221	1,496	14.8%	3,625	6.1%
Major Awards					
Major Awards Received	26	42	61.9%	73	35.6%
Research Funding					
NSERC Funding for Engineering	$29.9M	$123.6M	24.2%	$330.7M	9.0%

Note: Unlike the data contained in the rest of this report, enrolment (Full-Time Equivalent, or FTE) and degrees awarded statistics are based on the 2012 calendar year and come from Engineers Canada (www.engineerscanada.ca). Faculty data (tenured and tenure-stream) are based on November 2012 counts by Engineers Canada. Major awards and research funding statistics are based on the 2012–2013 grant year (April 2012 to March 2013).

Comparison of U of T Engineering with St. George Campus and University of Toronto, 2012–2013

The following table compares U of T Engineering with the University of Toronto based on key metrics for 2012–2013. Since our activities are concentrated on the St. George campus, we also present our relative metrics where possible.

	U of T Engineering	St. George Campus	Engineering % of Campus	University of Toronto	Engineering % of U of T
Student Enrolment					
Undergraduate	5,241	37,431	14.0%	60,415	8.7%
Professional Master's (MEng and MHSc)	544	6,011	9.1%	6,369	8.5%
Research Master's (MASc)	587	2,727	21.5%	2,873	20.4%
Doctoral (PhD)	802	5,660	14.2%	6,215	12.9%
All Students	7,174	51,829	13.8%	75,872	9.5%
Degrees Awarded					
Undergraduate	966	8,188	11.8%	12,117	8.0%
Professional Master's (MEng and MHSc)	271	2,573	10.5%	2,782	9.7%
Research Master's (MASc)	212	1,228	17.3%	1,270	16.7%
Doctoral (PhD)	107	830	12.9%	879	12.2%
Total Degrees	1,556	12,819	12.1%	17,048	9.1%
Faculty and Staff					
Professoriate	238			2,787	8.5%
Administrative and Technical Staff	293			5,958	4.9%
Research Funding					
Sponsored Research Funding	$63.3M			$395.5M	16.0%
Industry Research Funding	$7.0M			$17.4M	40.2%
Space					
Space (NASMs)	63,942	633,023	10.1%	807,794	7.9%
Revenue					
University-wide Costs	$55.0M			$451.6M	12.2%
Total Revenue	$170.3M			$1,574.0M	10.8%

Note: Student enrolment is shown as of November 1, 2012. Degrees awarded are based on the 2012–2013 academic year. Professoriate includes tenured, tenure-stream and teaching-stream faculty members. Administrative and technical staff include full- and part-time staff. Research funding is based on the 2011–2012 grant year (April to March). Space is measured in Net Assignable Square Metres (NASMs). Revenue is based on the 2012–2013 U of T fiscal year (May to April).

1 Undergraduate Studies

This year was significant for undergraduate studies in several ways. We reached our highest entering average on record, as well as a 10-year high in our percentage of female students. Our recruitment efforts continue to yield results, as shown in a 6.6-per-cent increase in applications. A decade ago, 5 per cent of our undergraduates came from outside of Canada; today, more than a quarter of our entering class were international students. Our retention rate also improved over previous years.

Several factors account for these strong outcomes. The increase in the percentage of female students stems from a focused strategy to attract more women to undergraduate studies. Events such as GLEE (Girls' Leadership in Engineering Experience) — which brought together more than 100 newly admitted female students for a weekend of social activities, discussion and networking — help to foster a welcoming atmosphere and community.

Our exceptionally high entering average of 91.3 per cent is a testament to our ability to attract the nation's — and the world's — top students. Our recruitment initiatives, reputation for excellence and increased curricular and co-curricular opportunities for incoming students all play a role in attracting scholars of the highest calibre.

The improved retention rate is directly related to better-prepared incoming students, our exciting curriculum offerings and the supportive environment fostered by our dedicated First Year Office counsellors and initiatives. Together, these factors help our students transition successfully to university and throughout their first year of studies.

We continue to enhance student experience by providing engaging opportunities to our undergraduates. Our goal is to ensure they acquire the skills and competencies to succeed, whatever path they take after graduation. This year, a record number of students chose to intern through the Professional Experience Year (PEY) program, and we expect this positive trend to continue.

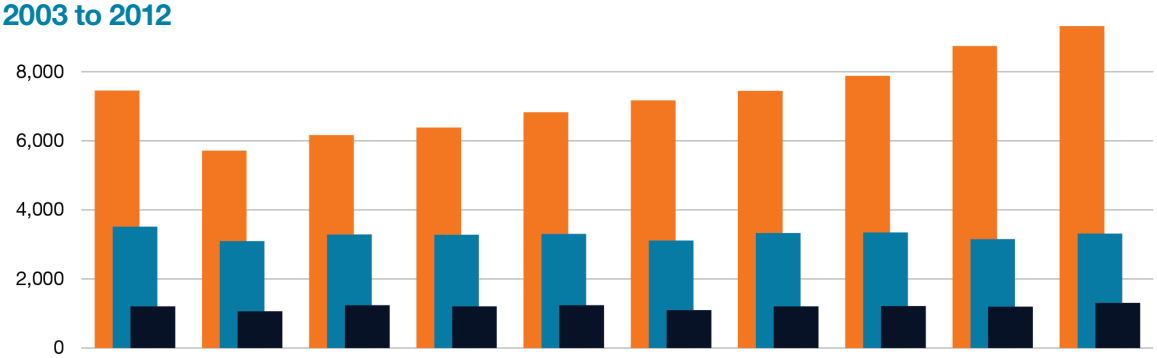
Undergraduate Admissions and First-year Students

Our first-year class was our strongest on record in 2012, as the entering average of Ontario Secondary School students rose to 91.3 per cent. The number of applicants also reached a historic high at 9,326, up from 8,745 in 2011. This larger pool of applicants allowed us to be more selective than ever before, with more offers accepted, represented by a yield of 39 per cent.

Our retention rate also improved, reaching a 10-year high of 0.937. Retention increases when the quality — entering average and preparedness for university — of the first-year class improves. Initiatives like First Year Foundations, Success 101, first-year math support and our substantial counselling program (e.g., embedded counsellors, an international transition advisor, a learning strategist and a wellness coordinator) also contributed to higher retention.

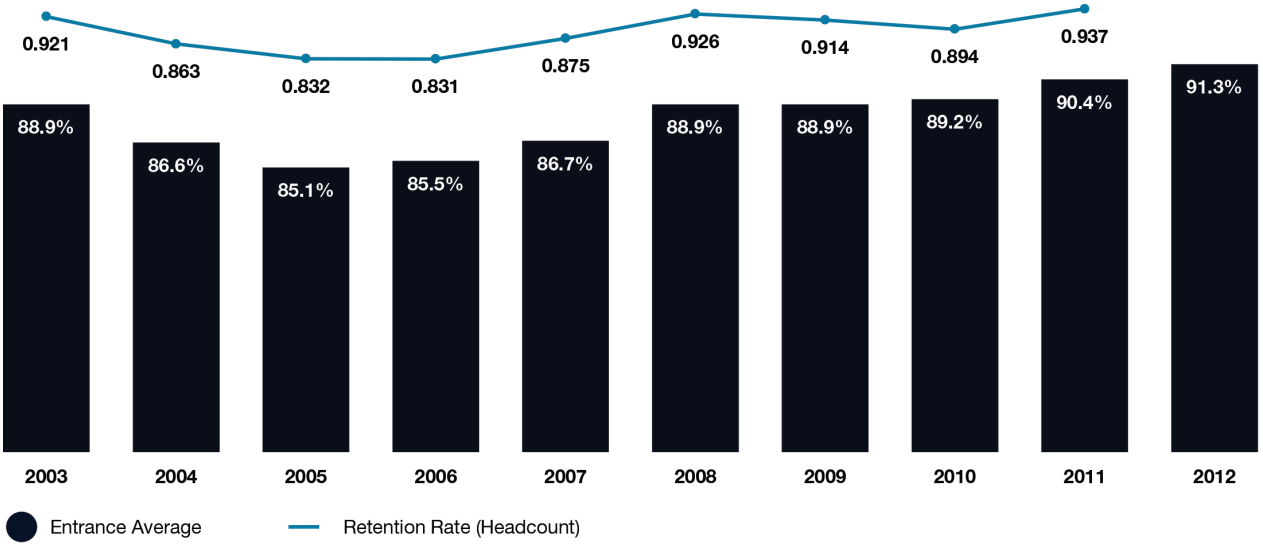
Through our First Year Office, we also proactively engage students who are underperforming on tests to meet with a counsellor to discuss success strategies. In addition, the T-program gives students who do not pass all their courses the opportunity to complete their first-year requirements without falling behind the rest of their class.

Figure 1.1 **Applications, Offers, Registrations, Selectivity and Yield of First-year Undergraduates, 2003 to 2012**



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Applications	7,454	5,715	6,163	6,383	6,829	7,173	7,446	7,881	8,745	9,326
Offers	3,513	3,094	3,290	3,276	3,300	3,107	3,329	3,347	3,149	3,309
Registrations	1,200	1,064	1,236	1,201	1,235	1,090	1,201	1,213	1,191	1,300
Selectivity	0.47	0.54	0.53	0.51	0.48	0.43	0.45	0.42	0.36	0.35
Yield	0.34	0.34	0.38	0.37	0.37	0.35	0.36	0.36	0.38	0.39

Figure 1.2 **Ontario Secondary School Averages of Incoming First-year Undergraduates and Retention Rate Between First and Second Year, 2003 to 2012**



Note 1.1: Student counts are shown as of November 1. Applications and offers are for the fall admission cycle.
Selectivity = Offers ÷ Applications; the proportion of applicants who were offered admission. Yield = Registrations ÷ Offers.
Note 1.2: Entrance average is calculated based on Ontario Secondary School students. Retention Rate is based on November 1 enrolment.

Diversity is a growing strength of our Faculty and incoming first-year students reflect this more than ever before; over 25 per cent are women, and nearly 27 per cent come from outside Canada. Diverse international students enrich the learning experience for everyone. We are actively building a global educational environment — rich with varied perspectives — in which our students can thrive. This is an important part of preparing our students to work in a global economy.

The diversity of our applicant pool is due in part to our growing international reputation and enhanced recruitment initiatives, including: continued applicant relations events in regions like Turkey, United Arab Emirates (UAE), Asia and India; use of video conferencing with prospective students; collaboration with other Faculties at U of T to expand our reach worldwide; and, building stronger relationships with educators in international schools. We also redeveloped recruitment materials and the Discover Engineering website (discover.engineering.utoronto.ca) to align with Boundless messages. To read more about these new promotional materials, please see the Communications chapter.

Our International Foundation Program (IFP), now in its third year, continues to draw highly qualified international students. We welcomed 31 IFP students in 2012–2013, up from 26 last year. This program allows students who are academically strong but have lower English facility scores to be conditionally admitted to the Faculty as non-degree students. Students in this program must complete an intensive eight-month English language program and also complete the Engineering Strategies and Practice course series to continue in a program of study.

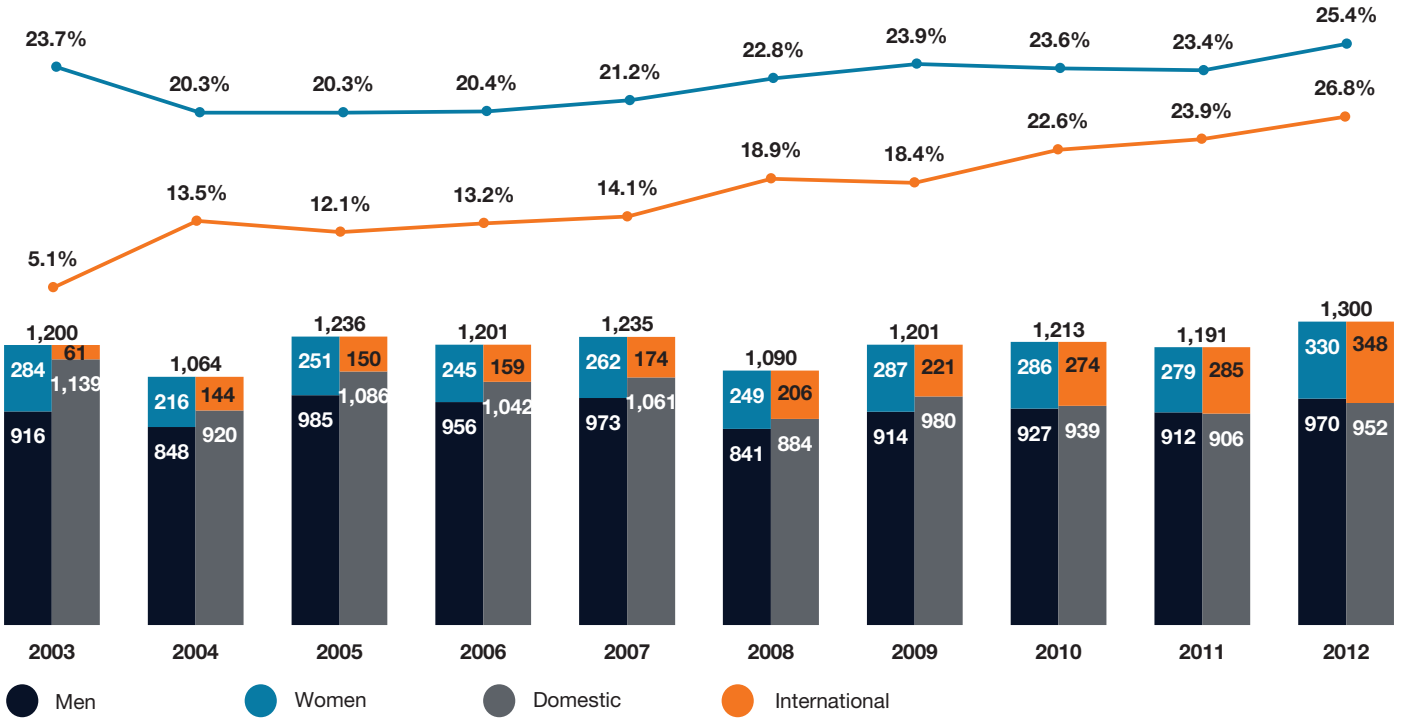
As the number of our international students grows, so do our efforts to ensure they adapt successfully into a new learning and cultural environment. Our International Student Ambassador Program, for example, connects new international students with upper-year engineering students to help ease them into a new community, city and country.

The increase in female enrolment is also an encouraging sign and can be attributed to a number of factors. For example, the new Girls' Leadership in Engineering Experience (GLEE) weekend held in May 2012 attracted nearly 100 newly admitted female students. This initiative aims to empower female students who are about to join a community where women are at the forefront of engineering leadership and innovation. In 2012, 82 per cent of those who attended the GLEE event ultimately chose to attend U of T Engineering in the fall.

We also held a number of other on-campus recruitment events at various stages of the applicant cycle to attract the best local students to U of T Engineering, including Fall Campus Day, March Break Applicant Event and Welcome to Engineering.

Together, these collaborative efforts position U of T Engineering as a first-choice destination for high-performing students of every kind from across the world.

Figure 1.3 **Incoming First-year Undergraduates with Percentage of Women and International Students, 2003 to 2012**



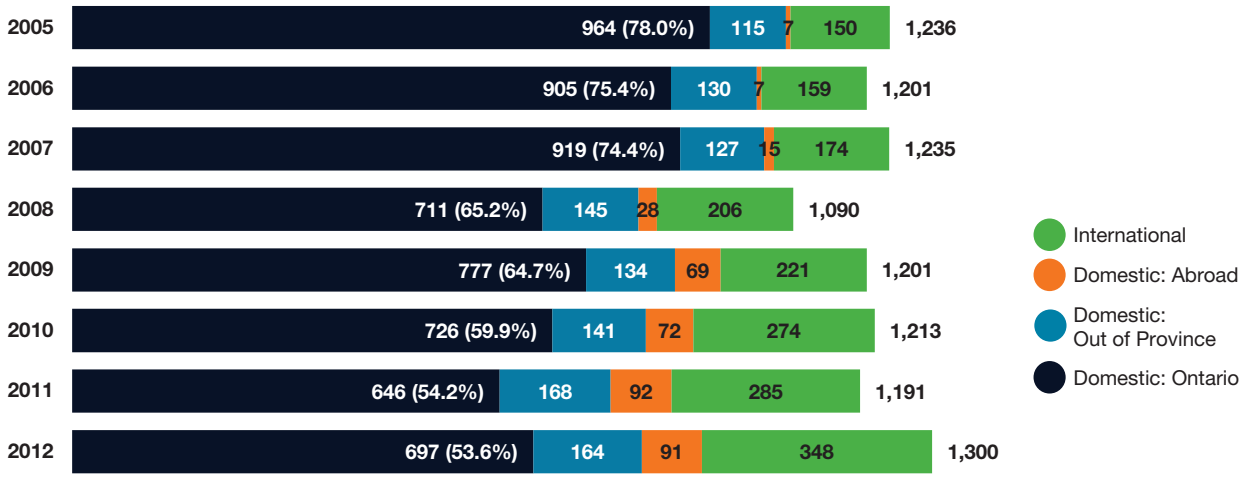
Note 1.3: Student counts are shown as of November 1.

We continue to draw high numbers of applicants from across Canada and around the world, thanks to our dynamic recruitment efforts and consistent placement as the top engineering school in the country. Total undergraduate enrolment grew by 3 per cent in 2012–2013, mostly due to an increase in international students.

The proportion of out-of-province students also continues to rise. To enhance our Canadian recruitment efforts, we held receptions for grade 9 and 10 students and their families during our visits to Western Canada to cultivate and nurture relationships with future applicants.

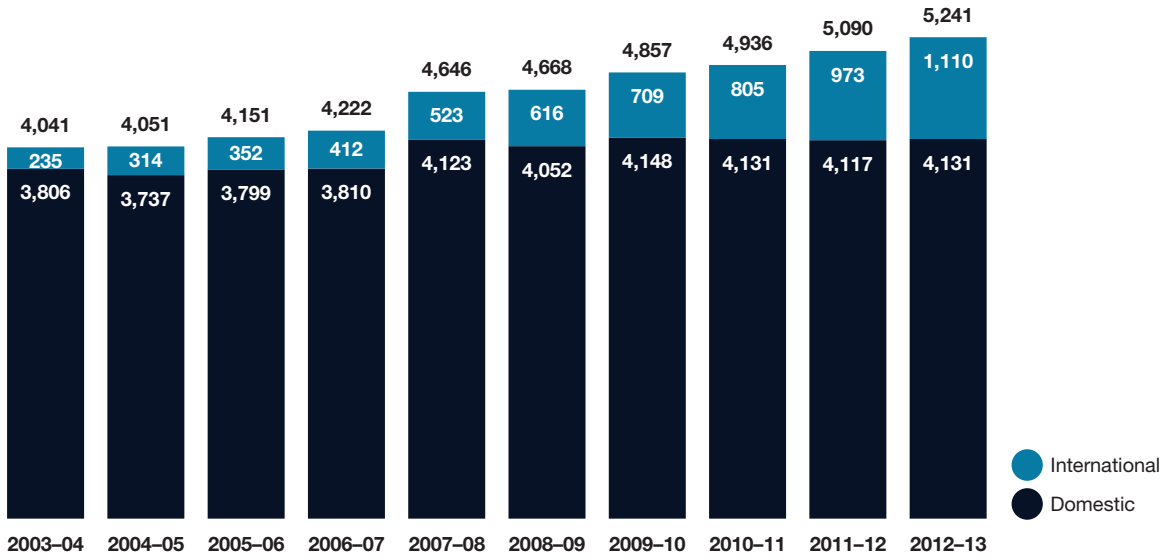
The overall rise in our first-year class resulted from the higher yield on offers in 2012 and to an increase in highly qualified applicants compared to previous years. In building each class, we will continue to work toward shifting the balance between undergraduate and graduate students to achieve our longer-term goal of a 60:40 ratio.

Figure 1.4 **Incoming First-year Domestic and International Undergraduates, 2005 to 2012**



Undergraduate Enrolment

Figure 1.5 **International and Domestic Undergraduate Enrolment, 2003–2004 to 2012–2013**

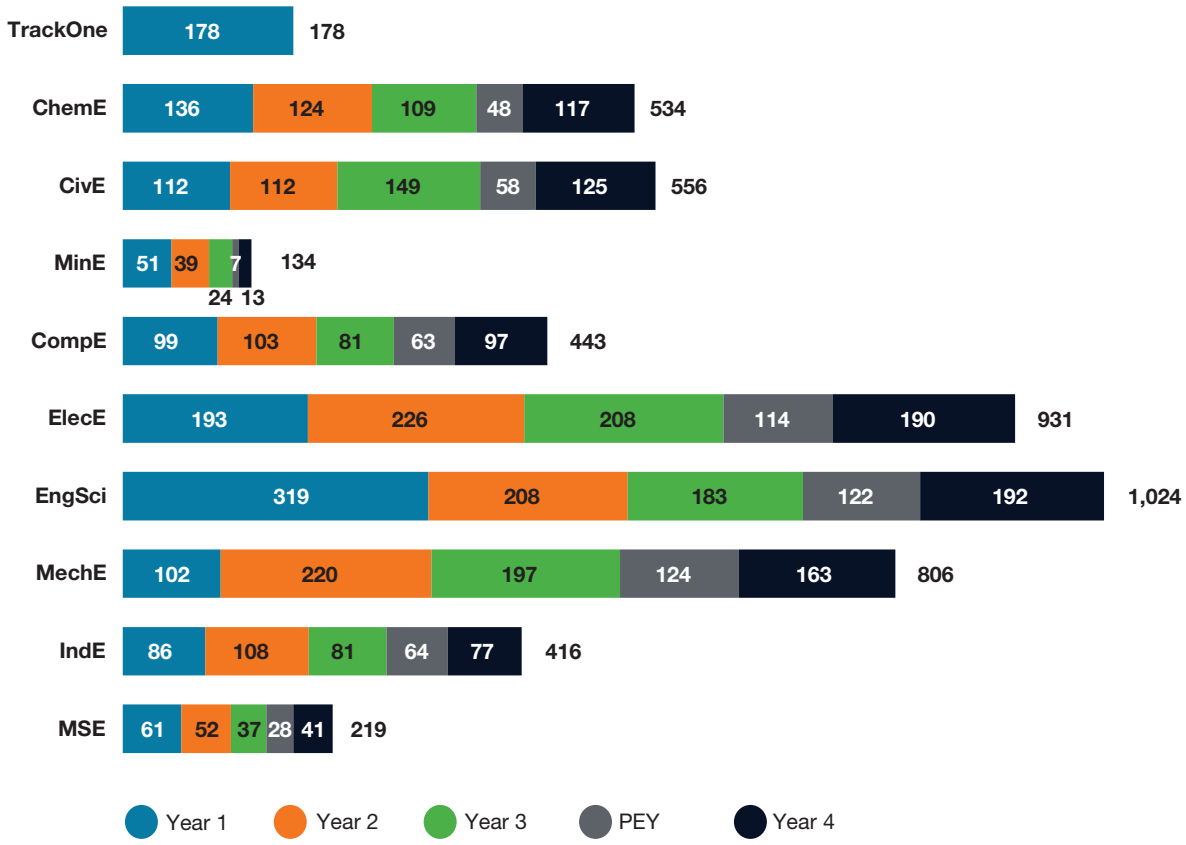


Note 1.4: Domestic students are defined as citizens or permanent residents of Canada. Student counts are shown as of November 1.
Note 1.5: Includes full- and part-time students and those on PEY internship. Does not include students with special (non-degree) status. Student counts are shown as of November 1.

Our Engineering Science program experienced significant growth over the past year (shown in Figure 1.7), with enrolment increasing from 940 students in 2011–2012 to 1,024 in 2012–2013. Engineering Science is a unique, academically rigorous program that enables students to specialize in one of eight majors in their third and fourth years. Last year, the Biomedical Systems Engineering major replaced the Biomedical Engineering major, and the Manufacturing Systems major phase-out is nearly complete.

Interest in the Electrical and Computer Engineering major continues to grow, fuelled by the strength of the software industry and the increasing popularity of mobile devices and apps. Mathematics, Statistics and Finance — one of our newer majors — has also attracted more students as an area of specialization.

Figure 1.6 **Undergraduates by Program, Year of Study and Professional Experience Year (PEY), 2012–2013**



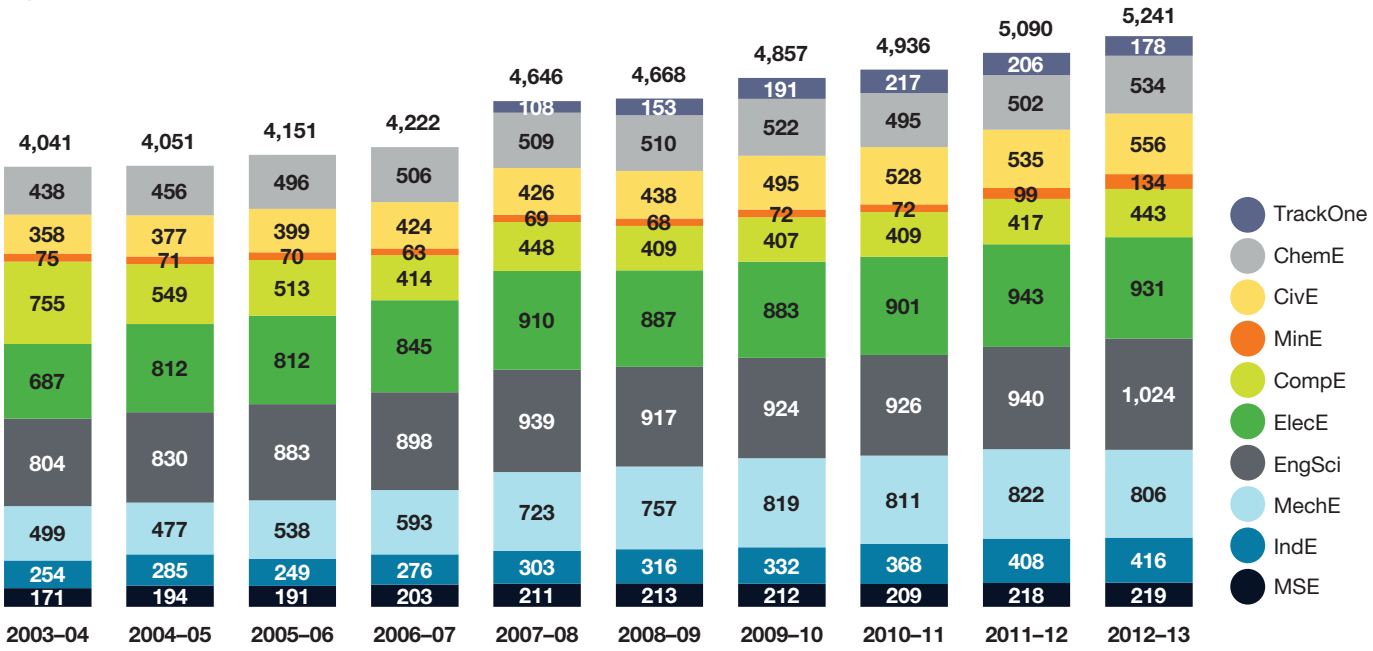
Engineering Science Majors	Enrolment
Aerospace Engineering	67
Biomedical Engineering	42
Biomedical Systems Engineering	30
Electrical and Computer Engineering	157
Energy Systems	57
Infrastructure Engineering	51
Manufacturing Systems	1
Mathematics, Statistics and Finance	51
Nanoengineering	15
Physics	24
Total	**495**

Note 1.6: The Electrical and Computer Engineering major for EngSci students includes those enrolled in the separate Electrical Engineering and Computer Engineering majors that are now combined. The Manufacturing major has been phased out, but has one student who is completing the last year.

Like the EngSci program, the Lassonde Mineral Engineering program numbers also rose significantly, almost doubling since 2010–2011. Toronto's reputation as a global hub for the mining industry is a likely contributor to the increased interest in mineral engineering, both among incoming students and those selecting their area of study after the TrackOne first-year program. This increase in mineral engineering graduates also fills an important need in the mining industry.

Most other programs stayed relatively constant, maintaining healthy enrolments.

Figure 1.7 **Undergraduates by Program, 2003–2004 to 2012–2013**



Undergraduate Funding

Students need to be able to concentrate on their academic careers without financial concerns. Therefore, undergraduate funding support is essential. Funding for students comes from a variety of sources such as individual donors and the University-wide UTAPS program (University of Toronto Advanced Planning for Students). In 2012–2013, the number of students receiving financial awards decreased for the third consecutive year, to 1,655 from 1,662. The decrease may, in part, be a reaction to the continued recovery of the North American economy. The amounts shown in this chapter do not include merit-based awards, or funding received from provincial assistance programs such as the Ontario Student Assistance Program.

As shown in Figure 1.8b, the total value of undergraduate need-based awards declined from $8.1 million to $7.6 million in 2012–2013. The distribution of this funding across years has stayed relatively constant, reflecting our commitment to support undergraduates throughout their studies. First-year students continued to receive almost 30 per cent of need-based awards while students in higher years received 23 to 24 per cent.

Note 1.7: Student counts are shown as of November 1.

Figure 1.8a **Number of Awards Received by Cohort with Total Number of Undergraduate Need-based Award Recipients, 2003–2004 to 2012–2013**

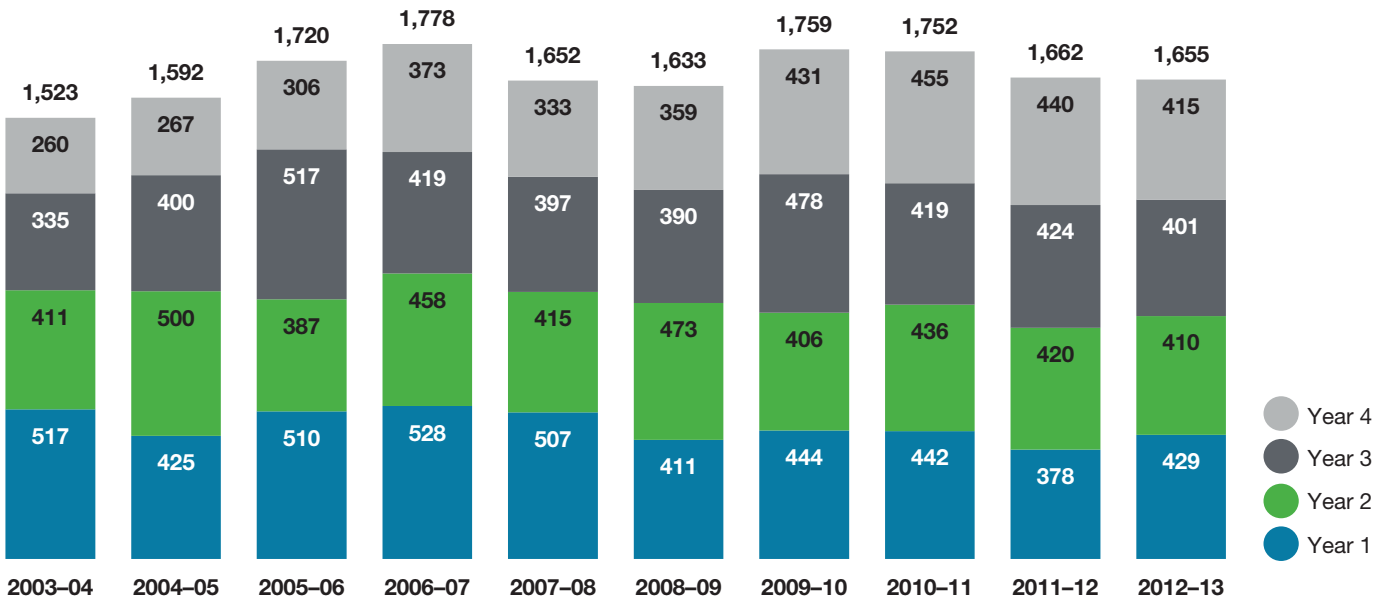
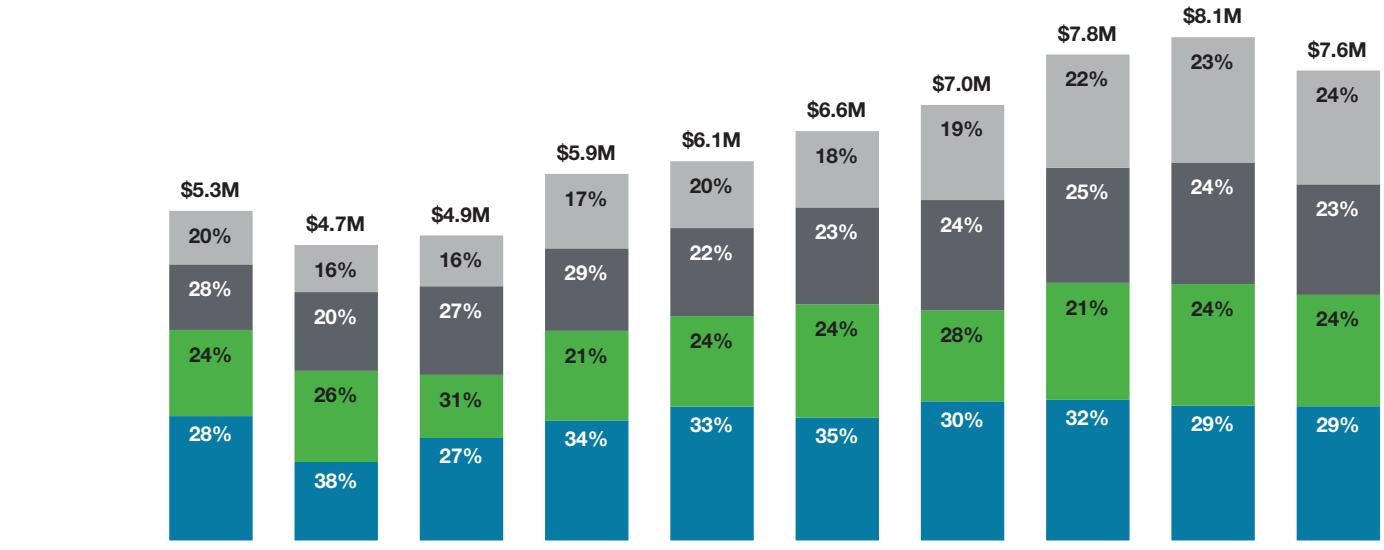


Figure 1.8b **Total Value of Undergraduate Financial Assistance and Percentage Distributed by Year of Study, 2003–2004 to 2012–2013**



	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Year 4	$860,831	$754,720	$816,316	$1,197,276	$1,073,536	$1,228,910	$1,531,968	$1,821,597	$2,015,187	$1,833,231
Year 3	$1,052,717	$1,264,981	$1,426,552	$1,325,499	$1,415,723	$1,560,064	$1,776,940	$1,853,184	$1,954,694	$1,775,729
Year 2	$1,384,072	$1,468,644	$1,013,770	$1,439,972	$1,457,171	$1,818,818	$1,456,683	$1,878,336	$1,955,606	$1,789,788
Year 1	$2,001,301	$1,261,554	$1,649,482	$1,929,947	$2,153,035	$1,977,494	$2,240,004	$2,262,988	$2,167,486	$2,159,980
Total	$5,298,921	$4,749,898	$4,906,119	$5,892,694	$6,099,465	$6,585,285	$7,005,595	$7,816,104	$8,092,973	$7,558,729

Note 1.8a and 1.8b: Data reported by academic year (September to August).

Degrees Awarded

U of T grants two types of degrees to engineering undergraduates: Bachelor of Applied Science (BASc) and Bachelor of Applied Science in Engineering Science (BASc EngSci). Though a degree normally spans four years, factors such as a Professional Experience Year (PEY) internship and program flexibility (e.g., pursuing optional minors or certificates) lead students to take more time to complete their program requirements.

The number of undergraduate degrees awarded in 2012–2013 was up slightly over the previous year. EngSci and ECE both experienced a large increase in graduates.

Shown in Figure 1.9b, nearly eight out of every 100 Canadian engineering graduates were from U of T. Our EngSci and MSE departments have exceptionally high ratios because comparable programs are offered at fewer institutions across Canada and North America.

Figure 1.9a **Undergraduate Degrees Awarded by Program, 2003–2004 to 2012–2013**

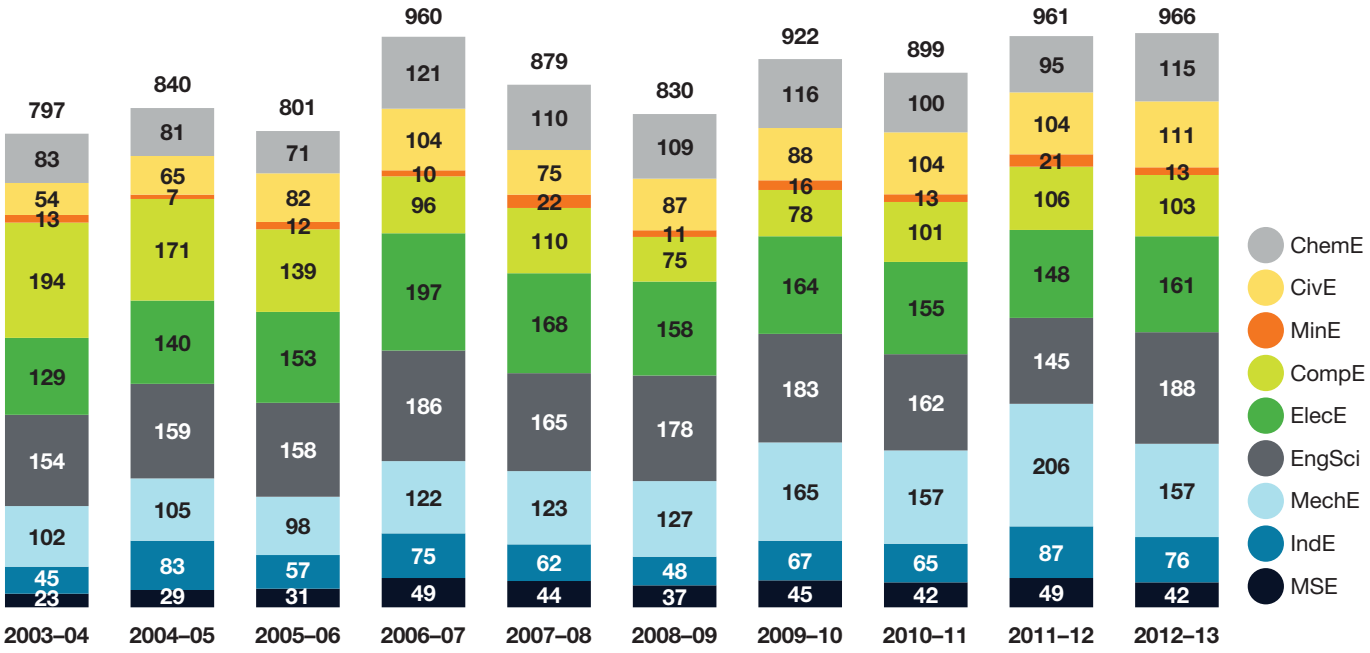
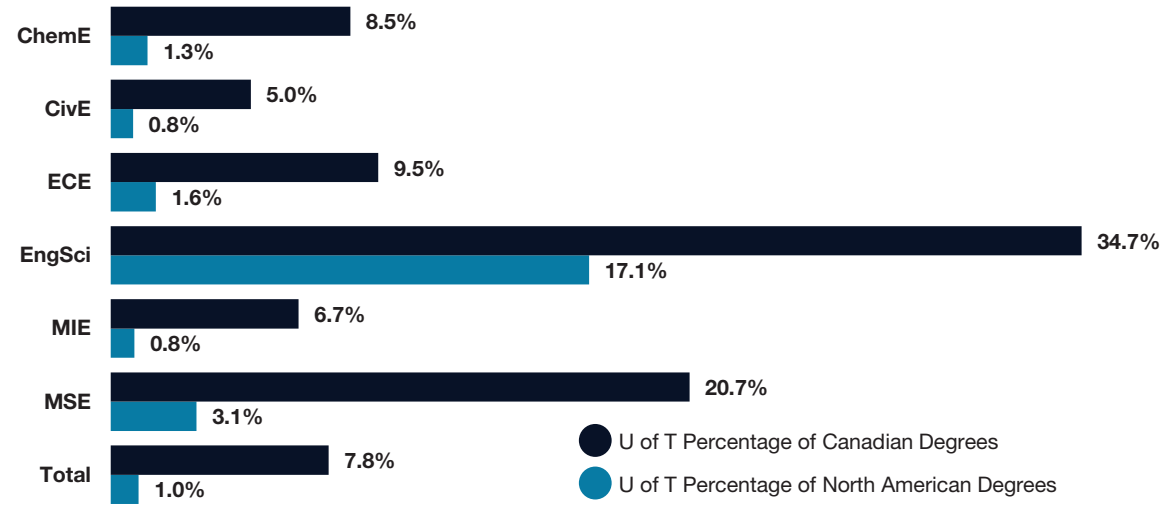


Figure 1.9b **U of T Engineering Degrees Awarded by Academic Area Compared with Canadian and North American Degree Totals, 2011**



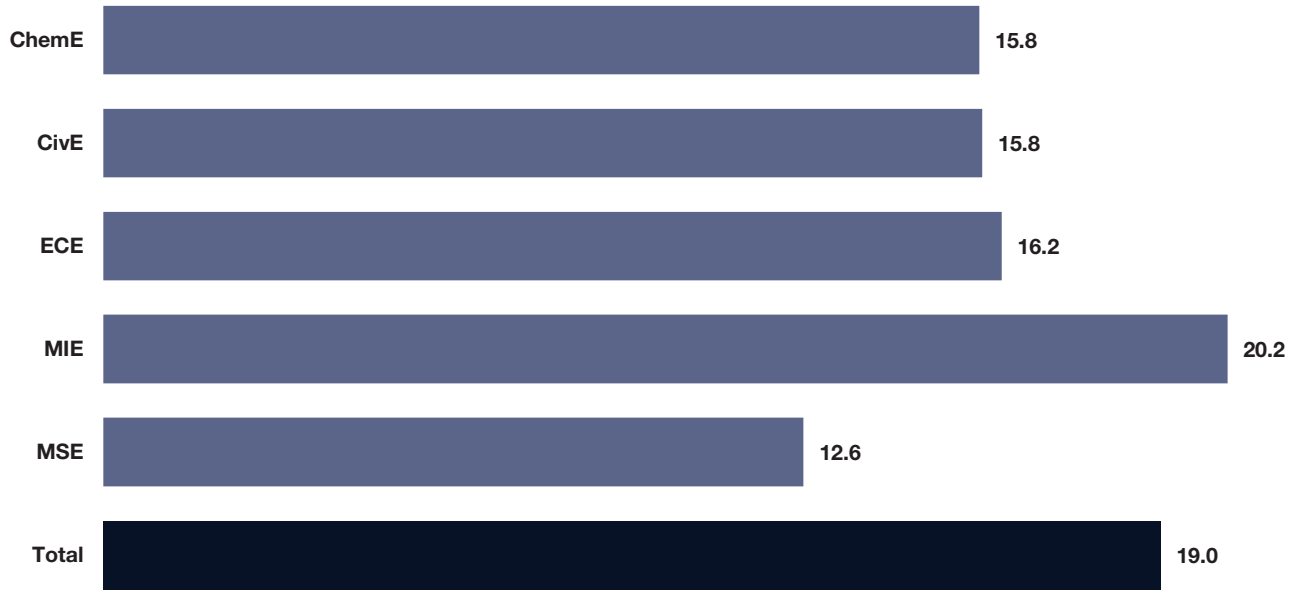
Note 1.9a: Data reported by academic year (September to August).
Note 1.9b: Data sourced from reports produced by Engineers Canada and the American Society for Engineering Education. Total percentages represent all engineering degrees in North America, including those in fields that are not specifically identified at U of T.

Student-Faculty Ratios

Figure 1.10 shows the number of undergraduates registered in each of our departments relative to the number of teaching faculty in that department. 'Total' is higher because it represents all students, including those in EngSci and TrackOne. The higher total ratio also reflects the collaborative and cross-Faculty approach we take to teaching.

MIE's ratio is higher than other areas because the department has seen a steady rise in students over the past few years. We are actively hiring faculty to gently increase resources in response to this trend.

Figure 1.10 **Undergraduate Student-Faculty Ratios by Academic Area, 2012–2013**



Note 1.10: Student enrolment (headcounts) is based on November 1 data. Students with special status and those on Professional Experience Year (PEY) are not included in ratio calculations. No adjustment has been made for departmental contributions to shared first-year curriculum, Engineering Science or cross-Faculty minors. Faculty counts are based on data from the 2011–2012 academic year, and include tenured or tenure-stream faculty and lecturers or teaching-stream faculty.

Improving the Undergraduate Experience

At the end of every undergraduate course, we encourage students to provide feedback through an evaluation form. Most of the questions posed are scored out of seven. Figure 1.11 shows the results of a question asking students to provide an overall rating of their instructor. As illustrated in the table, results using this methodology have been relatively consistent from year to year.

Starting in the fall of 2013, we will be moving to a new professionally validated evaluation system, designed to give both summative and formative feedback on teaching. It will inform our leadership about how well instructors are meeting the teaching needs of our students; it will also provide input on ways to improve. The core questions for the evaluation system are being deployed across the University, allowing for broad comparisons and better sharing of best practices. The new system will enable students to respond on their mobile devices for increased convenience. This online approach also reduces the cost of the evaluation process, and produces data quickly and in a form that can be mined more effectively. The reports generated for an instructor will be comprehensive and include both numerical and visual data on their course experience from the students' perspective.

The implementation of the Co-Curricular Record (CCR) will also be beneficial for our students. This is an official U of T document that recognizes students' co-curricular involvement as a significant part of their university experience. It will be available on an opt-in basis beginning in September 2013. Among its features is a search tool that will allow students to seek activities based on the skills they would like to gain, time commitment and interest. For more information, please visit ccr.utoronto.ca.

Figure 1.11 Undergraduate Course Teaching Evaluations by Academic Area, 2005–2006 to 2012–2013

	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
First Year	5.21	5.30	5.23	5.41	5.33	5.43	5.52	5.38
UTIAS	5.51	5.46	5.50	5.39	5.57	5.58	5.72	5.54
ChemE	5.23	5.33	5.33	5.32	5.45	5.51	5.27	5.33
CivE & MinE	5.47	5.40	5.36	5.46	5.33	5.29	5.19	5.39
ECE	5.46	5.44	5.67	5.57	5.69	5.73	5.71	5.66
MIE	5.28	5.23	5.33	5.42	5.39	5.42	5.19	5.34
MSE	4.98	5.15	5.21	5.36	5.42	5.39	5.36	5.51
Other	5.08	5.15	5.39	5.54	5.54	5.26	5.43	5.58
Faculty Average	**5.28**	**5.32**	**5.38**	**5.44**	**5.46**	**5.47**	**5.42**	**5.46**

Note 1.11: 'First Year' includes courses from all departments. Departmental evaluation results are based only on courses taken by second-, third- and fourth-year students. Each department's results include any courses taught by that area specifically for the EngSci program. 'Other' includes upper-year courses with the following designations: APS, BME, MAT, PHY, CSC, STA and HPS, as well as EngSci major seminars, capstone courses and theses.

Engineering Career Centre

The Engineering Career Centre is a hub for student career development. The Centre administers several programs, including the Professional Experience Year (PEY) internship program, the Engineering Summer Internship Program, the Transportation Career Development Program and the Graduate Enterprise Internship Program, which is described in the Graduate Studies chapter.

PEY is one of the largest undergraduate paid internship programs in Canada. Second- and third-year students apply for 12- to 16-month internships where they can apply their knowledge in a project-based, professional environment. The PEY program adds tremendous value to student experience; they complete their internships with newfound skills and connections — and often with job offers. PEY also inspires students to think differently about academics upon their return to school. For example, Mary Qiu (IndE 1T3 + PEY) drew on her internship at St. Michael's Hospital for her award-winning essay in the Health Council of Canada's nation-wide Health Innovation Challenge.

As shown in Figure 1.12a, the proportion of eligible students choosing to intern through the PEY program was at an all-time high in 2012–2013. Collectively, these 631 PEY students earned more than $35 million in salaries. Year-over-year increases in participation since the economic downturn are a direct result of bringing a greater awareness of the program to students earlier in their academic careers through improved communications, such as video and a more effective website. To further enhance the experience of students on PEY (or other work-related programs), we introduced a new Engineering Career Portal in fall 2012. This online system efficiently manages work-term records, applications, interviews and event registrations for students.

As the number of participating students has increased in the past few years, so has the number of employers. Our enhancement in employer relations is due to our efforts to establish new partnerships and maintain existing connections within industry both locally and internationally. Among our PEY employers are a growing number of companies in the financial industry, as well as start-up companies looking for interns with fresh ideas and perspectives.

Figure 1.12a **PEY Internship Placements for Engineering Undergraduates with Percentage Participation from Previous Third-year Class, 2004–2005 to 2012–2013**

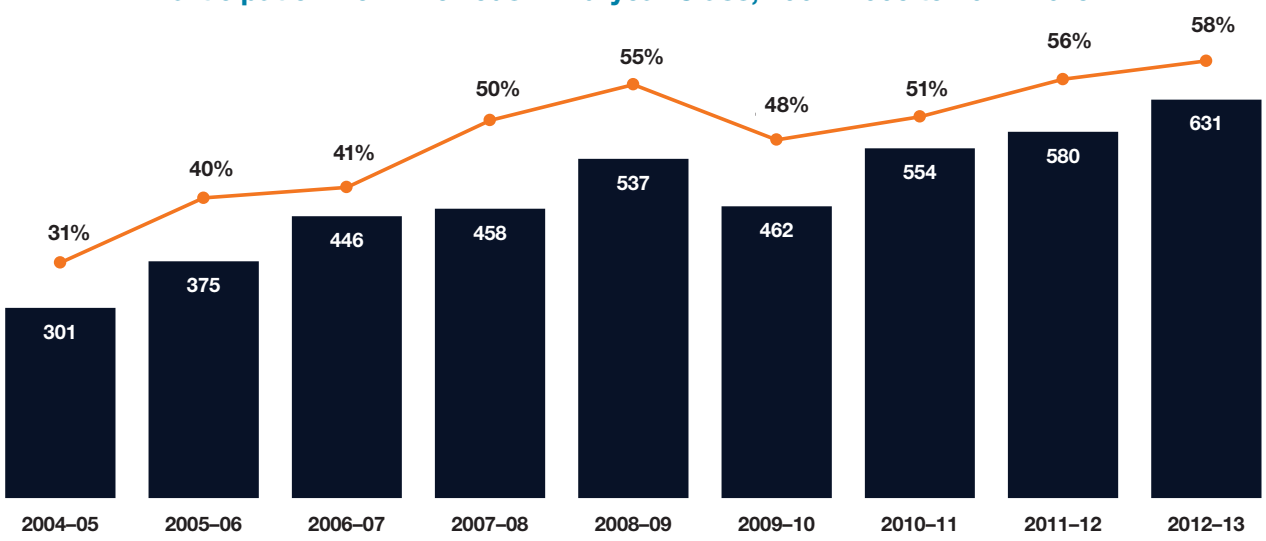


Figure 1.12b **PEY Internship Placements, 2008–2009 to 2012–2013**

	Canadian Placements	International Placements
2008–09	490	47
2009–10	426	36
2010–11	530	24
2011–12	547	33
2012–13	592	39

Figure 1.12c **PEY Employers, 2008–2009 to 2012–2013**

	PEY Employers who Hired Engineering Students
2008–09	193
2009–10	158
2010–11	185
2011–12	221
2012–13	241

Note 1.12a and 1.12b: The number of PEY placements reported here exceeds the number of students on PEY as reported in Figure 1.6 by three, due to those who started their placements and did not complete them.

Summer Research Opportunities

In 2013, 394 of our undergraduates spent their summer contributing to ongoing research both at U of T and abroad. Each year, these opportunities allow our students to put their knowledge to practice while gaining research experience. While the majority of these research opportunities took place on campus, more students than ever before conducted summer research at international institutions, bringing a more diverse perspective to their experience.

Among those who participated in summer research at U of T were 123 undergraduates from Brazil studying in our Faculty through the Science Without Borders program. To read more about the program, please see the International Initiatives chapter.

Figure 1.13a **Undergraduate Participation in Summer Research Opportunities, 2010 to 2013**

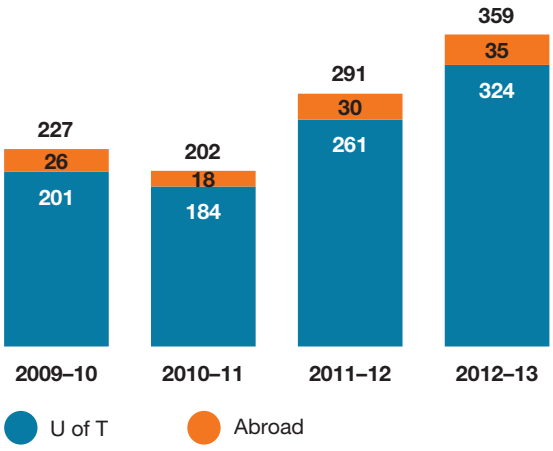


Figure 1.13b **Undergraduate Participation in Summer Research Opportunities, 2013**

Research Participation	U of T	Abroad	Science Without Borders
UTIAS	n/a	n/a	2
ChemE	30	6	10
CivE & MinE	19	1	16
ECE	43	4	33
EngSci	95	21	n/a
MIE	43	0	53
MSE	11	3	3
TrackOne	1	0	n/a
Total	**242**	**35**	**117**

Pre-University Engineering Outreach

The Engineering Student Outreach Office (ESOO) leads the core outreach programs offered by our Faculty. As a unit that seeks to engage youth in science, technology, engineering and math (STEM), ESOO designs and delivers a host of interactive pre-university programs taught by our undergraduate and graduate students. ESOO also collaborates with our student organizations, faculty members and academic areas to foster the engagement of pre-university students — particularly among underrepresented communities.

Outreach programs foster relationships with qualified high school students from across Canada and around the world. In 2012, our popular DEEP (Da Vinci Engineering Enrichment Program) Summer Academy attracted more than 1,000 students to our campus to take weeklong courses in everything from entrepreneurship to sustainable energy. Twenty-one per cent of the participants came from outside of Canada and 22 per cent were female. Ultimately, 71 per cent of eligible DEEP participants applied for admission into our undergraduate programs.

Outreach programs also play an important role in developing our current students. By serving as confident and enthusiastic role models, our participating student instructors enhance their abilities as teachers while encouraging elementary and high school students to consider engineering careers. In 2012–2013, they taught and inspired close to 6,000 young people. See Appendix A for a summary of our program offerings over the past year.

2012–2013 was also a year of growth for outreach programming. We offered three new programs:

- **DEEP Leadership Camp:** A new component of DEEP Summer Academy, this program fosters intensive leadership development in high school students. This unique two-week program took place at the CivE's survey camp at Gull Lake in Minden, Ontario. Students who completed the camp became eligible to serve as counsellors in our Jr. DEEP program.
- **Big Ideas — Design, Creativity and Prosperity:** This pilot program is offered in collaboration with the Institute for Competitiveness and Prosperity at the Rotman School of Management. The program introduced grade 7 and 8 students to design thinking as a novel way to apply engineering and technology insights to business challenges.
- **Student Group Training:** ESOO is proactively working with student groups to enhance and advise on their outreach initiatives. This training will ultimately help to bring greater consistency to our youth-focused activities. Training topics include safety considerations, serving as a U of T ambassador and working with young audiences.

Note 1.13a and 1.13b: All international research opportunities for U of T students going abroad were coordinated by the Centre for International Exchange. In Figure 1.13b, students are shown by their home department for opportunities at U of T and abroad. Science Without Borders students are shown by the department where they engaged in summer research. Of the students who did their research at U of T, 23 were hosted by UTIAS and 15 were hosted by IBBME.

Student Clubs and Teams

Student life at U of T Engineering is as dynamic and diverse as our students. A full list of categorized clubs can be found in Appendix B. Supported by the Engineering Society as well as the generous contributions of U of T Engineering, our alumni and other benefactors, the following clubs and teams enjoyed notable achievements in 2012–2013.

Canadian Engineering Competition

- Organized by the Canadian Federation of Engineering Students, the competition is now in its 28th year and saw 150 teams compete in seven categories: extemporaneous debate, consulting engineering, engineering communications, innovative design, junior design team, senior design team and re-engineering
- U of T Engineering teams placed second in the senior design team category and third in the engineering communications category
- Prior to the national competition, our teams excelled at the provincial level, winning awards in five of the six competition categories, including three first-place wins
- In September 2013, one U of T Engineering team will compete at the first-ever International Engineering Competition in Calgary, Alberta

Club for Undergraduate Biomedical Engineering (CUBE)

- CUBE hosted its most successful Biomedical Engineering Competition yet, with student registration exceeding available space by 50 per cent
- Teams were challenged to create a foosball-playing, prosthetic-forearm prototype, fashioned only from items in a LEGO® kit
- Designs were judged by Professors Paul Santerre (IBBME), Mary Nagai (IBBME) and Benjamin Hatton (MSE, IBBME)
- The winning team consisted of four, fourth-year EngSci students

Concrete Toboggan

- The team — comprised of 22 students — competed in January 2013 in the 39th annual Great Northern Concrete Toboggan Race in Vancouver, British Columbia
- Students competed against teams from across Canada and won in several categories: Best Performing Toboggan, Best Braking Distance, Most Improved Team, second place in the Technical Report category and, most notably, second place, overall

University of Toronto Aeronautics Team (UTAT)

- Comprised of more than 100 undergraduates and graduate students across the Faculty
- In addition to two existing team divisions — Powered Flight and Unpowered Flight — UTAT added two new divisions: Rocketry and Autonomous Unmanned Aerial Vehicles
- Had outstanding performances in both the Canadian Aeronautics and Space Institute (CASI) Free Flight Competition and the SAE Aero Design West Competition
- 2012 CASI results: first in the Free Flight Report; second in the Free Flight Presentation; and, third in the Free Flight Overall
- 2012 SAE Aero Design West results: second in the Advanced Class Overall, Data Acquisition System, Report and Presentation categories; second in the Micro Class Overall category; and first in the Micro Class Presentation category

University of Toronto Robotics Association (UTRA)

- More than 750 members, consisting of undergraduates, graduate students, alumni, faculty and staff
- Over 150 active members working on robotic projects that compete internationally, including RoboGames and the International Autonomous Robot Racing Competition (IARRC)
- 2012 RoboGame results: bronze medal in the 120-pound combat robot category
- 2012 IARRC results: third place, overall

University of Toronto Supermileage Team

- New design team formed in 2012–2013 consists of 10 students from across the Faculty
- Designed and built an eco vehicle called Journey 1, which competed for the first time in the annual Shell Eco-Marathon Challenge in Houston, Texas in April 2013
- The annual event challenges teams to race their energy-efficient vehicles against other universities worldwide; the vehicle that travels the farthest while using the least amount of energy wins
- The team did well in the preliminary rounds and plans to compete again next year

2 Graduate Studies

Our strong worldwide reputation as a leader in engineering research and education enables us to attract increasing numbers of outstanding graduate students. In 2012–2013, we had our highest-ever number of applicants. At the same time, we admitted a smaller and academically stronger group of graduate students, thereby becoming more selective. With 1,933 high-calibre students registered, we are well on track toward meeting our goal of 2,000 graduate students by 2015.

This past year, we actively recruited an even more diverse graduate student cohort: 22.5 per cent are from outside Canada and 26.2 per cent are women (up from 25.1 per cent in 2011–2012). Such diversity enriches the experience for all students. Graduate students collaborate with national and international researchers, professionals, industry partners and peers, gaining exposure to different points of view and perspectives. In turn, they teach and mentor our undergraduates, creating a richer learning and teaching environment.

As members of our research community, graduate students are proof of the observation that engineers create that which never was. For example, Electrical Engineering PhD candidate Graham Carey is exploring some of the key challenges in making quantum-dot solar cell systems more efficient. Carey received the Natural Sciences and Engineering Research Council's prestigious André Hamer Postgraduate Prize, awarded each year to only one doctoral student in the country.

We continue to expand options within our professional Master of Engineering (MEng) program, with a new MEng in Cities Engineering and Management and certificate options in Advanced Water Technologies & Process Design and Financial Engineering. These graduate students, often working professionals, have increased flexibility in completing the MEng program with the introduction of the extended full-time option.

In partnership with the School of Continuing Studies, we provide opportunities to internationally educated engineering professionals looking to build successful careers in Ontario through the Licensing International Engineers into the Profession (LIEP) bridging program.

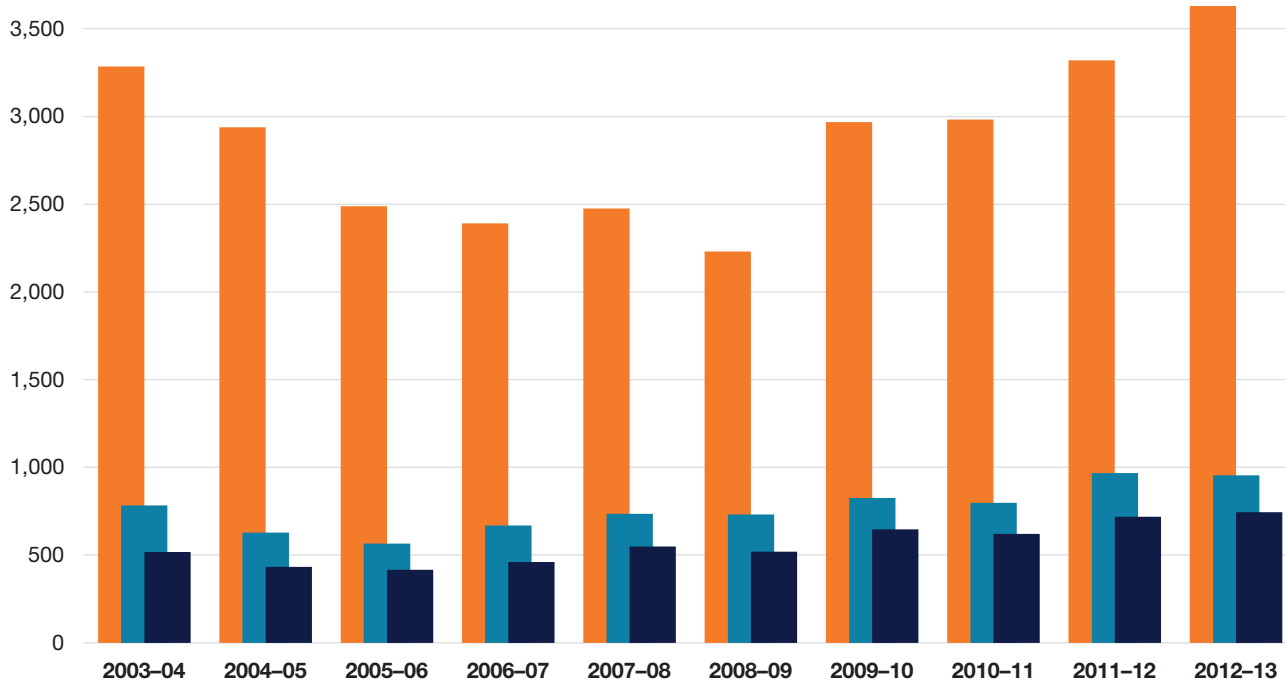
Graduate Student Admissions

Application numbers grew by 9 per cent over 2011–2012, sustaining a four-year trend of increases, with the largest increase in MASc applications. This rise in applications can be attributed to enhanced recruitment efforts, including new promotional materials such as a graduate recruitment brochure and website, among other factors. Through these materials, we continue to promote the global reputation of U of T Engineering, the quality and range of our programs, student experience and research strengths.

Recruitment activities at the departmental level also influence the increase in applications. Several of our departments stage events, showcasing graduate-level offerings, including ChemE's Graduate Research Weekend, MIE's Graduate Studies Open House and UTIAS's Prospective Graduate Student Day. Each allows our top applicants to learn more about U of T Engineering and to meet professors with whom they are interested in working.

Noted in Figure 2.1b, yield in our doctoral and professional graduate programs (MEng and MHSc) increased to our Faculty's highest levels yet, while the still higher yield in our research master's program continued the impressive levels of recent years. In all programs, more of the students to whom we offer admission are choosing to study in our Faculty.

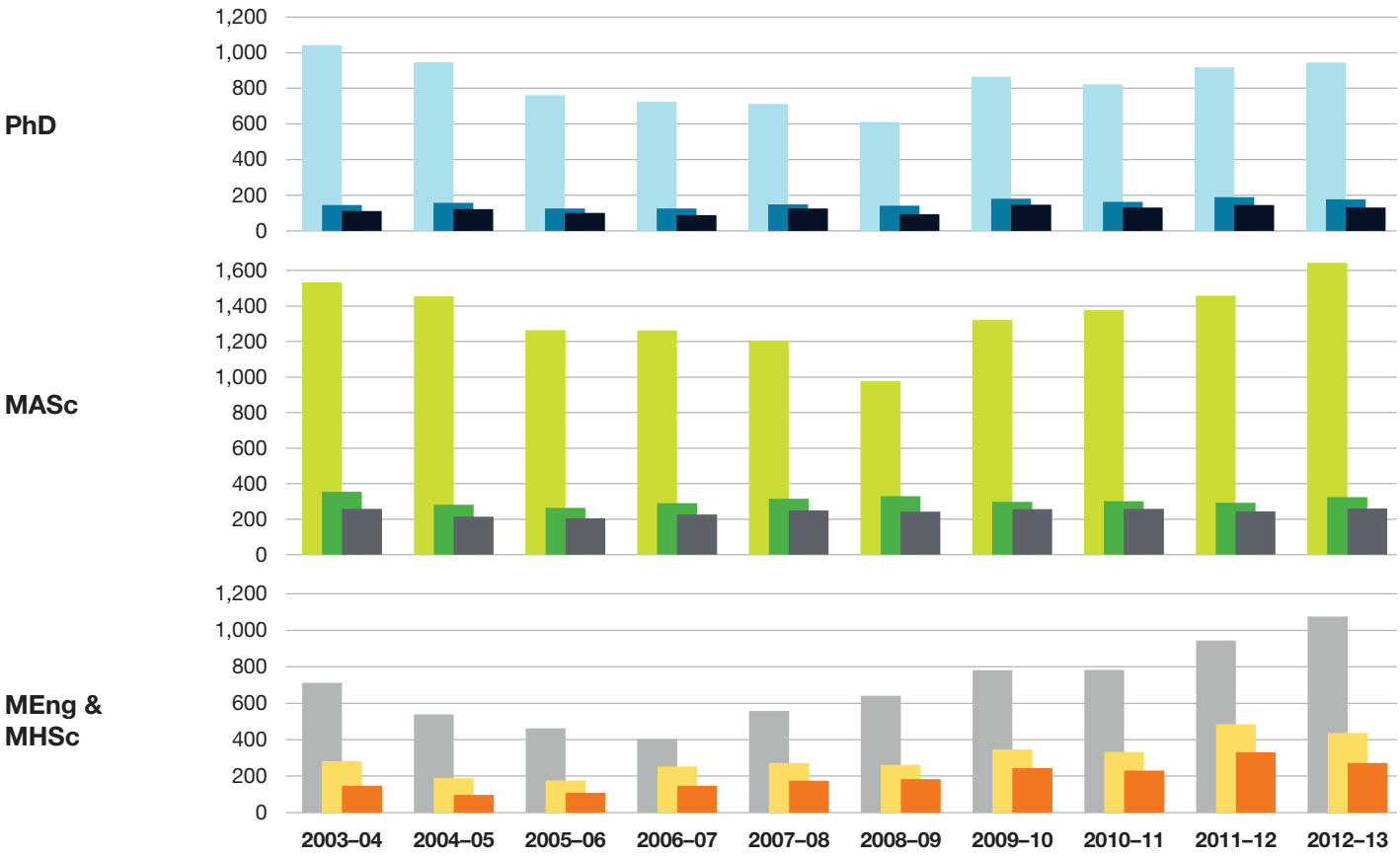
Figure 2.1a **Applications, Offers, Registrations, Selectivity and Yield of Graduate Students, 2003–2004 to 2012–2013**



	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Applications	3,285	2,939	2,489	2,391	2,475	2,230	2,968	2,982	3,320	3,629
Offers	782	628	565	669	735	732	825	798	967	955
Registrations	517	432	416	461	549	519	647	621	719	745
Selectivity	0.24	0.21	0.23	0.28	0.30	0.33	0.28	0.27	0.29	0.26
Yield	0.66	0.69	0.74	0.69	0.75	0.71	0.78	0.78	0.74	0.78

Note 2.1a: Graduate student counts are shown as of November 1. Applications and offers represent a full-year admission cycle. Selectivity = Offers ÷ Applications; the proportion of applicants who were offered admission. Yield = Registrations ÷ Offers; the proportion of students who accept our offers.

Figure 2.1b **Applications, Offers, Registrations, Selectivity and Yield of Graduate Students by Degree Type, 2003–2004 to 2012–2013**



		2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Applications	PhD	1,042	946	762	725	713	612	864	822	918	935
	MASc	1,532	1,455	1,265	1,263	1,205	977	1,322	1,377	1,458	1,642
	MEng & MHSc	711	538	462	403	557	641	782	783	944	1,052
Offers	PhD	145	158	125	126	148	141	181	163	189	178
	MASc	355	282	264	290	316	329	297	302	293	323
	MEng & MHSc	282	188	176	253	271	262	347	333	485	454
Registrations	PhD	111	121	101	88	125	94	147	131	144	148
	MASc	259	214	206	226	250	242	256	259	245	274
	MEng & MHSc	147	97	109	147	174	183	244	231	330	323
Selectivity	PhD	0.14	0.17	0.16	0.17	0.21	0.23	0.21	0.20	0.21	0.19
	MASc	0.23	0.19	0.21	0.23	0.26	0.34	0.22	0.22	0.20	0.20
	MEng & MHSc	0.40	0.35	0.38	0.63	0.49	0.41	0.44	0.43	0.51	0.43
Yield	PhD	0.77	0.77	0.81	0.70	0.84	0.67	0.81	0.80	0.76	0.83
	MASc	0.73	0.76	0.78	0.78	0.79	0.74	0.86	0.86	0.84	0.85
	MEng & MHSc	0.52	0.52	0.62	0.58	0.64	0.70	0.70	0.69	0.68	0.71

Note 2.1b: Student counts are shown as of November 1. Applications and offers represent a full-year admission cycle. Selectivity = Offers ÷ Applications; Yield = Registrations ÷ Offers

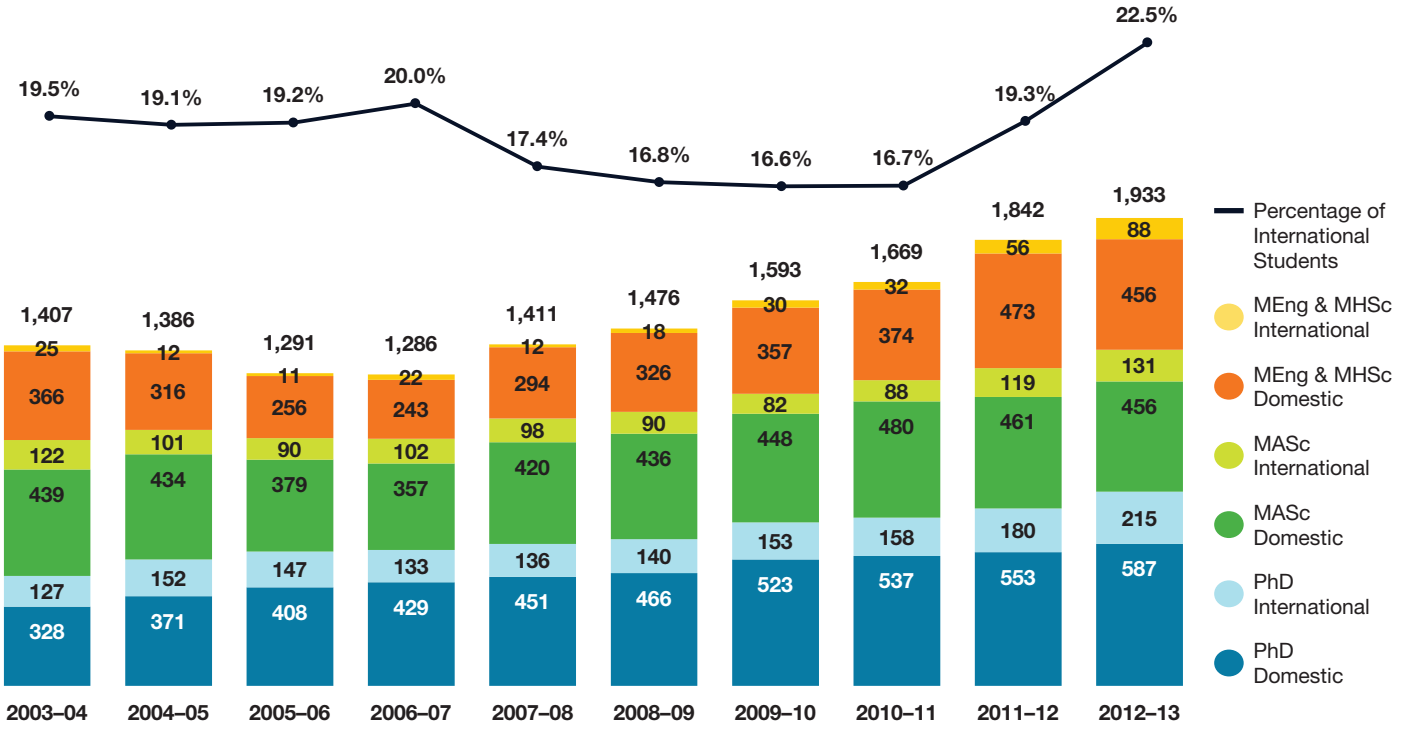
Graduate Student Enrolment

In 2012–2013 we saw the largest population of graduate students in our Faculty's history, with 1,933 students (1,751.7 full-time equivalent). We are on target to reach our goal of 2,000 graduate students by 2015.

Our graduate student body is more diverse than ever. This diversity is one of our strengths, as students broaden their understanding and knowledge through exposure to new ideas, new values and new mindsets. We are also attracting more women to our graduate programs — 26.2 per cent of our graduate students are female. The prominent role women play in our Faculty — as students, as researchers and as leaders in education — is a draw for women interested in graduate engineering study.

We now have the highest proportion of international students in our history, with 22.5 per cent of our graduate students from outside Canada, representing 79 countries. International students are attracted to U of T Engineering because of our reputation, the quality of our programs and faculty, as well as our location in a dynamic and diverse metropolitan city.

Figure 2.2a **International and Domestic Graduate Students by Degree Type, with Percentage of International Students, 2003–2004 to 2012–2013**



Note 2.2a: Student counts are shown as of November 1.

Figure 2.2b **Graduate Students by Degree Type and Gender, with Percentage of Women, 2003–2004 to 2012–2013**

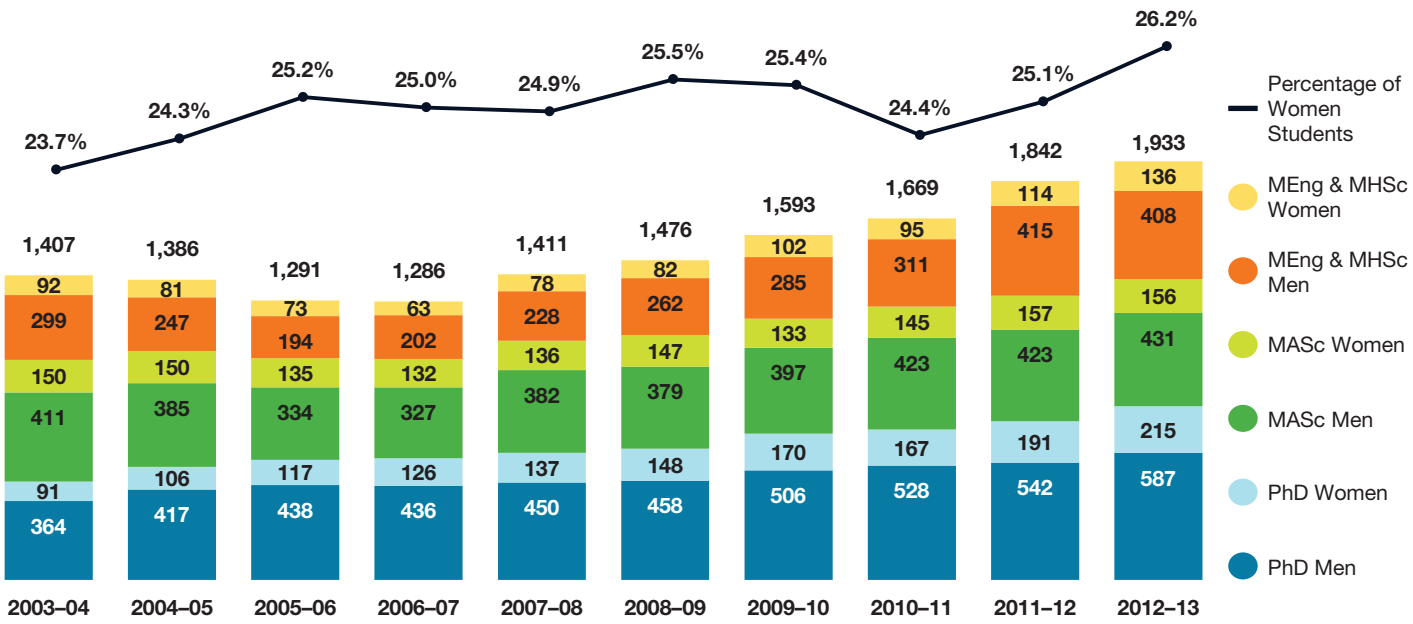


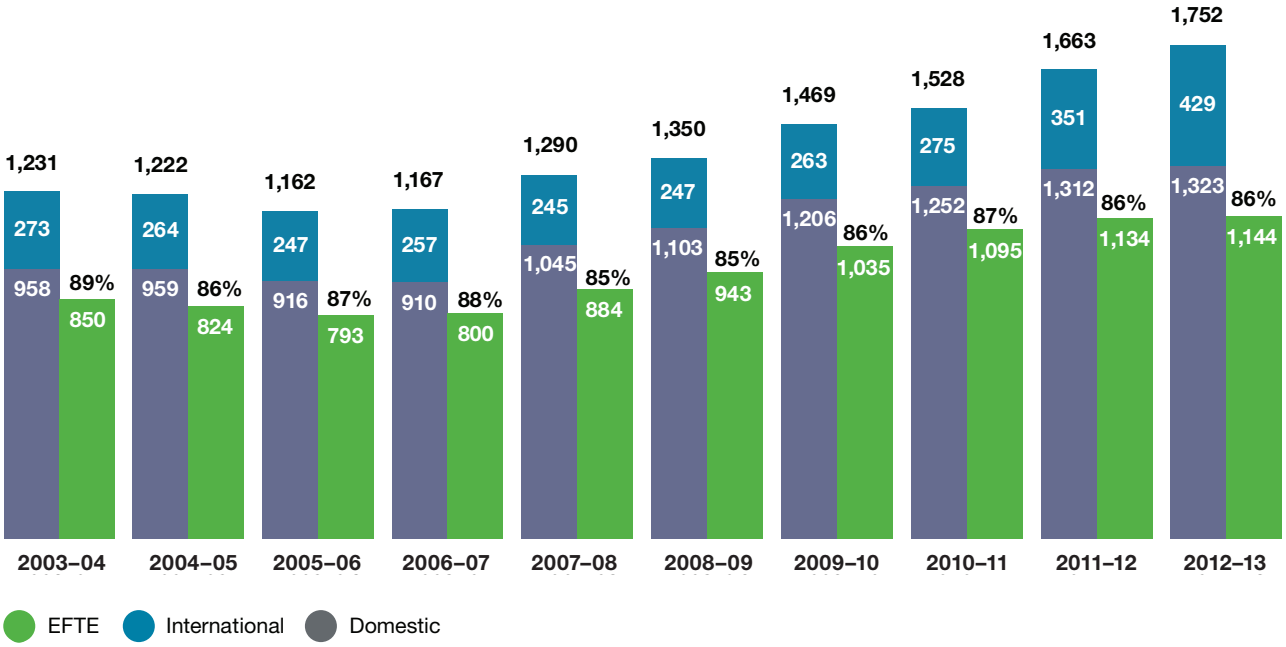
Figure 2.2c **Graduate Student Enrolment by Full-Time Equivalent (FTE) and Headcount (HC) by Academic Area, 2003–2004 to 2012–2013**

		UTIAS	IBBME	ChemE	CivE	ECE	MIE	MSE	Total
2003–04	FTE	89.9	48.0	159.4	184.2	383.6	288.5	77.0	**1,230.6**
	HC	92	48	165	222	441	355	84	**1,407**
2004–05	FTE	97.0	57.0	164.7	157.5	381.7	287.3	77.0	**1,222.2**
	HC	97	57	171	189	430	358	84	**1,386**
2005–06	FTE	85.3	52.0	142.1	150.4	382.5	278.8	71.1	**1,162.2**
	HC	86	52	147	170	428	332	76	**1,291**
2006–07	FTE	79.6	75.0	138.5	160.3	407.3	238.8	67.5	**1,167.0**
	HC	81	75	142	182	457	278	71	**1,286**
2007–08	FTE	105.0	115.0	150.0	183.3	438.1	227.3	71.2	**1,289.9**
	HC	105	115	157	212	478	270	74	**1,411**
2008–09	FTE	122.9	140.0	167.8	184.0	415.4	237.1	82.8	**1,350.0**
	HC	125	140	179	219	442	284	87	**1,476**
2009–10	FTE	130.6	153.0	209.1	200.2	421.5	284.3	70.4	**1,469.1**
	HC	132	153	221	238	453	320	76	**1,593**
2010–11	FTE	140.9	168.0	195.4	212.6	403.0	339.2	68.5	**1,527.6**
	HC	143	168	208	256	431	391	72	**1,669**
2011–12	FTE	143.2	199.0	202.3	229.8	437.7	382.6	68.2	**1,662.8**
	HC	146	199	217	276	479	454	71	**1,842**
2012–13	FTE	146.7	208.3	193.2	243.3	504.8	387.2	68.2	**1,751.7**
	HC	153	209	203	279	565	453	71	**1,933**

Note 2.2b: Student counts are shown as of November 1. EFTE is calculated on a 12-month basis (i.e., May to April).
Note 2.2c: To calculate Full-Time Equivalent (FTE) graduate student enrolment, full-time students are counted as 1.0 and part-time students as 0.3. The MEng is the only graduate engineering program that currently offers a part-time option.

Government funding guidelines define the number of years for which domestic students in each degree stream are grant-eligible. The number of our domestic students who are eligible (expressed as Eligible Full-Time Equivalent or EFTE) is consistent with historical values. Almost all domestic MEng and MASc students were eligible for grant funding in 2012–2013. The overall variation in EFTE reflects the number of students in doctoral programs who have exceeded the government-defined period of funding eligibility. This is one of the reasons we are making efforts both to fast-track students into doctoral programs and to encourage degree completion in a more timely fashion.

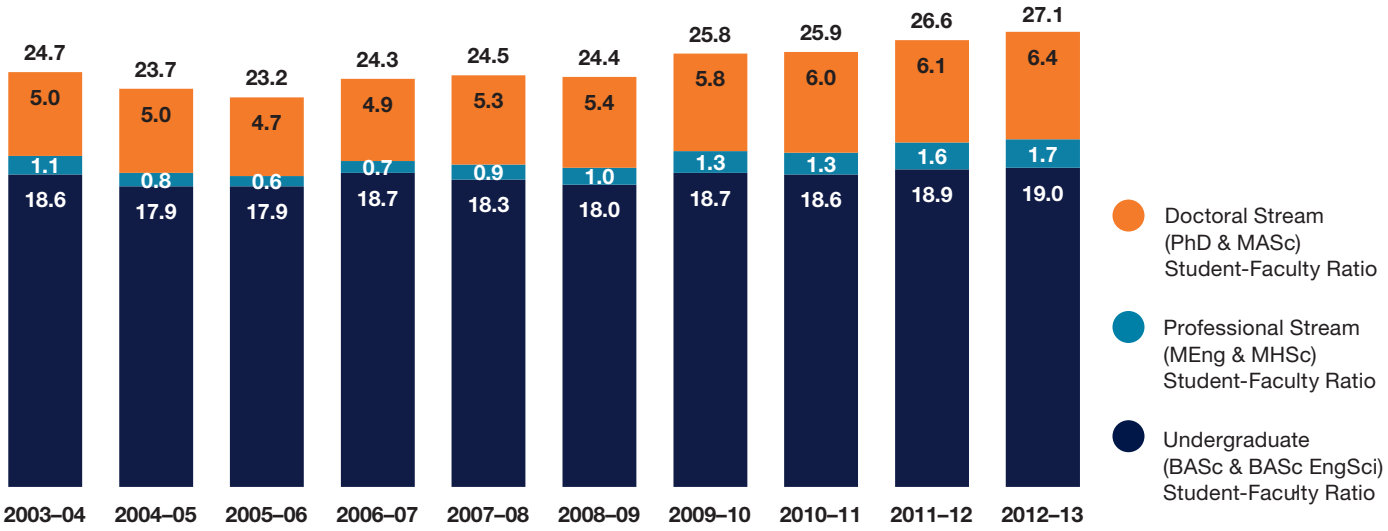
Figure 2.2d **Graduate Students: International and Domestic Full-Time Equivalent (FTE) and Domestic Eligible Full-Time Equivalent (EFTE), 2003–2004 to 2012–2013**



Note 2.2d: Graduate student counts are shown as of November 1.

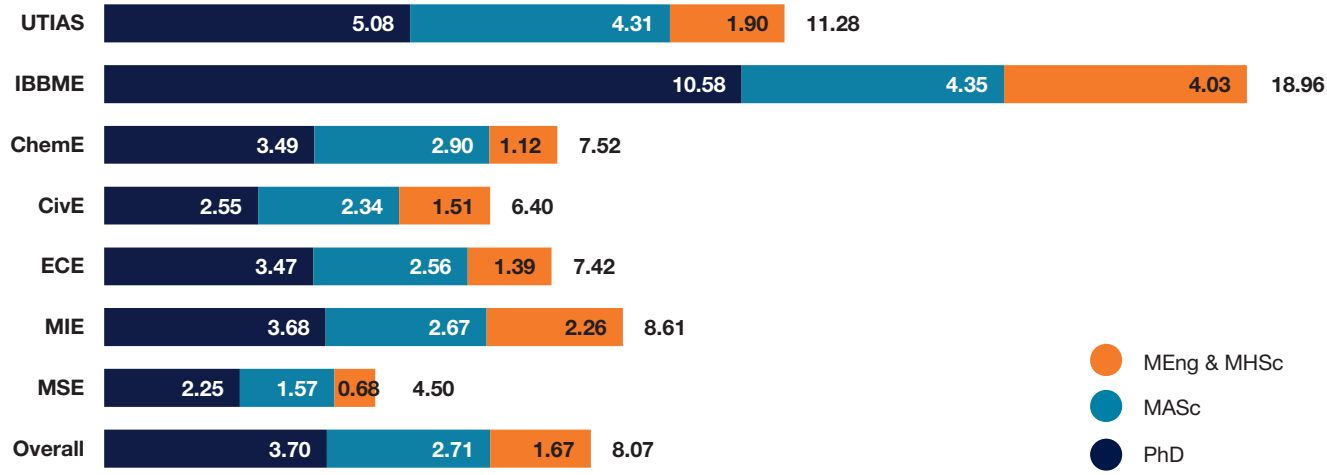
The number of FTE graduate students per tenure-stream faculty member increased from 7.7 to 8.1 in 2012–2013, corresponding to 3.7 PhD students, 2.7 MASc students and 1.7 MEng or MHSc students. More graduate students per faculty member is another indication that we are gaining momentum in achieving our graduate enrolment targets. Ultimately, we aspire to achieve a ratio of 60:40 for undergraduate to graduate students.

Figure 2.3a **Graduate and Undergraduate Full-Time Equivalent Student-Faculty Ratios, 2003–2004 to 2012–2013**



The number of graduate students per faculty member is calculated by dividing the number of full-time equivalent (FTE) students in each academic unit by the number of tenure-stream faculty. Figure 2.3b does not fully capture the interdisciplinary, collaborative, cross-faculty characteristics that are strengths of the U of T Engineering graduate education. For example, IBBME draws on faculty from Medicine, Dentistry and hospitals, as well as other departments within U of T Engineering.

Figure 2.3b **Full-Time Equivalent (FTE) Graduate Student-Faculty Ratios by Academic Area and Degree Type, 2012–2013**



Note 2.3a: To allow more accurate comparisons, undergraduate FTEs are determined by counting each part-time student as 0.3 FTE. Previous annual reports used the total undergraduate headcount. The revised methodology matches the way graduate student FTEs are calculated, and more accurately reflects actual undergraduate teaching.
Note 2.3b: Data reported by academic year (September to August).

Graduate Student Funding

Overall, graduate student funding increased by 6.6 per cent, thanks to increases to research, Faculty and departmental funds, as well as total scholarship funding for graduate students.

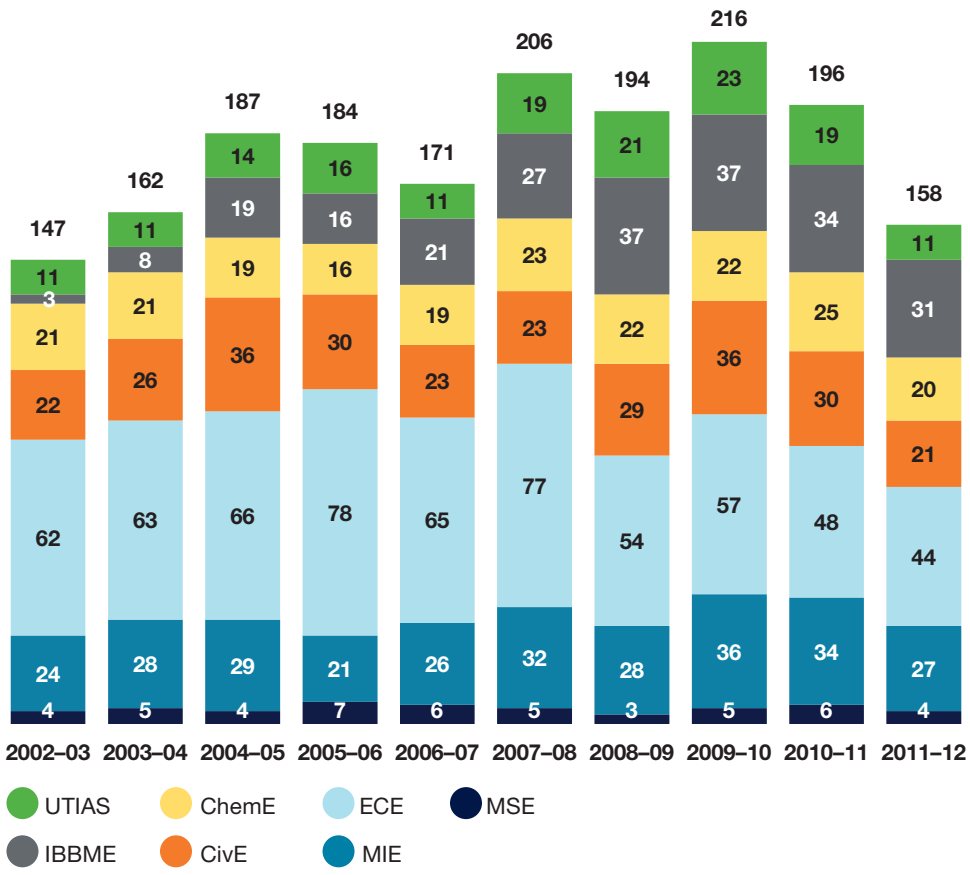
Research funds continue to be the greatest overall source of graduate student funding. A minimum average stipend of $15,000 plus tuition and fees is available to all Engineering graduate students in the funded cohort (first 20 months of the MASc program or first four years in the PhD program).

The number of students receiving NSERC scholarships decreased by 19 per cent, with all seven graduate units experiencing a decrease in the number of NSERC scholarships. This drop is reflective of a Canada-wide decline in both the number of scholarships NSERC gives out and the total value of those awards. Although our share of the total number of awards dropped slightly, we continue to attract the highest number in Canada. It should be noted that NSERC has increased the value of each award. The total value of NSERC graduate award funding received by our students has not decreased by as much as the number of awards, and our share of total dollars remains within the range of our 10-year average. Ultimately, the impact of the decrease in NSERC funding was mitigated by an increase in Ontario Graduate Scholarship (OGS) funding and other sources.

Figure 2.4a **External Graduate Student Scholarships by Source, 2002–2003 to 2011–2012**

	NSERC	OGS	External-Other	Total
2002-2003	$2,260,280	$1,328,342	$14,705	$3,603,327
2003–2004	$2,764,450	$1,479,994	$56,240	$4,300,685
2004–2005	$3,221,367	$1,161,671	$77,334	$4,460,372
2005–2006	$3,400,236	$1,106,665	$23,500	$4,530,401
2006–2007	$3,228,150	$1,088,332	$31,100	$4,347,582
2007–2008	$3,827,494	$930,000	$68,167	$4,825,661
2008–2009	$3,737,157	$868,332	$111,770	$4,717,259
2009–2010	$4,255,856	$838,334	$226,563	$5,320,753
2010–2011	$4,267,783	$1,050,011	$213,519	$5,531,313
2011–2012	$3,711,717	$1,511,661	$259,363	$5,482,741

Figure 2.4b **Number of NSERC Graduate Student Award Recipients by Academic Area, 2002–2003 to 2011–2012**



Note 2.4a: External-Other includes awards from the Canadian Institutes of Health Research and the Social Sciences and Humanities Research Council, as well as foundations and industry sources. Data reported by academic year (September to August).
Note 2.4b: Data reported by academic year (September to August).

Unlike previous annual reports, the graduate student funding reported in Figures 2.5a and 2.5b is based on academic rather than fiscal years. This approach not only uses the most up-to-date data available, it also reflects a more appropriate reporting cycle for graduate funding. Between 2010–2011 and 2011–2012, scholarships rose from $9.2 million to $9.3 milion, reflecting a continued upward trend seen over the past decade. Research funds and scholarships support the tuition and stipends of our graduate students.

Figure 2.5a **Graduate Student Funding by Category, 2002–2003 to 2011–2012**

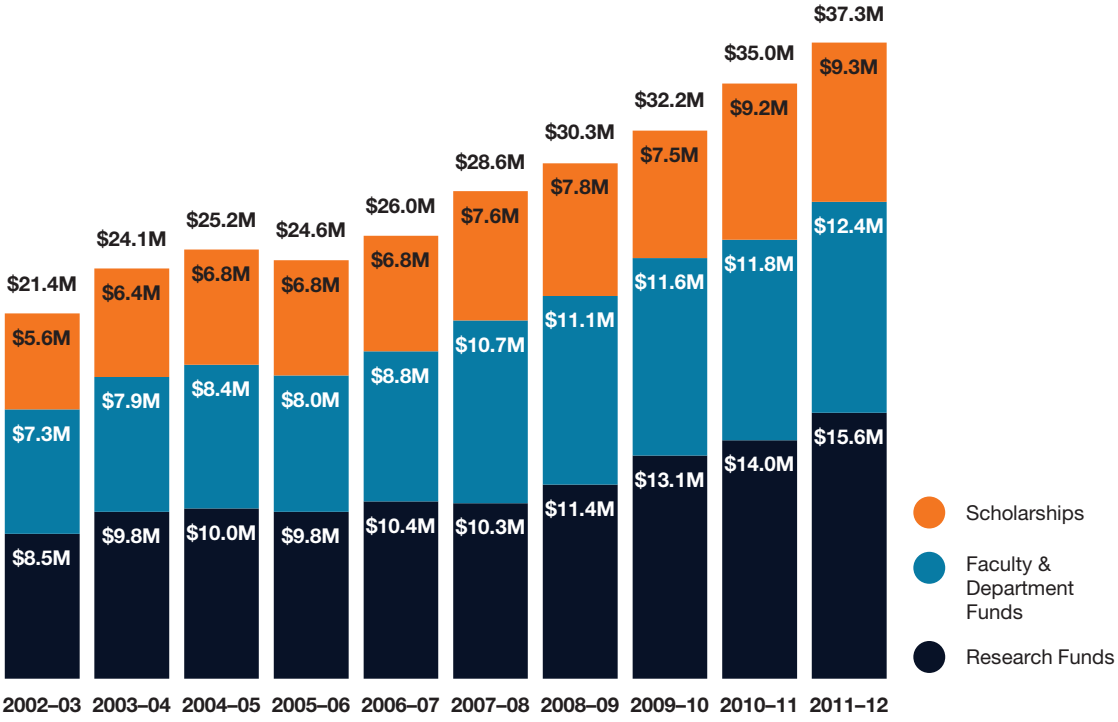
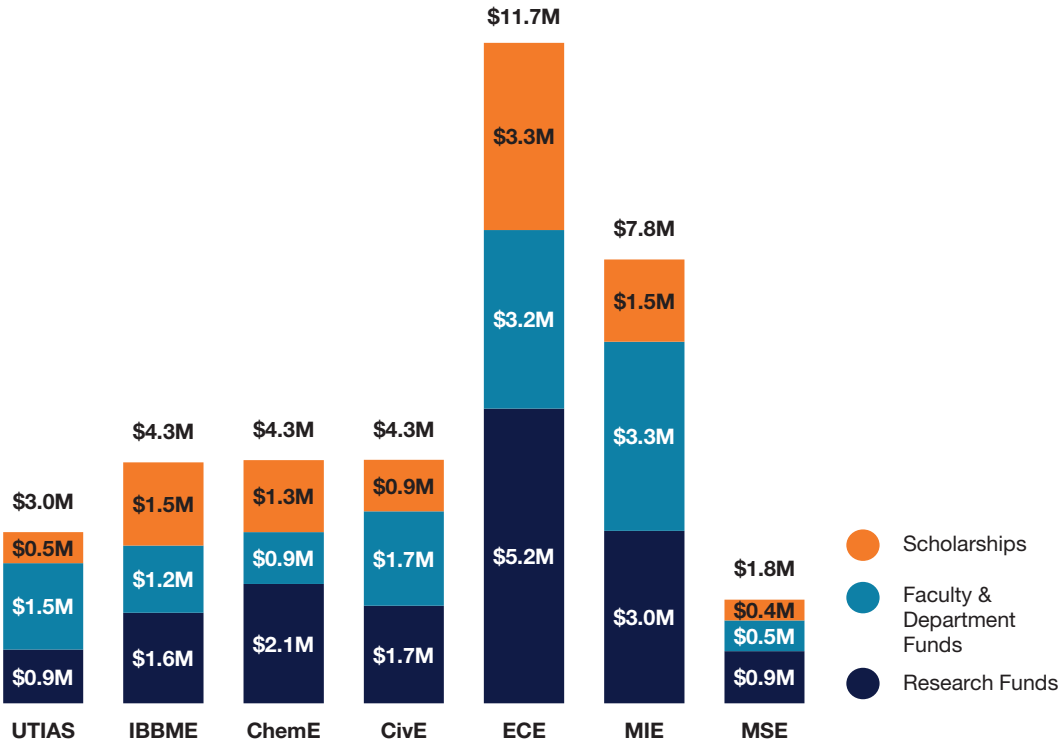


Figure 2.5b **Graduate Student Funding by Category and Academic Area, 2011–2012**



Graduate Studies Completion

Time to graduation represents the length of time between a student's initial enrolment in a graduate program and meeting all the requirements for graduation. MASc and full-time MEng students usually complete their program requirements in an established timeframe of two years and one year, respectively. On average, doctoral students take 5.3 years to complete their PhDs, which is among the lowest in the University (the U of T average over the past four years is 5.67 years). Chairs and the Associate Chairs, Graduate Studies across our Faculty are collaborating to develop mechanisms to further improve time to graduation. For an analysis of time to graduation by academic area, please see Appendix C.

The fast-track option for qualified MASc students near the end of their first year makes it possible to complete a doctoral degree in less time. Each academic unit has its own process for exercising this option. In some cases, students apply to fast-track, and in others, eligible students who demonstrate potential are approached by faculty and asked to consider the possibility.

Figure 2.6 Number of Students Fast-Tracked from MASc to PhD by Academic Area, 2006–2007 to 2011–2012

Fast-tracked during	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Most began PhD in	**Fall 2007**	**Fall 2008**	**Fall 2009**	**Fall 2010**	**Fall 2011**	**Fall 2012**
UTIAS	1	2	8	6	5	3
IBBME	2	8	9	8	7	5
ChemE	7	4	9	8	5	8
CivE	5	4	4	3	4	5
ECE	2	2	1	1	6	3
MIE	3	8	9	4	6	8
MSE	2	2	4	2	2	5
Total	**22**	**30**	**44**	**32**	**35**	**37**

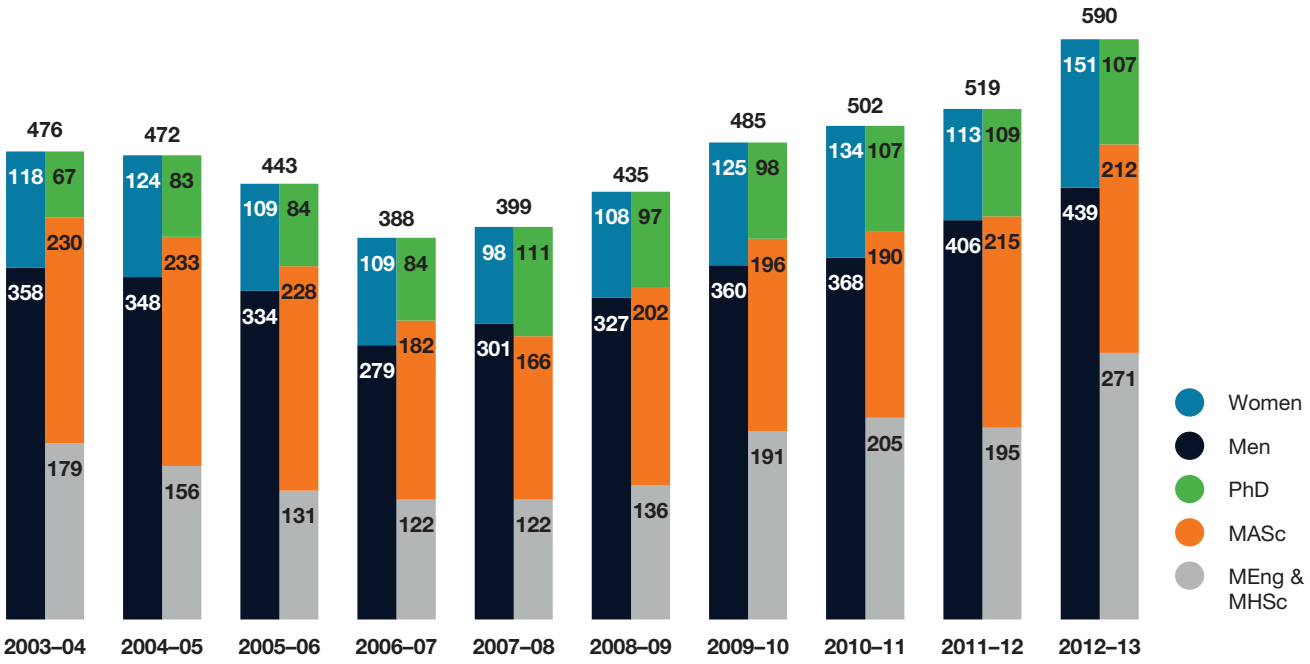
Figure 2.7 Time to Graduation for PhD, MASc, MEng and MHSc Students, 2003–2004 to 2012–2013

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
PhD	5.0	5.0	4.3	5.0	4.7	4.7	4.7	5.3	5.0	5.3
MASc	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
MEng & MHSc (FT)	1.0	1.0	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.3
MEng & MHSc (PT)	2.0	2.0	2.3	2.0	2.0	2.3	2.3	2.3	2.0	2.0

Note 2.7: Data reported by academic year (September to August).

As seen in Figure 2.8, our Faculty's largest class of graduate students convocated in 2012–2013. While the number of PhD and MASc graduates declined slightly, our MEng numbers increased by 39 per cent, from 195 to 271.

Figure 2.8 **Graduate Degrees Awarded by Degree Type and Gender, 2003–2004 to 2012–2013**



Graduate Studies Initiatives

New Graduate Courses

We continue to enhance learning opportunities for graduate students with new courses and programs. For example, JCR1000Y, An Interdisciplinary Approach to Addressing Global Challenges, brings together students from multiple disciplines (e.g., engineering, management, health and social sciences) with an international partner to address a locally relevant challenge. APS1020H, International Business for Engineers, also takes a global approach, teaching students how businesses can move into markets abroad. Other new courses include AER1514H Mobile Robotics, APS1018H History and Philosophy of Engineering and MIE1415H Analysis and Design of Cognitive Work.

Graduate Enterprise Internship Program

The Graduate Enterprise Internship program was launched in February 2012 at U of T, funded by the Federal Development Agency for Southern Ontario. It is a six-month paid internship program for graduate degree holders who have obtained their education within the last five years, as well as currently enrolled graduate students in the fields of Science, Technology, Engineering and Mathematics (STEM). The program offers participants a head start in career development, with salary subsidies for southern Ontario start-ups and small- to medium-size businesses in the STEM sector. To date, 73 participants — comprised of 25 graduate students and 48 recent graduates from U of T Engineering — have successfully secured internships with such companies as the Bayliss Medical Group, Sapient Canada, Inc. and Trantek Power Inc. The program is based at U of T's Engineering Career Centre.

Note 2.8: Data reported by academic year (September to August). 2012–2013 totals based on graduation projections made in March 2013.

Expanded MEng Opportunities

Primarily comprised of coursework, the Master of Engineering (MEng) degree is designed for new graduates and working engineers looking to upgrade their skills and gain knowledge in specialized fields for professional practice. We have made the MEng more flexible, by adding an extended full-time option to complement the existing full- and part-time options. The full-time option allows students to complete the program in just one year (nine or ten courses over three terms), the new extended full-time option takes two years (up to six courses per year over three terms) and the part-time option takes three years (up to three or four courses per year over three terms).

In addition, new MEng courses are being taught by professionals working in the field, helping to build important links between our students and industry.

As shown in Figure 2.9, interest in our Entrepreneurship, Leadership, Innovation & Technology in Engineering (ELITE) certificate continues to grow. Across our ELITE courses in 2012–2013, there were 986 enrolments in total, up from 898 the previous year.

The MEng program for the Stronach Centre for Innovation (MEng, SCFI) is a joint initiative with Magna International Inc. to provide employees with the opportunity to pursue a specialized MEng through a major technical project and coursework. Illustrated in Figure 2.10, enrolment has more than doubled since the program launched in 2008.

Figure 2.9 ELITE Certificates Awarded, 2008–2009 to 2012–2013

	2008–09	2009–10	2010–11	2011–12	2012–13
AeroE		1	1		7
ChemE		1	14	12	17
CivE	2	7	13	19	16
ECE	1	3	4	3	22
MIE		7	17	19	26
MSE			1	2	4
Total	**3**	**19**	**50**	**55**	**92**

Figure 2.10 MEng, SCFI Program Enrolment, Fall 2008 to Winter 2013

	Enrolment
Fall 2008	9
Fall 2009	8
Winter 2010	12
Fall 2010	30
Winter 2011	33
Fall 2011	28
Winter 2012	30
Fall 2012	21
Winter 2013	23

Note 2.9: 2012–2013 data based on graduation projections.

MEng in Cities Engineering and Management (MEngCEM)

A first of its kind in Canada, the MEng in Cities Engineering and Management will prepare engineers to address pressing issues that face cities and create innovative responses that are environmentally responsible, socially engaging and economically feasible. A collaborative program slated to start in September 2013, it will include courses from the Faculty of Applied Science & Engineering as well as from the Faculties of Arts & Science and Architecture. Students in the program will have the opportunity to conduct urban-related research at the Center for Urban Science and Progress (CUSP) in New York. The collaboration also includes New York University, Polytechnic Institute of New York University, Carnegie Mellon University, University of Warwick, Indian Institute of Technology Bombay, as well as leading companies like IBM, CISCO and Siemens.

MEng Emphasis in Advanced Water Technologies and Process Design

The newly approved MEng emphasis in Advanced Water Technologies and Process Design will begin accepting students in September 2013. Offered jointly by the Departments of Chemical Engineering & Applied Chemistry, Civil Engineering and Materials Science & Engineering, this unique program will meet an industrial need for experienced graduates in water-treatment technologies and water-process design and will offer students opportunities to operate and assess municipal and industrial water-technology unit operations, water recovery and process control.

MEng Emphasis in Financial Engineering

MIE initiated the Financial Engineering emphasis within the MEng program. Students in this program take four core courses in financial engineering, stochastic processes and linear programming, and can choose between several electives, ranging from enterprise modelling and decision analysis to risk management and non-linear optimization.

Graduate International Foundation Program

MEng applicants whose English facility test scores are below U of T's minimum requirements can take the Graduate International Foundation Program, which combines conditional MEng acceptance with intensive English-language instruction in an engineering environment. Successful completion of the four-month program guarantees admission to the MEng program. Since its launch in September 2012, seven students have participated.

Licensing International Engineers into the Profession (LIEP) program

We recently launched a bridging program to enable internationally educated engineers living in Ontario to make significant progress towards registration and employment as a Professional Engineer (PEng). A collaboration between U of T Engineering, the School of Continuing Studies, Professional Engineers Ontario and Bombardier Aerospace, the program welcomed 45 students this past year.

3 Research

U of T Engineering researchers continue to make inroads in areas ranging from tissue engineering to smart power grids to nanomaterials. Interdisciplinary research teams have continued to flourish and also contributed innovations. For example, Professors Axel Guenther (MIE, IBBME) and Milica Radisic (IBBME, ChemE) and a team of graduate students developed a new 3-D printer that allows for the uniform, large-scale engineering of tissue — which could be used as grafts for burn victims or for vascular patches. Another group of U of T researchers, including Professor Brendan Frey (ECE), have uncovered a compendium of RNA-binding motifs for decoding gene regulation. Their findings, recently published in *Nature*, will help to better identify DNA mutations that ultimately cause disease.

To underscore our commitment to collaborative and multidisciplinary research excellence, we initiated the Faculty's Research Leader Award in April 2013. The award celebrates leadership on major interdisciplinary projects, industrial partnerships and multi-investigator initiatives. The first award was given to Professors Elizabeth Edwards (ChemE), Radhakrishnan Mahadevan (ChemE) and Emma Master (ChemE) of BioZone, a unique multidisciplinary centre conducting leading-edge research at the intersection of biology and engineering.

Strong funding for research remains a priority, and we strive to ensure that our faculty are fully aware of, and equipped to take the greatest advantage of provincial, national and international funding opportunities. The benefits of this approach are evident in an increase in Tri-Council funding — particularly from Canadian Institutes of Health Research (CIHR) and Natural Sciences and Engineering Research Council (NSERC).

This increase was due in part to growth in Industrial Research Partnerships programs. Many research advances come about through collaborations with partners in industry, nonprofits and governments. The relationship between U of T Engineers and external partners is an important one, and is one that resonates in Canada and the world. This year, we hosted our first Faculty-wide reception for industry partners and created the position of Director of Corporate Partnerships to strengthen our external ties.

Selected Research Highlights for 2012–2013

Research Impact Narratives Series

In December 2012, the Faculty introduced a new series called Research Impact Narratives. Once a month, three or four researchers are invited to share their research stories and discuss the impact of their work with an audience of other U of T Engineering faculty and staff. The initiative offers faculty members the opportunity to share their research activities while the audience gains a greater understanding of our Faculty's research innovations. After each session, the Faculty develops a set of written resources profiling each speaker for internal reference. To date, researchers from every department have participated, including Professors Tim Barfoot (UTIAS), Eric Miller (CivE), Goldie Nejat (MIE), Harry Ruda (MSE) and Lacra Pavel (ECE).

Researchers Explore Heat-recycling House Design

Professor Kim Pressnail (CivE), PhD candidate Ekaterina Tzekova (CivE) and Ryerson University Professor Russell Richman (Architectural Science) have developed a Nested Thermal Envelop Design — a house that is constructed to employ zonal heating. This research has the potential to reduce residential energy consumption by 80 per cent. The nested thermal envelope design is currently being tested in a Toronto home, thanks to a research grant and contributions from the Ontario Power Authority's Technology and Development Fund and U of T.

Bionym: Software that Gets to the Heart of Computer Security

Bionym, a Toronto-based tech start-up founded by Foteini Agrafioti (ElecE MASc 0T9 PhD 1T1) and Karl Martin (ElecE BASc 0T1 MASc 0T3 PhD 1T0), promises to radically change computer security. The company developed biometric software that identifies computer users by their heartbeats. The technology can be used to secure various devices with accuracy greater than 99 per cent, roughly the same as current fingerprint-enabled security systems.

U of T Engineering Makes Toronto Hydro a Little Smarter

U of T Engineering has joined with Toronto Hydro and industry partners eCAMION and Korea-based Dow Kokam to install the world's first community-based power storage unit. The unit is tied into the Toronto Hydro grid and consists of a 250-kW battery system that can power an entire street for one hour if the electrical system fails. A team led by Professor Reza Iravani (ECE) developed the algorithms and software that integrates the power unit into the grid and provides control and operational needs of the battery system according to Toronto Hydro's requirements.

Pulp & Paper Centre Celebrates 25 Years of Industry Partnership

The Pulp & Paper Centre was founded by Professor Doug Reeve (ChemE) in 1987, with the mission of stimulating research for the manufacturing of pulp and paper products, as well as encouraging collaborative research with industry partners such as Babcock & Wilcox and International Paper. In November 2012, the Centre, which now includes 22 companies from seven countries, celebrated 25 successful years at its annual research consortium. NSERC paid tribute to the Centre's reputation by awarding a $1.88-million Collaborative Research and Development grant to Centre director Professor Honghi Tran for research into drying, combustion and ash properties of biomass and impacts of pulp and paper mill operations.

Engineering Student Takes Sunnybrook Prize with Biomaterials Discovery

Ben Ouyang, a fourth-year EngSci student (Biomedical Engineering major) won first prize in the nationwide Sunnybrook Prize competition. The competition recognizes excellence in undergraduate engineering and physical sciences research, pitting 10 finalists from across Canada against one another. Ouyang's winning research focused on the creation of an elastic biomaterial substance with 'highly tune-able' mechanical properties. It is thought that the unique material will enable better drug delivery systems. The research came out of a project Ouyang worked on at MIT as part of his Professional Experience Year (PEY) internship. Two other students also placed in the top 10: Ang Cui (EngSci 1T3 + PEY) and Mark Aquilino (EngSci 1T5).

CFI, Ontario Research Fund Invests Over $20 Million in Engineering Infrastructure Projects

The Canadian Foundation for Innovation (CFI) awarded three U of T Engineering projects over $10 million in total. The grants were matched by Ontario Research Fund grants. (Additional funding through partnerships with the private sector and institutional investments brought the total to over $20 million.) Professor Ömer Gülder (UTIAS) was awarded $2 million under the New Initiatives Fund program for a high-pressure, blow-down facility for gas turbine combustion research. Professor Charles Mims (ChemE) was awarded $4.6 million from the Leading Edge Fund for the Ontario Centre for Characterization of Advanced Materials (OCCAM). OCCAM is a collaborative effort between ChemE and MSE, with the support of more than 20 industry partners and spin-off companies. Professor Ted Sargent's (ECE) grant from the Leading Edge Fund, worth $3.4 million, is for research into nanomaterials for energy.

MSE PhD Student Wins Top Research Poster Prize

In competing against more than 900 graduate students, Kitty Kumar, a PhD candidate in MSE, received the Best Poster Award at the 38th annual IEEE Photovoltaic Specialists Conference in June 2012, one of the top technical events for photovoltaic scientists and engineers around the world. Supervised by Professor and MSE Chair Jun Nogami, Associate Professor Nazir P. Kherani (ECE, MSE) and Professor Peter Herman (ECE), Kumar's work addresses the capability to maximize light absorption in crystalline silicon (c-Si) — the primary material found in commercial photovoltaics.

On the Road to Safer Drivers

Professor Birsen Donmez (MIE) received $813,000 in funding over three years to investigate driver feedback systems from Toyota's Collaborative Safety Research Center (CSRC). She is the only Canadian researcher to receive funding from the CSRC. Professor Donmez's research group will work to determine how feedback systems should be designed to help prevent risky behaviors, without imposing additional workload or a potential distraction to the driver. The project will include a series of experiments to test driver reactions as well as cognitive and physiological responses to various situations in a controlled environment. Transport Canada will provide additional in-kind equipment support valued at $250,000 for the last phase of the project.

U of T Engineering's Next Generation of Researchers Boosted with Early Researcher Awards

Seven U of T Engineering professors in the early stages of their research careers had their work honoured with Early Research Award funding, which helps recently appointed Ontario researchers to build their teams and enables Ontario to attract and retain the best and brightest research talent. Recipients were Aimy Bazylak (MIE), Timothy Chan (MIE), Khandker Habib (CivE), Sean Hum (ECE), Natalie Enright Jerger (ECE), Ashish Khisti (ECE) and Daman Panesar (CivE).

UTIAS Establishes Centre for Research in Sustainable Aviation

Estabilised in 2012, the Centre for Research in Sustainable Aviation (CRSA) will serve to promote collaborative research in sustainable aviation. Currently, nine graduate student trainees from UTIAS, CivE and the University of Sherbrooke are engaged in research toward reducing the environmental impact of aviation. The CRSA also aims to make an impact through their annual International Workshop on Aviation and Climate Change, a graduate certificate in sustainable aviation and other educational and collaborative initiatives.

U of T Researchers Invent New Tissue Engineering Tool

A team, led by two U of T Engineering professors, has invented a new device that allows for the uniform, large-scale engineering of tissue – tissue that could be used as grafts for burn victims or vascular patches. Professors Axel Guenther (MIE, IBBME) and Milica Radisic (IBBME, ChemE), developed the device with a team that included graduate students Lian Leng (MIE), Boyang Zhang (ChemE) and Arianna McAllister (MIE). The invention, which was presented in *Advanced Materials* in 2012, is being commercialized by MaRS Innovations in collaboration with U of T's Innovations and Partnerships Office.

Three Engineering Professors Get Boost from Coveted Health Research Grants

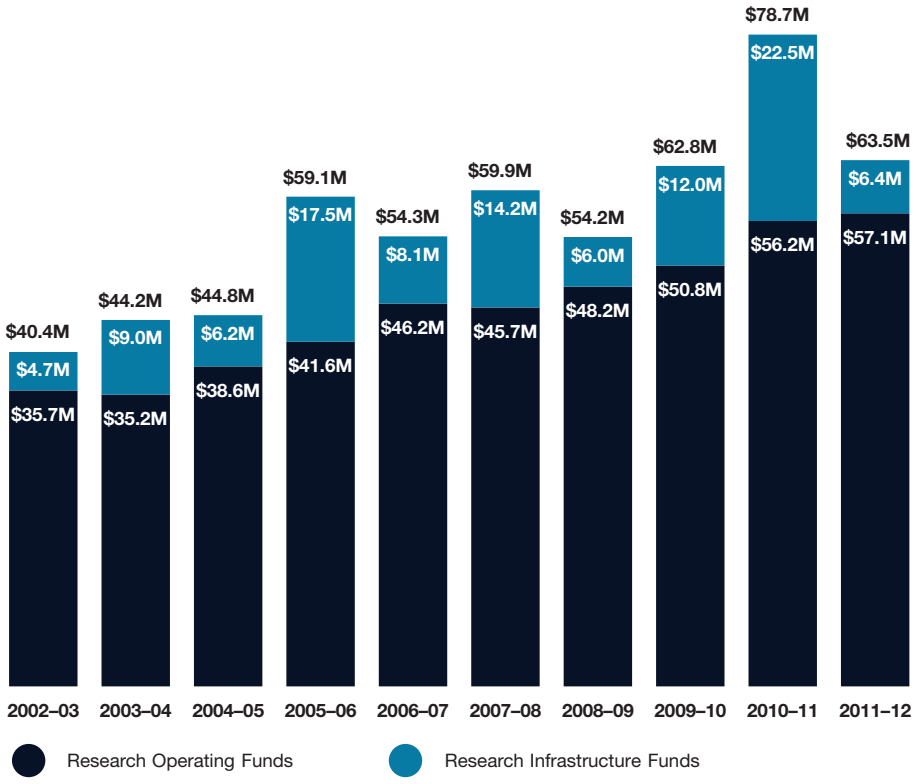
Three U of T engineers were awarded research grants by Canada's Collaborative Health Research Projects (CHRP) program. CHRP — an initiative of NSERC and CIHR — supports interdisciplinary research projects that will lead to health benefits for Canadians, more effective health services or economic development in health-related areas. Faculty recipients were: Professor Roman Genov (ECE), for research on a fully implantable wireless multi-electrode ECoG monitoring system; Professor Ofer Levi (IBBME, ECE), for research on developing an optical imaging system that will monitor brain dynamics in patients with epilepsy and stroke; and Professor Peter Zandstra (IBBME), for research on the development and application of stem cell counting.

New Plastics Research Facility

The Centre for Industrial Application of Microcellular Plastics (CIAMP) officially opened in May 2013, bringing with it the promise of lighter, stronger and more cost effective plastic materials for the automotive and construction industries. Located in Mississauga, CIAMP is a state-of-the-art research and development centre with industry-scale facilities for developing innovative, commercially viable plastic foaming and composite technologies. Led by Professor Chul Park (MIE), Canada Research Chair in Microcellular Plastics, CIAMP was funded by a $9.2-million grant from the Canada Foundation for Innovation — Leading Edge Funds and the Ontario Research Fund — Large Infrastructure Fund, and is part of the Network for Innovative Plastic Materials and Manufacturing Processes, a Natural Sciences and Engineering Research Council network of 21 researchers across Canada. CIAMP is also supported by the Consortium of Cellular and Microcellular Plastics (CCMCP), a network uniting more than 20 leading plastic companies around the world.

Research Funding and Partnerships

Figure 3.1a **Overall Research Funding Breakdown: Research Infrastructure and Research Operating Funding, 2002–2003 to 2011–2012**

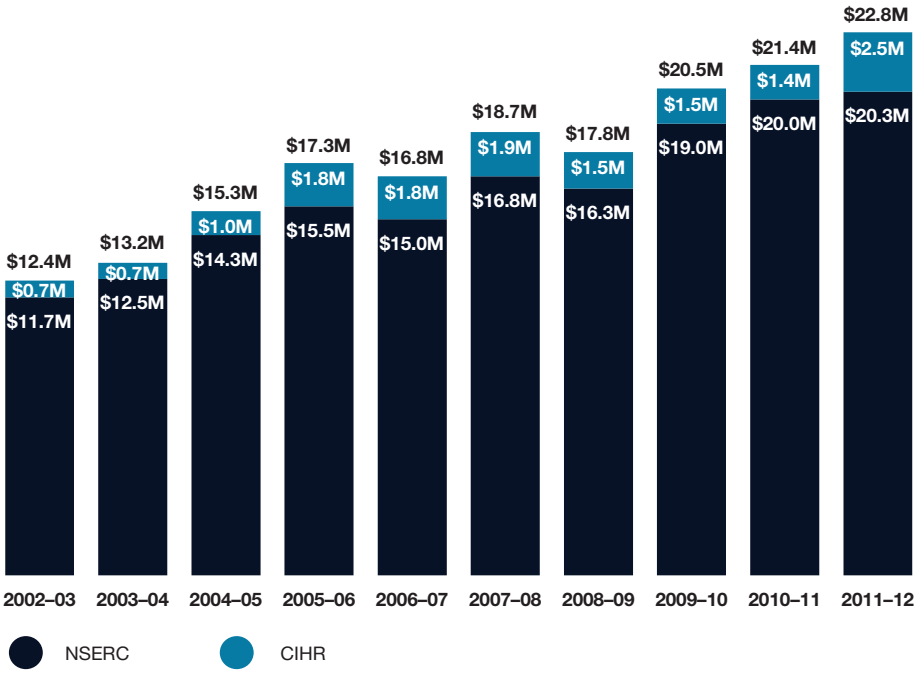


Shown in Figures 3.1a and 3.1c, our research operating funding has held a steady growth over the years and is now at its highest yet ($57.1 million). This consistent growth trajectory is due mostly to Tri-Council (CIHR, NSERC, SSHRC) funding. This funding is crucial to the Faculty's ability to retain and expand our share of foundational support for the research enterprise, such as Canada Research Chairs.

The spike in total research funding seen in 2010–2011 was largely due to an unprecedented $22-million influx of infrastructure funding.

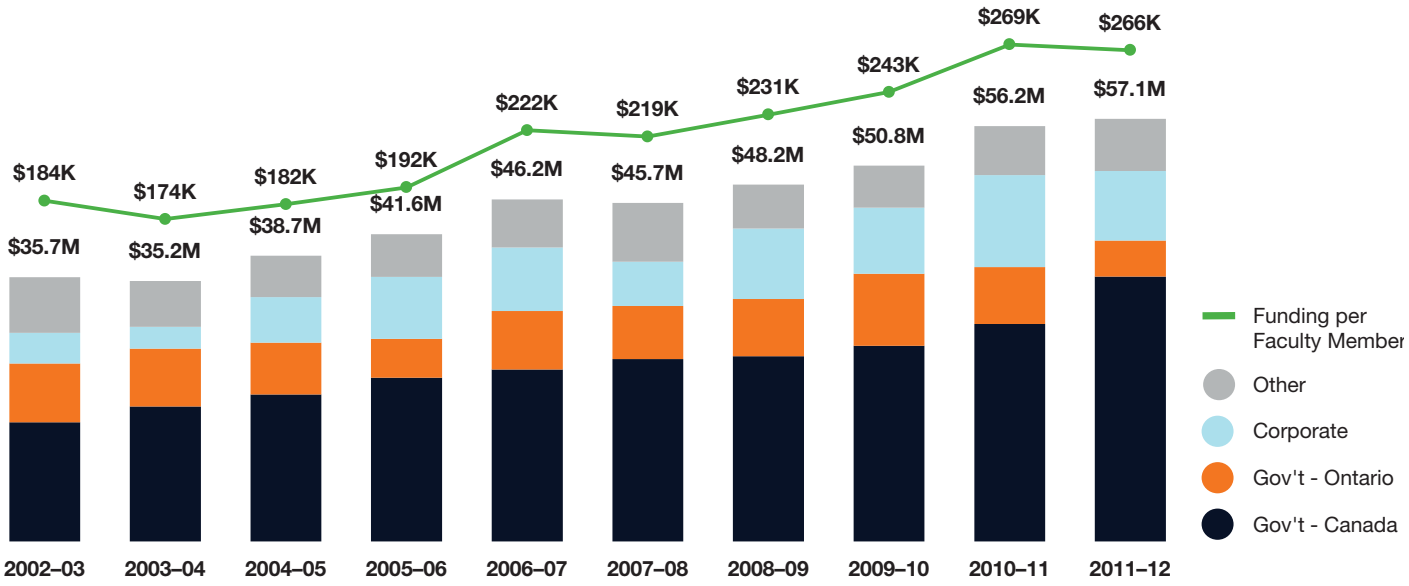
For an analysis of research operating funding by academic area, please see Appendix D.

Figure 3.1b **Canadian Institutes of Health Research (CIHR) and Natural Sciences and Engineering Research Council (NSERC) Funding, 2002–2003 to 2011–2012**



Overall NSERC funding has continued to grow and CIHR revenue almost doubled in the past year. Growth in Tri-Council funding was in significant part attributable to growth in Industrial Research Partnerships Programs — a positive sign that U of T Engineering is increasing its participation in these important programs.

Figure 3.1c **Research Operating Funding by Year, Source and Funding per Faculty Member, 2002–2003 to 2011–2012**

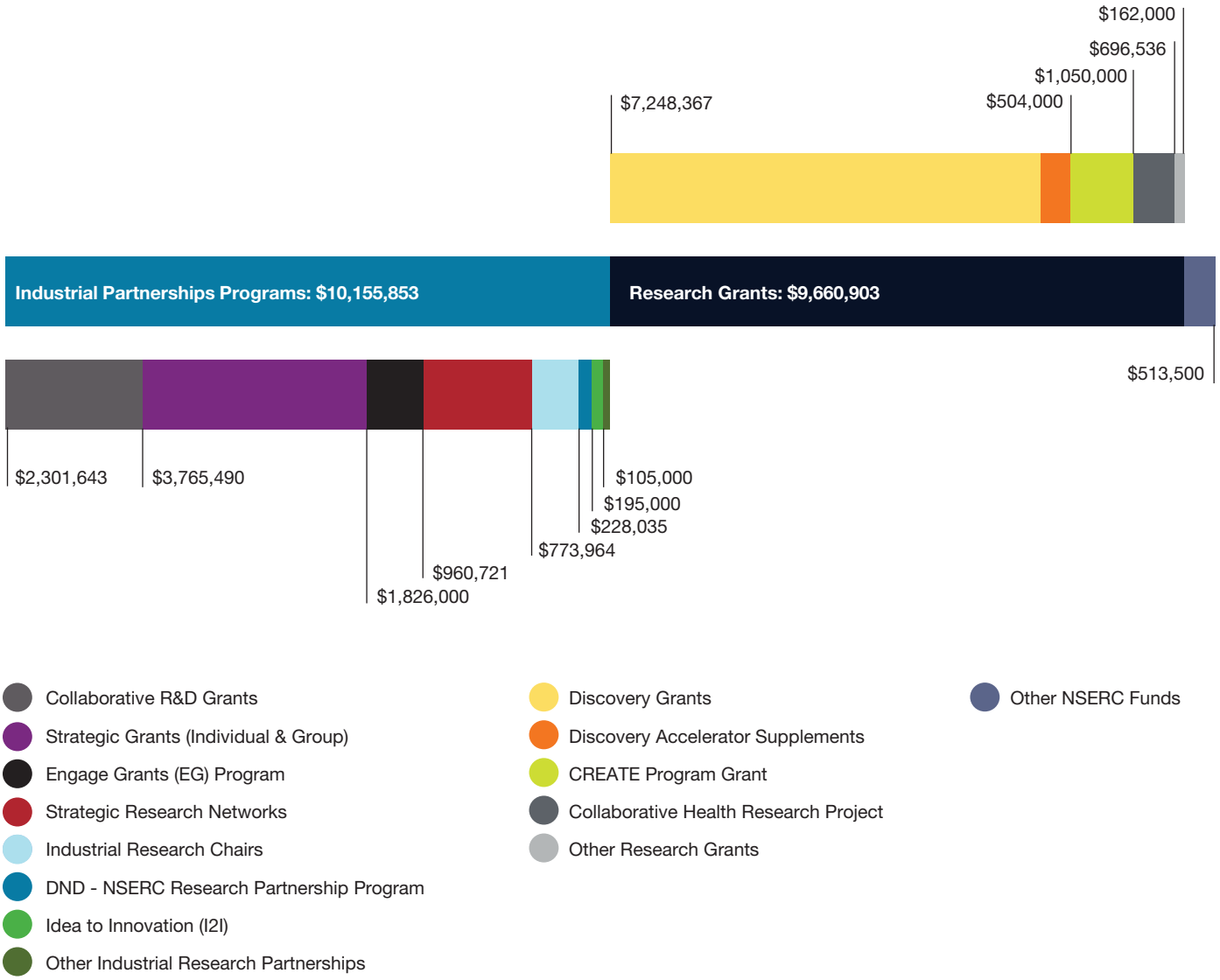


	Funding per Faculty Member	Gov't - Canada	Gov't - Ontario	Industry	Other	Total
2002–03	$184,257	$16,121,497	$7,923,760	$4,139,958	$7,560,641	**$35,745,856**
2003–04	$174,330	$18,265,288	$7,800,731	$2,946,339	$6,202,324	**$35,214,682**
2004–05	$182,314	$19,880,145	$7,015,973	$6,149,095	$5,605,287	**$38,650,500**
2005–06	$191,503	$22,140,217	$5,251,595	$8,393,102	$5,771,219	**$41,556,133**
2006–07	$222,356	$23,258,971	$7,902,767	$8,589,109	$6,499,117	**$46,249,964**
2007–08	$218,896	$24,665,555	$7,188,650	$5,966,170	$7,928,921	**$45,749,296**
2008–09	$230,788	$25,062,963	$7,694,179	$9,535,832	$5,941,749	**$48,234,723**
2009–10	$243,076	$26,458,382	$9,749,492	$8,919,993	$5,675,044	**$50,802,911**
2010–11	$268,783	$29,422,389	$7,680,541	$12,427,710	$6,644,961	**$56,175,601**
2011–12	$265,719	$35,819,309	$4,882,458	$9,395,676	$7,032,190	**$57,129,633**

Note 3.1c: 'Gov't – Canada' represents funding from the Tri-Council (CIHR, NSERC, SSHRC), Canada Foundation for Innovation, Canada Research Chairs and National Centres of Excellence. 'Gov't – Ontario' denotes funds from the Ministry of Research and Innovation, Ontario Research Fund and Ontario Centres of Excellence. Industry partners are listed later in this chapter.

Research grants and industrial partnership programs contribute nearly comparable levels of investment to U of T Engineering. This funding is vital to our efforts to push our collaborative research forward in critical areas; research that translates to improvements in products and services that benefit society and the economy.

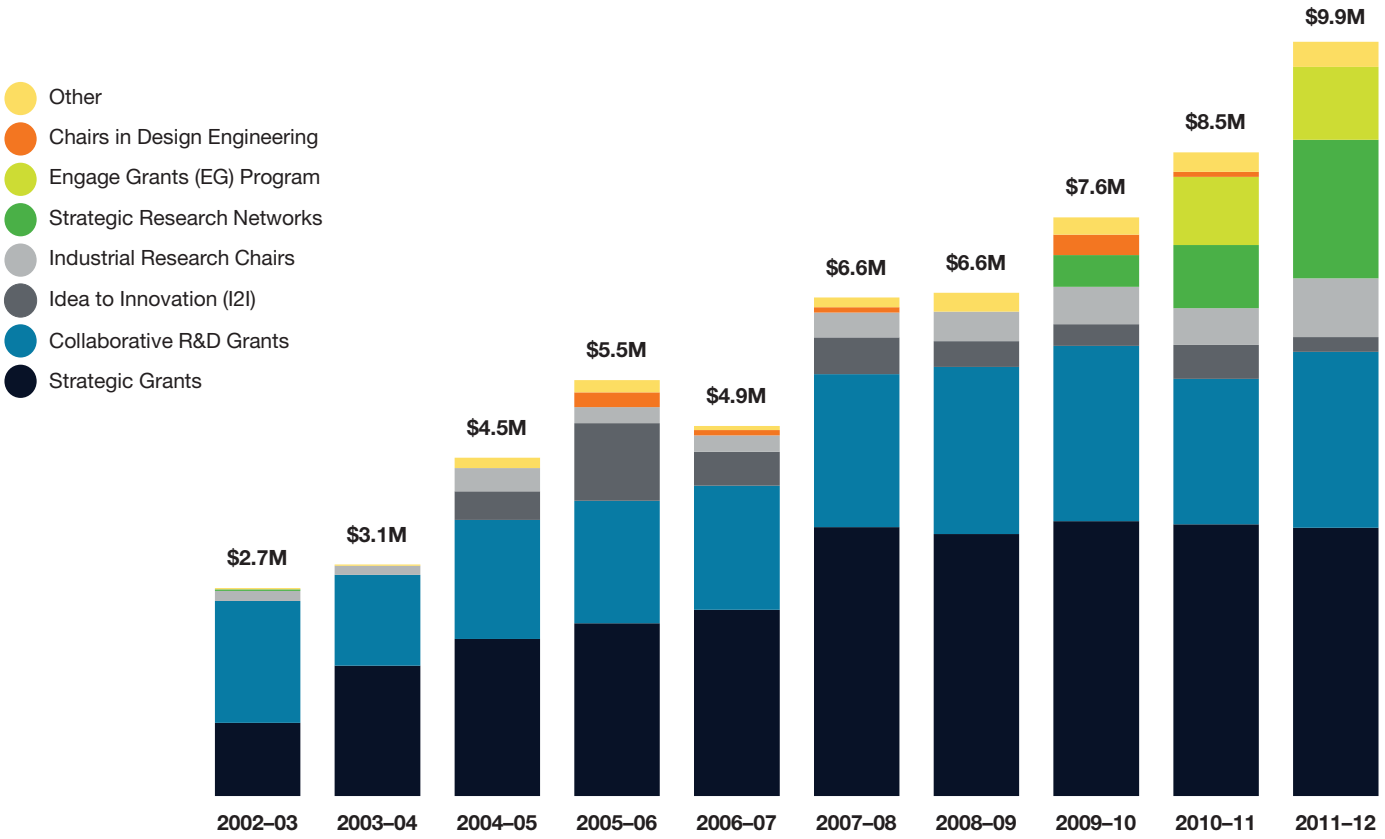
Figure 3.2a **Natural Sciences and Engineering Research Council (NSERC) Funding, 2011–2012**



Note 3.2a: Data current as of May 2013 and based on grant year (April to March).

NSERC Industrial Partnership funding grew by 17 per cent, largely driven by a more than doubling (219 per cent) in the Strategic Networks category. Over half of the $1.83 million noted for 2011–2012 is for the NSERC Strategic Network in Smart Applications on Virtual Infrastructure (SAVI) led by Professor Alberto Leon-Garcia. SAVI was created last year with the support of a $5-million five-year grant to develop innovative digital application platforms.

Figure 3.2b **NSERC Industrial Partnership Funding by Program, 2002–2003 to 2011–2012**



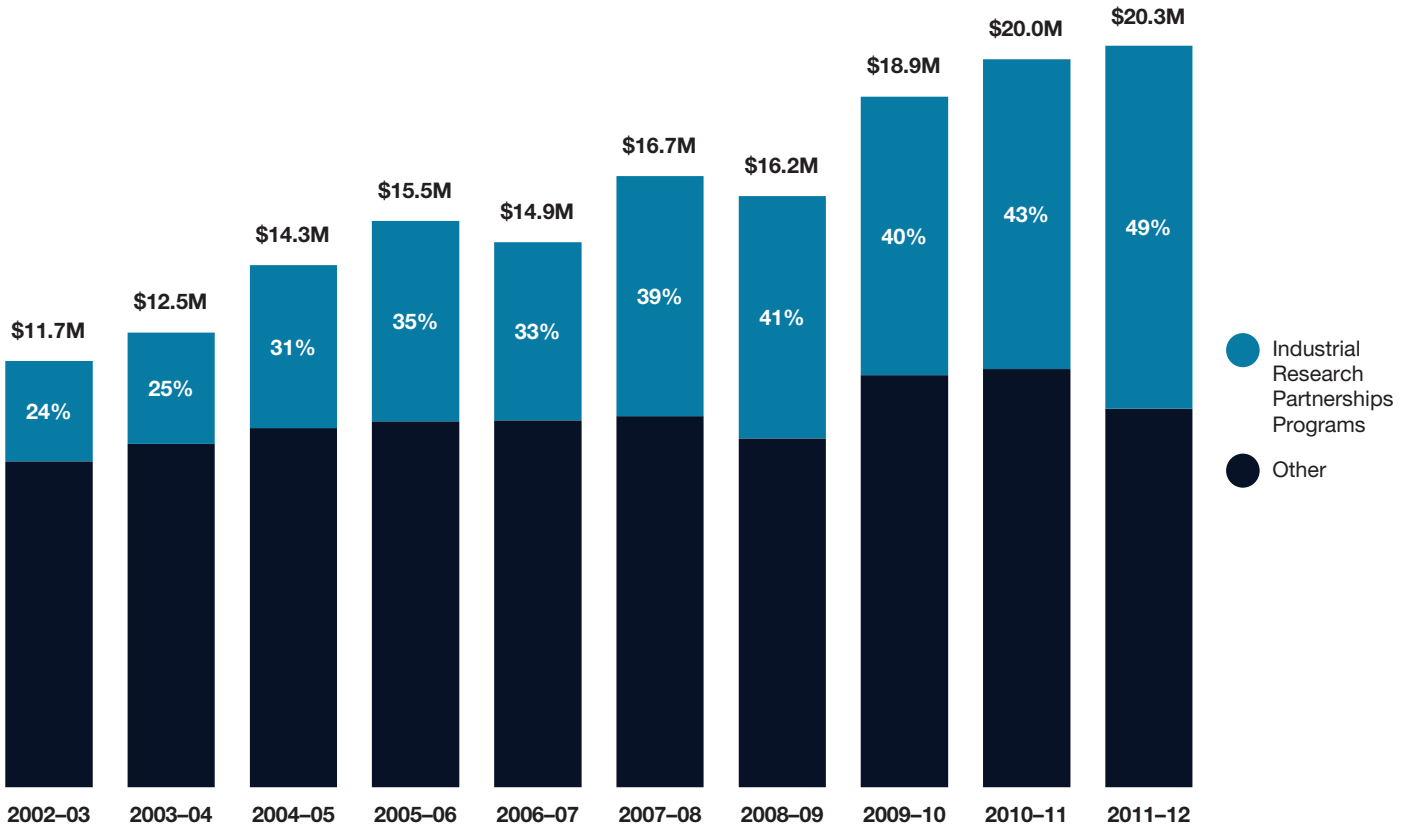
	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Other	$17,400	$17,400	$136,233	$163,537	$55,267	$130,000	$247,392	$230,000	$256,300	$333,035
Chairs in Design Engineering				$195,437	$69,076	$69,076		$267,173	$69,076	
Engage Grants (EG) Program									$897,114	$960,721
Strategic Research Networks	$22,200							$417,293	$832,697	$1,826,000
Industrial Research Chairs	$132,243	$118,500	$309,500	$211,000	$216,000	$329,834	$390,667	$493,197	$485,711	$773,964
Idea to Innovation (I2I)			$375,000	$1,023,640	$449,032	$483,200	$339,200	$287,417	$448,612	$195,000
Collaborative R&D Grants	$1,608,084	$1,196,225	$1,571,393	$1,612,412	$1,637,132	$2,015,904	$2,203,103	$2,313,127	$1,917,049	$2,320,480
Strategic Grants	$965,806	$1,722,087	$2,072,793	$2,282,310	$2,457,079	$3,549,374	$3,457,330	$3,625,317	$3,584,698	$3,540,311
Total	**$2,745,733**	**$3,054,212**	**$4,464,919**	**$5,488,336**	**$4,883,586**	**$6,577,388**	**$6,637,692**	**$7,633,524**	**$8,491,257**	**$9,949,511**

We continue to collaborate with the University of Toronto Innovations and Partnerships Office (IPO), providing feedback on how our Faculty and the IPO can most effectively work together.

This past year, we held a series of sessions in which faculty offered peer-to-peer insights into how best to take advantage of funding opportunities from NSERC (e.g., Discovery, Strategic), U.S. (e.g., National Institutes of Health and Department of Energy), as well as international funding opportunities.

This year, we strengthened ties with outside partners by creating a new position for Director of Corporate Partnerships, whose role is to further the Faculty's engagement with industry, including contract research, research grants and philanthropy. The Faculty Research Committee also organized our first Faculty-wide reception for industry partners in November 2012, to thank partners such as AMD, GE Healthcare, Hatch, MDA, Mircom, Pratt & Whitney, Siemens and Thales for their partnership and to invite further collaboration.

Figure 3.2c **Industrial Partnerships as a Proportion of Total NSERC Funding, 2002–2003 to 2011–2012**



The following list identifies those organizations that funded Faculty research in the 2012–2013 fiscal year through individual sponsored research agreements, or as part of consortia. The list reflects sponsored research agreements recorded in U of T's Research Information System, and is supplemented by research collaborators that participate in funded research through the Pulp & Paper Centre, Centre for Industrial Application of Microcellular Plastics, Toronto Nanofabrication Centre and the Centre for Advanced Coating Technologies. Not reflected in this list are the many of partners that provide philanthropic support, in-kind support, sponsorship of events, and student employment and development opportunities through initiatives such as Professional Experience Year internship program and Capstone Design Projects.

Figure 3.2d **Industrial Partnerships, 2012–2013**

- 5D Composite
- ABB Group
- Advanced Micro Devices Inc.
- AEG Power Solutions Inc.
- Agnico-Eagle Mines Ltd.
- Alcatel-Lucent Canada Inc.
- Allanson International Inc.
- Altera Corp.
- American Institute of Steel Construction
- Americas Styrenics LLC
- Andec Manufacturing Ltd.
- Andritz Group
- Armacell
- Atomic Energy of Canada Ltd.
- Automotive Fuel Cell Cooperation
- AV Nackawic Group
- Axcelon Biopolymers Corp.
- Babcock & Wilcox Ltd.
- Barrick Gold Corp.
- BASF Global
- Bell Canada
- BLiNQ Inc.
- BMW
- Boise Cascade

- Bombardier Inc.
- Borealis Infrastructure Management Inc.
- Brammo, Inc.
- Braskem
- Brican Flight Systems Inc.
- Broadcom Corp.
- Calgon Carbon Corp.
- Canadian Solar Inc.
- Canadian Transportation Research Forum
- Canadian Urban Institute
- Carter Holt Harvey Ltd.
- Cascades
- Cedap
- Celulose Nipo-Brasileira
- Centre for Excellence in Mining
- Clyde-Bergemann, Inc.
- COM DEV International Ltd.
- Cytodiagnostics
- Daishowa-Marubeni International Ltd. - Peace River Pulp Division
- Dana Canada Corp.
- Digital Predictive Systems Inc.
- Dow Chemical Company
- eCamion Inc.
- Eco-Tec Inc.
- Eldorado Brasil
- Elementa Group Inc.
- Enbridge Gas Distribution Inc.
- Energent Inc.
- Engineering Services Inc.
- ERCO Worldwide
- Exar Corp.
- Facca Inc.
- Fibria Celulose
- Ford Motor Company
- FP Innovations
- Fuji Electric Holdings Co. Ltd.
- Fujitsu Laboratories Ltd.
- GE Global Research
- Gefinex
- General Electric
- General Motors of Canada Ltd.
- Genia Photonics Inc.
- Global Emissions Systems Inc.
- GO Lighting Technologies Inc.
- Google Inc.
- Gracious Living Innovations Inc.
- Greencore Composites
- Groupe Mequaltech Inc.
- Hanwha Solar Canada
- Hatch Ltd.
- Hewlett-Packard Company
- Hitachi High-Technologies
- Holcim (Canada) Inc.
- Horizon Plastics
- Huawei Technologies Co. Ltd.
- Hydro Quebec
- IBM Canada Ltd.
- Industrial Thermo Polymers Ltd.
- Ingenia Polymers Corp.
- Insight Nanofluidics Inc.
- Intel Corp.
- International Paper Company
- Inteva Products Canada Ulc
- Intlvac Canada
- IPPLEX Holdings Corp.
- Irving Pulp & Paper Ltd.
- Johnson & Johnson Inc.
- Jyco Sealing Technologies
- Kapik Integration
- Kiln Flame Systems Ltd.
- Kimberly-Clark Corp.
- Kinectrics
- Klabin
- Krauss Maffei Corp.
- Kumho Petrochemical R & D Center
- Lockheed Martin Canada
- Lyngsoe Systems
- MacDonald, Dettwiler and Associates Ltd.
- Marksman Cellject
- Materials & Manufacturing Ontario
- Mattson Technology, Inc.
- MeadWestvaco Corp.
- Messier-Dowty Inc.
- Metso Pulp, Paper and Power
- Mircom
- Mitsubishi Electric Research Laboratories
- Mitsubishi Rayon Co., Ltd.
- Mitsui
- Moldflow Corp.
- Morgan Solar Inc.
- Morrison Hershfield Ltd.
- Multisorb Technologies
- National Semiconductor
- NatureWorks LLC
- Neo Material Technologies
- Nike, Inc.
- Nippon Steel Corp.
- Northwest Mettech Corp.
- Nuclear Waste Management Organization
- NXP Semiconductors Netherlands B.V.
- OLI Systems Inc.
- OneChip Photonics Inc.
- Ontario Power Authority
- Opalux Inc.
- Orenda Engines
- ORNGE
- Pathogen Detection Systems, Inc
- Plasco Energy Group
- Pratt & Whitney Canada Inc.
- Process Research Ortech Inc.
- Procter & Gamble
- PwC
- QTI
- Qualcomm Canada Inc.
- Qualcomm Inc.
- Qualcomm Technologies Inc.
- Quorum Technologies Inc.
- Rambus Inc.
- Raytheon Canada Ltd.
- Redline Communications Inc.
- Research in Motion Ltd.
- Robert Bosch Corp.
- Rochling Engineering Plastics Ltd.
- Sabic
- Safety Power Inc.
- Samsung Advanced Institute of Technology
- Sandvik Canada Inc.
- Saudi Basic Industries Corp. (SABIC)
- Schlumberger Canada Ltd.
- Sealed Air Corp.
- Semiconductor Research Corp.
- Semtech Corp.
- Sendyne Corp.
- Sigma Bio-Instruments Inc.
- SigmaEight Inc.
- Silicon Mitus
- Siltech Corp.
- Silver Creek Pharmaceuticals
- SIM-One
- SINTEF Energi AS
- Sirap Gema
- Solana Networks
- Solantro Semiconductor Corp.
- SolarGrid Energy Inc.
- Solvay Specialty Polymers
- Stantec Inc.
- StoraEnso
- Sulzer Metco
- Suzano Papel e Celulose
- Synbra
- Syncrude Canada Ltd.
- Synthos
- Taiwan Semiconductor Manufacturing
- Teck Resources Ltd.
- Teledyne ISCO
- Teledyne Technologies Inc.
- TELUS
- Tembec Industries, Inc.
- Tenova GoodFellow Inc.
- Texas Instruments Inc.
- The Lubrizol Corp.
- The Miller Group
- Tolko Industries Ltd.
- Toronto Electric Ltd.
- Toronto Waterfront Revitalization Corp.
- Total American Services Inc.
- Total Plastics Solutions Inc.
- Toyota Technical Center U.S.A., Inc.
- Trojan
- Ultra Electronics
- VAC Aero International Inc
- Vale Canada Ltd.
- Vision Extrusions Ltd.
- ViXS Systems Inc.
- VTT Technical Research Centre of Finland
- Wuzhong Instrument Company
- Xagenic Inc.
- Xilinx Inc.
- Xogen Technologies Inc.
- Xstrata Nickel
- Zentrum Mikroelektronik Dresden AG
- Zotefoams PLC

Figure 3.3a **Canadian Peer Universities vs. University of Toronto Share of NSERC Funding for Engineering, Cumulative Five-year Share, 2007–2008 to 2011–2012**

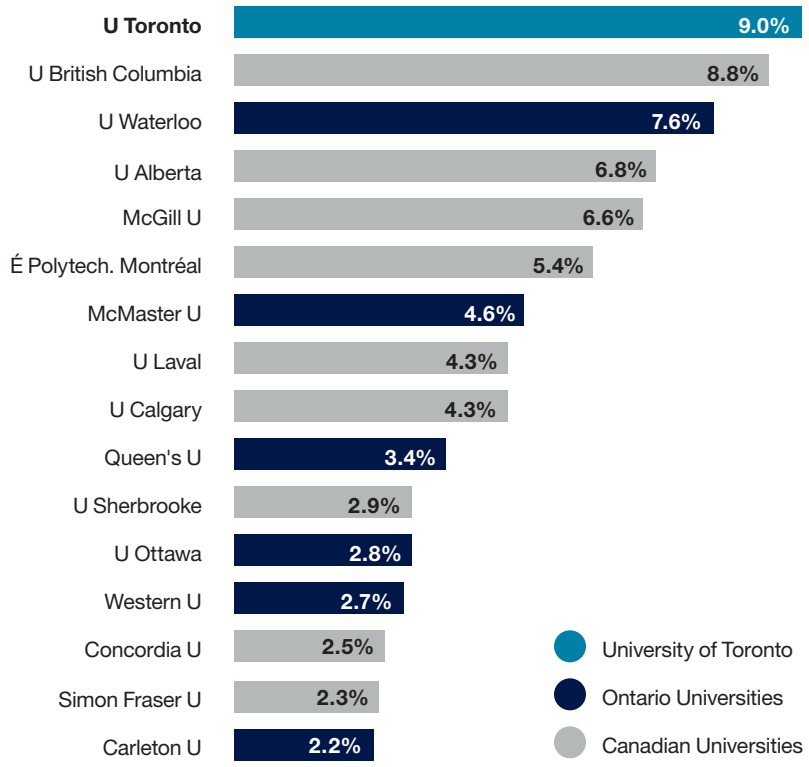


Figure 3.3b **U of T Annual Share of NSERC Funding in Engineering, 2002–2003 to 2011–2012**

2002–03	9.0%
2003–04	8.2%
2004–05	8.9%
2005–06	9.1%
2006–07	9.0%
2007–08	9.2%
2008–09	8.5%
2009–10	9.4%
2010–11	8.8%
2011–12	9.3%

Figure 3.4a **Engineering Invention Disclosures by Academic Area, 2008–2009 to 2012–2013**

	2008–09	2009–10	2010–11	2011–12	2012–13	5-Yr Total
UTIAS	1.0	1.0	1.0	1.0	1.0	**5.0**
IBBME	9.3	7.0	9.3	13.3	8.4	**47.4**
ChemE	2.9	6.5	13.2	5.9	11.6	**40.0**
CivE	1.0	0.5	6.4	3.2	3.0	**14.1**
ECE	33.9	29.8	42.2	23.0	34.6	**163.4**
EngSci	0.0	0.0	0.0	0.0	0.5	**0.5**
MIE	8.9	6.7	14.1	20.5	14.1	**64.3**
MSE	2.3	1.9	4.0	2.5	3.7	**14.4**
Annual Total	**59.4**	**53.4**	**90.2**	**69.3**	**76.9**	**349.1**
University Annual Total	**148.0**	**136.0**	**196.0**	**158.0**	**169.0**	**807.0**
Engineering Percentage	**40%**	**39%**	**46%**	**44%**	**45%**	**43%**

Four out of every 10 invention disclosures filed in 2012–2013 at U of T originated with our Faculty's researchers. Almost half (45 per cent) of the Faculty's 76.9 new disclosures were filed by ECE. Over the past five years across U of T, four of the top five departments for invention disclosures were in the Faculty of Applied Science & Engineering.

The Innovations & Partnerships Office requires all U of T inventors to disclose and file their inventions. In the majority of filings, the inventor and the University jointly own the rights to the invention. The commercialization of inventions often results in the creation of spin-off companies. In 2012–2013 four new companies — CoursePeer, MyTrak Health Systems, Whirlscape Inc. and XTT — joined the list of more than 100 Faculty spin-offs since 1970 (see Appendix F for the complete list).

Cross-faculty collaborations mean that some of the disclosures are shared by more than one academic area, resulting in disclosure totals that include fractions.

Note 3.3a and 3.3b: Data are from the NSERC advanced search website and are shown by NSERC's fiscal year (April to March).

Figure 3.4b **U of T Invention Disclosures by Faculty, 2012–2013**

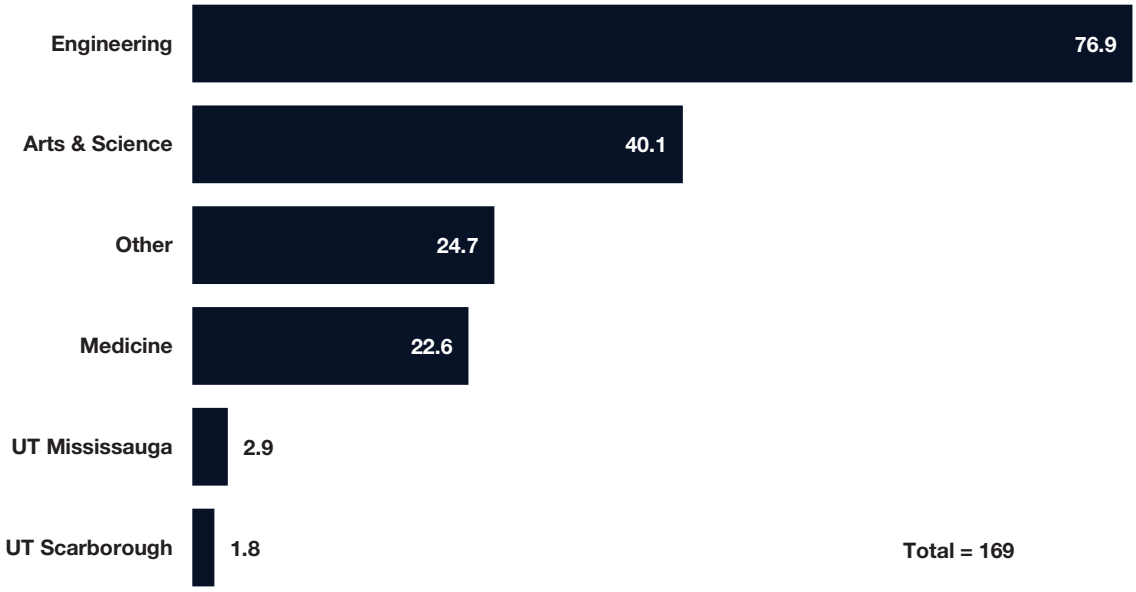
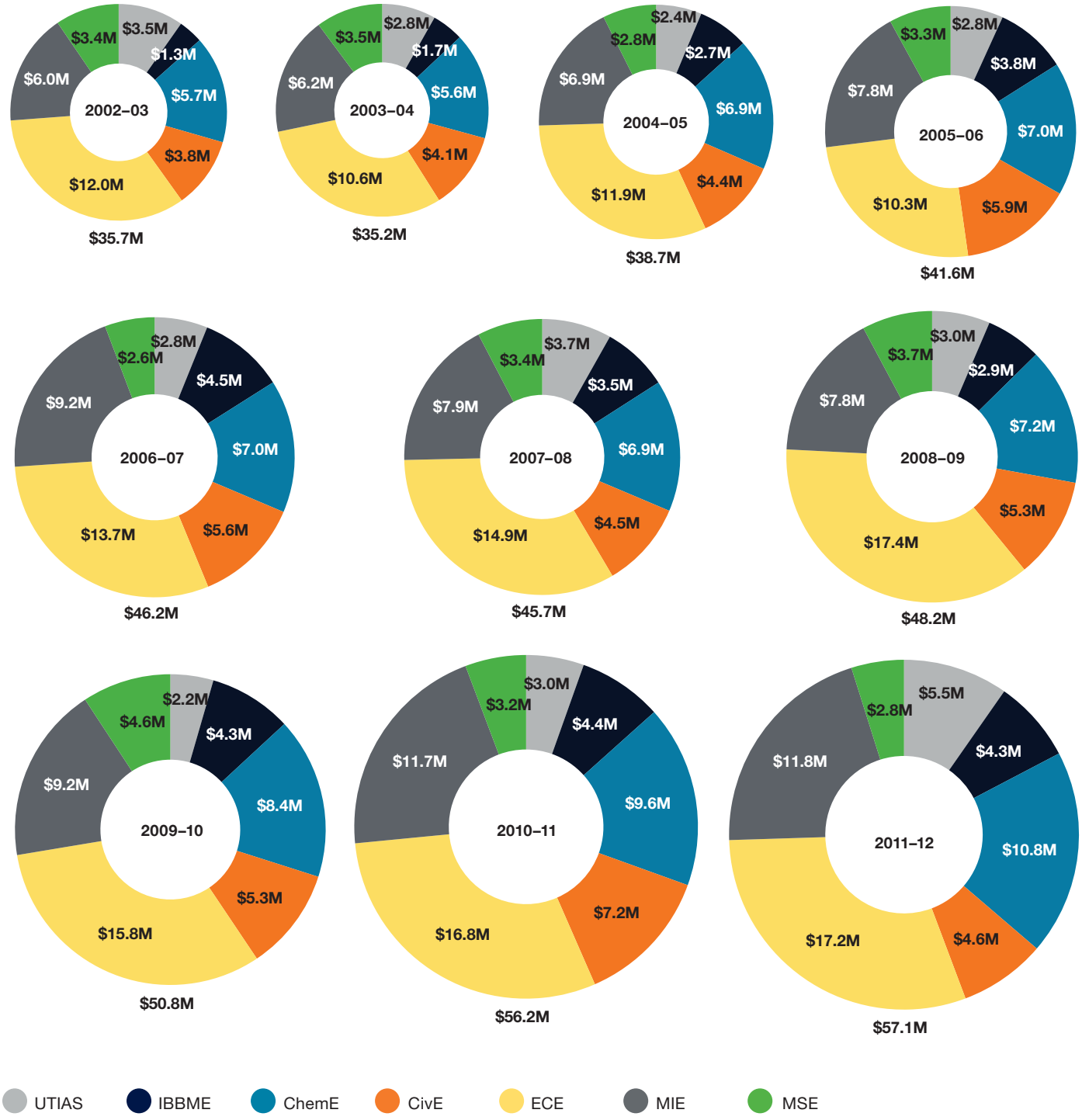


Figure 3.4c **U of T Patent Applications by Faculty, 2012–2013**

Figure 3.5 **Distribution of Research Operating Funding by Academic Area, 2002–2003 to 2011–2012**



Note 3.5: Totals include a small amount of additional funding not shown in the breakdown by academic areas. The research funding attributed to IBBME for 2011–2012 represents 55 per cent of the total funding received by core professors in the Institute. Because of IBBME's cross-disciplinary structure, many of its faculty have their research funding processed through the Medicine or Dentistry faculties. The figure above shows only the funding that comes through U of T Engineering and is presented by grant year (April to March).

4 Cross-Faculty Education and Research

At U of T Engineering, we foster collaboration and encourage a diversity of viewpoints and ideas, through our education and research, both within the Faculty and with the wider University and outside communities. Our reputation as one of the world's leading Engineering schools is due in part to our interdisciplinary commitment.

We continued to strengthen our interdisciplinary approach this past year by creating opportunities and strengthening existing initiatives. For example, the new Centre for Engineering Innovation & Entrepreneurship will be a hub for interdisciplinary and cross-Faculty collaboration in research, learning, design and innovation. The launch of the University of Toronto Institute for Multidisciplinary Design & Innovation (UT-IMDI), the expanded BioZone and the re-classification of the Centre for Sustainable Energy as the Institute for Sustainable Energy also reflect our broader collaborative focus.

More than 700 undergraduates took part in our five undergraduate minors in 2012–2013, with the greatest proportion of students enrolled in the Engineering Business minor. We are expanding cross-Faculty educational options with a new undergraduate certificate in Nuclear Engineering, slated to start in fall 2013. We continue to develop our graduate-level multidisciplinary opportunities as well, with a Master of Engineering in Cities Engineering and Management (MEngCEM) and a certificate in Advanced Water Technologies & Process Design.

Outside of the classroom, our students have a long tradition of initiating their own cross-Faculty club connections. For example, the Blue Sky Solar Racing team, comprising more than 50 undergraduate and graduate students from every discipline as well as other Faculties, has been in existence since 1997 and is once again preparing to race in this year's World Solar Challenge. Another cross-Faculty club, Supermileage, raced their car in April 2013 at the Shell Eco-Challenge for the first time.

Selected Cross-Faculty Research and Education Initiatives

Institute for Sustainable Energy

Founded in 2010, the Centre for Sustainable Energy achieved EDU:C status and has been renamed the Institute for Sustainable Energy (ISE) in 2013, reflecting its broader mandate at promoting cross-disciplinary research programs. ISE is a cross-Faculty group of researchers working with partners from industry and government, with the goals of increasing energy efficiency and reducing the environmental impact of energy use and conversion. The Institute draws membership from a broad range of departments and disciplines. With more than 100 researchers across the campus, ISE has established itself as a focal point for energy research, collaboration, news and events. An increasingly important role for the Institute for Sustainable Energy is readying teams of researchers for large funding initiatives, and connecting researchers to energy companies.

BioZone

BioZone's newly renovated and expanded space was officially opened in December 2012 with speeches, guided tours and a ribbon-cutting. Close to 100 faculty, students, alumni and other guests helped celebrate the research facility, a multidisciplinary centre for collaborative bioengineering research. BioZone's research focuses on providing viable solutions to urgent societal needs in energy, the environment and health. The new centre is home to nine principal investigators and approximately 90 graduate students, post-doctoral fellows and research associates. In addition, the centre facilitates collaboration with researchers in a variety of fields and institutions. Details on other major renovation and facilities improvements can be found in Chapter 10: Space.

Collaboration in Space Robotics Control

With support from the Dean's Strategic Fund (2010–2011), UTIAS and ECE are collaborating on a joint initiative in space robotics control. Graduate students participating in the program are working to address several pressing issues related to the design of aviation systems, such as the development of a nonlinear control system to improve spacecraft attitude control, and testing new approaches for correcting the systemic bias in visual odometry motion estimation.

Institute for Leadership Education in Engineering

The Institute for Leadership Education in Engineering (ILead) played host for the first time to the two-day Community of Practice for Leadership Education for Twenty-first-century Engineers (COMPLETE) conference in September 2012. Initiated in 2010 by the Gordon-MIT Engineering Leadership Program, the group comprises 10 of the top Engineering schools in North America, including MIT, Pennsylvania State University, Tufts University and U of T. COMPLETE meets annually to share best practices in infusing leadership development into the student experience.

In another ILead initiative, Professor Greg Evans (ChemE), working in collaboration with PhD Candidate Patricia Sheridan and Professor Doug Reeve (ChemE), is developing a new online learning tool to help students refine their group leadership skills in large classes. Through a website, students can provide anonymous feedback to fellow teammates and use self-assessment tools to identify skills that could use further development.

Educational Technology Workshop

Our cross-Faculty initiatives are not limited to students and researchers. Organized by the Faculty's Instructional Technology Office, the EdTech Workshop provided an opportunity for U of T instructors, staff and administrators to learn about online education effectiveness in May 2013. Now in its second year, the workshop brought 240 attendees and 14 speakers together to share their experiences, get exposure to new technologies and to learn about different methods and strategies for implementing technology in the classroom.

Multidisciplinary Capstone Design Course

Led by Professor Kamran Behdinan (MIE), the U of T Institute for Multidisciplinary Design & Innovation (UT-IMDI) was officially launched in October 2012. One of the Institute's initiatives is a new multidisciplinary capstone design course. In the course, multidisciplinary student teams complete a capstone project while communicating with a broad spectrum of industry sectors and clients. The Institute also provides summer work opportunities — last year, MIE, MSE and EngSci undergraduates were employed at Bombardier, Pratt & Whitney Canada and Goodrich Landing Gear.

Selected Cross-Faculty Initiatives and Teams for Students

The Hatchery's Idea Ignition Weekend

The Entrepreneurship Hatchery — a Faculty-wide co-curricular program — in cooperation with the student-run Nspire Innovation Network, hosted U of T's first-ever Idea Ignition Weekend in January 2013. The event encouraged U of T students from all Faculties to join forces, molding ideas into a winning business pitch. The goal of the event was to promote not only entrepreneurial thinking around an idea, but to encourage team building. More than 50 students participated in the inaugural event, in which 15 teams each developed an innovative idea to pitch to a panel of judges on the final day. The panel included three generations of alumni entrepreneurs: Hadi Aladdin (CompE 1T2) of CoursePeer Inc., Somen Mondal (CompE 0T2), CEO of Field ID, and Arthur H. Watson (CivE 7T5) of Convergent Bioscience Ltd.

Human-Powered Vehicle Design Team

The Human-Powered Vehicle Design Team was founded by UTIAS alumni Dr. Todd Reichert (EngSci 0T5, UTIAS PhD 1T1) and Cameron Robertson (EngSci 0T8, UTIAS MASc 0T9), who later achieved fame by realizing the age-old dream of human-powered bird-like flight with their ornithopter, Snowbird. In the summer of 2013, Reichert and Robertson, with the help of current student members of the Human-Powered Vehicle Design Team, again made history by winning the $250,000 AHS Igor I. Sikorsky Human-Powered Helicopter Prize, for the first-ever sustained flight of a human-powered helicopter. The team consists of undergraduate and graduate students from several departments, including ECE, EngSci, MIE and UTIAS. Members of the team were seconded to AeroVelo, the company founded by Reichert and Robertson, and played a vital role in the historic achievement.

The Human-Powered Vehicle Design Team continued its string of success at the Human-Powered Vehicle Challenge East, sponsored by ASME and held in Big Rapids, Michigan in April 2013. With a newly built trike, they placed third in the men's and women's speed categories, and first in the endurance race. They placed third overall.

Blue Sky Solar Racing

The Blue Sky Solar Racing team is comprised of more than 50 undergraduate and graduate students from every department in U of T Engineering, as well as colleagues from other Faculties. They are hard at work building a solar-powered car to compete in the 2013 World Solar Challenge to be held in Australia in October 2013. The team's goal is to finish in the top five in the race, which traverses Australia for 3,000 kilometres, from Darwin in the north to Adelaide on the south coast.

Supermileage

Another car-building student group, U of T Supermileage, also exemplified how our students reach across disciplines to achieve their goals. The Supermileage team built and raced a 90-pound, 1.3 horsepower vehicle — powered by a Honda leafblower motor — against teams representing other universities from Brazil, Canada, Guatemala, Mexico and the United States at the annual Shell Eco-Challenge event in Houston in April 2013. The team, which is in its first year, did well in the preliminary rounds, establishing a foundation for future success.

Undergraduate Engineering Minors and Certificates

Our interdisciplinary minors and certificates play an important role in nurturing students to see beyond the traditional boundaries of their academic programs. We offer the following minors and certificates:

Minors
- Bioengineering
- Engineering Business
- Environmental Engineering
- Mechatronics & Robotics
- Sustainable Energy

Certificates
- Engineering Business
- Entrepreneurship
- Global Engineering
- Mineral Resources (new for 2012)
- Nuclear Engineering (starts in 2013)
- Preventative Engineering & Social Development

Undergraduate participation in our interdisciplinary minors continues to increase. Since their introduction in 2007–2008, enrolment has more than tripled. The increase from 749 in 2011–2012 to 781 in 2012–2013 is due largely to interest in our two newest minors: Engineering Business and Robotics & Mechatronics. A collaboration with the Rotman School of Management, the Engineering Business minor has quickly become our most popular offering, accounting for 56 per cent of all minor enrolments in 2012–2013.

It is important to note that the 781 enrolments for 2012–2013 presented in Figure 4.1 represent 716 students. That means a number of ambitious students with diverse interests are pursuing two or even three minors simultaneously.

In 2012, we developed a new undergraduate certificate program in Nuclear Engineering, slated to begin in September 2013. This certificate strengthens the Faculty's suite of nuclear engineering courses.

Figure 4.1 **Undergraduate Enrolment in Engineering Minors, 2007–2008 to 2012–2013**

	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Bioengineering	111	138	195	168	145	95
Engineering Business					313	439
Environmental Engineering (Collaborative Program)	(95)	(74)	135	105	79	49
Robotics & Mechatronics					36	59
Sustainable Energy			198	241	176	139
Total Enrolment	**206**	**212**	**528**	**514**	**749**	**781**

5 Awards and Honours

Our faculty members have an impressive track record for achievement, earning some of the highest professional distinctions in Canada and the world. In recent years, we have expanded our awards nomination program to actively ensure our early-career professors — in addition to our more distinguished faculty members — are being recognized for their achievements. The results of these efforts were especially prominent this past year. Our professors garnered several of the major awards available to early-career engineers — for example, the Engineers Canada Young Engineer Achievement Award, the Steacie Prize and two Steacie Fellowships — and one of our professors was named one of the Top 35 Innovators Under 35 by the *MIT Technology Review*. Another encouraging trend is that many of these awards were won by women professors.

Our more senior faculty members have continued to receive top national and international engineering honours, including the Synergy Award, induction into the Royal Society of Canada and election as Fellows of the American Association for the Advancement of Science. In all cases, these honours topped the numbers awarded to any other Canadian engineering school.

We also received recognition within the University for the achievements of our faculty and staff. Two faculty were named Distinguished Professors, two early-career professors received McLean Awards, one was honoured with the Northrop Frye Award and 14 staff members received Excellence Through Innovation Awards.

In April 2013, we held our sixth annual Celebrating Engineering Excellence event where we honoured the achievements of our staff and faculty and presented two new awards: the Sustained Excellence in Teaching Award and the Research Leader Award.

Selected Awards Received by Faculty Members and Alumni, 2012–2013

Our Faculty continues to be recognized with prestigious international, national and provincial awards and honours, which is an indication of excellence in research, education and service to the profession.

International

American Association for the Advancement of Science
Fellow
Alberto Leon-Garcia (ECE)
Andreas Mandelis (MIE)
Doug Perovic (MSE)

Great Minds in STEM
Hispanic Engineer National Achievement Awards Corporation Hall of Fame
Cristina Amon (MIE)

Humboldt Foundation
Alexander von Humboldt Research Award
Andreas Mandelis (MIE)

International Academy of Food Science and Technology
Fellow
Levente Diosady (ChemE)

International Congress on Durability of Concrete
V.M. Malhotra Award
Doug Hooton (CivE)

Institute of Physics (UK)
Fellow
Harry Ruda (MSE)

Korean Academy of Science and Technology
Member
Chul Park (MIE)

MIT Technology Review
Top 35 Innovators Under 35
Joyce Poon (ECE)

New Jersey Center for Biomaterials
Biomaterials Achievement Award
Michael Sefton (ChemE, IBBME)

Society of Industrial Microbiology and Biotechnology
Young Investigator Award
Radhakrishnan Mahadevan (ChemE)

National

Canadian Academy of Health Sciences
Fellow
Molly Shoichet (ChemE, IBBME)

Canadian Aeronautics and Space Institute
McCurdy Award
David Zingg (UTIAS)

Canadian Association of Physicists/ National Optics Institute
Medal for Outstanding Achievement in Applied Photonics
Andreas Mandelis (MIE)

Canadian Science and Engineering Hall of Fame
Ursula Franklin (MSE)

Canadian Society for Mechanical Engineering
Robert W. Angus Medal
Javad Mostaghimi (MIE)

Engineering Institute of Canada
Fellow
Paul Chow (ECE)
Shamim Sheikh (CivE)
Yu Sun (MIE)
K.Y. Lo Medal
Chul Park (MIE)
Sir John Kennedy Medal
Andrew Goldenberg (MIE)

Engineers Canada
Award of Journalism Excellence in Engineering
Tyler Irving (ChemE MASc 1T0)
Young Engineer Achievement Medal
Goldie Nejat (MIE)

E.W.R. Steacie Memorial Fund
Steacie Prize
Ted Sargent (ECE)

Governor General of Canada Queen Elizabeth II Diamond
Jubilee Medal
Levente Diosady (ChemE)
Alexander McLean (MSE)
Milica Radisic (IBBME, ChemE)
Molly Shoichet (ChemE, IBBME)
Paul Young (CivE)

National Sciences and Engineering Research Council
Steacie Fellowship
Warren Chan (IBBME)
Yu Sun (MIE)
Synergy Award for Innovation
Paul Santerre (IBBME)

Royal Society of Canada
Fellow
Elizabeth Edwards (ChemE)
Frank Kschischang (ECE)
Jonathan Rose (ECE)

Senior Women Academic Administrators of Canada
Recognition Award
Brenda McCabe (CivE)

University of British Columbia
Margolese National Design for Living Prize
Eric Miller (CivE)

Women of Influence Magazine
Canada's 25 Most Influential Women
Cristina Amon (MIE)

Provincial

Ernst & Young
Entrepreneur of the Year Ontario – Emerging Entrepreneur
Somen Mondal (CompE 0T2)

Order of British Columbia
Norman B. Keevil (GeoE 5T9)

Professional Engineers Ontario and Ontario Society of Professional Engineers (Ontario Professional Engineers Awards)
Engineering Excellence Medal
George Nowak (CivE 7T3)
Gold Medal
Bert Wasmund (ChemE PhD 6T6)
Management Medal
John Bianchini (ChemE 8T5)
Research and Development Medal
Doug Hooton (CivE)
Shaker Meguid (MIE)
Young Engineer Medal
Goldie Nejat (MIE)

University of Toronto

Distinguished Professor in Application Platforms and Smart Infrastructure
Alberto Leon-Garcia (ECE)

Distinguished Professor in Plasma Engineering (renewal)
Javad Mostaghimi (MIE))

McCharles Prize for Early Career Research Distinction
Joyce Poon (ECE)

McLean Award
Milica Radisic (ChemE, IBBME)
Craig Simmons (MIE, IBBME)

Northrop Frye Award
Greg Evans (ChemE)

Note: The international, national, provincial and U of T awards listed above include honours received between June 2012 and April 2013.

Figure 5.1 Summary of Major International, National and Provincial Awards and Honours, 2003–2004 to 2012–2013

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
International										
AAAS Fellowship*			1	1	2	4	4	6	5	3
Guggenheim Fellowship*		1			1					
MIT Top 35 Under 35	1		1			1				1
NAE Foreign Associate*			1	1				1	1	
National										
3M Teaching Fellowship*					1					
Alan Blizzard Award					1					
Canadian Academy of Engineering Fellowship			3	2	1	3	9	8	1	7
Engineering Institute of Canada Awards								1	1	1
Engineering Institute of Canada Fellowship		1		2	2	3	4	3	3	3
Engineers Canada Awards					1		1	3		1
Killam Prize*	1					1				
Killam Research Fellowship*						2		2		
Royal Society of Canada Fellowship*	2		1	1	1	1	1	2	4	3
Steacie Fellowship*	2	1	1				1			2
Steacie Prize*										1
Synergy Award for Innovation		1	1	1			1			1
Provincial										
Ontario Professional Engineers Awards	1	1	4	2	3	5	5	5	5	3
Total	**7**	**5**	**13**	**10**	**13**	**20**	**26**	**31**	**20**	**26**

Note 5.1: (*) denotes U of T performance indicator. Data shown are by calendar year (January to December). Includes faculty award recipients only. To read descriptions of the awards and honours listed above, please see Appendix F.

Figure 5.2a **Number of Major Awards Received by U of T Engineering Compared to other Canadian Engineering Faculties, 2012–2013**

More than 35 per cent of all major international and national engineering awards received by Canadian faculty in engineering schools went to our professors in 2012–2013.

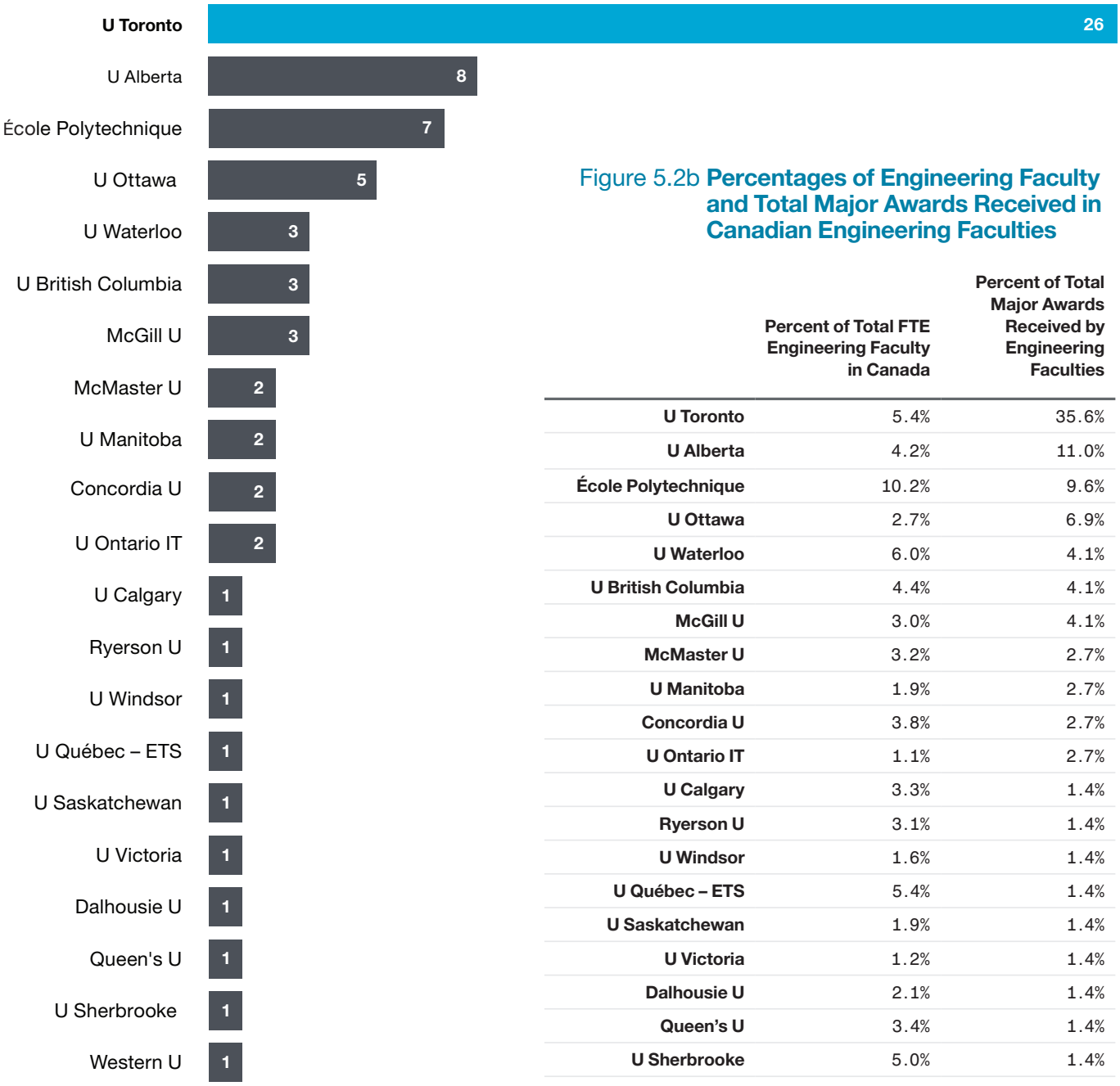
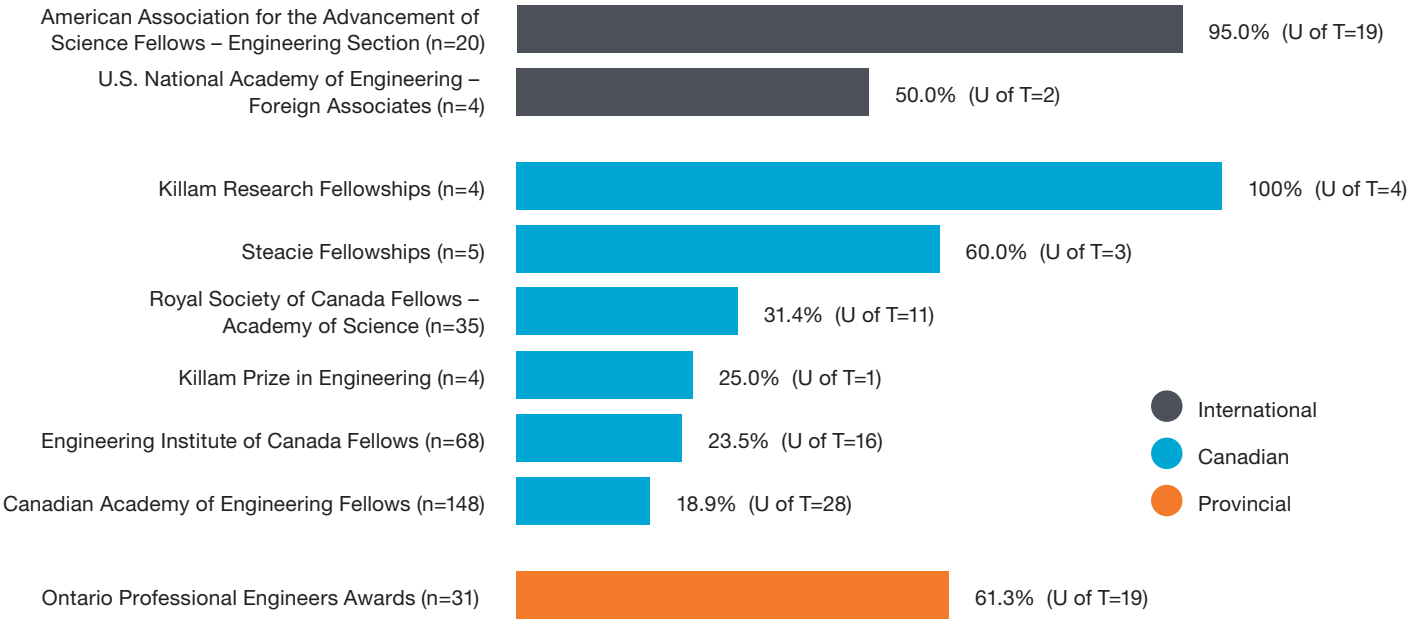


Figure 5.2b **Percentages of Engineering Faculty and Total Major Awards Received in Canadian Engineering Faculties**

	Percent of Total FTE Engineering Faculty in Canada	Percent of Total Major Awards Received by Engineering Faculties
U Toronto	5.4%	35.6%
U Alberta	4.2%	11.0%
École Polytechnique	10.2%	9.6%
U Ottawa	2.7%	6.9%
U Waterloo	6.0%	4.1%
U British Columbia	4.4%	4.1%
McGill U	3.0%	4.1%
McMaster U	3.2%	2.7%
U Manitoba	1.9%	2.7%
Concordia U	3.8%	2.7%
U Ontario IT	1.1%	2.7%
U Calgary	3.3%	1.4%
Ryerson U	3.1%	1.4%
U Windsor	1.6%	1.4%
U Québec – ETS	5.4%	1.4%
U Saskatchewan	1.9%	1.4%
U Victoria	1.2%	1.4%
Dalhousie U	2.1%	1.4%
Queen's U	3.4%	1.4%
U Sherbrooke	5.0%	1.4%
Western U	2.2%	1.4%

Note 5.2a and 5.2b: The following major awards are included: International — AAAS Fellowship (Engineering Section), MIT Top 35 Under 35, NAE Foreign Associate; National — CAE Fellowship, EIC Awards, EIC Fellowship, Engineers Canada Awards, Killam Prize (Engineering), Royal Society of Canada Fellowship (Engineering/Physical Sciences), Steacie Fellowship, Steacie Prize and Synergy Awards for Innovation.

Figure 5.3 **Number of Awards Received by U of T Engineering Faculty Compared to other Canadian Engineering Faculties, 2007 to 2012**



Selected Awards Received by Staff, 2012–2013

International

Association of Marketing and Communication Professionals: MarCom Awards

Platinum Award: Print Media, Educational Category for Your Feedback Matters
Shilpa Gantotti (ESC)
Raj Grainger (ESC)

Gold Award: Print Media, Viewbook Category for Discover Engineering
Shilpa Gantotti (ESC)
Raj Grainger (ESC)
Janet Hunter (ESRRO)

Gold Award: Web Video, Educational Category for 'An Exchange Would Do You Good'
Shireen Cuthbert (ESC)
Rosemary Guido (Office of the Registrar)
Wayne MacPhail (ESC)
Tom Nault (Office of the Registrar)

16th Annual Videographer Awards

Award of Distinction, Video for Web for New Solutions for Electronic Displays
Liam Mitchell (ESC)

University of Toronto

Excellence Through Innovation Awards
Manfred Aulich (ECE)
Matthew Chow (ECE)
Eugenia Distefano (ECE)
Khuong Doan (Office of the Registrar)
Adam Fox (Office of the Registrar)
Bruno Korst-Fagundes (ECE)
Yong Lee (ECE)
Jay Li (ECE)
Linda Marsh (Office of the Registrar)
Mehrdad (Mike) Mehramiz (ECE)
Sergei Metropolitansky (Office of the Registrar)
Dan Pettigrew (Office of the Registrar)
Jim Prall (ECE)
Jaro Pristupa (ECE)

Note: The international and U of T awards listed above include honours received between June 2012 and April 2013.
ESC = Engineering Strategic Communications; ESRRO = Engineering Student Recruitment & Retention Office

University of Toronto Engineering Faculty Awards, 2003–2004 to 2012–2013

We have created a number of internal awards to honour staff and faculty for exemplary leadership and dedication. In 2012–2013, we introduced two new awards: Research Leader Award and Sustained Excellence in Teaching Award.

Agnes Kaneko Citizenship Award

Presented to a staff member who has served with distinction and made contributions to the Faculty's mission above and beyond their job description over a long period of time. This award was established in memory of a dedicated CivE staff member.

2012–13: Mary Stathopoulos (ECE)
2011–12: Giovanni Buzzeo (CivE)
2010–11: John MacDonald (CivE)
2009–10: Joe Baptista (MIE)

Early Career Teaching Award

Presented in recognition of teaching excellence early in a career.

2012–13: Jason Anderson (ECE)
2012–13: Timothy Chan (MIE)
2011–12: Micah Stickel (ECE)
2010–11: Sean Hum (ECE)
2009–10: Glenn Hibbard (MSE)

Faculty Teaching Award

The highest teaching tribute awarded by the Faculty.

2012–13: Evan Bentz (CivE)
2011–12: Jonathan Rose (ECE)
2010–11: Jim Wallace (MIE)
2009–10: Ali Sheikholeslami (ECE)

Harpreet Dhariwal Emerging Leader Award

Presented to a staff member who leads by example in their dedication to the Faculty's mission. Recipients are held in high regard by colleagues and demonstrate potential to assume more senior leadership roles within the Faculty. This award was renamed in memory of an esteemed staff member who received this honour in 2011–2012.

2012–13: Tom Nault (Office of the Registrar)
2011–12: Harpreet Dhariwal (Office of the Dean)
2010–11: Ryan Mendell (MIE)
2009–10: Helen Bright (Office of the Registrar)

Influential Leader Award

Presented to a staff member who demonstrates exemplary support for the Faculty's education and research endeavours. Recipients inspire others to realize their potential through their significant and sustained contributions.

2012–13: Sandra Walker (IBBME)
2011–12: Austra Ozolins (ECE)
2010–11: Nelly Pietropaolo (CivE)
2009–10: Arlene Smith (ChemE)

Innovation Award

Presented to staff who, individually or as a team, address a problem creatively by developing a new technology or making significant improvements to an existing system or method.

2012–13: Khuong Doan, Adam Fox, Linda Marsh, Sergei Metropolitansky and Dan Pettigrew (Office of the Registrar)
2011–12: Jay Li (ECE)
2010–11: Bruno Korst-Fagundes (ECE); Steve Miszuk (Office of the Dean); Joe Wong (ECE)
2009–10: Joan Chen, Pauline Martini, Liam Mitchell and Deborah Peart (ChemE)

Quality of Student Experience Award

Presented to a staff member who has made significant improvements to the quality of student experience.

2012–13: Deborah Peart (ChemE, MIE)
2011–12: Shannon Osborne (MIE)
2010–11: Lesley Mak (Office of the Registrar)
2009–10: Annie Simpson (ILead)
2009–10: Pierina Filippone (Office of the Registrar)

Research Leader Award

Presented to a faculty member or team who has shown leadership in innovative, interdisciplinary and/or collaborative research initiatives that has enhanced the Faculty's research profile within the broader community. The Research Leader Award is new this year.

2012–13: Elizabeth Edwards, Radhakrishnan Mahadevan and Emma Master (ChemE)

Sustained Excellence in Teaching Award

Presented to a faculty member who exhibits teaching excellence over a sustained period of time. This award is new this year.

2012–13: Tarek Abdelrahman (ECE)

Teaching Assistant Award

Recognizes the excellence of a teaching assistant.

2012–13: Aaron Persad (MIE)
2011–12: Drew Cheung (CivE)
2010–11: Bernie Fitzpatrick (UTIAS)

Engineering Alumni Association Awards, 2012

Each fall, the Engineering Alumni Association (EAA) recognizes graduates for their involvement at U of T Engineering and their dedication to improve and advance the engineering profession.

L.E. (Ted) Jones Award of Distinction

Inspired by the contributions of Professor Emeritus L.E. (Ted) Jones, this award honours an alumnus/alumna for his or her support and dedication to U of T Engineering and its arts community.

Andrew Oldham (MechE 1T1 + PEY)
Jonathan Sun (EngSci 1T1 + PEY)

7T6 Early Career Award

Presented to an alumnus/alumna 10 years after graduation who is distinguished in the profession and community.

Somen Mondal (CompE 0T2)

2T5 Mid-Career Achievement Award

Presented to an alumnus/alumna 25 years after graduation who has earned respect within the profession and broader community, attained significant achievement and exhibits promise of further contributions.

Helen Wojcinski (CivE 8T7)

Malcolm F. McGrath Alumni Achievement Award

Named in honour of Malcolm McGrath on his retirement as Assistant Dean, Alumni Liaison, this award recognizes contributions of personal service to the Faculty, University or to the greater community.

Paul Walters (MinE 5T6)

Engineering Alumni Hall of Distinction Award

The Hall of Distinction is an assembly of extraordinary alumni, selected by their peers for their lifelong accomplishments. These are graduates who have ultimately defined what is most exemplary in the engineering profession.

Willian 'Bill' Buckley (MechE 7T1)
Norman B. Keevil (GeoE 5T9)
Arthur Slutsky (EngSci 7T0, IndE MASc 7T2)
Christopher F.M. Twigge-Molecey (MechE MASc 6T9, PhD 7T2)

Engineering Alumni Medal

As EAA's highest honour, this award is presented to an alumnus/alumna who has demonstrated superior accomplishment and serves as an outstanding role model for students.

Angus A. Bruneau (EngPhys 5T8)

6 World Recognition by Rankings

Although no ranking can definitively portray a school's performance, world-class rankings like those found in this chapter do enhance our Faculty's ability to attract top academics and strong students from the community and around the world. Rankings have become more competitive as universities throughout the world recognize their importance for developing a global reputation and for recruiting both students and faculty. In particular, many Asian governments are investing heavily in their premier universities, especially in areas like engineering and technology that feature prominently in many rankings.

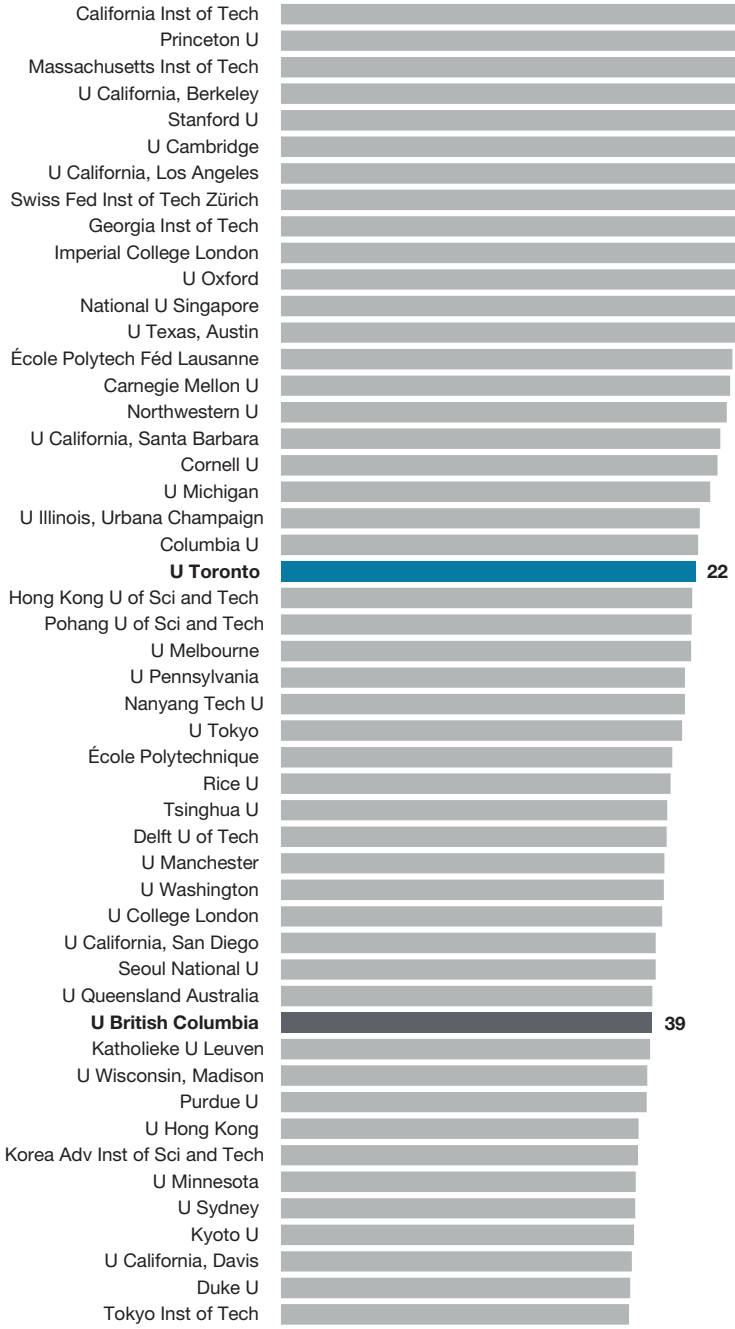
Despite the increased competition, U of T Engineering continues to do well in all major rankings, placing first in Canada, and among the best worldwide. We also excel at the discipline-specific level, placing first among Canadian schools in five out of six QS subject categories — Chemical Engineering, Civil & Structural Engineering, Computer Science & Information Systems, Electrical & Electronic Engineering and Materials Sciences.

We fared particularly well in the 2013 Shanghai Jiao Tong Academic Ranking of World Universities (ARWU) in Engineering/Technology and Computer Sciences. For the seventh consecutive year, U of T Engineering was identified as the top engineering school in Canada, and our international ranking at 12 worldwide represented a jump of nine positions from 2011.

We also held our lead in the National Taiwan University's Performance Ranking of Engineering Papers (formerly Higher Education Evaluation and Accreditation Council of Taiwan) at 27th place, 29 positions ahead of the next strongest Canadian engineering school. Number of citations is an important metric as it indicates the relevance of published research among peer researchers. The most recent Association of American Universities citation index, covering 2006 to 2010, ranks us second in citations in North America and the leading university in Canada in all metrics: citations, citations per faculty and citations per publication.

Comprehensive University Rankings

Figure 6.1a **Times Higher Education–Thomson Reuters World University Rankings, Top 50 Universities for Engineering and Information Technology, 2012**



To compare global, research-intensive universities as thoroughly as possible, the Times Higher Education (THE)–Thomson Reuters World University Rankings measures institutions across all their core missions: teaching, research, knowledge transfer and international outlook.

The THE ranking uses 13 performance indicators in five weighted categories:

- Teaching: the learning environment (30%)
- Research: volume, income and reputation (30%)
- Citations: research influence (30%)
- Industry income and innovation (2.5%)
- International outlook: staff, students and research (7.5%)

U of T Engineering is ranked 22nd globally, 16th in North America (6.1b) and first in Canada in the Engineering and Information Technology category. In fact, we are the only Canadian institution among the top 25 institutions worldwide and one of two Canadian institutions in the top 25 within North America.

Figure 6.1b **Top 25 North American Universities for Engineering and Information Technology**

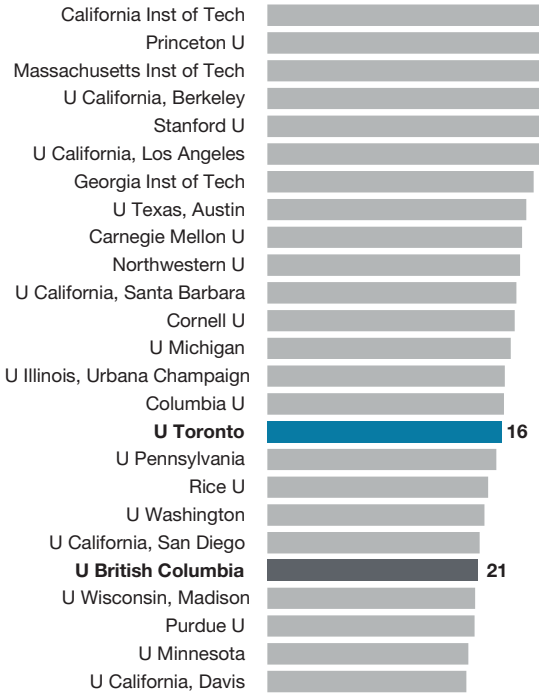


Figure 6.2a **QS World University Rankings and U.S. News & World Report World's Best Colleges and Universities, Top 50 Universities for Engineering and Information Technology, 2012**

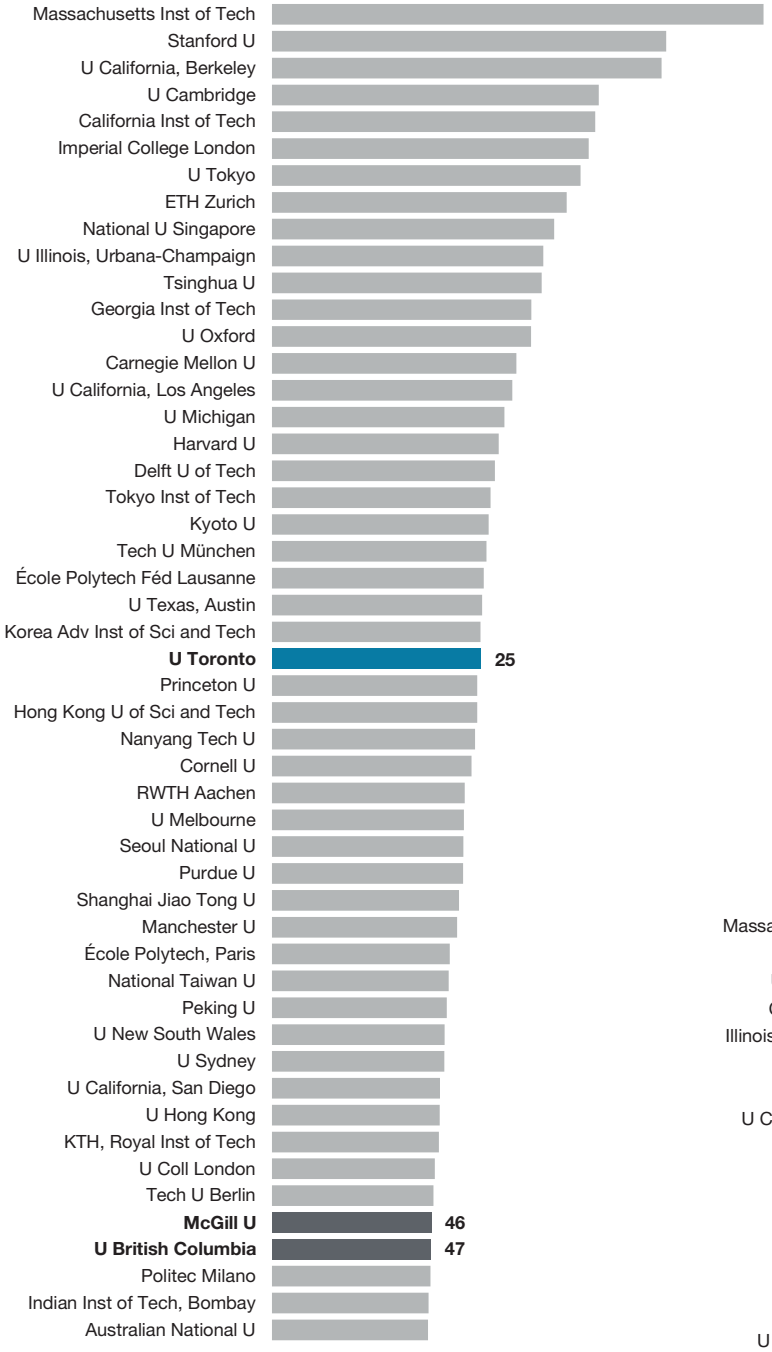


Figure 6.2b **Canadian U15 in Top 100 for Engineering and Information Technology**

Canadian universities faced formidable competition from international universities in the 2012 QS (Quacquarelli Symonds) rankings. However, U of T Engineering placed 25th internationally, 12th in North America and remains the top Canadian school. The results were published in U.S. News & World Report's World's Best Colleges and Universities, Top 50 Universities for Engineering and Information Technology in September 2012.

The QS World Rankings draw on four criteria (weighted differently, depending on the subject area): Academic Reputation, Employer Reputation, Citations Per Paper and H-Index. The H-Index attempts to measure both the productivity and impact of published work based on citations. This is the first time the QS World Rankings has used the H-Index as a criterion.

As shown in Figure 6.2d on the following page, U of T tops the Canadian university breakout list in five out of six branches of engineering and information technology.

Figure 6.2c **Top 20 North American Universities for Engineering and Information Technology**

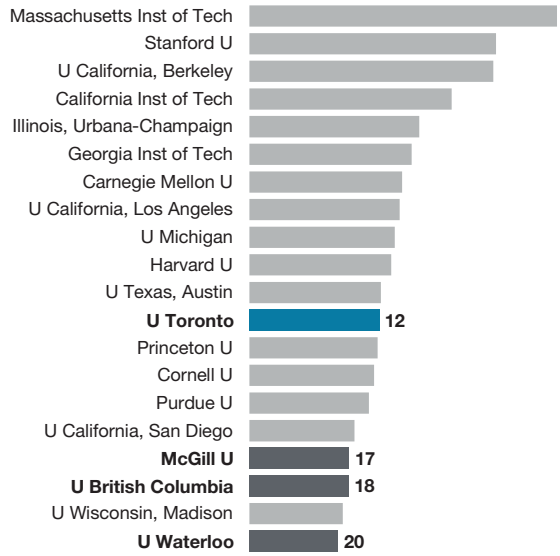
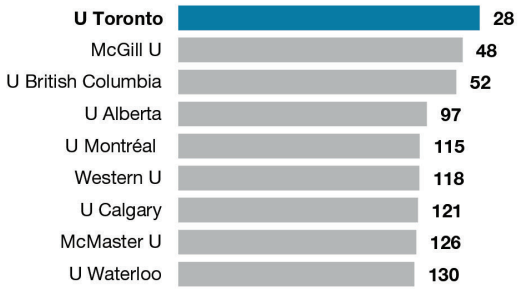
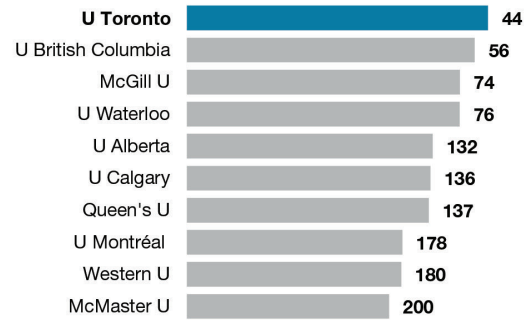


Figure 6.2d **Canadian Universities in QS World Ranking by Discipline for Engineering and Information Technology, 2012**

Chemical Engineering

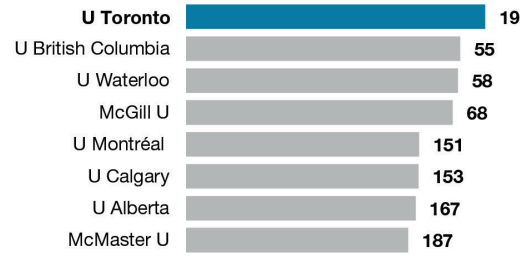


Civil & Structural Engineering

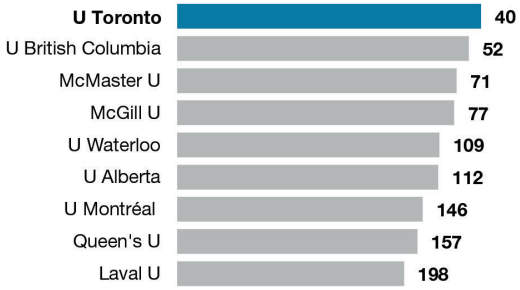


Computer Science & Information Systems

Electrical & Electronic Engineering



Materials Science



Mechanical, Aeronautical & Manufacturing Engineering

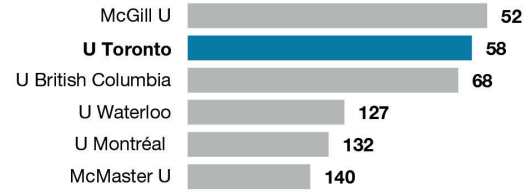


Figure 6.3a **Shanghai Jiao Tong Academic Ranking of World Universities (ARWU), Top 50 Universities for Engineering/Technology and Computer Sciences, 2012**

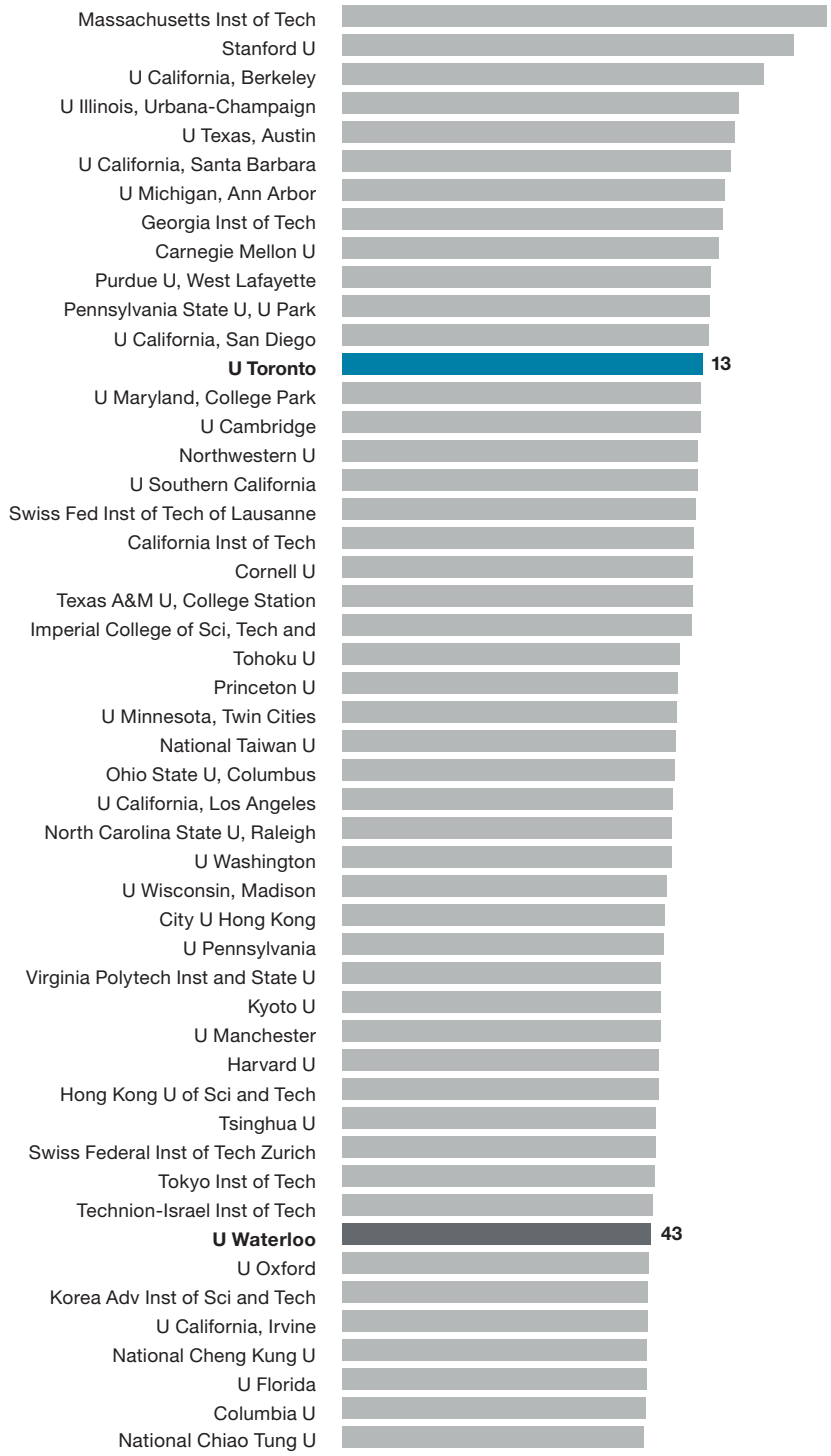


Figure 6.3b **Canadian Universities in Top 100**

Only two Canadian universities — U of T and University of Waterloo — placed in the top 50 worldwide for Engineering/ Technology and Computer Science in the Shanghai Jiao Tong Academic Ranking of World Universities (ARWU) in 2012, with U of T placing 13th and Waterloo placing 43rd.

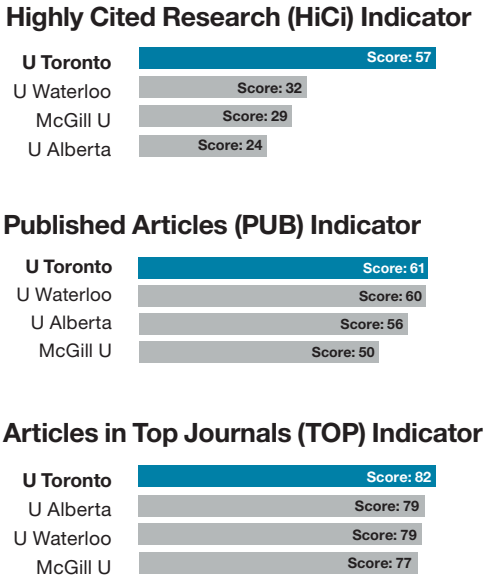
In this ranking, a score of 100 is assigned to the top institution, with others calculated as a percentage of that top score. The ranking itself is based on three indicators (see Figure 6.3c), each with equal weighting:

- Highly cited research (HiCi)
- Published articles (PUB)
- Percentage of articles published in the top 20% of journals in the field (TOP)

U of T placed first in every indicator among our Canadian peer institutions.

Figures 6.3a, 6.3b and 6.3c are repeated from last year's *Annual Report of Performance Indicators* as new data has not yet been published.

Figure 6.3c **Scoring Analysis of Canadian Universities in Top 100**



Note 6.3c: In addition to HiCi, Pub and TOP, the ARWU uses a fourth indicator called Research Expenditure (FUND). FUND is not used to rank Canadian institutions and is therefore not reported here.

Rankings Based on Publications and Citations

The international ranking of engineering papers, formerly published by the Higher Education Evaluation & Accreditation Council of Taiwan (HEEACT) and now administered by National Taiwan University (NTU), places U of T Engineering 27th among world universities and at the top of the list of Canadian universities.

NTU's ranking is based on eight criteria:

- Total number of articles published in the past 11 years
- Total number of articles published in the current year
- Total number of citations in the past 11 years
- Total number of citations in the past two years
- Average number of citations over the past 11 years
- H-index (measures productivity and impact of published work) of the past two years
- Number of highly cited papers in the past 11 years
- Number of papers published in high-impact journals in the current year

Each of these criteria is given a weighted value in determining a university's total score in the three main levels of ranking:

- overall institution
- field (e.g., Engineering, Medicine, Natural Sciences)
- subject (e.g., Civil Engineering, Materials Science)

As shown in Figure 6.4b, U of T Engineering placed first among Canadian institutions in four of five NTU subject rankings.

Figure 6.4a **National Taiwan University (NTU) Performance Ranking of Engineering Papers for World Universities, 2012**

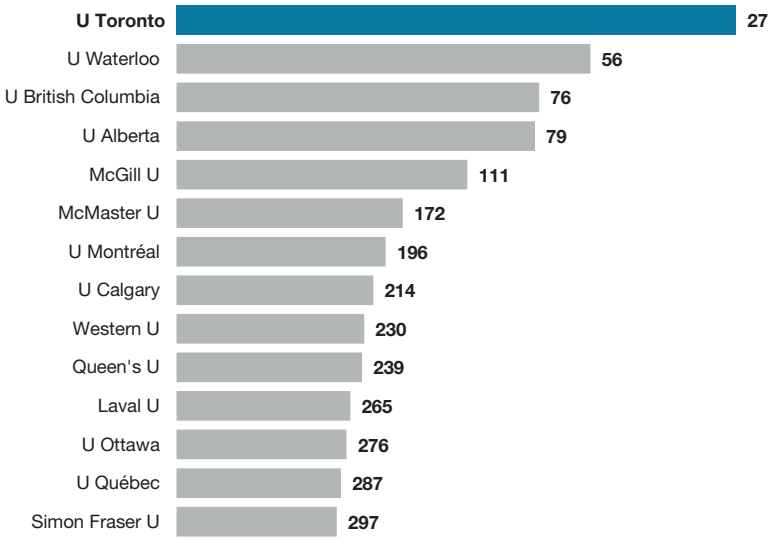
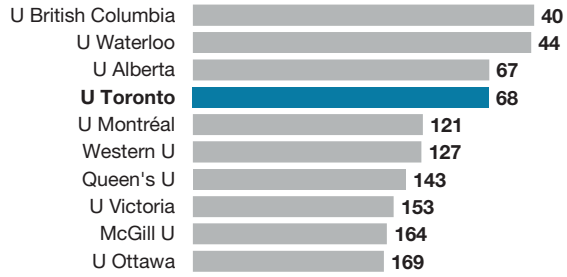
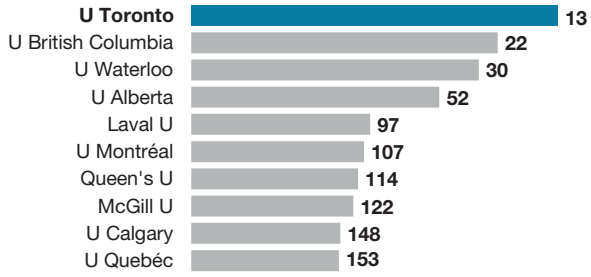


Figure 6.4b **Canadian Universities in NTU Performance Ranking of Engineering Papers by Subject, 2012**

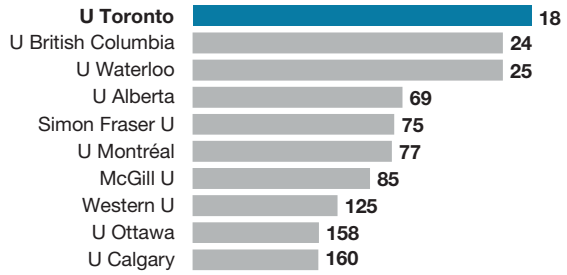
Chemical Engineering



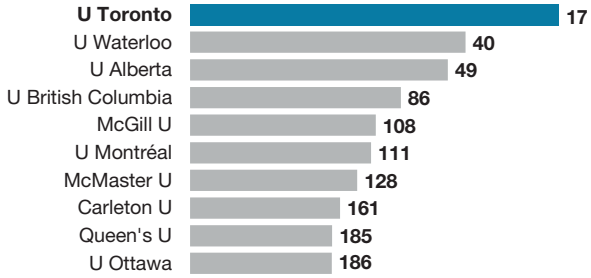
Civil Engineering



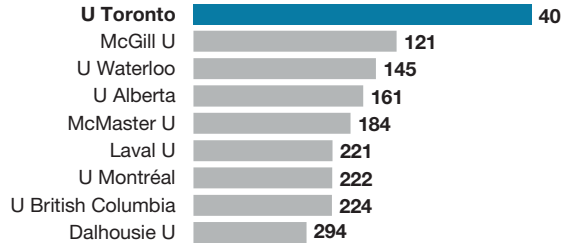
Computer Science



Electrical Engineering



Materials Science



Mechanical Engineering

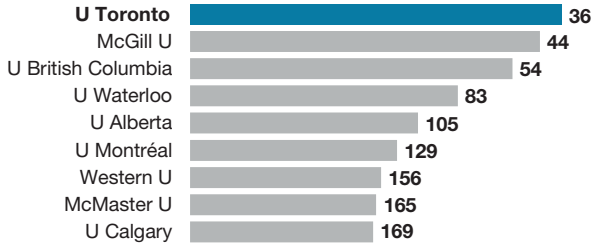
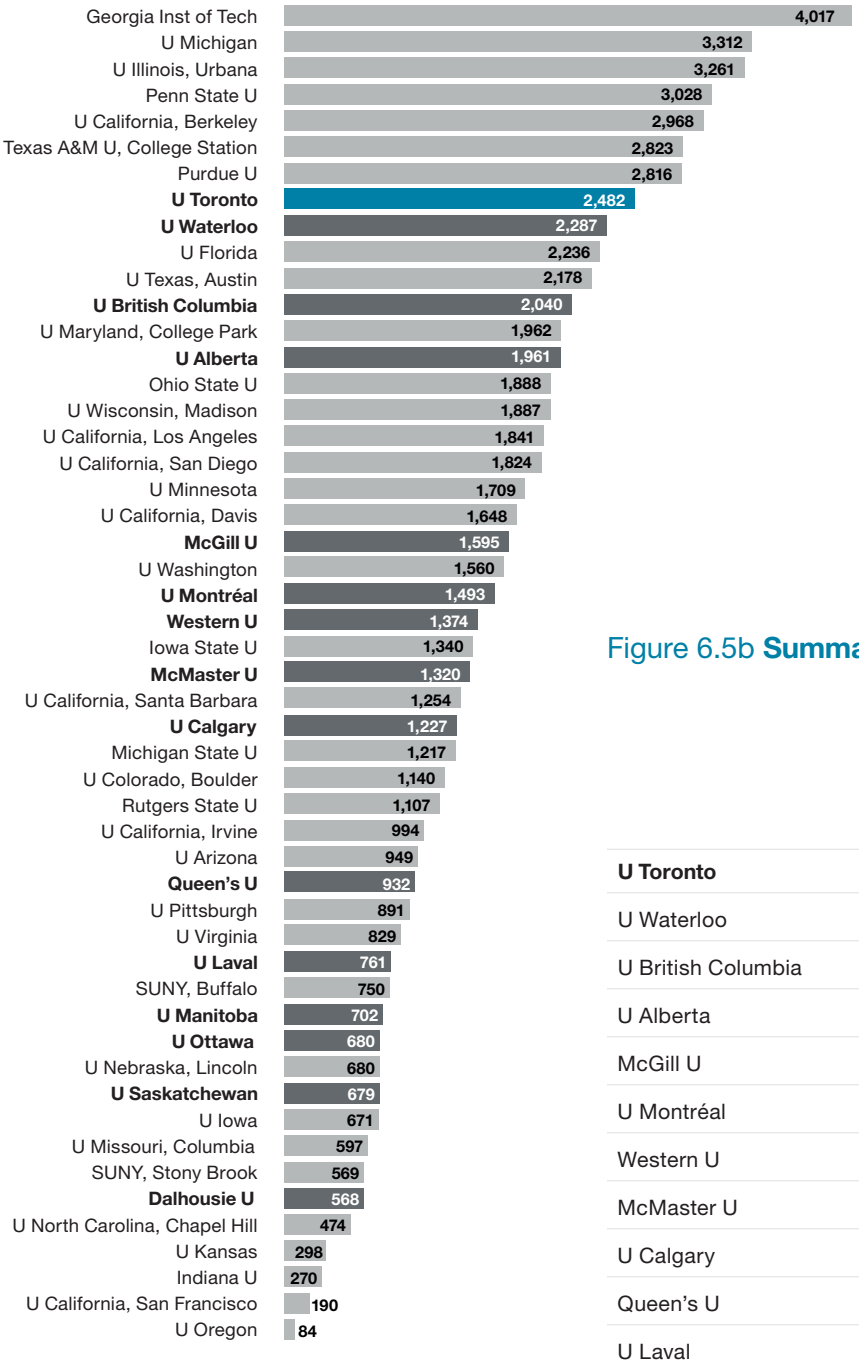


Figure 6.5a **Number of Engineering Publications Indexed by Thomson Reuters Association of American Universities (AAU) Public and Canadian Peer Institutions, 2006 to 2010**



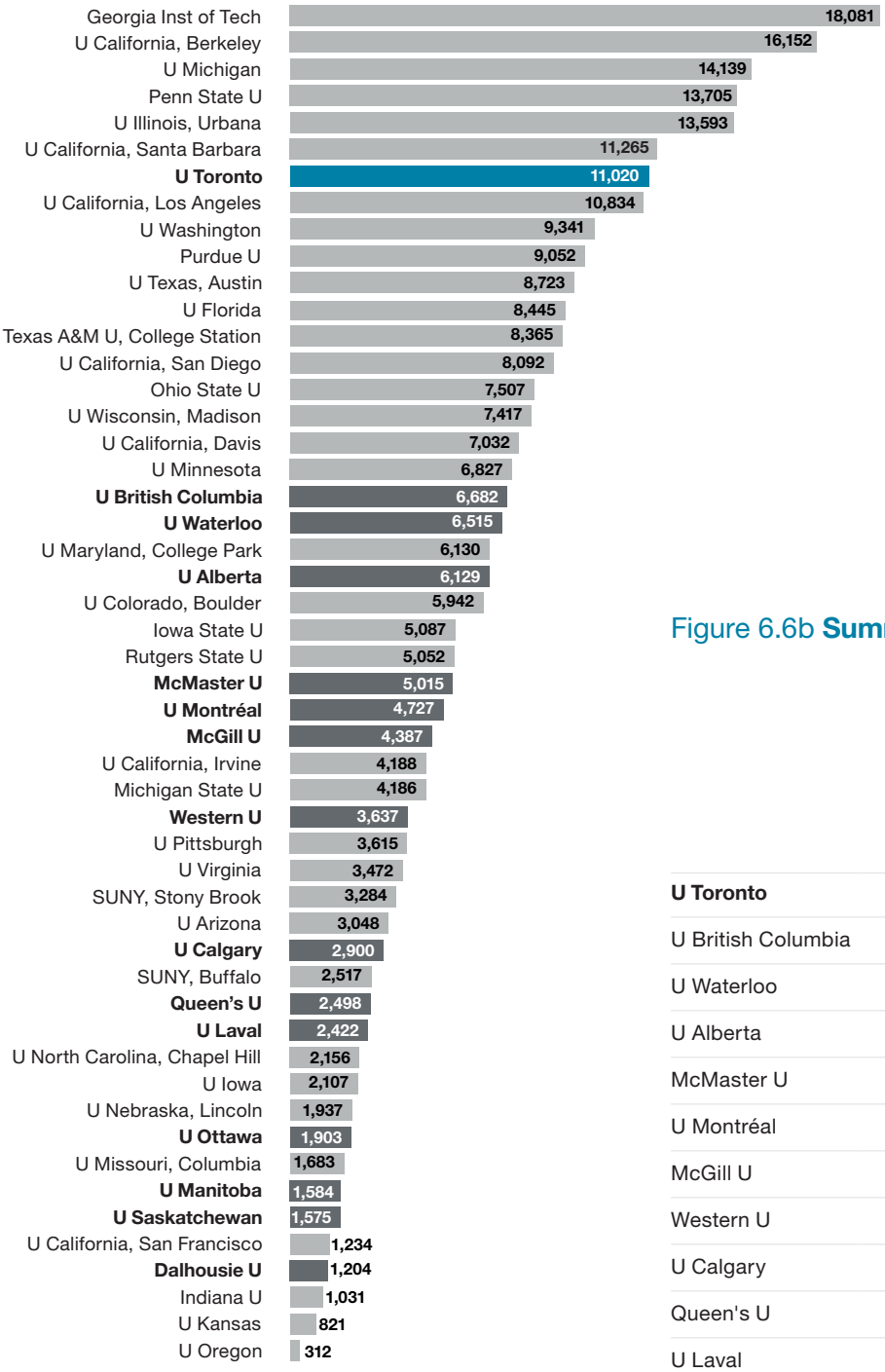
The AAU index measures research output, productivity and intensity based on publication counts. U of T Engineering placed eighth in North America and first in Canada for publication counts between 2006 and 2010, with 2,482 papers indexed. The indexed number represents a 62-per-cent increase in publications over the 2003 to 2007 reporting period. We placed fourth among our Canadian peer universities on a per-faculty basis.

Figure 6.5b **Summary of U15 Bibliometrics for Publications**

	Publications	Faculty Count	Publications per Faculty	Rank on Pub per Faculty
U Toronto	**2,482**	**232**	**10.7**	**4**
U Waterloo	2,287	248	9.2	7
U British Columbia	2,040	172	11.9	3
U Alberta	1,961	195	10.1	5
McGill U	1,595	134	11.9	2
U Montréal	1,493	362	4.1	14
Western U	1,374	95	14.5	1
McMaster U	1,320	136	9.7	6
U Calgary	1,227	145	8.5	9
Queen's U	932	151	6.2	12
U Laval	761	232	3.3	15
U Manitoba	702	78	9.1	8
U Ottawa	680	119	5.7	13
U Saskatchewan	679	84	8.1	10
Dalhousie U	568	90	6.3	11

Note 6.5b: U15 refers to the group of 15 leading research-intensive universities in Canada. Faculty counts for analysis of U15 publications per faculty member are from the Engineers Canada 2010 Resources Report. Western U faculty count corrected based on 2011 data.

Figure 6.6a **Number of Engineering Citations Indexed by Thomson Reuters Association of American Universities (AAU) Public and Canadian Peer Institutions, 2006 to 2010**



AAU index citation counts are based on the total number of papers cited over a five-year period, as well as the intensity of those indexed. With a 166-per-cent increase over the 2003 to 2007 reporting period, U of T Engineering was the seventh most cited public institution in North America and the leading Canadian university for both citations per faculty and citations per publication.

Figure 6.6b **Summary of U15 Bibliometrics for Citations**

	Citations	Faculty Count	Citations per Faculty	Rank on Citations per Faculty	Citations per Publication	Rank on Citations per Publication
U Toronto	**11,020**	**232**	**47.5**	**1**	**4.4**	**1**
U British Columbia	6,682	172	38.8	2	3.3	3
U Waterloo	6,515	248	26.2	7	2.8	7
U Alberta	6,129	195	31.4	6	3.1	6
McMaster U	5,015	136	37.0	4	3.8	2
U Montréal	4,727	362	13.1	14	3.2	5
McGill U	4,387	134	32.7	5	2.8	9
Western U	3,637	95	38.3	3	2.6	11
U Calgary	2,900	145	20.0	9	2.4	12
Queen's U	2,498	151	16.6	11	2.7	10
U Laval	2,422	232	10.4	15	3.2	4
U Ottawa	1,903	119	16.0	12	2.8	8
U Manitoba	1,584	78	20.4	8	2.3	14
U Saskatchewan	1,575	84	18.7	10	2.3	13
Dalhousie U	1,204	90	13.5	13	2.1	15

Summary of Ranking Results

Over the last three years, our position globally has stayed strong in spite of the increasing competitiveness of the major international rankings. We also consistently placed as the leading school in Canada across all major rankings. In 2012, our Faculty held top position in Canada and ranked within the top 20 institutions in North America and the top 30 worldwide.

Figure 6.7 **Summary of U of T Engineering's Performance in International Rankings Relative to the World, North America and Canada, 2010 to 2012**

	2010			2011			2012		
	World	North America	Canada	World	North America	Canada	World	North America	Canada
Times Higher Education-Thomson Reuters World University Rankings	**13**	**9**	**1**	**18**	**14**	**1**	**22**	**16**	**1**
QS World University Ranking and U.S. News & World Report	**14**	**7**	**1**	**21**	**11**	**1**	**25**	**12**	**1**
– Chemical	n/a	n/a	n/a	14	8	1	27	13	1
– Civil & Structural	n/a	n/a	n/a	20	10	1	37	16	1
– Electrical	n/a	n/a	n/a	13	8	1	23	13	1
– Materials Science	n/a	n/a	n/a	27	19	1	30	18	1
– Mechanical, Aeronautical & Manufacturing	n/a	n/a	n/a	31	20	1	58	23	2
– Computer Science & Information Systems	n/a	n/a	n/a	10	8	1	15	9	1
Academic Ranking of World Universities	**19**	**18**	**1**	**21**	**19**	**1**	**13**	**13**	**1**
– Highly Cited (HiCi)	14	14	1	14	14	1	14	14	1
– Publications (PUB)	31	10	1	32	11	1	29	9	1
– Top Journals (TOP)	58	25	1	72	42	1	65	38	1
National Taiwan University Ranking (formerly HEEACT)	**31**	**15**	**1**	**26**	**12**	**1**	**27**	**12**	**1**
– Chemical	74	21	3	59	20	2	68	24	4
– Civil	9	3	1	24	11	1	13	5	1
– Computer Science	26	18	2	17	9	1	18	12	1
– Electrical	19	12	1	15	9	1	17	11	1
– Materials Science	38	15	1	39	16	1	40	15	1
– Mechanical	31	17	1	31	16	1	36	17	1

7 Advancement

In September 2012, the Faculty officially joined Boundless: The Campaign for the University of Toronto with a launch event called *An Afternoon of Engineering Innovation*. It was a great success, drawing participation from more than 500 alumni, students, faculty and staff who attended information panels, lectures and graduate-student poster sessions. Designed to demonstrate the depth and breadth of the Faculty's teaching and research, the launch also provided an important opportunity for the Faculty to publicly thank its generous donors and build enthusiasm for the Centre for Engineering Innovation & Entrepreneurship (CEIE). We also announced our campaign goal of $200 million, including:

- $55 million for the CEIE;
- $50 million for endowed chairs and professorships;
- $35 million for graduate fellowships;
- $20 million for undergraduate aid;
- $25 million for research support;
- $10 million for annual giving; and,
- $5 million for other capital projects.

To extend the Boundless campaign to all members of our community, we launched a fundraising initiative called *Boundless Dedication* in April to encourage staff and faculty to support the Faculty's campaign goals.

In 2012–2013, we made significant strides toward strengthening our alumni ties across the world. We held events in Calgary, San Francisco, Mountain View, Shanghai, Taipei, Jakarta, Kuala Lumpur, Singapore and Hong Kong. These occasions provided valuable networking opportunities for alumni and enabled us to generate further excitement about the campaign and new building. For the first time, we also invited prospective students and their parents to attend in select cities, leveraging the enthusiasm of our alumni to support our international recruitment efforts.

We continue to work closely with the Engineering Alumni Association on both enhancing engagement with alumni and measuring our successes.

Philanthropic Support

In fiscal year 2012–2013, we raised $12.2 million in total support, including more than $9 million in gifts and $3 million in grants. This brings the Faculty's campaign total to over $88 million. More than 35 per cent of the gifts made to the Faculty were designated toward supporting the construction of the Centre for Engineering Innovation & Entrepreneurship (CEIE).

While major gifts remain the focus of the Faculty's fundraising efforts, we continue to see significant increases in discretionary annual giving. The Skule Society — which recognizes donors for annual gifts of $1,000 or more per year — saw a particularly large increase in membership. And for the first time, the Faculty raised more than $1 million in annual giving ($1.13 million), a 21-per-cent increase over the 2011–2012 fiscal year.

Figure 7.1a **Advancement Results, 2012–2013**

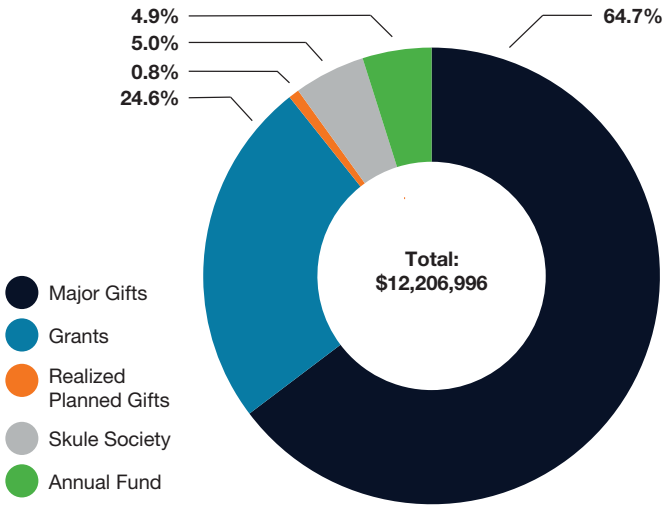


Figure 7.1b **Philanthropic Support, 2007–2008 to 2012–2013**

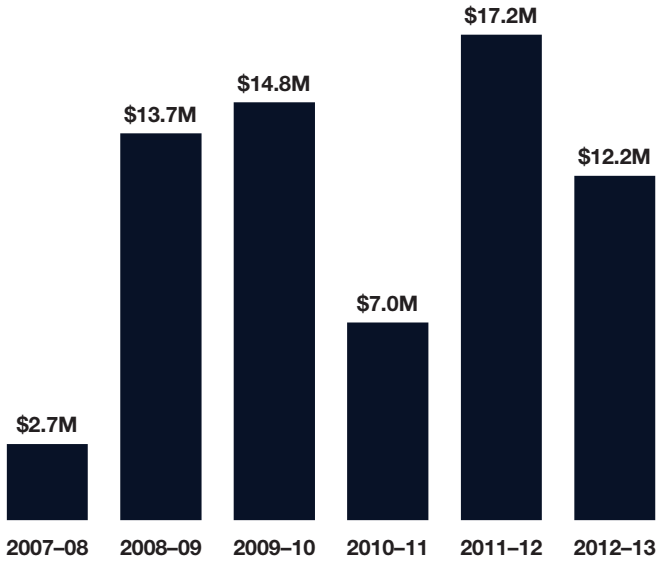
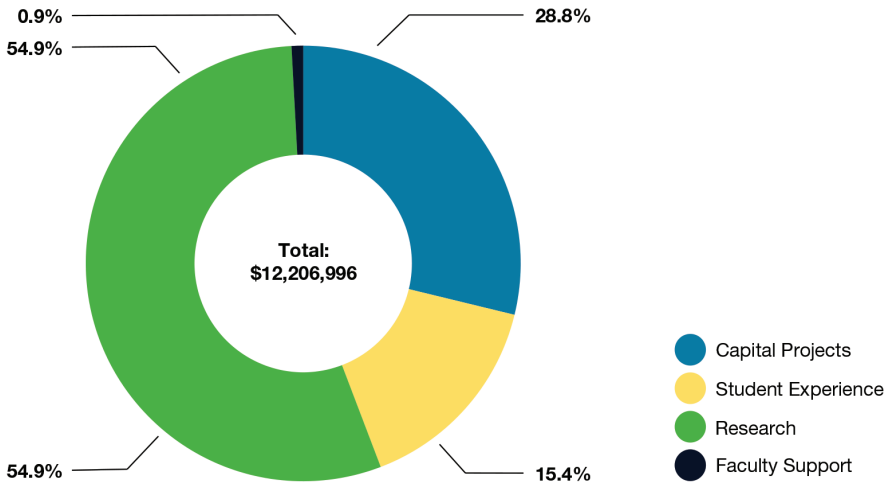


Figure 7.1c **Gift Designations, 2012–2013**



Note 7.1a, 7.1b and 7.1c: Data are shown by fiscal year (i.e., May to April).

Initiatives and Projects for 2012–2013

Campaign Launch

On September 15, 2012, we welcomed more than 500 members of the U of T Engineering community to *An Afternoon of Engineering Innovation* to celebrate the launch of the Engineering component of the Boundless campaign. Attendees participated in a plenary session in Convocation Hall featuring an undergraduate panel, followed by two industry and alumni panels on entrepreneurship and energy. Guests also attended faculty lectures on topics such as biomedical engineering, sustainable aviation and photonics, and explored the research of 20 graduate students during a poster session. The event concluded with a reception in the lobby of the Bahen Centre for Information Technology. In tandem with the launch, we distributed a special campaign issue of *Skulematters*, our alumni magazine.

Centre for Engineering Innovation & Entrepreneurship

In April 2013, the Faculty announced the selection of Toronto-based Montgomery Sisam Architects, in joint venture with the British firm of Feilden Clegg Bradley Studios, as the architects for the preliminary design of the Centre for Engineering Innovation & Entrepreneurship (CEIE). Both architectural firms are known for their commitment to sustainability, and the new state-of-the-art facility will be designed to the highest LEED standards. The building will include carefully planned spaces for learning, group work and research, including a marquee 500-seat auditorium, unique in the world in its design to optimize audience engagement. A multidisciplinary research cluster will help promote a culture of innovation and entrepreneurship throughout the building and provide exceptional opportunities for student placements and teaching. CEIE will accelerate innovation, foster collaborative learning and instil in our students an entrepreneurial spirit. For additional information on the CEIE, please see the Space chapter.

Biz Skule Expansion

The Faculty's successful alumni speaker series, Biz Skule — which features alumni who have pursued careers in business, finance and entrepreneurship — has gone global. In February 2013, we hosted Biz Skule at Google Headquarters in Mountain View, California with George Babu (EngSci 0T0) as speaker. We plan to expand Biz Skule events in more cities abroad in the 2013–2014 fiscal year.

Alumni Engagement Strategy

2012–2013 was a year of planning for the Alumni Relations Office. We identified several strategic priorities, including how best to define and measure alumni engagement. Looking ahead, three annual performance indicators will help us assess engagement: number of donors, number of event attendees and number of volunteers. Using these measures, the percentage of engaged alumni in the 2012–2013 fiscal year was 9 per cent (based on the number of contactable alumni). Our goal is to double engagement over the course of the Boundless campaign — whether through volunteering, participation in events or philanthropy.

The Alumni Relations Office also underwent reorganization and recently hired an Alumni Engagement and Partnerships Officer. This role will identify volunteer opportunities across the Faculty and match them to alumni. Our combined efforts will allow us to provide increased volunteer opportunities, measure alumni engagement and better understand how alumni move through engagement cycles.

Alumni Relations Activities

Figure 7.2 **Contactable Alumni by Academic Area, 2012–2013**

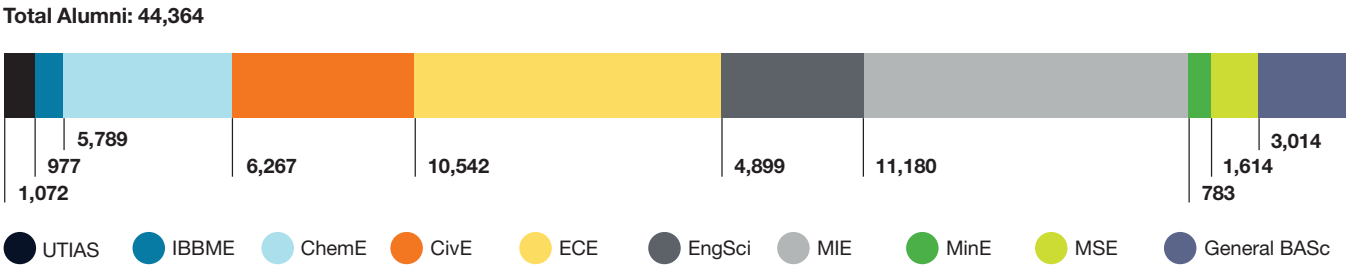
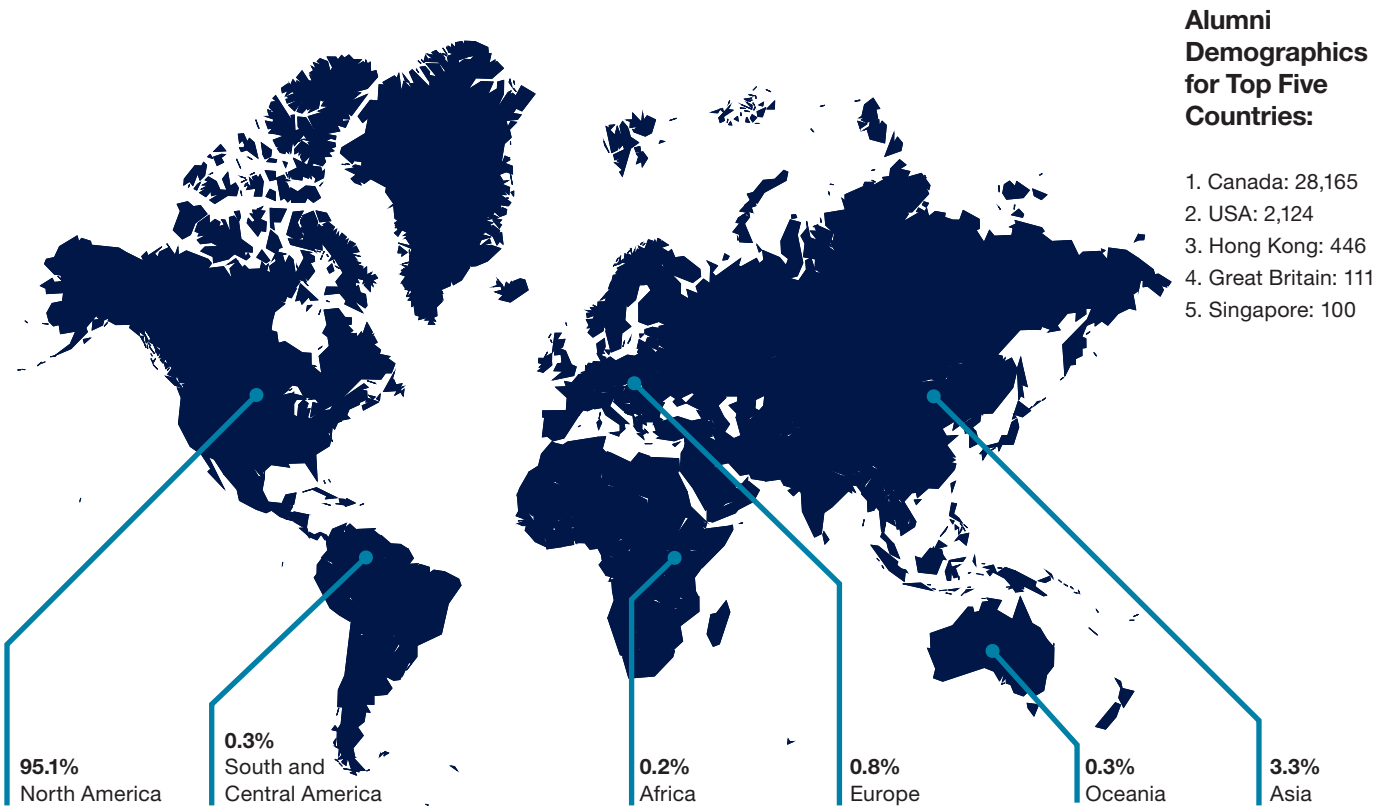


Figure 7.3 **Geographic Location of Contactable Alumni, 2012–2013**



Note 7.2: Includes alumni of graduate and undergraduate programs. General BASc refers to alumni whose degrees do not link to an existing department, division or institute. The total number of 43,364 represents the number of unique alumni, including those with multiple department affiliations. Therefore, the total is less than the sum of the numbers reported for each academic area.

Note 7.3: This figure plots the current location of our alumni — both graduate and undergraduate — for which we have contact information.

We continually strive to provide a variety of meaningful opportunities to engage alumni locally and globally. In 2012–2013, we hosted 52 alumni events across the world; the most in our history. Among our new events was the Skule Lunch & Learn Series. This series, formerly known as the 5T3 Lunch & Learn, was previously operated by the class of 5T3. This past year, we worked with the class to promote the event to a broader alumni audience.

2012–2013 also marked the first time we leveraged alumni events hosted by Dean Amon in Kuala Lumpur, Singapore and Hong Kong to support our Faculty's international student recruitment efforts. We will continue to enhance our ability to attract top students from around the world while enabling our alumni to share their experiences with future generations.

Figure 7.4 **Alumni Events, 2012–2013**

Event Name	Date
Praxis Design Showcase	April 16, 2013
MIE Alumni & Industry Dinner	April 12, 2013
Hong Kong Alumni & Recruitment Event	April 11, 2013
Skule Lunch & Learn Series	April 10, 2013
Singapore Alumni & Recruitment Event	April 8, 2013
13th Annual EngSci Alumni Dinner	April 5, 2013
Orbis Pitch Event (EngSci)	April 4, 2013
Kuala Lumpur Alumni & Recruitment Event	April 4, 2013
Jakarta Skule Alumni Event	April 2, 2013
Taipei Skule Alumni Event	April 1, 2013
Shanghai Skule Alumni Event	March 28, 2013
28th Annual ChemE Dinner	March 22, 2013
Skule Lunch & Learn Series	March 13, 2013
Skule Nite Reception	March 13, 2013
Mentorship Closing Reception	March 13, 2013
MIE Lunch & Learn	March 12, 2013
Iron Ring Ceremonies	March 2, 2013
Biz Skule Networking Speaker Series: Mountain View	Feb. 20, 2013
San Francisco Alumni Event	Feb. 19, 2013
EngSci First-year Job Shadowing Program	Feb. 18-22, 2013
Skule Lunch & Learn Series	Feb. 13, 2013
Moment: The Valentine's Ball	Feb. 15, 2013
CivE, GeoE & MinE Alumni Dinner	Feb. 8, 2013
Annual EngSci Education Conference	Jan. 25, 2013
You're Next Career Fair	Jan. 18, 2013
CivE & MinE Career Fair	Jan. 10, 2013

Event Name	Date
Calgary Skule Alumni Chapter Fall Reception	Nov. 19, 2012
ECE Alumni Networking Talk & Reception	Nov. 15, 2012
Skule Comes to Asia Pacific: Hong Kong	Oct. 13, 2012
MSE Alumni Career Event	Oct. 11, 2012
Skule Lunch & Learn Series	Oct. 10, 2012
IBBME 50th Anniversary Symposium & Alumni Homecoming	Oct. 9 & 10, 2012
Skule Comes to Asia Pacific: Singapore	Oct. 8, 2012
Biz Skule Networking Speaker Series	Sept. 27, 2012
An Afternoon of Engineering Innovation	Sept. 15, 2012
Mentorship Information Session for Students and Mentors	Sept. 11, 2012
Class of 7T6 Reunion BBQ	Sept. 9, 2012
Calgary Send-off Event	July 18, 2012
Spring Convocation	June 20, 2012
Volunteer Recognition Event	June 13, 2012
UTIAS Industry-Alumni-Student Dinner	June 12, 2012
MIE Spring Reunion Lunch	June 2, 2012
ECE Spring Reunion Lunch	June 2, 2012
MSE Spring Reunion Lunch	June 2, 2012
ChemE Spring Reunion Lunch	June 2, 2012
CivE, GeoE & MinE Spring Reunion Lunch	June 2, 2012
EngSci Spring Reunion Lunch	June 2, 2012
3T7 to 8T7 Spring Reunion	June 2, 2012
9T2 Spring Reunion	June 1, 2012
9T7 & 0T2 Spring Reunion	June 1, 2012
0T7 Spring Reunion	May 31, 2012
Biz Skule Networking Speaker Series	May 23, 2012

Gift Highlights for 2012–2013

William & Kathleen Troost, $2M

William (Bill) Troost (ChemE 6T7) has provided exceptional volunteer service to the Faculty of Applied Science & Engineering for more than a decade. He is a dedicated member of advisory boards for the Department of Chemical Engineering & Applied Chemistry and the Institute for Leadership Education in Engineering (ILead), a groundbreaking centre that promotes engineering leadership. Bill uses his U of T Engineering education on a daily basis as the founder and President of Peel Plastic Products Ltd. in Brampton, which designs, manufactures and supplies flexible packaging solutions for a wide range of products, including organic rice, lawn seed and pet food. Bill and Kathleen are outstanding, civic-minded community members who care deeply about health and the future of Canada. They have been long-time supporters of ILead because they believe that leadership and communication skills can amplify an engineer's ability to solve problems. They want to see leadership programming have the kind of space it needs to grow and flourish and were therefore delighted to make a generous contribution of $2 million to support the creation of the new home for ILead in the Centre for Engineering Innovation & Entrepreneurship.

Peter Allen, $1M

Peter Allen (CivE 6T2) and Jocelyn Allen (BA '91) share a passion for creative excellence and innovation. With a keen appreciation for the ways in which physical space can support — or diminish — creativity, invention and design, the Allens recognized early on the impact that the new Centre for Engineering Innovation & Entrepreneurship could have on generations of future engineering students and researchers. Through a generous gift of $1 million, Peter and Jocelyn Allen provided an early investment to build a highly flexible, interdisciplinary and design-oriented space that will help to spark innovation among students and faculty alike. The couple's commitment to this project has driven discussions about cutting-edge pedagogical practices and the ability of buildings and spaces to reshape the ways in which individuals discover, invent, share and create.

Walter Curlook, $1M

Walter Curlook (MMS 5T0, MASc 5T1, PhD 5T3) is a visionary, innovator, scientist and engineer with a keen focus on the commercial application of research. He has left a lasting imprint on the mining and metallurgical industry in Canada and around the world. He has made a significant impact on the Department of Materials Science & Engineering through his involvement as a Distinguished Adjunct Professor, his service as a senior volunteer on the Department's Advisory Board and his generous support of two new labs: the Walter Curlook Materials Processing Laboratory and the Walter Curlook Materials Characterization Laboratory. Dr. Curlook's generous $1-million commitment to advancing materials processing and characterization research, as well as teaching facilities, is crucial to the ongoing development of this field. His gift will support the purchase of new equipment in the labs, supporting MSE's strategic priorities.

Som Seif, $250,000

Som Seif (IndE 9T9) is the President and CEO of Purpose Investment Inc. and has been a dedicated volunteer since graduation. A member of both the Department of Mechanical & Industrial Engineering Board of Advisors and Biz Skule committee, he also participates as a lecturer, a mentor and a consultant on initiatives and programs. A successful entrepreneur and business person, he is investing in his passions. His generous gift of $250,000 to the Faculty established new scholarships in Industrial Engineering that are focused on students that demonstrate an interest in, and passion for, business and entrepreneurship. His support also encourages entrepreneurially minded students with awards to pursue their own dreams of creating a successful startup through The Entrepreneurship Hatchery.

William C. Bowman, $25,000

In August 2012, second-year engineering student Emma Bowman's father, William C. Bowman (EngSci 7T5), became terminally ill with cancer. The Bowman family, including Mr. Bowman, felt a gift to the Faculty would be the best way to capture his spirit and legacy. After his passing, provisions were rapidly put in place to gather memorial gifts from family and friends to establish the William C. Bowman Memorial Award. The award will be given to a student with demonstrated financial need as part of the Boundless Promise Matching Program, through which the University matches the award amount generated by the endowment. The Bowman family is pleased that the award will fund the education of a student starting this fall, commemorating the anniversary of Mr. Bowman's passing.

8 Communications

A Faculty that fosters innovation needs to tell its stories in new ways as well. We also need to adapt the way we tell those stories to an increasingly connected and distracted world.

This year, we developed a strategic communications framework to guide our communications work for the next three years. The framework will help us shift our messaging from print to digital, with an emphasis on portable platforms and emerging social media. The framework also sets strategic, measurable benchmarks. One of the objectives we laid down in the framework is to enhance our social media strategy. As news dissemination shifts from a top-down to a decentralized model, we need to engage more with our audiences through channels such as Twitter, LinkedIn and other social media.

We continued to work on developing our key messages and on increasing the effectiveness of those messages through more efficient and timely collaboration with our communication colleagues in other Faculties and in the University's central communications area.

In 2012–2013, we also initiated the development of a high-quality corporate prospectus for sharing with key partners, and deployed 13 digital displays throughout the Faculty to communicate with students, faculty, staff and visitors.

Engineering Strategic Communications Framework

This past year, we developed a draft strategic communications framework to guide the Faculty's communications efforts for the next three years. The goals of the framework are to:

1. Deliver a plan that articulates our communication goals, maintains consistency of our branding and products, keeps on top of markets and clearly outlines methods so that we can remain competitive and set the Faculty apart.
2. Strengthen the Faculty's key messages and customize them for target audiences.
3. Establish the Faculty as the go-to resource for media looking for comments and engineering expertise on breaking news issues.
4. Continue to increase the quality of our storytelling, journalism and communications processes and tools to make our practices best-in-class and in pace with emerging technologies and their uses by our target audiences.
5. Remain flexible to changing media and technologies, nurture blogger and social media relationships, and build relationships and communications with traditional media.
6. Increase the Faculty's presence, visibility and reputation on modern social media platforms.

Selected Communication Projects for 2012–2013

Increasing Student Engagement

Communicating more effectively with current students is a priority for our Faculty. In 2012–2013, we launched two efforts to help achieve this goal: digital displays throughout the Faculty's buildings and an online student resource called *Just ASK Engineering!*

As a result of a successful proposal to the Dean's Strategic Fund in 2010–2011, the Faculty has 13 digital displays installed throughout the Engineering precinct. The U of T Engineering community can upload slides through a centralized, widget-based content-management system for display either globally or to specific screens. Since the launch of the system, we have promoted everything from individual events and workshops to larger campaigns, like National Engineering Month. While students are a primary audience, the slides also serve an important role in communicating with faculty, staff and visitors to U of T Engineering.

The Faculty also created an online resource called *Just ASK Engineering!* to better address student needs, concerns and questions. Inspired by an idea from first-year students in the Engineering Strategies & Practice course, the online tool allows a trained team of 20 responders to answer queries about services, facilities, finances and more. We look forward to improving this resource further in the coming year.

Promoting Global Opportunities to Engineering Undergraduates

To raise awareness among current undergraduates about the opportunities to go abroad, our Faculty collaborated with the Centre for International Experience to develop promotional materials, including an animated whiteboard video, a poster campaign, online stories and allied web promotion. The efforts were a great success, with more than 1,900 video views since its release and a 68 per cent increase in applications over the previous academic year. The video, titled *An Exchange Would Do You Good*, also earned a gold MarCom Award from the Association of Marketing and Communication Professionals.

Celebrating Our Newest Faculty Members

Between April 2009 and May 2012, we welcomed 24 faculty members. To showcase our newest researchers and educators, we created a brochure and a dynamic microsite (uoft.me/engacademicappointments) that includes brief bios and videos of each new member of our engineering community. This website — which will be frequently updated with new hires — helps our ongoing faculty recruitment efforts and brings wider attention to the diverse and leading-edge research being undertaken by our new professors. As of June 2013, the 36 video profiles have been viewed more than 1,500 times.

Supporting Undergraduate and Graduate Student Recruitment

We continue to strive to attract the best and the brightest students from around the world to our undergraduate and graduate programs. We redeveloped our entire suite of undergraduate promotional materials — including publications and a website — and created our first Faculty-wide graduate studies prospectus. We also launched a stand-alone graduate studies website (gradstudies.engineering.utoronto.ca). These communications efforts complemented other Faculty recruitment initiatives and events, contributing to U of T Engineering's continuing success in attracting highly qualified students at both the undergraduate and graduate level.

Reimagining Alumni and Development Communications

This past year, we strengthened our advancement and alumni communications on many fronts. In September 2012, we renewed our Engineering Alumni & Friends website (alumni.engineering.utoronto.ca) to better engage alumni and align with our Faculty's visual identity.

In November 2012, we established the role of Communications Coordinator, Alumni & Development to improve our alumni and donor engagement communications. This position will play a central part in implementing an alumni communications plan that includes e-newsletters, our alumni magazine *Skulematters* and several campaign-related initiatives.

Engaging Industry

We began developing a customizable suite of print materials that will consist of a main Faculty-wide brochure and concise, topic-specific inserts. Intended for an external audience, the brochure and inserts will focus on our strengths — in research, education, collaboration and global impact — and convey the advantages of partnering with, and supporting, U of T Engineering. The brochure package will be available for use beginning in the fall of 2013.

Media Coverage

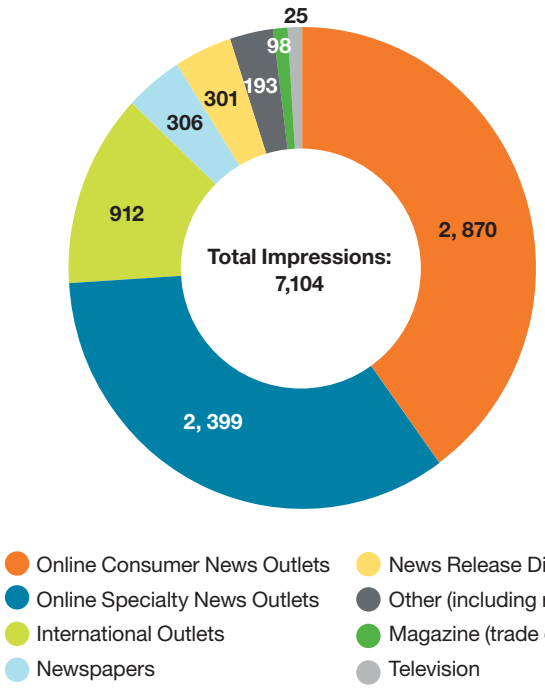
In 2012–2013, U of T Engineering made its biggest media impact online, both through the websites of traditional media and through specialized online media, such as engineering and science newsblogs. Our stories enjoyed significant pickup outside of Canada as well, with international media outlets accounting for more than 10 per cent of published stories.

Coverage of U of T Engineering was consistent through the year, but three months saw better-than-average interest. In July 2012, stories about record efficiency for solar cells and the Gardiner Expressway caught the media's attention. And in September 2012, the U of T team winning third place in the 'Reinvent the Toilet Challenge' was popular. Several stories contributed to our record number of placements in February 2013, including the launch of the world's smallest space telescopes, a report on cities and climate change and the invention of the world's most energy-efficient light bulb.

Other popular stories (as noted in Figure 8.1d) included "Money Puck" (identifying the value of professional hockey players), the continued quest of a team led by U of T alumni to achieve human-powered flight, as well as honours achieved by U of T Engineering faculty, including Professors Cristina Amon, Joyce Poon and Ted Sargent.

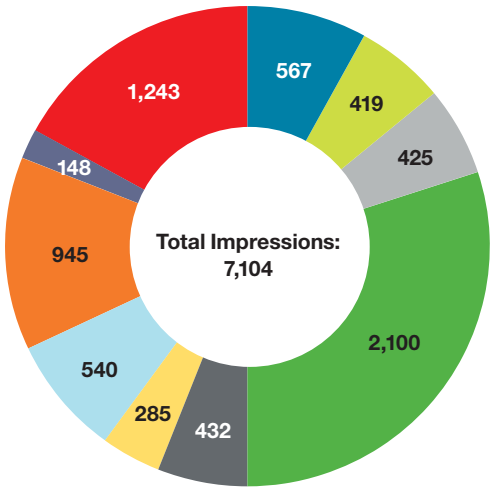
To increase our media influence, we undertook two initiatives to establish closer working relationships with key national and international STEM media. First, we engaged in personalized (email, telephone and in-person contact) outreach to learn their needs and preferences. Second, we participated in ENGINE, a New York-based networking event for leading universities to meet key STEM reporters and editors.

Figure 8.1a **U of T Engineering Media Impressions by Channel, 2012–2013**



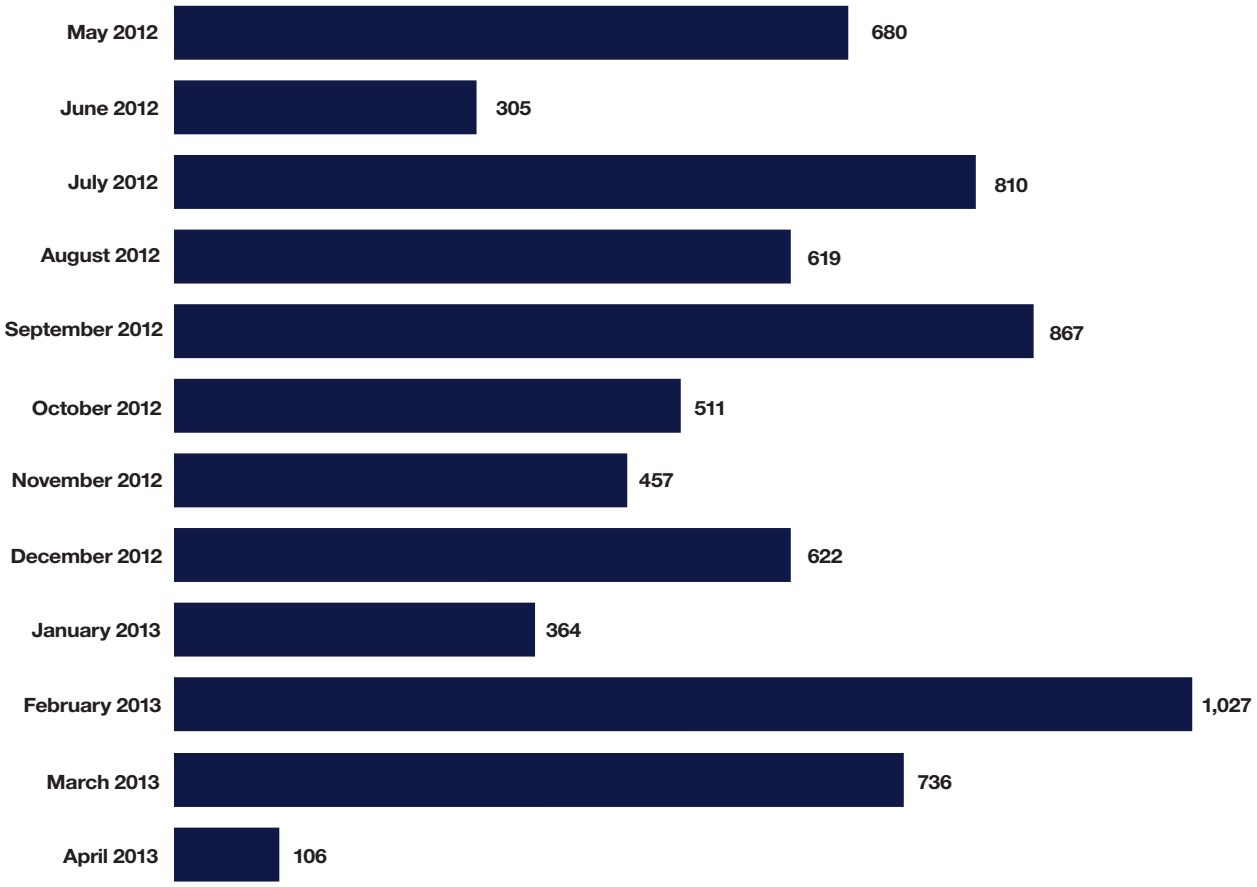
Online Consumer News Outlets
Online Specialty News Outlets
International Outlets
Newspapers
News Release Distribution Service
Other (including radio)
Magazine (trade or industry)
Television

Figure 8.1b **U of T Engineering Media Impressions by Area, 2012–2013**



Alumni
EngSci
UTIAS
ChemE
IBBME
U of T Engineering
CivE
MIE
ECE
MSE

Figure 8.1c **Media Coverage by Month, 2012–2013**



Note 8.1a, 8.1b and 8.1c: A comparison to previous years is not possible due to a mid-year changeover from our previous media monitoring service to MediaMiser. MediaMiser is also used by U of T Strategic Communications.

Figure 8.1d **Engineering Story Traffic on U of T News Website, 2012–2013**

Story	Date Posted	Reads
New solar cell sets world record for efficiency	July 30, 2012	17,457
U of T engineers win third place in Gates Foundation toilet challenge	August 15, 2012	7,630
MIT Technology Review names Joyce Poon to 'Top 35 Under 35'	August 22, 2012	6,157
Money puck (calculating the value of professional hockey players)	May 1, 2012	4,687
Sargent wins Steacie Prize for outstanding young Canadian researcher	December 10, 2012	4,584
The quest to build a human-powered helicopter	May 29, 2012	4,279
Toronto can reduce greenhouse gas emissions by 70 per cent	February 13, 2013	4,059
Gates Foundation backs U of T efforts to design toilet for developing world	November 28, 2012	3,625
World record human-powered flight confirmed	November 27, 2012	3,415
World Bank veteran joins University of Toronto	May 7, 2012	3,373
Forging friendships, fostering innovation	September 21, 2012	3,059
U of T's robots crawl, swim and fly across the MarsDome	April 30, 2013	3,043
Global rise in life expectancy not equal	December 14, 2012	2,845
From the dugout to the laboratory (profile of scholar-athlete Drew Taylor)	May 11, 2012	2,768
Keeping tap water clean and clear	May 25, 2012	2,452
New technique makes solar cells more efficient	March 7, 2013	2,393
Making cars safer, cleaner and more affordable	May 30, 2012	2,262
Driven to compete (Shell Eco-marathon challenge)	October 19, 2012	2,221
U of T Engineering makes Toronto Hydro a little smarter	December 19, 2012	2,181
Wearable computing and augmented reality: conference	February 6, 2013	2,051
Women of Influence Magazine honours Engineering Dean	September 10, 2012	2,048
WIND Mobile founder and U of T alumnus inspires Engineering students	September 10, 2012	1,998
Engineering: top North American schools tackle leadership education	October 16, 2012	1,974
Career fair draws massive crowd	January 21, 2013	1,555
U of T student a finalist in healthcare innovation challenge	March 18, 2013	940
Accidental discovery by U of T researchers may lead to improved polymers	April 5, 2013	901
Centre for Engineering Innovation & Entrepreneurship selects architect	April 25, 2013	848
Tiny U of T vehicle returns from Eco-marathon	April 12, 2013	540
Supermileage: U of T's Shell Eco-marathon car	March 22, 2013	520
Like Rosie from the Jetsons but better dressed (robot serving refreshments at Institute for Robotics & Mechatronics)	April 24, 2013	467
Total Number of Reads		**96,332**

Website Activity

Our most active U of T Engineering website last year was the undergraduate site (undergrad.engineering.utoronto.ca), with 746,751 visits and 71 per cent repeat visitors (Figure 8.2b). The high number of repeat visitors shows that we are a trusted source for students seeking information and news about U of T Engineering. The number of unique visitors well exceeds our current undergraduate population, suggesting that this site is an important resource for audiences that may include U of T staff, prospective students, alumni as well as students and staff at other universities. Also worthy of note is the high average amount of time per visit on the undergraduate recruitment site, Discover Engineering (Figure 8.2c). An average of four minutes per visit indicates that the information on the site is of considerable value to prospective students.

Traffic to our sites came from a number of different sources. Social media played a significant role, with more than 2,200 referrals from Twitter and more than 5,000 from Facebook. Almost 3,000 people found us through Google, but the largest source from University of Toronto's online presence — more than 115,000 visitors — came to us from various U of T sites, including 42,000 from the main utoronto.ca site.

Though most visitors continue to reach us through desktop browsers, mobile platforms are beginning to make an impact: the percentage of people accessing U of T Engineering through mobile devices increased from 6.4 in May 2012 to 9.8 in May 2013, validating our strategy of transitioning to a mobile-first preference. To help with the transition to smaller platforms, we have introduced responsive web design (where the site's layout is automatically adjusted to optimally fit the size of the screen) on selected websites. We will continue to update the remaining Faculty sites over the next three years.

During the past year, we launched several sites across the Faculty, including:

- The Entrepreneurship Hatchery: hatchery.engineering.utoronto.ca
- Engineering Graduate Studies: gradstudies.engineering.utoronto.ca
- Centre for Global Engineering: cgen.utoronto.ca

We also renovated and re-launched websites for:

- Engineering Alumni & Friends: alumni.engineering.utoronto.ca
- Institute for Robotics and Mechatronics: irm.utoronto.ca
- Engineering Career Centre: engineeringcareers.utoronto.ca

A priority over the coming year will involve assessing all of our sites to ensure they are in compliance with Accessibility for Ontarians with Disabilities Act regulations, and are therefore equally accessible to all visitors.

Figure 8.2a Summary of Analytics for engineering.utoronto.ca, 2011–2012 to 2012–2013

	2011–2012	2012–2013
Total number of visits	353,226	360,615
Number of unique visitors	208,579	210,864
Average number of pageviews per visit	2.6	2.3
Average number of pageviews per day	2,478	2,296
Average amount of time spent on site	2:72 min	2:56 min
Number of cities visitors came from	6,489	6,538
Number of countries visitors came from	194	197

Figure 8.2b Summary of Analytics for undergrad.engineering.utoronto.ca, 2011–2012 to 2012–2013

	2011–2012	2012–2013
Total number of visits	709,065	746,751
Number of unique visitors	265,818	213,254
Average number of pageviews per visit	1.8	1.8
Average number of pageviews per day	3,647	3,726
Average amount of time spent on site	2:28 min	2:22 min
Number of cities visitors came from	3,449	4,244
Number of countries visitors came from	176	188

Figure 8.2c Summary of Analytics for discover.engineering.utoronto.ca, 2011–2012 to 2012–2013

	2011–2012	2012–2013
Total number of visits	230,306	264,363
Number of unique visitors	146,552	172,725
Average number of pageviews per visit	4.0	3.7
Average number of pageviews per day	2,523	2,648
Average amount of time spent on site	4:23 min	3:56 min
Number of cities visitors came from	4,842	5,586
Number of countries visitors came from	189	202

Social Media

Social media is becoming an increasingly significant part of our communications strategy. Services such as Twitter and Facebook drive traffic to our websites, which helps to increase media coverage. Shown in Figure 8.3, use of Twitter continued to grow across the Faculty, and our various accounts now have nearly 7,000 followers. Live-tweeting during events such as convocation, the first-ever Women in Science & Engineering (WISE) conference, Praxis, EdTech Workshop and the NSERC Robotic Field Trials at UTIAS helped generate excitement and gave us increased exposure. We will increase our live-tweeting and other use of social media as we move forward with the goals outlined in our strategic communications framework.

We continue to make use of Vimeo to showcase U of T Engineering videos. Last year, we posted 48 new videos on topics such as news events, Professional Experience Year internships, new faculty appointments, entrepreneurship activities, convocation and Faculty events. Our videos were viewed more than 78,000 times. The most-watched video was 'U of T Reinvents the Toilet' with 35,400 views, followed by two videos featuring the human-powered ornithopter.

Departments within the Faculty are beginning to use LinkedIn as part of a deliberate outreach strategy. CivE, EngSci, MSE and ECE have all established LinkedIn groups to reach out to alumni and students. We are also continuing to develop a Faculty-wide presence on LinkedIn by creating sub-groups for alumni communities across the world (e.g., Hong Kong, Bay Area and Calgary). We will continue our efforts to further engage alumni through social media worldwide to facilitate better interaction between alumni and their alma mater.

Figure 8.3 **Faculty Twitter Accounts, 2012–2013**

Account	Twitter Name	Followers
Faculty of Applied Science & Engineering	uoftengineering	4,383
Department of Chemical Engineering & Applied Chemistry	ChemEng_UofT	870
Department of Civil Engineering	civmin	144
The Edward S. Rogers Sr. Department of Electrical & Computer Engineering	eceuoft	184
Department of Materials Science & Engineering	uoftmse	307
Institute of Biomaterials & Biomedical Engineering	IBBME_UofT	236
U of T Engineering Media Relations	uofteng_media	192
U of T Engineering Registrar	uofteng_registr	381
Engineering Leaders of Tomorrow	EngineeringLOT	258
Total Followers		**6,955**

9 International Initiatives

As the world becomes ever more interconnected, it is important for U of T Engineering to sharpen its international focus — in research, teaching and partnerships. We are consistently ranked as one of the world's top engineering schools and our international reputation grows each year as we strengthen our global ties in education, research and in industrial partnerships.

We aim to create the next generation of global engineers and citizens; students who can apply a global perspective to the challenges our world faces. This means attracting high-calibre international students and scholars to add to the diverse perspectives within our classrooms. It also means creating more opportunities for our students to go abroad to understand their engineering interests in a global context, and incorporating a global perspective into all our courses.

One example of our strengthened international focus was the joint appointment by U of T Engineering and the Munk School of Global Affairs of alumnus Paul Cadario, formerly a senior manager at the World Bank, as Distinguished Senior Fellow in Global Innovation at the Centre for Global Engineering (CGEN). In this role, he will deliver public lectures, mentor students in the Master of Global Affairs program and at CGEN and work with faculty members throughout the University.

Our students also continue to demonstrate their international perspective. For example, student teams compete at the international level in many different fields — from communications to solar car races.

Selected Highlights of Global Impact for 2012–2013

Pour, Shake and Stir

IBBME's Professor Warren Chan (Canada Research Chair in Nanobiotechnology) and PhD candidate Kyryl Zagorovsky have developed a diagnostic 'cocktail', consisting of blood, water and DNA powder with gold particles, which could one day help treat some of the world's leading diseases. Professor Chan's group is working on custom designing nanoparticles to target and illuminate cancer cells and tumors, with the potential of one day being able to deliver drugs to cancer cells. Zagorovsky's rapid-diagnostic biosensor will allow technicians to test for multiple diseases at one time with one small sample, and with high accuracy and sensitivity.

Longevity Gains Not Evenly Distributed

ChemE doctoral candidate Ryan Hum has determined that even though people are living longer on average than they were in 1970, across the world that rise in life expectancy is not benefiting everybody equally. Hum and his collaborators — Professors Yu-Ling Cheng, Director of the Centre for Global Engineering (CGEN), Prabhat Jha of the Dalla Lana School of Public Health and Anita McGahan of the Rotman School of Management — published their results in the open-access science journal *eLife* recently. Their work reveals that the costs for an extra year of life among adult males in lower-income countries are rising, while the costs for an extra year of life among children worldwide and for adults in high-income countries continues to drop.

Gates Foundation Awards U of T Engineers $2.2 Million for Toilet Research

A University of Toronto Engineering team led by Professor Yu-Ling Cheng (ChemE, Director of CGEN), was one of the top three teams in the Bill & Melinda Gates Foundation toilet challenge in 2012. The U of T team received a $2.2-million grant for 15 months from the Foundation to develop an operational prototype. Working with partners in Bangladesh, their goal is to have the prototype ready by December 2013.

The U of T solution uses a sand filter and UV-ray disinfecting chamber to process liquid waste and a smolder chamber to incinerate solid waste that has been flattened and dried in a roller/belt assembly. The result is a toilet that is sustainable, easy to use and that processes waste while protecting the community from contamination.

U of T Engineering Start-up Helps Rebuild Haitian School

In an effort to rebuild Haiti after its devastating 2010 earthquake, Cast ConneX Corporation, a CivE start-up led by Carlos de Oliveira (CivE MASc 0T6), is taking part in an industry-wide coalition aimed at preparing the island nation in the event of another major tremor. Cast ConneX is supporting the initiative with cutting-edge, seismic-resistant connectors.

The technology behind Cast ConneX's connectors was developed at U of T Engineering in 2006, based on research by de Oliveira and Michael Gray (CivE PhD 1T1). These connectors are playing a leading role in the establishment of a seismic-resistant school in the capital city of Port-au-Prince. Led by the Canadian Construction Association and Builders Without Borders, the project will reconstruct a vocational centre called École Lakay that will serve as a training facility for young Haitian tradespeople. The school will also have the capacity to serve as a safe zone, providing food, shelter and medical attention in the event of a natural disaster.

EngSci and MSE Alumnus Named One of TIME Magazine's "100 Most Influential People in the World"

U of T Engineering alumnus and Massachusetts Institute of Technology Professor Donald R. Sadoway (EngSci 7T2, MSE MASc 7T3, PhD 7T7) was named one of TIME Magazine's "100 Most Influential People in the World" for 2012.

Professor Sadoway is one of the world's foremost researchers in the area of materials engineering for energy-storage technologies. In a recent online TED Talk that has logged more than 1.3 million views, he spoke about "The Missing Link to Renewable Energy," describing how renewable energy resources can be made more viable for grid-level use through high-capacity batteries, built at low cost. Professor Sadoway is currently the John F. Elliott Professor of Materials Chemistry at MIT.

U of T Engineering Graduates Invent World's Most Energy-efficient Light Bulb

Three U of T Engineering graduates — Gimmy Chu (ElecE 0T6), Tom Rodinger (IBBME PhD 0T7) and Christian Yan (ElecE 0T6) — have invented what they say is the world's most energy-efficient light bulb, the NanoLight. The NanoLight is made of printed circuit-board material that is folded into the shape of a light bulb. It uses only 12 watts of electricity to generate the equivalent output of a 100-watt incandescent bulb. According to Chu, if you burn the bulb for an average of three hours a day, the bulb would last 20 years.

UTIAS Tiny Space Telescopes Orbiting the Earth

Two space telescopes developed by U of T Engineering's Space Flight Laboratory (SFL) are circling the Earth, searching for the brightest objects in the sky. Measuring only 20 centimetres a side, and weighing less than seven kilograms, the nano-satellites are the smallest astronomical satellites ever built. They were launched February 2013 from the Satish Dhawan Space Centre in Sriharikota, India. Funded by Austria, they are the first two components in the planned six-satellite BRIght Target Explorer (BRITE) mission. The BRITE satellites are the latest in a series of mini-satellites designed and built by SFL for international clients such as Norway, Australia and Poland.

Engineering Global Health Symposium

In April 2013, IBBME, CGEN and the Faculties of Applied Science & Engineering and Medicine held the first annual Engineering Global Health Symposium. This one-day event provided a snapshot of the kinds of thoughtful, innovative solutions that U of T professors are developing, with the help of community partners, to help developing nations achieve cost-effective, lasting solutions to some of the world's greatest health challenges. More than 80 faculty and students from across campus attended the event, along with community partners.

Blood Cell Measurement in Under-resourced Countries Instrument Funded

Professor Yu Sun (MIE) received funding from the federal government's Grand Challenges Canada program to develop a low-cost instrument for blood cell measurements in under-resourced countries. The project, which will be implemented in Egypt, will develop low-cost devices for blood cell count and white blood cell differentials to enable wide availability of routine blood testing to large populations.

Selected International Partnerships for 2012–2013

Brazil's Science Without Borders Program

Thanks to the Brazilian government's Science Without Borders program, we welcomed 123 students from Brazil for a year of study in 2012–2013. The four-year program, launched in 2012, aims to send 100,000 Brazilian university students to study at top universities around the world. This year, 700 students have come to Canada, with 192 choosing U of T, and the vast majority of those studying in our Faculty. We hosted a welcome breakfast in September 2012 for these students as well as others currently on exchange at U of T Engineering.

Opportunities for MIE Undergraduates at Asian Universities

This year, MIE taught two summer courses at Peking University as part of its Global Education Exchange (Globex) program. The exchange also enables MIE students to take courses at Peking University. Those courses include offerings from other Globex educational partners such as Stanford University and the University of Maryland.

After years of successful partnerships with Peking University, MIE offered its first cross-disciplinary international capstone project involving 17 students from U of T, Peking University and the National University of Singapore. The project, called "Smart Shopping Solutions," asked students to design ways to improve the shopping experience. Their proposals included a shopping application for mobile devices and a re-engineered shopping cart.

MIE will launch another capstone course program in September 2013 in collaboration with the Hong Kong University of Science & Technology. MIE undergraduates interested in an international experience can also choose programs affiliated with Shanghai Jiao Tong University and Penn State.

Developing Next-generation African Leaders through The MasterCard Foundation Program

In April 2013, U of T received a $22.5-million grant as one of three Canadian institutions to participate in The MasterCard Foundation Scholars Program — a global initiative to educate and develop next-generation African leaders who will contribute to social transformation across the continent. The Program selects bright, motivated young people from economically disadvantaged communities, who, despite facing challenges, have demonstrated leadership and a commitment to improving the lives of others.

In total, 67 students will come to U of T over the next five years to study in the Faculties of Arts & Science or Applied Science & Engineering. Our Faculty will welcome our first five students through the Program this coming fall.

Through the Program, students receive a comprehensive set of supports — including tuition, residence, meals and travel, as well as special mentorship and internship opportunities — to enable a successful transition into their education in Canada, and ultimately into the workforce in Africa.

The MasterCard Foundation Scholars Program is a $500-million global education initiative that will provide secondary and university education to an estimated 15,000 young people in developing nations, primarily in Africa.

10 Space

Space continues to be a major limitation of our world-class teaching and research capabilities. Through careful assessment, investment and planning, we made significant progress in improving and maximizing our facilities this year.

BioZone's newly renovated and expanded space was officially opened in December 2012. Close to 100 faculty, students, alumni and other guests attended the event to celebrate the facility, a multidisciplinary centre for collaborative bioengineering research in the Department of Chemical Engineering & Applied Chemistry.

In April 2013, we announced that Toronto-based Montgomery Sisam Architects (MSA) and U.K.-based Feilden Clegg Bradley Studios were chosen as architects for the Centre for Engineering Innovation & Entrepreneurship (CEIE). We continue to work with the City of Toronto regarding the approvals needed for the project. This coming year, we will increase the momentum of our fundraising and accelerate planning efforts for the new building, which is targeted to open in 2016.

In May 2013, we officially opened the Centre for Industrial Application of Microcellular Plastics (CIAMP). The multi-million dollar facility is located off campus, in Mississauga, and is a state-of-the art research centre for developing innovative, commercially viable plastic foaming technologies.

We are working to maximize the efficiency of campus space in use. After having completed audits for meeting rooms (fall 2012) and student club and study spaces (fall 2011), we are now evaluating the utilization of our undergraduate teaching laboratories to identify opportunities to accommodate a wider range of students and courses. This assessment will help address our space concerns while having a positive impact on our operating budget, contributing to our efforts for cost containment.

Infrastructure and Facilities

Our research productivity and ability to provide a leading-edge education to our students depend on our physical infrastructure. For that reason, infrastructure has been an ongoing priority for our Faculty over the past several years, and will continue to be one of the areas of focus in our fundraising efforts.

Since our last annual report, we added 1,889 net assignable square metres (NASMs) to our total footprint. Much of the additional space is attributable to the Microsatellite Science and Technology Centre, which opened at UTIAS in 2012. The new Centre is not only a hub of research and industrial collaboration; it is also the birthplace of the world's smallest satellites. To read more about the microsatellites, please refer to the International Initiatives chapter.

Figure 10.1 Summary of Buildings Occupied by Engineering, 2012–2013

Code	Building	Office of the Dean	EngSci	UTIAS	ChemE	CivE & MinE	ECE	IBBME	MIE	MSE	Total NASMs
AS	**Aerospace (Downsview)**			5,289							**5,289**
BA	**Bahen Centre**	1,151	564		67		5,741		1,362		**8,884**
DC	**CCBR**				667			889			**1,566**
EA	**Annex**	233					946		92		**1,271**
EL	**Electrometal**									149	**149**
FI	**Fields Institute**	340									**340**
GB	**Galbraith**	1,670				4,903	4,216				**10,790**
HA	**Haultain**				198	110			639	721	**1,667**
MB	**Lassonde Mining**					1,205		1,366	1,899	830	**5,300**
MC	**Mechanical**	63							5,482		**5,544**
PT	**Pratt**						1,342			1,491	**2,833**
RS	**Rosebrugh**							814	2,111		**2,925**
SF	**Sandford Fleming**	817		692		1,487	3,668				**6,664**
WB	**Wallberg**	374			7,847		130			1,327	**9,678**
CX	**245 College**	513									**513**
RM	**256 McCaul**	468							59		**528**
	Total Area	**5,629**	**564**	**5,981**	**8,780**	**7,705**	**16,042**	**3,080**	**11,644**	**4,517**	**63,942**
		63,942 NASMs									

Note 10.1: 245 College is a temporary space allocation. A map of the buildings within the Engineering precinct is available in Appendix I.

Projects Completed in 2012–2013

BioZone Phase III — Wallberg Building

Over the course of five years, BioZone — a multidisciplinary centre for bioengineering research housed within ChemE — has undergone a physical transformation. With the third phase complete, BioZone is now equipped with a world-class protein production and characterization facility. In 2011–2012, a wet lab, mass spectrometer lab and offices for researchers and graduate students were also added. Phase IV of development is planned to start later this year and will include renovations to the Bioprocess Engineering Facility in the Wallberg Building to support large-scale bioreactor experiments.

Centre for Industrial Application of Microcellular Plastics — Mississauga

This state-of-the art research centre develops innovative, commercially viable plastic foaming technologies within its new industry-scale research facility. The Centre for Industrial Application of Microcellular Plastics (CIAMP) — which officially opened in May 2013 — features an injection-molding machine, two extrusion lines for plastics-molding experimentation, data analysis room and an overhead crane. CIAMP is an integral extension to the Microcellular Plastics Manufacturing Laboratory (MPML), which is a global leader in plastic foaming research.

Cleanroom Upgrades — Pratt Building

The Toronto Nanofabrication Centre (formerly the Emerging Communications Technology Institute) is an interdisciplinary research centre with state-of-the-art nanofabrication facilities. To maintain the air-quality standards in the Pratt Building cleanroom, we added a compressed dry air system. In the near future, we will also replace the HEPA filtration system.

Drinking Water Research Group Lab — Galbraith Building

Once an undergraduate teaching laboratory, room 420 of the Galbraith Building has been transformed into additional research space for the Drinking Water Research Group. Funding for this renovation came from FedDev Ontario's investment in the Southern Ontario Water Consortium.

Other completed projects include:

- Air-conditioning upgrade (Mechanical Engineering Building)
- Faculty-wide digital signage (various buildings)
- Fire alarm upgrade (Galbraith Building and Sanford Fleming Building)
- First-floor washroom renovations (Wallberg Building)
- IBBME research lab renovations (Rosebrugh Building)
- Lab renovations (Wallberg Building)
- Student design lab renovations (Mechanical Engineering Building)
- Thermo-pane window replacement (Lassonde Mining Building)

Projects Underway

Centre for Engineering Innovation & Entrepreneurship

The Centre for Engineering Innovation & Entrepreneurship (CEIE) will serve as the hub of U of T Engineering's collaborative learning and interdisciplinary research, housing interactive spaces for learning and design, as well as a number of multidisciplinary research centres and institutes. The building will also serve as a home for The Entrepreneurship Hatchery, which encourages and supports U of T Engineering students inspired to launch entrepreneurial ventures.

After an extensive search, we selected Toronto-based Montgomery Sisam Architects (MSA) and U.K.-based Feilden Clegg Bradley Studios as architects for the CEIE. Located on St. George Street, adjacent to iconic Convocation Hall, the 15,000 square-metre building is targeted to open in 2016.

The project planning committee completed its interim report and we are currently in negotiations with the City of Toronto to determine the allowable density of the site.

New Teaching Computer Lab — Lassonde Mining Building

We are in the process of relocating MIE's undergraduate teaching lab from the fourth floor of the Haultain Building to the first floor of the Lassonde Mining Building. The relocated lab will feature an advanced audio-visual system and upgraded computer hardware.

Energy Fundamentals Lab Renovation — Mechanical Building

In an effort to centralize all energy-related labs, we converted the Heat Engines Lab into an Energy Fundamentals Lab in 2011. An important part of this project involved replacing obsolete equipment and updating architectural finishes. We have now started the final phase of this renovation, which includes the installation of an HVAC (heating, ventilation, air conditioning) system.

Laser/Combustion Lab Renovation — UTIAS Downsview

To enable research in fluid mechanics and turbulent combustion of jet flames, we are converting a former machine shop into a research lab. The new space will feature exhaust hoods and an HVAC system.

Other ongoing projects include:

- CivE main office renovation (Galbraith Building)
- Electrical Energy Systems Lab upgrade (Galbraith Building)
- Electronic access control (Wallberg and Pratt Buildings)
- EngSci office construction (Bahen Centre)
- IBBME main office renovation (Rosebrugh Building)
- MIE old wing air conditioning project (Mechanical Engineering Building)
- MIE design shop relocation (Mechanical Engineering Building)
- MIE office creation (Mechanical Engineering Building)
- Ontario Centre for Characterization of Advanced Materials (Wallberg Building and Pratt Building)
- UTIAS gas turbine combustion research lab (Downsview)
- Wireless access upgrade (Galbraith Building and Sanford Fleming Building)

Determining Needs

Audits are an important part of understanding our space needs and where we could be using our facilities more efficiently. We completed a major audit of our meeting rooms and began implementing recommendations this year. Our next audit will focus on undergraduate teaching lab spaces.

11 Finance

We continue to strengthen our financial position with total revenues of $170.3 million in 2012–2013. The 7-per-cent rise in revenue over fiscal year 2011–2012 was accompanied by careful cost containment and strategic resource allocation. With revenue sources — particularly government — under extreme pressure and amidst ongoing economic uncertainty, it is important to retain sufficient financial operating flexibility. Progress in our component of Boundless: The Campaign for the University of Toronto will provide the necessary funding to continue our space infrastructure enhancement and to further develop scholarship opportunities for our students.

Our budget allocation model distributes revenues based on drivers and activities, improving transparency and providing incentives for academic units to increase revenues and contain costs. The model has now been in use for three years.

Also in its third year is the Dean's Strategic Fund, which was designed to offer financial support to strategically important initiatives outside of operating budgets. Since the 2010 fiscal year, this Faculty-wide initiative has provided $7.3 million in seed money for several projects, ranging from research-driven proposals to those focused on improving student experience. New for 2012, we instituted the Engineering Instructional Innovation Program (EIIP). As an extension of the Dean's Strategic Fund, EIIP supports initiatives that enhance our undergraduate courses.

We aim to provide our students with better access to arts, humanities and social science elective courses while ensuring appropriate revenue sharing. Toward this end, we resumed discussions with the Faculty of Arts & Science to simplify and codify our interdivisional teaching arrangements. This includes aligning historical teaching agreements with the University's budget model.

Total Revenue and Central Costs

Figures 11.1, 11.2 and 11.3 show our total revenue and the associated central costs attributed to the Faculty since the University's budget model was established in the 2006–2007 fiscal year. In the past year, total revenue grew by 7.1 per cent to $170.3 million while total central costs increased by 8.5 per cent to $82 million. Tuition revenues grew, but the provincial per-student grant revenue has started to level off. This trend is expected to continue until the provincial government solves its deficit challenges.

Central costs are made up of University-wide costs, University fund contributions and the student aid levy, which experienced year-over-year increases of 8.3 per cent, 7.9 per cent and 10.5 per cent, respectively.

Negotiated wage settlements, coupled with a short-term need for special increased pension funding to compensate for underperforming financial markets, propelled the University-wide cost increase.

The rise in student aid levy is a result of our commitment to providing need-based aid through the Student Access Guarantee, which states: "No student offered admission to a program at the University of Toronto should be unable to enter or complete the program due to lack of financial means." Student aid ensures that we continue to attract the very best students regardless of their financial capability.

As a result, net revenue (Figure 11.3) increased 5.8 per cent to $88.4 million, which is approximately half of the previous year's increase.

Figure 11.1 **Total Revenue, 2006–2007 to 2012–2013**

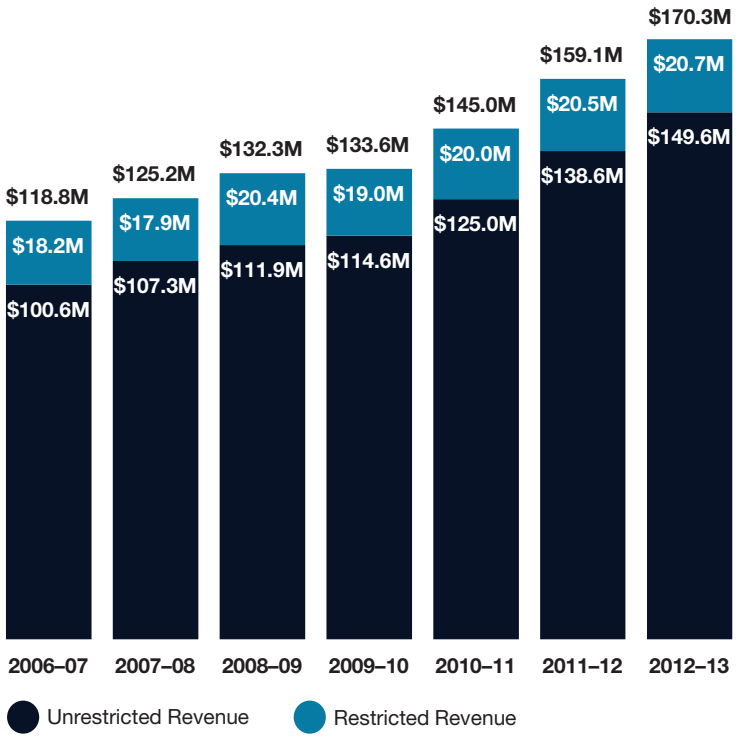
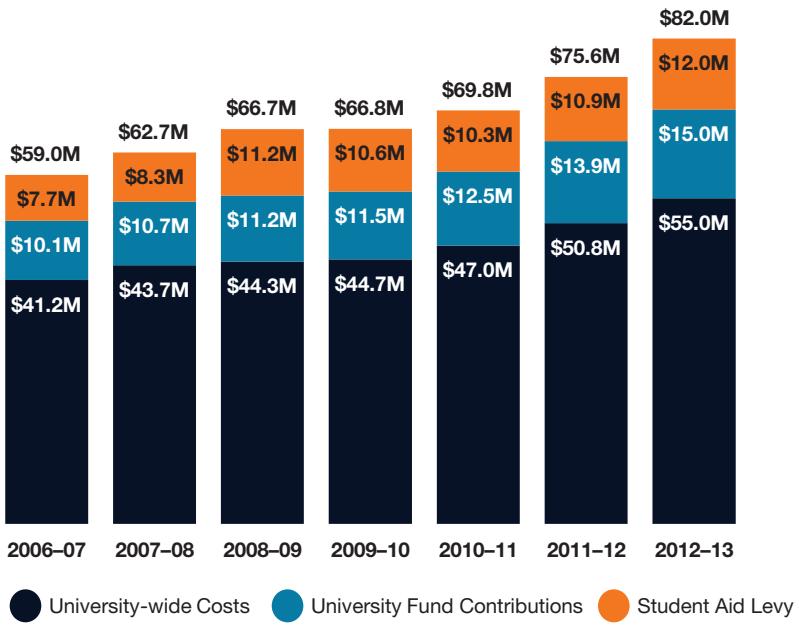


Figure 11.2 **Total Central Costs, 2006–2007 to 2012–2013**



Note 11.1 and 11.2: Data are shown by fiscal year (May to April). For example, 2012–2013 represents the financial cycle starting in May 2012 and ending in April 2013.

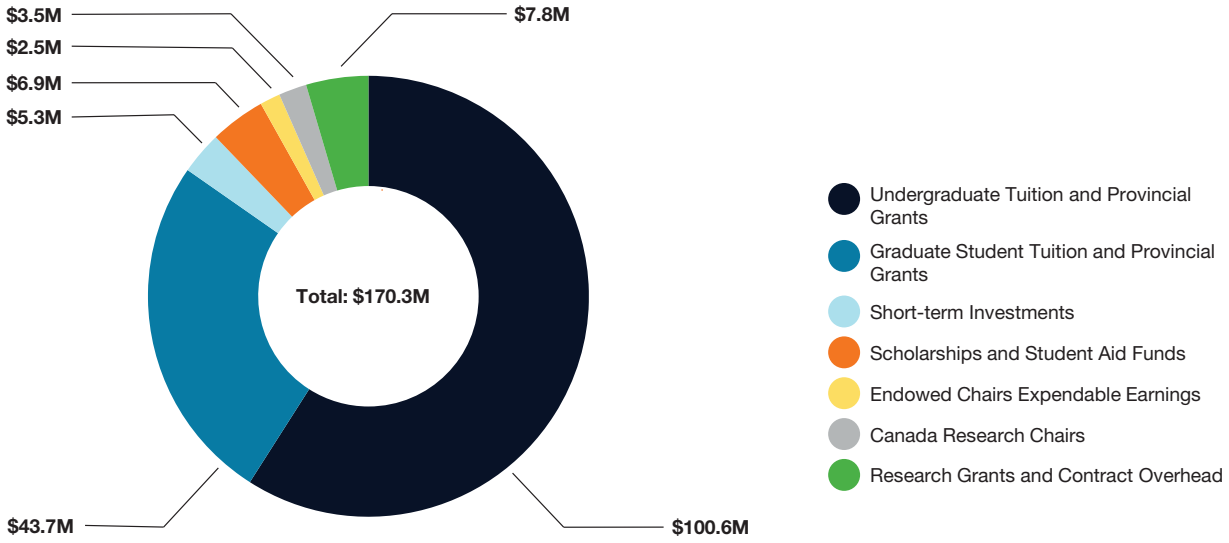
Figure 11.3 **Budget Data, 2006–2007 to 2012–2013**

	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Total Revenue	**$118,826,327**	**$125,233,418**	**$132,333,400**	**$133,571,789**	**$144,976,282**	**$159,081,170**	**$170,342,629**
Unrestricted Revenue	$100,663,690	$107,347,671	$111,937,605	$114,602,697	$124,966,518	$138,597,605	$149,615,656
Restricted Revenue	$18,162,637	$17,885,747	$20,395,795	$18,969,092	$20,009,764	$20,483,566	$20,726,973
Total Central Costs	**$58,976,711**	**$62,755,042**	**$66,667,514**	**$66,768,403**	**$69,837,572**	**$75,536,585**	**$81,984,923**
University-wide Costs	$41,180,986	$43,698,011	$44,307,203	$44,693,620	$47,027,056	$50,817,454	$55,028,273
University Fund Contributions	$10,066,369	$10,734,767	$11,193,761	$11,460,270	$12,496,652	$13,859,760	$14,961,566
Student Aid Levy	$7,729,356	$8,322,264	$11,166,550	$10,614,513	$10,313,864	$10,859,371	$11,995,084
Net Revenue	**$59,849,616**	**$62,478,376**	**$65,665,886**	**$66,803,386**	**$75,138,710**	**$83,544,584**	**$88,357,706**

Budget Overview for 2012–2013

Our revenue sources, attributed central costs and budget breakdown are shown on the following pages for the 2012–2013 fiscal year. Revenues this past year increased largely due to rising enrolments of international undergraduates and those pursuing the MEng and PhD programs. The increase in revenue and its ultimate distribution (Figure 11.5) remained approximately proportionate to the previous year, which — when combined with a prudent operating budget and careful fiscal management — allowed us to rebuild reserves, upgrade much needed infrastructure and invest in the Dean's Strategic Fund initiatives as shown in Figure 11.6.

Figure 11.4 **Revenue Sources, 2012–2013**



Note 11.3 and 11.4: Data are shown by fiscal year (May to April).

Figure 11.5 **Revenue Distribution, 2012–2013**

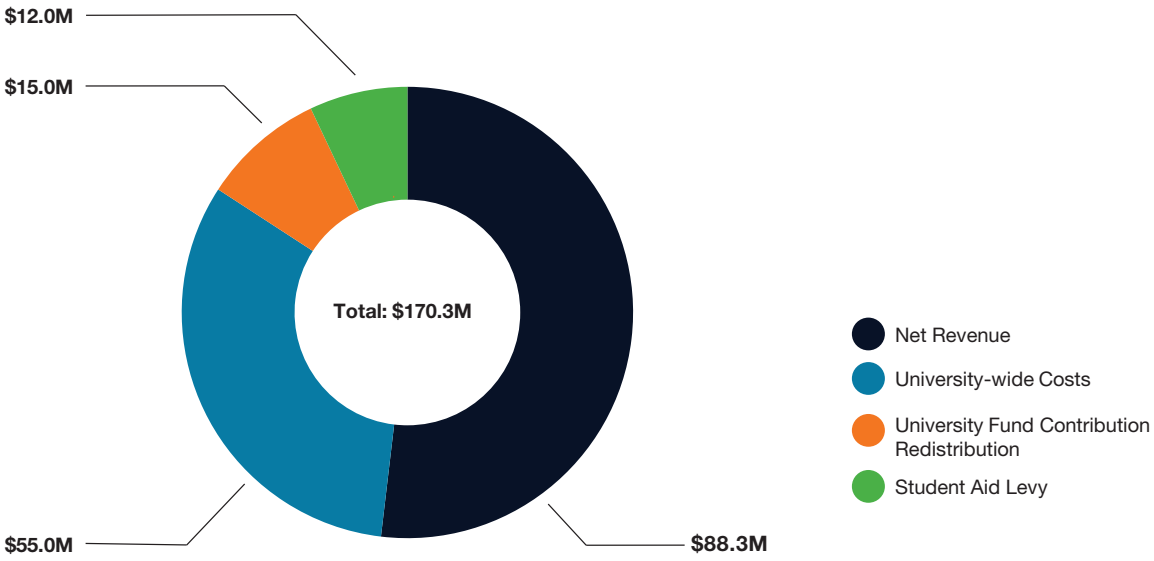
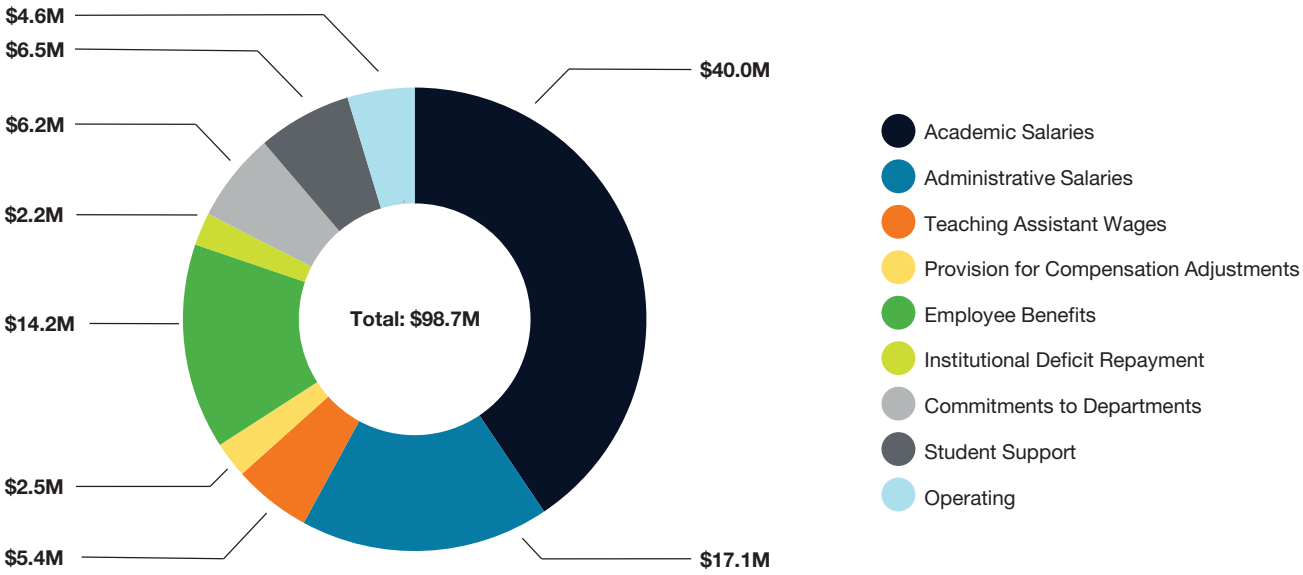


Figure 11.6 **Total Operating Budget: Breakdown by Expense, 2012–2013**



Note 11.5 and 11.6: Data are shown by fiscal year (May to April).

Dean's Strategic Fund

Since we instituted the Dean's Strategic Fund in 2010, the Faculty has committed a total of $7.3 million toward an array of innovative projects that serve to advance our objectives in fostering research collaboration and enhancing our students' learning experience.

This year, 13 projects were submitted for funding consideration. Some of the projects slated to start in 2013–2014 include:

- A three-day international symposium called Bio-inspired Energy Conversion Technologies. The event will bring together 30 of the world's leaders in advanced sustainable energy science and technology to discuss current and future research directions.
- A collaboration between U of T Engineering researchers and the Dalla Lana School of Public Health entitled Institute for Research into Exposomics Based Assessment. The initiative will investigate the synergistic interactions between genome and cumulative environmental exposure.
- Further enhancements to The Entrepreneurship Hatchery, a co-curricular initiative that provides undergraduates with encouragement, guidance and assistance in developing their product or technology ideas, as well as their entrepreneurial skills.

Engineering Instructional Innovation Program

Our Faculty embodies a rich and inquisitive intellectual community. The collective wealth of creativity available through the diverse talents of our researchers, educators and students is astounding. When evaluating the range of submissions made to the Dean's Strategic Fund over the past two years, we quickly recognized that technology — and research on teaching and learning — has substantially reshaped the landscape of higher education. This presented an opportunity to further our objectives for instructional innovation through projects specifically geared toward rethinking our traditional teaching approaches. In response, the Engineering Instructional Innovation Program (EIIP) was instituted in the fall of 2012.

Funded through an ancillary reserve of the Dean's Strategic Fund, the aim of the EIIP is to support projects geared toward undergraduate courses that reach broadly across the curriculum. EIIP funds can be requested to develop resources, acquire additional teaching assistance, undertake limited re-modelling of space to facilitate course delivery, or to acquire training, equipment or supplies.

Several unique initiatives were selected for EIIP funding to start in 2013–2014:

Project Title	Project Leads	Description
Enhancing Curriculum Delivery at the IBBME Undergraduate Teaching Laboratory	Dawn Kilkenny (IBBME) and Paul Santerre (IBBME)	A three-stage initiative that will use innovative technological audio-visual tools to enhance the delivery of advanced laboratory-based courses for students involved in our biomedical and bioengineering programs.
Digital Scaffolding for Design	Jason Bazylak (MIE) and Jason Foster (EngSci)	This project will develop a set of reusable, digital learning devices to provide a support framework for students related to the design aspects of their program.
Integrated Engineering Economics Teaching	Yuri Lawryshyn (ChemE) and Joseph Paradi (ChemE)	An initiative that seeks to normalize the teaching of engineering economics across the Faculty.
Materials One	Jun Nogami (MSE) and Scott Ramsay (MSE)	This team plans to develop reusable learning and teaching tools as well as resources for the delivery of a common curriculum in materials fundamentals.
Supporting Large-scale Independent Research Programs	Alan Chong (Engineering Communication Program) and Lisa Romkey (EngSci)	This proposal aims to improve the experience of students and supervisors during thesis courses while exploring new research and independent study opportunities.

We look forward to seeing the positive results that will stem from these and future academic innovations over the coming years.

Glossary

Faculty of Applied Science & Engineering Academic Area Terms

Academic Area	For the purpose of this annual report, 'Academic Area' refers to the following departments, divisions and institutes: UTIAS, IBBME, ChemE, CivE, ECE, MIE and MSE. While TrackOne is not an academic unit, it is also included as an academic area in specific contexts in the Undergraduate Studies chapter.
AeroE	Graduates who studied the discipline of Aerospace Engineering from the University of Toronto Institute of Aerospace Studies (UTIAS).
BioMedE	Graduates who studied the discipline of Biomedical Engineering at the Division of Engineering Science and the Institute of Biomaterials & Biomedical Engineering.
ChemE	Department of Chemical Engineering & Applied Chemistry: www.chem-eng.utoronto.ca Graduates who studied the discipline of Chemical Engineering are also designated as ChemE.
CivE	Department of Civil Engineering: www.civil.engineering.utoronto.ca Graduates who studied the discipline of Civil Engineering are also designated as CivE.
CompE	Graduates of The Edward S. Rogers Sr. Department of Electrical & Computer Engineering (ECE) who studied the discipline of Computer Engineering.
ElecE	Graduates of The Edward S. Rogers Sr. Department of Electrical & Computer Engineering (ECE) who studied the discipline of Electrical Engineering.
ECE	The Edward S. Rogers Sr. Department of Electrical & Computer Engineering: www.ece.utoronto.ca Graduates of Electrical Engineering are designated as ElecE; graduates of Computer Engineering are designated as CompE.
EngSci	Division of Engineering Science: www.engsci.utoronto.ca Graduates of this Division are also designated as EngSci.
IBBME	Institute of Biomaterials & Biomedical Engineering: www.ibbme.utoronto.ca Graduates who studied the discipline of Biomedical Engineering within this Institute are referred to as BioMedE.
IndE	Graduates from the Department of Mechanical & Industrial Engineering (MIE) who studied the discipline of Industrial Engineering.
MechE	Graduates from the Department of Mechanical & Industrial Engineering (MIE) who studied the discipline of Mechanical Engineering.
MIE	Department of Mechanical & Industrial Engineering: www.mie.utoronto.ca Graduates of Mechanical Engineering are designated as MechE; graduates of Industrial Engineering are designated as IndE.
MinE	Graduates from the Department of Civil Engineering (CivE) who studied the discipline of Mineral Engineering.
MSE	Department of Materials Science & Engineering: www.mse.utoronto.ca Graduates who studied the discipline of Materials Engineering are also designated as MSE.
TrackOne	General first-year undergraduate studies in Engineering. Upon successful completion of TrackOne, students choose from one of the Engineering undergraduate programs, excluding Engineering Science.
UTIAS	University of Toronto Institute for Aerospace Studies: www.utias.utoronto.ca Graduates who studied the discipline of Aerospace Engineering within this Institute are designated as AeroE.

Additional Terms

AAAS	American Association for the Advancement of Science: www.aaas.org
Academic Year	The University of Toronto academic year runs from September to August.
ASME	American Society of Mechanical Engineers
BASc	Bachelor of Applied Science
CAE	Canadian Academy of Engineering: www.acad-eng-gen.ca
CCBR	Donnelly Centre for Cellular and Biomolecular Research: tdccbr.med.utoronto.ca
CEAB	Canadian Engineering Accreditation Board
CIHR	Canadian Institutes of Health Research: www.cihr-irsc.gc.ca
CRC	Canada Research Chair
DEEP Summer Academy	Da Vinci Engineering Enrichment Program (DEEP) Summer Academy; an advanced summer engineering, science, business and technology program for high school students worldwide: www.outreach.engineering.utoronto.ca
Domestic	Students who are citizens, landed immigrants or permanent residents of Canada
ECF	Engineering Computing Facility
ECN	Engineering Communications Network
EDU	Extra-Departmental Unit: www.provost.utoronto.ca/policy/interdisciplinary
EIC	Engineering Institute of Canada: www.eic-ici.ca
EFTE	Eligible Full-Time Equivalent
ELITE	Entrepreneurship, Leadership, Innovation & Technology in Engineering: gradstudies.engineering.utoronto.ca/meng/elite-certificate
Engineering Society	Student government for Engineering students at the University of Toronto: www.skule.ca
FedDev	Federal Development Agency for Southern Ontario: www.feddevontario.gc.ca
Fiscal Year	The University of Toronto fiscal year runs from May to April.
FTE	Full-Time Equivalent
GEI	Graduate Enterprise Internships: www.graduateinternships.utoronto.ca
G-IFP	Graduate International Foundation Program
GLEE	Girls' Leadership in Engineering Experience
Grant Year	The grant year runs from April to March.
Headcount	Number of degree-seeking students
IEEE	Institute of Electrical and Electronics Engineers: www.ieee.org

IFP	International Foundation Program
LinkedIn	Social media site where professionals build their networks
MASc	Master of Applied Science: www.gradstudies.engineering.utoronto.ca/masc
MEng	Master of Engineering: www.gradstudies.engineering.utoronto.ca/meng
MHSc	Master of Health Science in Clinical Engineering: www.gradstudies.engineering.utoronto.ca/mhsc
NAE	National Academy of Engineering: www.nae.edu
NSERC	Natural Sciences and Engineering Research Council of Canada: www.nserc-crsng.gc.ca
NSERC CREATE	Collaborative Research and Training Experience program funded by NSERC
OGS	Ontario Graduate Scholarship
PEO	Professional Engineers Ontario: www.peo.on.ca
PhD	Doctor of Philosophy (doctoral program): www.gradstudies.engineering.utoronto.ca/phd
Retention Rate	The proportion of first-year students who move into second year
ROSI	Repository of Student Information: www.rosi.utoronto.ca
SAE	Society of Automotive Engineers
SCFI	Stronach Centre for Innovation
Special Student Status	Also known as a non degree-seeking student. A student who is enrolled in a class, but is not proceeding toward degree completion (e.g., a special student is a visiting student from another institution who is taking a course to meet admission requirements for graduate studies).
SSHRC	Social Sciences and Humanities Research Council: www.sshrc.ca
Teaching-Stream Faculty	Academic staff including lecturers, instructors and other teaching faculty with continuing appointments
Tenure-Stream Faculty	Academic staff including Assistant Professors, Associate Professors and Professors; excludes lecturers
Tri-Council	Typically refers to NSERC, CIHR, SSHRC
UTAPS	University of Toronto Advance Planning for Students (UTAPS) is a financial aid program for full-time students who are Canadian citizens, permanent residents or protected persons (recognized convention refugees) and are eligible for need-based government student assistance or funding from a First Nations band. www.adm.utoronto.ca/financial-aid/u-of-t-advance-planning-for-students-utaps
U15	Group of 15 leading, research-intensive universities in Canada, including: University of Alberta, University of British Columbia, University of Calgary, Dalhousie University, Université Laval, University of Manitoba, McGill University, McMaster University, Université de Montréal, University of Ottawa, Queen's University, University of Saskatchewan, University of Toronto, University of Waterloo, Western University

Appendix A: Outreach Programs

Between July 2012 and June 2013, we offered the following pre-university outreach programs, reaching nearly 7,000 students from across Ontario, Canada and the world.

Program	Audience	Session	Approx. Number of Participants
DEEP Summer Academy	Grades 9 through 12	July 2012	1,000
Camp U of T	Grades 5 to 8	July 2012	75
DEEP Leadership Camp	Grades 11 to 12	July 2012	20
Boys and Girls Clubs' Camp Workshops	Grades 1 to 8	July 2012	200
Girls' Jr. DEEP	Grades 4 to 8	July 2012	75
Jr. DEEP	Grades 5 to 8	August 2012	400
ENGage	Grades 5 to 8	August 2012	40
Go ENG Girl	Grades 7 to 10	October 2012	100
Girls' Science & Engineering Saturdays, Fall	Grades 3 to 12	October 2012	60
Saturday Science & Engineering Academy, Fall	Grades 5 to 12	November 2012	85
Girls' Science & Engineering Saturdays, Winter	Grades 3 to 12	January 2013	40
Saturday Science & Engineering Academy, Winter	Grades 5 to 12	February 2013	85
Engineering for Educators	Secondary school teachers	November 2012	75
Reading Week Workshops	Grades 3 to 10	February 2013	215
Big Ideas	Grades 5 to 8	March 2013	20
Jr. DEEP at March Break	Grades 5 to 8	March 2013	75
March Break Math Academy	Grades 11 to 12	March 2013	25
Engineering Family Program	Parents and students in grades 5 to 12	April 2013	60
Science Rendezvous	General public	May 2013	200
In-School and On-campus Workshops	Grades 3 to 8	May & June 2013	4, 000
Skule Kids	Grades 1 to 12	June 2013	75
Total Estimated Reach			**6,925**

Appendix B: Student Clubs & Teams

Below is a list of Engineering student clubs and teams, referenced in the Undergraduate Studies chapter. Beyond the groups presented here, our students also have access to clubs and teams across U of T.

Arts

- Appassionata Music Group
- Skule Arts Festival
- Skule Improv Society
- Skule Orchestra
- Skule Stage Band
- Tales of Harmonia
- The Brass Ring
- U of T Music Clubs Initiative

Athletics

- Engineering Ping Pong Association
- Iron Dragons
- U of T Ironsports Club
- U of T Quidditch Team
- U of T Ski and Snowboard Club
- U of T Yoga and Fitness Club

Community

- Engineers for Christ/Power to Change
- Engineers in Borders
- Engineers Without Borders — U of T Chapter
- Eyes of Hope
- Galbraith Society
- Kidney Disease Screening and Awareness Program
- LeadingLEED
- LGBTQ & Allies in Science and Engineering
- MIE Mentorship Program
- NSight Mentorship Program
- Promise to Future Generations
- Refresh Bolivia
- Skule's Got Talent
- Students Fighting Cancer (SFC)
- Social Spark
- U of T Mandarin Chinese Christian Fellowship
- Women in Science and Engineering (WISE)

Cultural

- Arab Students' Association
- Egyptian Students' Association at U of T
- Engineering Chinese Club
- Former Yugoslavian Engineering Association
- Indian Engineering Students' Association
- Indian Students' Society
- Korean Engineering Students' Association
- Middle Eastern Students' Association
- National Society of Black Engineers
- Nawranj Iranian Association
- U of T Chinese Engineering Students' Association

Design & Competition

- Blue Sky Solar Racing
- Hovercraft Design Team
- Human Powered Vehicle Design Team
- Mechatronics Design Association
- Solar Blimp Design Team
- Spark Design Club
- Tetra
- U of T Aeronautics Team
- U of T Baja Team
- U of T Concrete Canoe
- U of T Concrete Toboggan Team
- U of T Destination Imagination
- U of T Formula SAE
- U of T iGEM Club
- U of T Mining Games
- U of T Robotics Association
- U of T Solar House Design Team
- U of T Space Design Contest
- U of T Supermileage

Hobby & Special Interest

- Astronomy & Space Exploration Society
- Engineering Lego Group
- Rational Capital Investment Fund
- Skule MTG (Magic: The Gathering) Club
- U of T Emergency First Responders (UTEFR)
- U of T Engineering Toastmasters (UTET)

Professional Development & Industry

- American Society of Mechanical Engineers at U of T
- Blank Canvas Collective
- Canadian Society for Chemical Engineering
- Canadian Society for Civil Engineering
- Canadian Society of Mechanical Engineers U of T Student Chapter
- Chapter for Healthcare Improvement at U of T
- Club for Undergraduate Biomedical Engineering (CUBE)
- Hacker Academy
- Institute for Electrical and Electronics Engineers (IEEE), U of T Student Branch
- Institute of Industrial Engineers, U of T Chapter
- MSE Industry Club
- Nspire Innovation Network
- Ontario Water Works Association — Student Chapter
- Ontario Society of Professional Engineers U of T Section
- Sustainable Engineers Association
- SuitsU
- U of T Business Association
- U of T Consulting Association
- U of T Developers
- U of T Engineering Finance Association

Note: Does not include DEEP Summer Academy, which was offered in July 2012.

Appendix C: Time to Completion for Graduate Students

The following figures indicate the median time to completion for graduating cohorts in each master's and doctoral degree program by academic area for the past decade. Time to graduation represents the length of time between a student's initial enrolment in a graduate program and meeting all the requirements for graduation. The data only includes terms in which a student is registered, excluding leaves, lapses and (in most cases) the term in which convocation occurs. Where a student is fast-tracked from the MASc into a PhD, the total time for both programs is counted. Distinguishing full-time and part-time MEng students provides greater clarity.

Figure C.1 University of Toronto Institute for Aerospace Studies Time to Completion for Graduate Students, 2003–2004 to 2012–2013

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
PhD	6.3	5.3	4.3	4.5	5.2	5.3	6.0	7.0	4.7	5.3
MASc	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
MEng (FT)	1.7	1.7	1.3	1.3		1.3	1.2	1.3	1.3	1.0
MEng (PT)	3.0	2.0		1.7	1.7	1.0	1.8			1.7

Figure C.2 Institute of Biomaterials and Biomedical Engineering Time to Completion for Graduate Students, 2003–2004 to 2012–2013

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
PhD		2.7	4.7	5.2	3.3	4.3	4.3	6.0	5.7	5.0
MASc	2.0	2.0	2.0	2.3	2.0	2.2	2.0	2.0	2.0	2.0
MHSc (FT)	1.7	1.8	2.0	2.0		2.0	2.0	2.0	2.0	2.0

Figure C.3 Department of Chemical Engineering & Applied Chemistry Time to Completion for Graduate Students, 2003–2004 to 2012–2013

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
PhD	5.0	5.0	5.3	5.7	4.7	5.0	5.3	6.0	5.3	5.2
MASc	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
MEng (FT)	1.0	1.7	1.2	1.3	1.0	1.0	1.0	1.0	1.0	1.0
MEng (PT)	2.7	2.3	2.7	3.3	2.0	3.7	2.2	1.8	1.3	2.0

Figure C.4 Department of Civil Engineering
Time to Completion for Graduate Students, 2003–2004 to 2012–2013

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
PhD	4.8	4.7	5.0	4.8	4.7	5.0	5.0	5.3	5.3	5.3
MASc	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.0	2.0	2.0
MEng (FT)	1.2	1.3	1.5	1.3	1.0	1.0	1.0	1.3	1.0	1.0
MEng (PT)	1.7	1.7	2.0	1.8	1.7	1.7	2.0	2.3	1.8	2.0

Figure C.5 The Edward S. Rogers Sr. Department of Electrical & Computer Engineering
Time to Completion for Graduate Students, 2003–2004 to 2012–2013

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
PhD	5.0	5.3	4.7	5.3	4.7	4.7	4.7	5.0	5.2	5.5
MASc	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
MEng (FT)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
MEng (PT)	2.3	2.3	2.7	2.0	2.0	2.0	3.0	2.7	2.0	2.2

Figure C.6 Department of Mechanical & Industrial Engineering
Time to Completion for Graduate Students, 2003–2004 to 2012–2013

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
PhD	5.0	4.7	4.3	4.5	4.7	4.7	4.0	4.7	5.0	5.7
MASc	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
MEng (FT)	1.0	1.0	1.3	1.0	1.3	1.0	1.3	1.0	1.3	1.0
MEng (PT)	2.0	2.0	2.0	2.0	2.3	2.3	2.3	2.0	2.0	2.0
MEng - Design (PT)	2.0	2.0	2.2	2.7	2.2	3.3	2.7	2.3	2.7	2.5

Figure C.7 Department of Materials Science & Engineering
Time to Completion for Graduate Students, 2003–2004 to 2012–2013

	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
PhD	5.3	4.8	4.0	5.8	5.3	4.0	5.3	6.0	6.3	5.7
MASc	2.3	2.3	2.3	2.0	2.0	1.7	2.0	2.0	2.0	2.0
MEng (FT)	1.7	1.0	1.0			1.5	1.7		0.8	1.0
MEng (PT)	1.7	2.0	2.5	2.7		1.3	2.0	2.3	2.3	2.0

Appendix D: Research Chairs

In 2012–2013, our faculty held 61 research chair titles. The list below reflects four types of Chairs:

Canada Research Chair (CRC)
Established by the Government of Canada to attract and retain some of the world's most outstanding researchers. The program invests a total of $300 million per year across Canada in two types of CRCs: 1) **Tier 1** — a renewable title that is held for seven years; and 2) **Tier 2** — a junior chair that is held for five years and is eligible for renewal once. The University receives $200,000 annually per Tier 1 Chair and $100,000 annually per Tier 2 Chair.

Endowed Research Chair
Created with the generous support of donations and indicates a broad and continuing commitment to the position and discipline of research. Each faculty member who holds a Chair position is considered to be of great distinction and typically at the rank of professor with tenure. Each Chair position is held for a fixed term.

Industrial Research Chair
Jointly funded by NSERC and industry to help universities build on existing strengths or develop major research capacity in areas of interest to industry.

U of T Distinguished Professor
Designed to advance and recognize faculty with highly distinguished accomplishments. This Chair is limited to no more than 3 per cent of tenured professors within a Faculty.

Figure D.1 Research Chairs, 2012–2013

Title	Chairholder	Sponsor	Tier	Dep't
Alumni Chair in Bioengineering	Cristina Amon	Endowed		MIE
Bahen/Tanenbaum Chair in Civil Engineering	Jeffrey Packer	Endowed		CivE
Bahen/Tanenbaum Chair in Civil Engineering	Michael Collins	Endowed		CivE
Bell Canada Chair in Multimedia	Dimitrios Hatzinakos	Endowed		ECE
Bell University Laboratories Chair in Computer Engineering	Baochun Li	Endowed		ECE
Bell University Laboratories Chair in Software Engineering	Hans-Arno Jacobsen	Endowed		ECE
Canada Research Chair in Autonomous Space Robotics	Tim Barfoot	NSERC	Tier 2	UTIAS
Canada Research Chair in Biological Computation	Brendan Frey	NSERC	Tier 1	ECE
Canada Research Chair of Biotechnology	Warren Chan	NSERC	Tier 2	IBBME
Canada Research Chair in Cellular Hybrid Materials	Glenn Hibbard	NSERC	Tier 2	MSE
Canada Research Chair in Communication Algorithms	Frank Kschischang	NSERC	Tier 1	ECE
Canada Research Chair in Computational Aerodynamics and Environmentally Friendly Aircraft Design	David Zingg	NSERC	Tier 1	UTIAS
Canada Research Chair in Computational Modeling and Design Optimization Under Uncertainty	Prasanth Nair	NSERC	Tier 2	UTIAS
Canada Research Chair in Diffusion-Wave Sciences and Technologies	Andreas Mandelis	NSERC	Tier 1	MIE
Canada Research Chair in Fuel Cell Materials and Manufacturing	Olivera Kesler	NSERC	Tier 2	MIE
Canada Research Chair in Functional Cardiovascular Tissue Engineering	Milica Radisic	NSERC	Tier 2	IBBME, ChemE
Canada Research Chair in Information Theory and Wireless Communications	Wei Yu	NSERC	Tier 1	ECE
Canada Research Chair in Integrated Photonic Devices	Joyce Poon	NSERC	Tier 2	ECE
Canada Research Chair in Mechanobiology	Craig Simmons	CIHR	Tier 2	MIE, IBBME
Canada Research Chair in Micro and Nano Engineering Systems	Yu Sun	NSERC	Tier 2	MIE
Canada Research Chair in Microcellular Plastics	Chul Park	NSERC	Tier 1	MIE

Title	Chairholder	Sponsor	Tier	Dep't
Canada Research Chair in Nano- and Micro-Structured Electromagnetic Materials and Applications	George Eleftheriades	NSERC	Tier 1	ECE
Canada Research Chair in Nanotechnology	Ted Sargent	NSERC	Tier 1	ECE
Canada Research Chair in Organic Optoelectronics	Zheng-Hong Lu	NSERC	Tier 1	MSE
Canada Research Chair in Rehabilitation Engineering	Tom Chau	NSERC	Tier 2	IBBME
Canada Research Chair in Secure and Reliable Computer Systems	David Lie	NSERC	Tier 2	ECE
Canada Research Chair in Seismic Resilience of Infrastructure	Constantin Christopoulos	NSERC	Tier 2	CivE
Canada Research Chair in Smart and Functional Polymers	Hani Naguib	NSERC	Tier 2	MIE
Canada Research Chair in Stem Cell Bioengineering	Peter Zandstra	NSERC	Tier 1	IBBME
Canada Research Chair in Tissue Engineering	Molly Shoichet	NSERC	Tier 1	ChemE, IBBME
Canada Research Chair in Wireless Networks	Ashish Khisti	NSERC	Tier 2	ECE
Celestica Chair in Materials for Microelectronics	Doug Perovic	Endowed		MSE
Chair in Computer Networks and Enterprise Innovation	Elvino Sousa	Endowed		ECE
Chair in Information Engineering (retired)	Joseph Paradi	Endowed		ChemE
Chair in Software Engineering	Greg Steffan	Endowed		ECE
Clarice Chalmers Chair of Engineering Design	Greg A. Jamieson	Endowed		MIE
Dusan and Anne Miklas Chair in Engineering Design	Paul Chow	Endowed		ECE
Edward S. Rogers Sr. Chair in Engineering	Glenn Gulak	Endowed		ECE
Eugene V. Polistuk Chair in Electromagnetic Design	Costas Sarris	Endowed		ECE
Frank Dottori Chair in Pulp and Paper Engineering	Honghi Tran	Endowed		ChemE
J. Armand Bombardier Foundation Chair in Aerospace Flight	David Zingg	Endowed		UTIAS
L. Lau Chair in Electrical and Computer Engineering	Reza Iravani	Endowed		ECE
Michael E. Charles Chair in Chemical Engineering	Michael Sefton	Endowed		ChemE, IBBME
Nortel Institute Chair in Emerging Technology	J. Stewart Aitchison	Endowed		ECE
Nortel Institute Chair in Network Architecture and Services	Jörg Liebeherr	Endowed		ECE
NSERC/Altera Industrial Research Chair in Programmable Silicon	Vaughn Betz	NSERC/ Altera		ECE
NSERC Associate Industrial Research Chair in Drinking Water	Ron Hofmann	NSERC		CivE
NSERC/Cement Association of Canada Industrial Research Chair in Concrete Durability and Sustainability	Doug Hooton	NSERC		CivE
NSERC Chair in Multidisciplinary Engineering Design	Kamran Behdinan	NSERC		MIE
NSERC Industrial Research Chair in Drinking Water Research	Robert Andrews	NSERC		CivE
NSERC/P&WC Industrial Research Chair in Aviation Gas Turbine Combustion/Emissions Research and Design System Optimization	Sam Sampath	NSERC/ P&WC		UTIAS
NSERC/UNENE Industrial Research Chair in Corrosion Control and Materials Performance in Nuclear Power Systems	Roger Newman	NSERC/ UNENE		ChemE
Pierre Lassonde Chair in Mining Engineering	John Hadjigeorgiou	Endowed		CivE
Stanley Ho Professorship in Microelectronics	Sorin Voinigescu	Endowed		ECE
The Stanley L. Meek Chair in Advanced Nanotechnology	Harry Ruda	Endowed		MSE
Toronto Rehabilitation Engineering Institute's Chair in Spinal Cord Injury	Milos Popovic	Endowed		IBBME
University of Toronto Distinguished Professor in Application Platforms and Smart Infrastructure	Alberto Leon-Garcia	Endowed		ECE
University of Toronto Distinguished Professor in Plasma Engineering	Javad Mostaghimi	Endowed		MIE
Velma M. Rogers Graham Chair in Engineering	George Eleftheriades	Endowed		ECE
Wallace G. Chalmers Chair of Engineering Design	Axel Guenther	Endowed		MIE
W. M. Keck Chair in Engineering Rock Mechanics	John Harrison	Endowed		CivE

Appendix E: Research Funding by Academic Area

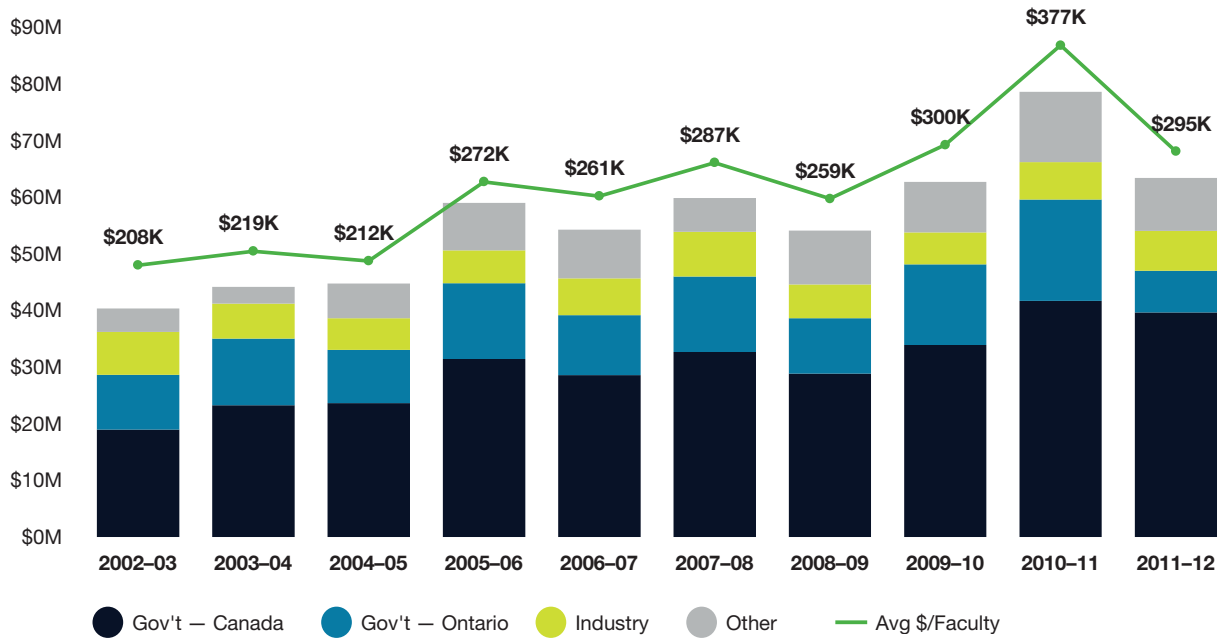
Figure E.1 shows our Faculty's total research funding, including operating and infrastructure.

Figures E.2 to E.8 in this appendix show research operating funding by department and institute over the last decade. This data excludes funding received under the following research infrastructure programs:

- Canada Foundation for Innovation (except the CFI Career Award)
- NSERC Research Tools & Instruments program for Faculty
- Ontario Innovation Trust
- Ontario Research Fund – Research Infrastructure

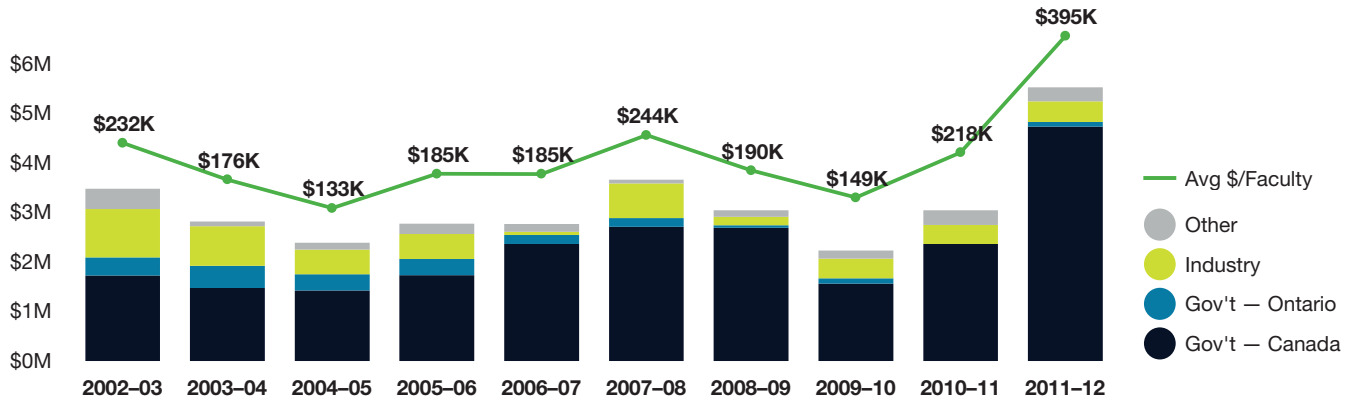
Data is based on grant years (April to March). For example, 2011–2012 represents the granting cycle starting in April 2011 and ending in March 2012.

Figure E.1 University of Toronto Faculty of Applied Science & Engineering Total Research Funding by Source and Average Funding per Faculty Member, 2002–2003 to 2011–2012



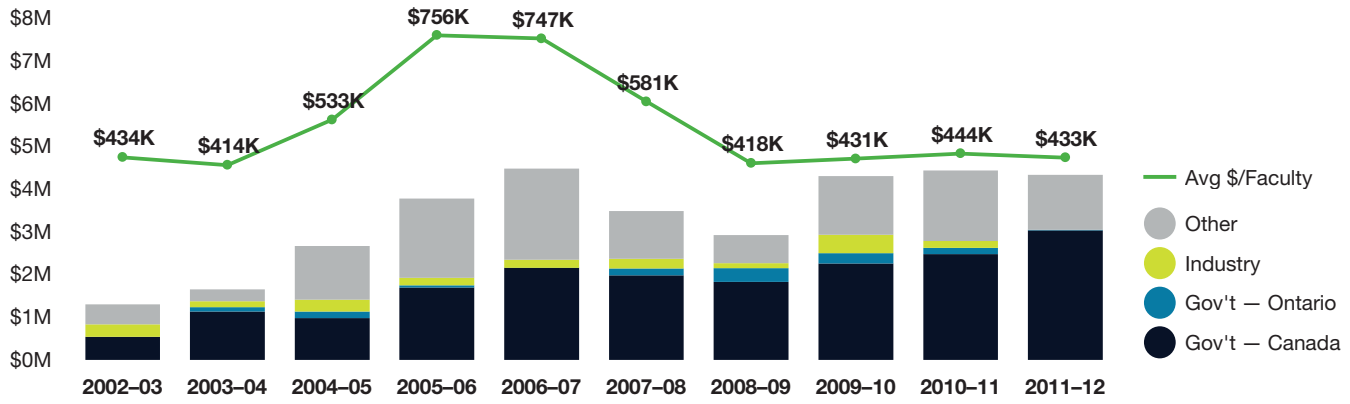
	Gov't - Canada	Gov't - Ontario	Corporate	Other	Total	Avg $/Faculty
2002–03	$19,017,450	$9,689,776	$7,560,641	$4,139,958	**$40,407,825**	**$208,288**
2003–04	$23,337,168	$11,751,992	$6,202,324	$2,946,339	**$44,237,823**	**$218,999**
2004–05	$23,716,248	$9,371,903	$5,605,287	$6,149,095	**$44,842,533**	**$211,521**
2005–06	$31,475,373	$13,420,788	$5,771,219	$8,393,102	**$59,060,482**	**$272,168**
2006–07	$28,653,970	$10,594,737	$6,499,117	$8,589,109	**$54,336,933**	**$261,235**
2007–08	$32,703,389	$13,339,025	$7,928,921	$5,966,170	**$59,937,505**	**$286,782**
2008–09	$28,882,403	$9,820,980	$5,941,749	$9,535,832	**$54,180,964**	**$259,239**
2009–10	$33,975,202	$14,227,915	$5,675,044	$8,919,993	**$62,798,154**	**$300,470**
2010–11	$41,788,651	$17,870,012	$6,644,961	$12,427,710	**$78,731,334**	**$376,705**
2011–12	$39,715,126	$7,371,300	$7,032,190	$9,395,676	**$63,514,292**	**$295,415**

Figure E.2 University of Toronto Institute for Aerospace Studies Research Operating Funding by Source and Average Funding per Faculty Member, 2002–2003 to 2011–2012



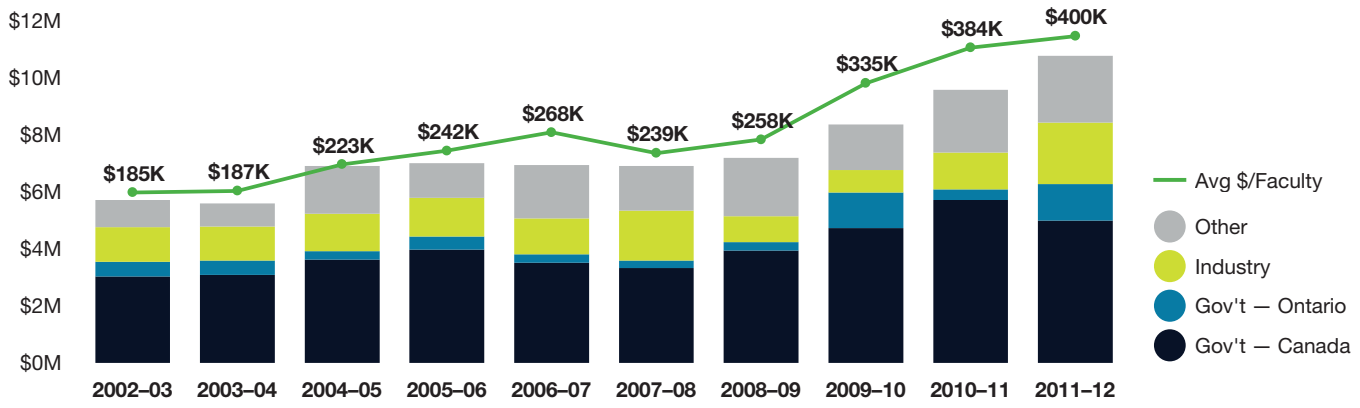
	Gov't - Canada	Gov't - Ontario	Corporate	Other	Total	Avg $/Faculty
2002–03	$1,726,795	$370,528	$973,032	$414,594	**$3,484,949**	**$232,330**
2003–04	$1,475,691	$446,828	$801,745	$98,404	**$2,822,668**	**$176,417**
2004–05	$1,427,214	$327,394	$498,461	$136,796	**$2,389,865**	**$132,770**
2005–06	$1,737,031	$329,500	$499,365	$210,069	**$2,775,965**	**$185,064**
2006–07	$2,365,513	$185,000	$60,000	$161,533	**$2,772,046**	**$184,803**
2007–08	$2,712,542	$175,000	$703,727	$71,667	**$3,662,936**	**$244,196**
2008–09	$2,697,272	$45,000	$172,002	$131,466	**$3,045,740**	**$190,359**
2009–10	$1,566,735	$107,333	$395,731	$163,952	**$2,233,751**	**$148,917**
2010–11	$2,363,242		$390,200	$295,436	**$3,048,878**	**$217,777**
2011–12	$4,740,871	$89,356	$420,400	$280,637	**$5,531,264**	**$395,090**

Figure E.3 Institute of Biomaterials & Biomedical Engineering Research Operating Funding by Source and Average Funding per Faculty Member, 2002–2003 to 2011–2012



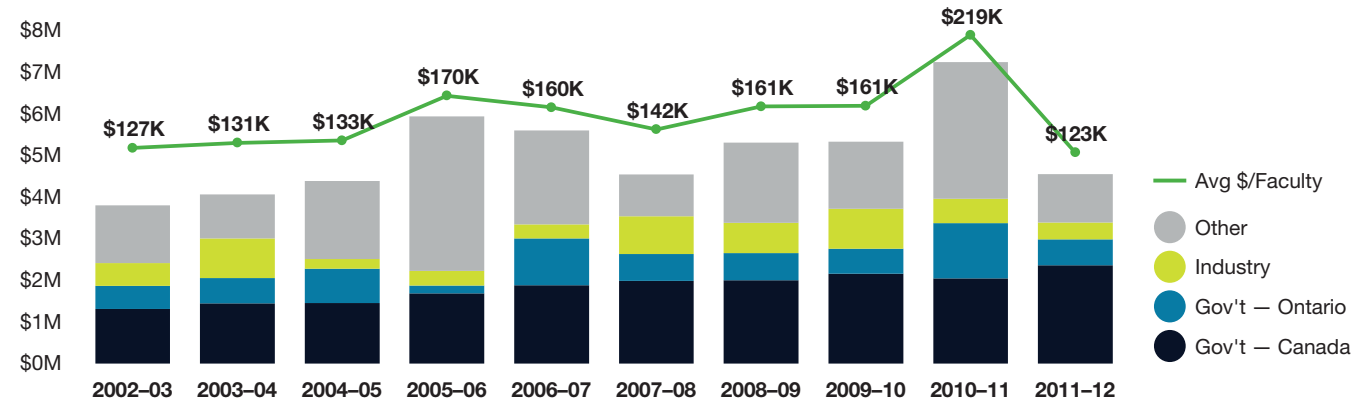
	Gov't - Canada	Gov't - Ontario	Corporate	Other	Total	Avg $/Faculty
2002–03	$538,865		$298,576	$465,733	**$1,303,174**	**$434,391**
2003–04	$1,135,098	$100,000	$142,307	$276,704	**$1,654,109**	**$413,527**
2004–05	$983,835	$150,001	$275,888	$1,257,129	**$2,666,853**	**$533,371**
2005–06	$1,697,313	$48,666	$176,220	$1,857,110	**$3,779,309**	**$755,862**
2006–07	$2,159,231	$1,333	$186,904	$2,137,473	**$4,484,941**	**$747,490**
2007–08	$1,980,785	$165,515	$222,300	$1,119,211	**$3,487,811**	**$581,302**
2008–09	$1,831,256	$317,147	$117,411	$663,498	**$2,929,312**	**$418,473**
2009–10	$2,258,302	$242,228	$433,282	$1,372,801	**$4,306,613**	**$430,661**
2010–11	$2,481,753	$142,383	$160,634	$1,657,644	**$4,442,414**	**$444,241**
2011–12	$3,036,914	$13,500		$1,283,694	**$4,334,108**	**$433,411**

Figure E.4 Department of Chemical Engineering & Applied Chemistry Research Operating Funding by Source and Average Funding per Faculty Member, 2002–2003 to 2011–2012



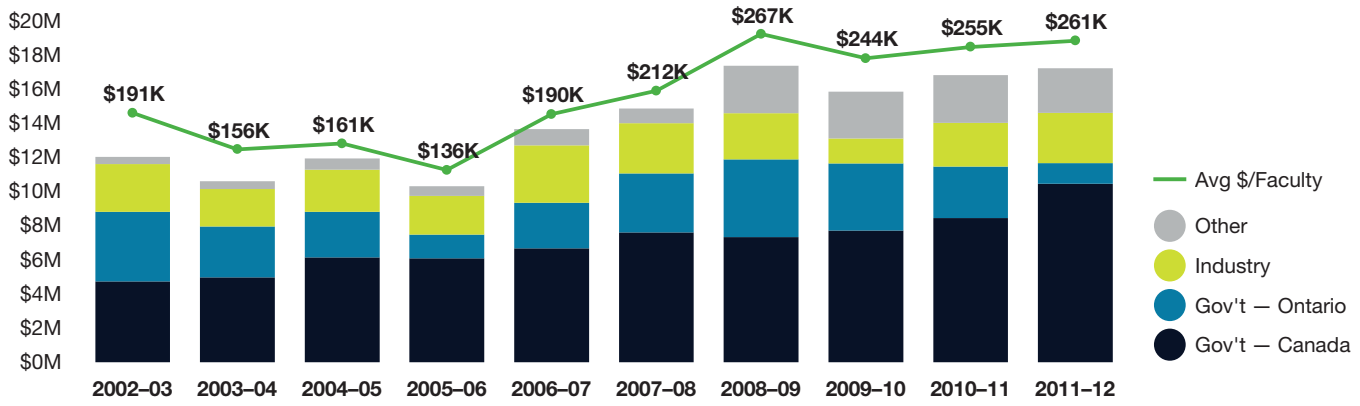
	Gov't - Canada	Gov't - Ontario	Corporate	Other	Total	Avg $/Faculty
2002–03	$3,040,172	$517,438	$1,214,611	$954,463	**$5,726,684**	**$184,732**
2003–04	$3,092,486	$504,091	$1,197,649	$812,408	**$5,606,634**	**$186,888**
2004–05	$3,635,147	$293,952	$1,320,139	$1,675,132	**$6,924,370**	**$223,367**
2005–06	$3,982,279	$465,999	$1,359,291	$1,215,809	**$7,023,378**	**$242,185**
2006–07	$3,527,890	$290,203	$1,261,279	$1,875,921	**$6,955,293**	**$267,511**
2007–08	$3,335,629	$261,610	$1,762,190	$1,567,653	**$6,927,082**	**$238,865**
2008–09	$3,949,214	$299,378	$907,256	$2,056,033	**$7,211,881**	**$257,567**
2009–10	$4,735,864	$1,258,503	$781,842	$1,603,035	**$8,379,244**	**$335,170**
2010–11	$5,727,760	$377,737	$1,285,045	$2,213,727	**$9,604,269**	**$384,171**
2011–12	$5,000,671	$1,283,994	$2,166,328	$2,350,010	**$10,801,003**	**$400,037**

Figure E.5 Department of Civil Engineering Research Operating Funding by Source and Average Funding per Faculty Member, 2002–2003 to 2011–2012



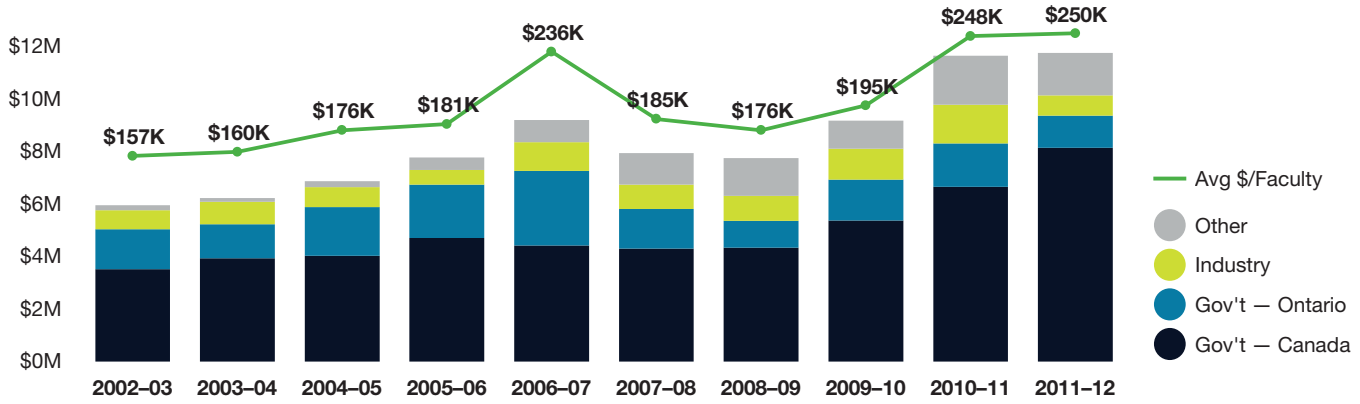
	Gov't - Canada	Gov't - Ontario	Corporate	Other	Total	Avg $/Faculty
2002–03	$1,313,569	$554,663	$547,402	$1,388,197	**$3,803,831**	**$126,794**
2003–04	$1,448,071	$610,140	$945,948	$1,059,504	**$4,063,663**	**$131,086**
2004–05	$1,456,773	$826,688	$225,653	$1,878,573	**$4,387,687**	**$132,960**
2005–06	$1,685,873	$192,459	$347,635	$3,715,020	**$5,940,987**	**$169,742**
2006–07	$1,879,079	$1,125,029	$337,126	$2,260,792	**$5,602,026**	**$160,058**
2007–08	$1,990,013	$642,000	$910,734	$1,003,394	**$4,546,141**	**$142,067**
2008–09	$2,005,579	$648,503	$730,076	$1,923,989	**$5,308,147**	**$160,853**
2009–10	$2,159,407	$602,542	$956,466	$1,609,277	**$5,327,692**	**$161,445**
2010–11	$2,043,800	$1,326,780	$585,244	$3,286,808	**$7,242,632**	**$219,474**
2011–12	$2,362,129	$620,645	$403,513	$1,167,699	**$4,553,986**	**$123,081**

Figure E.6 **The Edward S. Rogers Sr. Department of Electrical & Computer Engineering Research Operating Funding by Source and Average Funding per Faculty Member, 2002–2003 to 2011–2012**



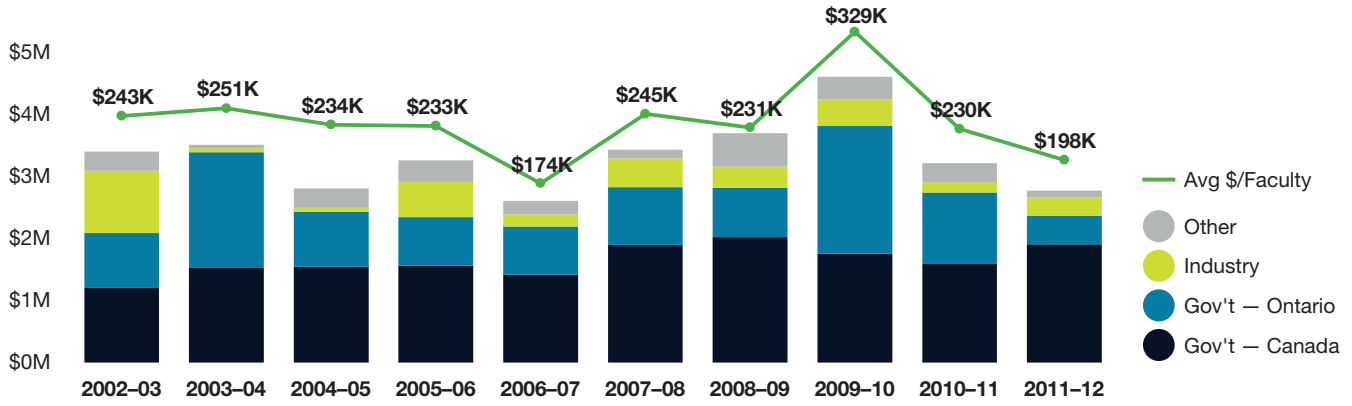
	Gov't - Canada	Gov't - Ontario	Corporate	Other	Total	Avg $/Faculty
2002–03	$4,731,884	$4,075,548	$2,801,462	$419,862	**$12,028,756**	**$190,933**
2003–04	$4,966,596	$2,982,592	$2,191,341	$457,693	**$10,598,222**	**$155,856**
2004–05	$6,142,164	$2,680,773	$2,455,661	$663,252	**$11,941,850**	**$161,376**
2005–06	$6,094,609	$1,378,334	$2,266,096	$575,955	**$10,314,994**	**$135,724**
2006–07	$6,679,878	$2,660,526	$3,363,559	$957,306	**$13,661,269**	**$189,740**
2007–08	$7,599,810	$3,470,568	$2,940,516	$863,281	**$14,874,175**	**$212,488**
2008–09	$7,341,419	$4,551,690	$2,699,325	$2,780,615	**$17,373,049**	**$267,278**
2009–10	$7,717,409	$3,923,865	$1,471,958	$2,735,435	**$15,848,667**	**$243,826**
2010–11	$8,444,203	$3,028,906	$2,550,974	$2,795,566	**$16,819,649**	**$254,843**
2011–12	$10,454,442	$1,205,389	$2,959,090	$2,599,683	**$17,218,604**	**$260,888**

Figure E.7 **Department of Mechanical & Industrial Engineering Research Operating Funding by Source and Average Funding per Faculty Member, 2002–2003 to 2011–2012**



	Gov't - Canada	Gov't - Ontario	Corporate	Other	Total	Avg $/Faculty
2002–03	$3,513,599	$1,531,951	$719,250	$186,659	**$5,951,459**	**$156,617**
2003–04	$3,938,897	$1,290,633	$860,084	$139,626	**$6,229,240**	**$159,724**
2004–05	$4,024,542	$1,857,684	$766,235	$224,614	**$6,873,075**	**$176,233**
2005–06	$4,703,394	$2,042,264	$555,242	$473,811	**$7,774,711**	**$180,807**
2006–07	$4,425,552	$2,833,485	$1,095,225	$847,992	**$9,202,254**	**$235,955**
2007–08	$4,297,733	$1,519,533	$924,880	$1,202,714	**$7,944,860**	**$184,764**
2008–09	$4,336,793	$1,027,566	$946,457	$1,441,058	**$7,751,874**	**$176,179**
2009–10	$5,367,992	$1,558,727	$1,173,710	$1,070,948	**$9,171,377**	**$195,136**
2010–11	$6,651,033	$1,653,762	$1,477,364	$1,869,428	**$11,651,587**	**$247,906**
2011–12	$8,146,788	$1,215,754	$779,995	$1,609,453	**$11,751,990**	**$250,042**

Figure E.8 **Department of Materials Science & Engineering Research Operating Funding by Source and Average Funding per Faculty Member, 2002–2003 to 2011–2012**



	Gov't - Canada	Gov't - Ontario	Corporate	Other	Total	Avg $/Faculty
2002–03	$1,213,613	$873,632	$1,006,308	$306,450	**$3,400,003**	**$242,857**
2003–04	$1,523,775	$1,866,447	$63,250	$57,000	**$3,510,472**	**$250,748**
2004–05	$1,551,531	$879,481	$63,250	$313,599	**$2,807,861**	**$233,988**
2005–06	$1,561,749	$783,577	$567,370	$345,328	**$3,258,024**	**$232,716**
2006–07	$1,417,224	$777,970	$195,024	$216,848	**$2,607,066**	**$173,804**
2007–08	$1,898,382	$927,585	$464,574	$138,250	**$3,428,791**	**$244,914**
2008–09	$2,020,903	$796,601	$339,222	$539,173	**$3,695,899**	**$230,994**
2009–10	$1,754,687	$2,056,294	$432,055	$364,545	**$4,607,581**	**$329,113**
2010–11	$1,589,098	$1,150,973	$165,500	$309,101	**$3,214,672**	**$229,619**
2011–12	$1,907,594	$453,820	$302,864	$104,500	**$2,768,778**	**$197,770**

Appendix F: Spin-off Companies

Est.	Company Name	Engineering Affiliation	Department
2012	CoursePeer	Hadi Aladdin	ECE
2012	MyTrak Health Systems	Sean Doherty	CivE
2012	Whirlscape Inc.	Will Walmsley	MIE
2012	XTT	Parham Aarabi	ECE
2011	Kinetica Dynamics Inc.	Constantin Christopoulos	CivE
2011	Ojiton Inc.	Tom Chau	IBBME
2011	Filaser Inc.	Peter Herman	ECE
2011	RenWave	Mohamed Kamh	ECE
2011	Xagenic Canada Inc.	Ted Sargent	ECE
2010	Arda Power Inc.	Peter Lehn	ECE
2010	FOTA Technologies	Tony Chan Carusone	ECE
2009	Chip Care Corp.	J. Stewart Aitchison	ECE
2009	Cytodiagnostics	Warren Chan	IBBME
2009	Peraso Technologies Inc.	Sorin Voinigescu	ECE
2008	Ablazeon Inc.	Javad Mostaghimi	MIE
2008	Arch Power Inc.	Mohammad (Reza) Iravani	ECE
2008	AXAL Inc.	Milos Popovic and Egor Sanin	IBBME
2008	Incise Photonics Inc.	Peter Herman	ECE
2008	Quantum Dental Technologies	Andreas Mandelis	MIE
2008	Simple Systems Inc.	Milos Popovic, Aleksandar Prodic and Armen Baronijan	ECE, IBBME
2007	002122461 Ontario Inc.	Harry Ruda	MSE
2007	Cast Connex Corp.	Jeffrey Packer and Constantin Christopoulos	CivE
2007	Elastin Specialties	Kimberly Woodhouse	ChemE
2007	Inometrix Inc.	Michael Galle	ECE
2007	Modiface Inc.	Parham Aarabi	ECE
2007	Neurochip Inc.	Berj Bardakjian	IBBME
2007	Viewgenie Inc.	Parham Aarabi	ECE
2006	Anviv Mechatronics Inc. (AMI)	Andrew Goldenberg	MIE
2006	InVisage Technologies Inc.	Ted Sargent	ECE
2006	Metabacus	Jianwen Zhu	ECE
2006	Vennsa Technologies Inc.	Andreas Veneris and Sean Safarpour	ECE
2005	Greencore Composites	Mohini Sain	Forestry, ChemE
2004	Field Metrica Inc. (FMI)	Tim DeMonte, Richard Yoon	IBBME
2004	Tissue Regeneration Therapeutics Inc. (TRT)	J.E. Davies	IBBME
2003	1484667 Ontario Inc.	Brad Saville	ChemE
2003	ArchES Computing Systems Corp.	Paul Chow	ECE
2003	Norel Optronics Inc.	Zhenghong Lu	MSE
2003	Vocalage Inc.	Mark Chignell	MIE
2002	Information Intelligence Corporation (IIC)	Burhan Turksen	MIE
2002	MatRegen Corp.	Molly Shoichet	IBBME, ChemE
2002	OMDEC Inc.	Andrew K.S. Jardine	MIE
2002	SiREM	Elizabeth Edwards	ChemE
2001	Fox-Tek	Rod Tennyson	UTIAS
2001	Insception Biosciences	Peter Zandstra	IBBME
2001	Interface Biologics	Paul Santerre	IBBME
2000	Biox Corporation	David Boocock	ChemE
2000	Photo-Thermal Diagnostics Inc.	Andreas Mandelis	MIE
2000	Simulent Inc.	Javad Mostaghimi	MIE
2000	Virtek Engineering Science Inc.	Andrew Goldenberg	MIE
1999	Accelight Networks Inc.	Alberto Leon-Garcia and Paul Chow	ECE
1999	em2 Inc.	J.E. Davies	IBBME
1999	Soma Networks	Michael Stumm and Martin Snelgrove	ECE
1999	Vivosonic Inc.	Yuri Sokolov and Hans Kunov	IBBME
1998	1208211 Ontario Ltd. (affiliate: Regen StaRR)	Robert Pilliar, Rita Kandel and Marc Grynpas	IBBME
1998	BANAK Inc.	Andrew K.S. Jardine	MIE
1998	BoneTec Corp. (now owned by subsidiary of TRT)	J.E. Davies and Molly Shoichet	IBBME

1998	Right Track CAD Corp.	Jonathan Rose	ECE
1998	SMT HyrdaSil	Rod Tennyson	UTIAS
1998	Snowbush Microelectronics	Kenneth Martin and David Johns	ECE
1997	Rimon Therapeutics	Michael Sefton	IBBME, ChemE
1996	OANDA Corp.	Michael Stumm	ECE
1996	Rocscience Inc.	John Curran	CivE
1995	Amilog Systems		MIE
1995	Electrobiologies	Paul Madsen	IBBME
1995	Hydrogenics Corp.		MIE
1995	Tribokinetics Inc.	Raymond Woodhams	ChemE
1994	Key Lime Co.	Honghi Tran	ChemE
1994	Trantek Power		ECE
1993	Electro Photonics	Raymond Measures	UTIAS
1993	Liquid Metal Sonics Ltd.		MSE
1993	SAFE Nozzle Group	Honghi Tran	ChemE
1993	SmartSpeaker Corp.	Anees Munshi	ECE
1992	Condata Technologies Ltd.		ECE
1992	Gao Research & Consulting Ltd.	Frank Gao	ECE
1992	Novator Systems Ltd.	Mark Fox	MIE
1992	Paul Madsen Medical Devices	Hans Kunov	IBBME
1992	PolyPhalt Inc.	Raymond Woodhams	ChemE
1991	Advent Process Engineering Inc.		MSE
1991	LinShin Canada Inc.		IBBME
1991	Minnovex	Glenn Dobby	MSE
1991	Redrock Solvers Inc.	Michael Carter	MIE
1990	Fibre Metrics	Dale Hogg	UTIAS
1989	Apollo Environmental Systems Corp.	John Harbinson	ChemE
1989	Integrity Testing Laboratory Inc. (ITL)		UTIAS
1989	Translucent Technologies	Paul Milgram	MIE
1989	Xiris Automation Inc.	Cameron Serles	MIE
1988	Advanced Materials Technologies	Steven Thorpe	MSE
1988	Food BioTek Corp.	Leon Rubin	ChemE
1988	HydraTek and Associates Inc.	Bryan Karney and (since 2006) Fabian Papa	CivE
1986	EHM Rehabilitation Technologies	Pomeranz Salansky	UTIAS
1986	LACEC Energy Systems Inc.	Charles Ward	MIE
1985	El-Mar Inc.		IBBME
1985	Electrocaps Inc.	J. Smith	ChemE
1985	Katosizer Industries Ltd.	W. Snelgrove	ECE
1985	Tibur-Howden		MSE
1984	ABIT Systems Inc.	Burhan Turksen	MIE
1984	Ergotechnics	P. Foley	MIE
1984	MERP Enhanced Composites Inc.	Michael Piggott	ChemE
1983	Human Factors North	N. Moray	MIE
1982	DMER	D. MacKay	ChemE
1982	Engineering Services Inc. (ESI)	Andrew Goldenberg	MIE
1982	Owl Instruments	J.W. Smith	IBBME
1980	Almax Ltd.	G. Sinclair	ECE
1980	Dynaco Inc.	Peter Hughes	UTIAS
1980	SatCon Power Systems Canada Ltd.	Shashi Dewan	ECE
1978	Aurora Scientific Inc.	David James	MIE
1978	Hummel Energy Systems Ltd.	R.L. Hummel	ChemE
1976	Hooper & Angus Consulting Engineers	Frank Hooper	MIE
1976	Kings Engineering Associates Ltd.	Iian Currie	MIE
1975	General Comminution Inc.	Olev Trass	ChemE
1974	Envirogetics	Frank Hooper	MIE
1974	MDS Sciex - Division of MDS Inc.	Barry French	UTIAS
1974	Tibur Metals Inc.		MSE
1973	Hooper & Hix, Engineers and Architects	Frank Hooper	MIE
1970	Eco-Tec Ltd.	R. Hunter	ChemE

Appendix G: Descriptions of Major Awards

The Awards and Honours chapter summarizes the international, national and provincial awards received by our faculty. Below are descriptions of those awards and honours.

International

AAAS Fellowship
Recognition for meritorious efforts to advance science or its applications from the American Association for the Advancement of Science

Guggenheim Fellowship
Intended for men and women who have demonstrated exceptional capacity for productive scholarship

MIT Top 35 Under 35
Awarded to world's top 35 young innovators under the age of 35 by *MIT Technology Review* magazine

NAE Foreign Associate
Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer

National

3M Teaching Fellowship
Canada's highest teaching award in recognition of educational excellence and leadership

Alan Blizzard Award
Recognition for exemplary collaboration in university teaching as it enhances student learning

CAE Fellowship
Fellows elected by the Canadian Academy of Engineering for distinguished achievements and career-long service to the engineering profession

EIC Fellowship and Award
Recognition for exceptional contributions to engineering in Canada and for service to the profession and to society by the Engineering Institute of Canada

Engineers Canada Awards
Recognition of outstanding Canadian engineers, teams of engineers, engineering projects and engineering students

Killam Prize
Awarded to distinguished Canadian scholars conducting research in one of five fields of study, including engineering, by the Canada Council for the Arts

Killam Research Fellowship
Awarded to an established scholar who has demonstrated outstanding research ability and has published research results in substantial publications in their field by the Canada Council for the Arts. Recipients have the opportunity to devote two years to full-time research

Royal Society of Canada Fellowship
Highest Canadian honour a scholar can achieve in the arts, humanities and sciences

Steacie Fellowship
Awarded to enhance the career development of outstanding and highly promising scientists and engineers by NSERC

Steacie Prize
Awarded to a young scientist or engineer in Canada and is administered by the E.W.R. Steacie Memorial Trustees Fund

Synergy Award for Innovation
Recognition for university-industry collaboration that stands as a model of effective partnership

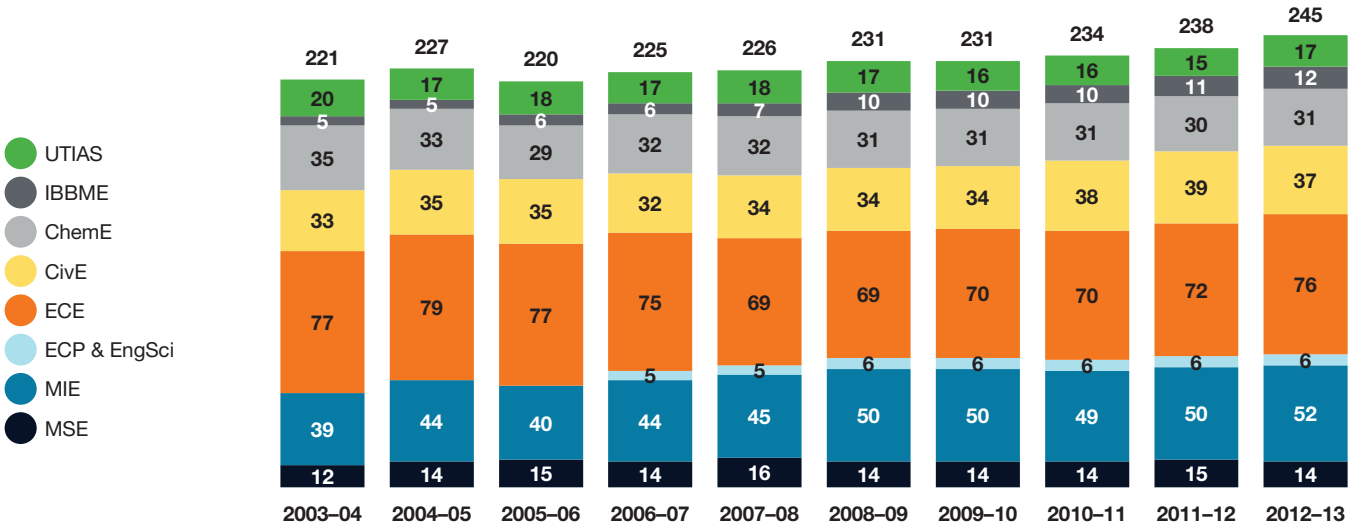
Provincial

Ontario Professional Engineers Awards
Recognition of professional engineers in Ontario who have made outstanding contributions to their profession and their community

Appendix H: Academic Staff by Academic Area

The figures in Appendix H show the composition of our academic staff from 2003–2004 to 2012–2013. Figures H.1a and H.1b provide a Faculty overview and H.2 to H.8 depict our composition.

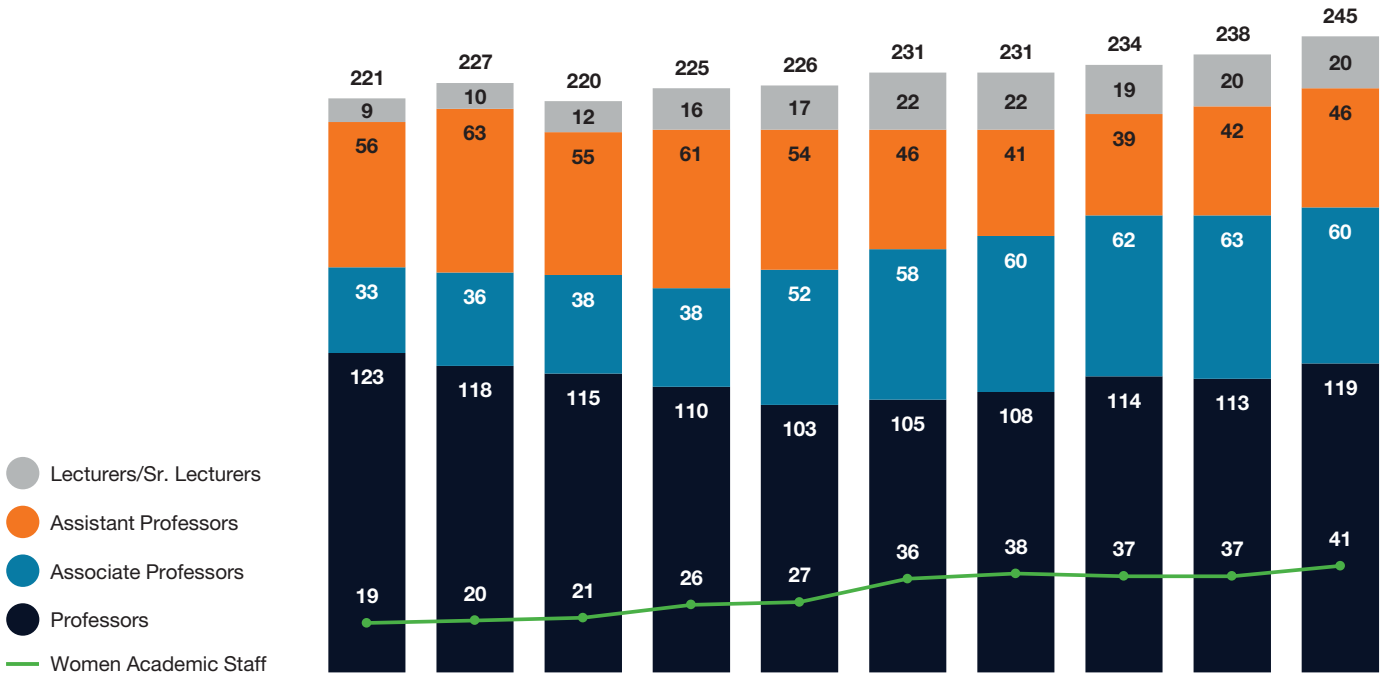
Figure H.1a **Total Academic Staff by Academic Area, 2003–2004 to 2012–2013**



		2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
UTIAS	Assistant Profs	5	4	4	4	4	4	4	4	5	6
	Associate Profs	1	1	1	1	3	5	4	3	3	4
	Professors	12	10	10	10	9	6	6	7	5	5
	Lecturers	2	2	3	2	2	2	2	2	2	2
IBBME	Assistant Profs	5	4	3	3	3	6	5	3	5	6
	Associate Profs	0	1	3	3	3	3	1	3	3	2
	Professors	0	0	0	0	1	1	4	4	3	4
	Lecturers	0	0	0	0	0	0	0	0	0	0
ChemE	Assistant Profs	1	1	2	4	5	5	6	7	5	6
	Associate Profs	6	6	2	3	3	3	2	2	3	3
	Professors	24	22	22	22	20	17	17	18	18	18
	Lecturers	4	4	3	3	4	6	6	4	4	4
CivE	Assistant Profs	9	8	7	11	8	6	6	9	9	8
	Associate Profs	7	9	9	6	10	12	12	11	10	11
	Professors	17	18	19	15	15	15	15	17	19	17
	Lecturers	0	0	0	0	1	1	1	1	1	1
ECE	Assistant Profs	30	35	28	25	18	9	8	7	9	11
	Associate Profs	9	9	14	15	22	26	26	25	25	22
	Professors	35	32	30	30	25	30	32	34	34	39
	Lecturers	3	3	5	5	4	4	4	4	4	4
ECP & EngSci	Lecturers				5	5	6	6	6	6	6
MIE	Assistant Profs	6	10	10	13	14	13	11	8	7	7
	Associate Profs	7	7	5	6	7	8	12	15	16	14
	Professors	26	26	24	24	23	26	24	24	24	28
	Lecturers	0	1	1	1	1	3	3	2	3	3
MSE	Assistant Profs	0	1	1	1	2	2	1	1	2	2
	Associate Profs	3	3	4	4	4	2	3	3	3	4
	Professors	9	10	10	9	10	10	10	10	10	8
	Lecturers	0	0	0	0	0	0	0	0	0	0
Total		**221**	**227**	**220**	**225**	**226**	**231**	**231**	**234**	**238**	**245**

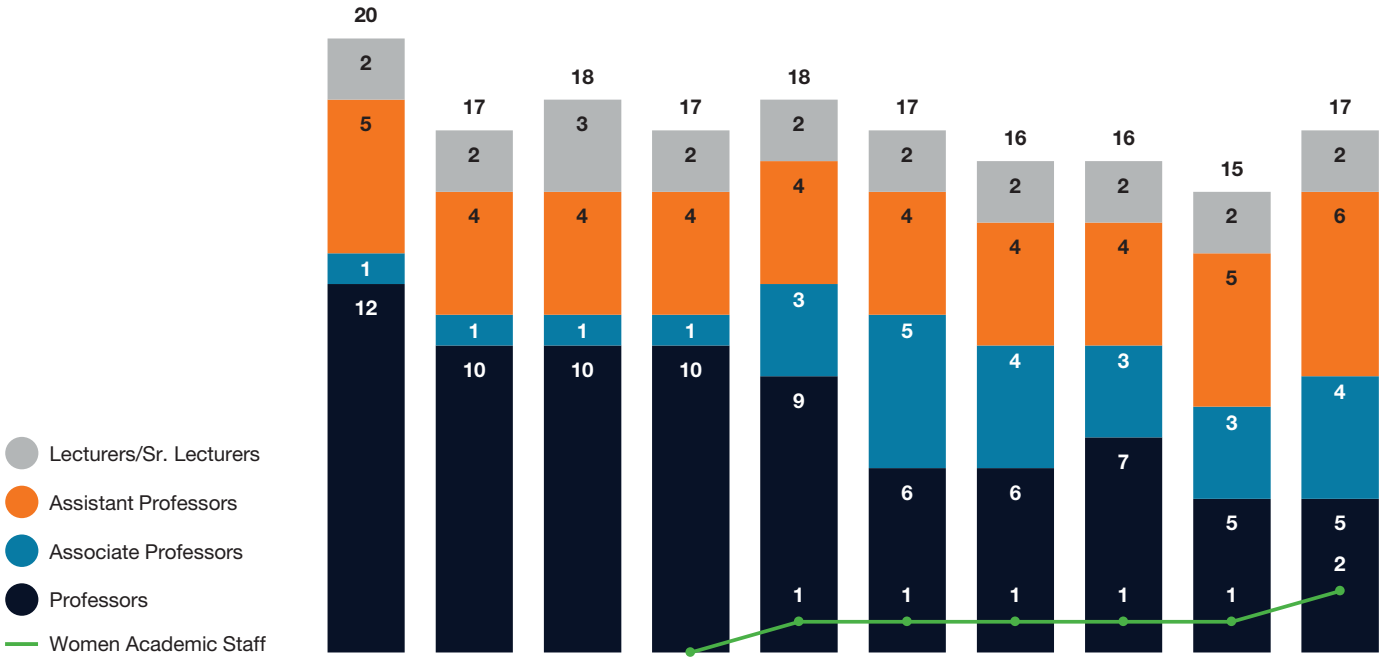
Note: Number of lecturers from Engineering Communications Program (ECP) and EngSci is unavailable prior to 2006–2007.

Figure H.1b **University of Toronto Faculty of Applied Science & Engineering Total Academic Staff by Position with Percentage of Women, 2003–2004 to 2012–2013**



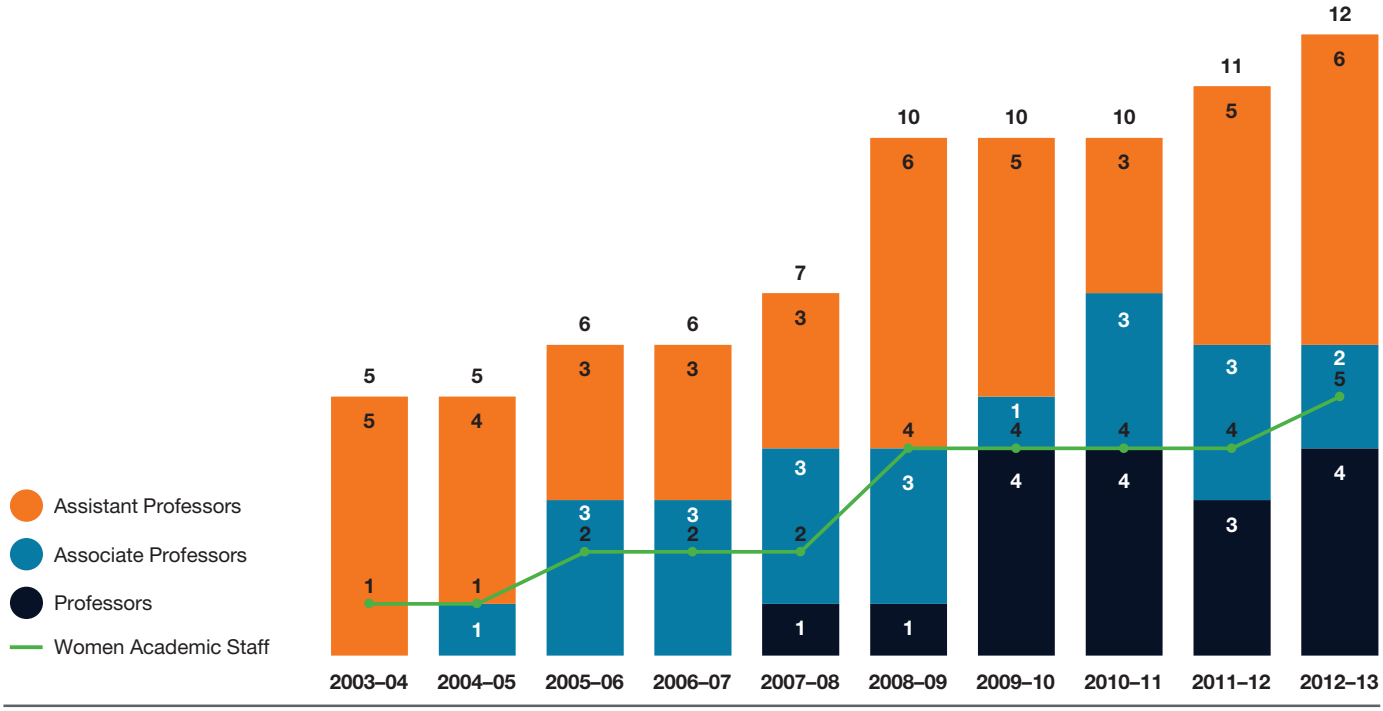
	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Assistant Professors	56	63	55	61	54	46	41	39	42	46
Women Assistant Professors	7	8	9	13	12	17	17	15	14	16
% Women Assistant Professors	**12.5%**	**12.7%**	**16.4%**	**21.3%**	**22.2%**	**37.0%**	**41.5%**	**38.5%**	**33.3%**	**34.8%**
Associate Professors	33	36	38	38	52	58	60	62	63	60
Women Associate Professors	8	8	6	5	6	8	10	13	13	13
% Women Associate Professors	**24.2%**	**22.2%**	**15.8%**	**13.2%**	**11.5%**	**13.8%**	**16.7%**	**21.0%**	**20.6%**	**21.7%**
Professors	123	118	115	110	103	105	108	114	113	119
Women Professors	1	1	4	5	6	5	5	5	6	8
% Women Professors	**0.8%**	**0.8%**	**3.5%**	**4.5%**	**5.8%**	**4.8%**	**4.6%**	**4.4%**	**5.3%**	**6.7%**
Lecturers/ Sr. Lecturers	9	10	12	16	17	22	22	19	20	20
Women Lecturers/ Sr. Lecturers	3	3	2	3	3	6	6	4	4	4
% Women Lecturers/ Sr. Lecturers	**33.3%**	**30.0%**	**16.7%**	**18.8%**	**17.6%**	**27.3%**	**27.3%**	**21.1%**	**20.0%**	**20.0%**
Total Tenured and Tenure Stream	212	217	208	209	209	209	209	215	218	225
Women Tenured and Tenure Stream	16	17	19	23	24	30	32	33	33	37
% Women Tenured and Tenure Stream	**7.5%**	**7.8%**	**9.1%**	**11.0%**	**11.5%**	**14.4%**	**15.3%**	**15.3%**	**15.1%**	**16.4%**
Total Academic Staff	221	227	220	225	226	231	231	234	238	245
Women Academic Staff	19	20	21	26	27	36	38	37	37	41
% Women Academic Staff	**8.6%**	**8.8%**	**9.5%**	**11.6%**	**11.9%**	**15.6%**	**16.5%**	**15.8%**	**15.5%**	**16.7%**

Figure H.2 **University of Toronto Institute for Aerospace Studies: Academic Staff by Position with Percentage of Women, 2003–2004 to 2012–2013**



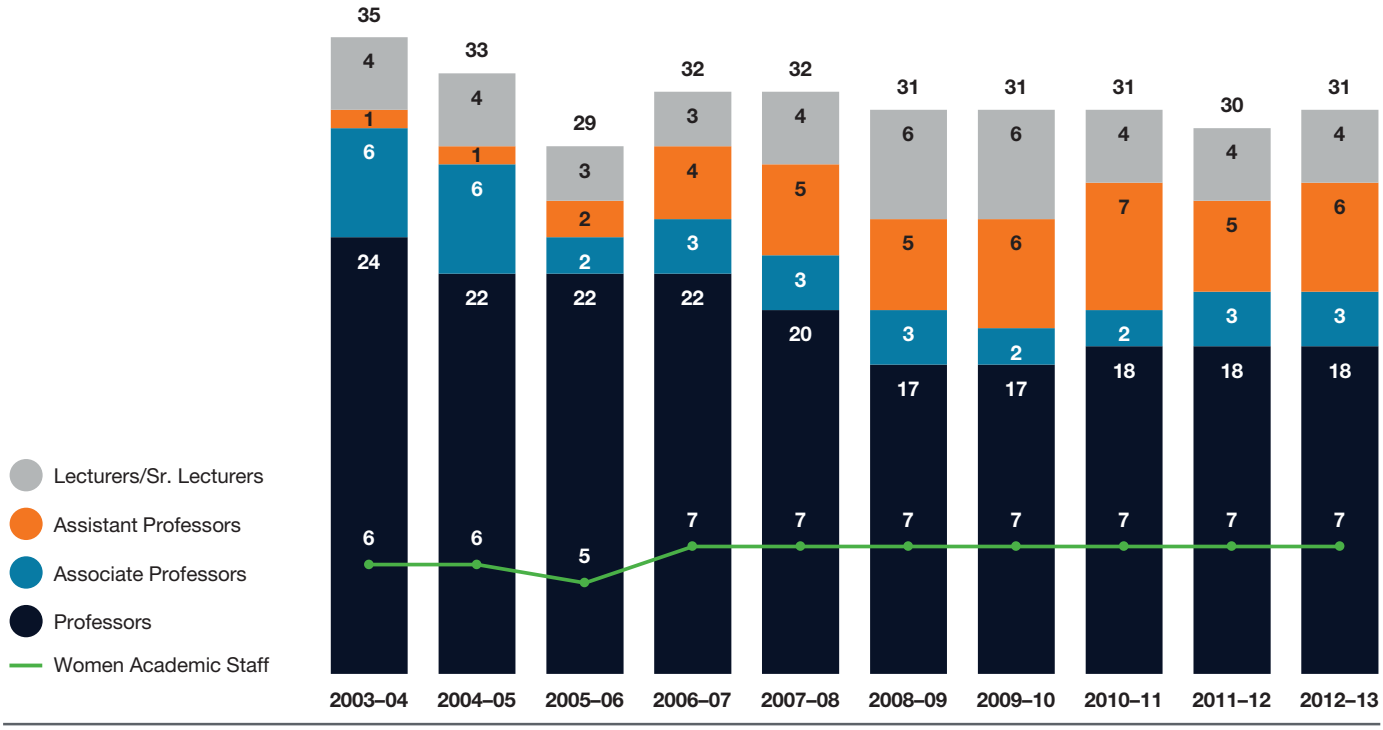
	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Assistant Professors	5	4	4	4	4	4	4	4	5	6
Women Assistant Professors	0	0	0	0	1	1	1	1	1	2
% Women Assistant Professors	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**25.0%**	**25.0%**	**25.0%**	**25.0%**	**20.0%**	**33.3%**
Associate Professors	1	1	1	1	3	5	4	3	3	4
Women Associate Professors	0	0	0	0	0	0	0	0	0	0
% Women Associate Professors	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Professors	12	10	10	10	9	6	6	7	5	5
Women Professors	0	0	0	0	0	0	0	0	0	0
% Women Professors	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Lecturers/ Sr. Lecturers	2	2	3	2	2	2	2	2	2	2
Women Lecturers/ Sr. Lecturers	0	0	0	0	0	0	0	0	0	0
% Women Lecturers/ Sr. Lecturers	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Total Tenured and Tenure Stream	18	15	15	15	16	15	14	14	13	15
Women Tenured and Tenure Stream	0	0	0	0	1	1	1	1	1	2
% Women Tenured and Tenure Stream	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**6.3%**	**6.7%**	**7.1%**	**7.1%**	**7.7%**	**13.3%**
Total Academic Staff	20	17	18	17	18	17	16	16	15	17
Women Academic Staff	0	0	0	0	1	1	1	1	1	2
% Women Academic Staff	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**5.6%**	**5.9%**	**6.3%**	**6.3%**	**6.7%**	**11.8%**

Figure H.3 **Institute of Biomaterials & Biomedical Engineering: Academic Staff by Position with Percentage of Women, 2003–2004 to 2012–2013**



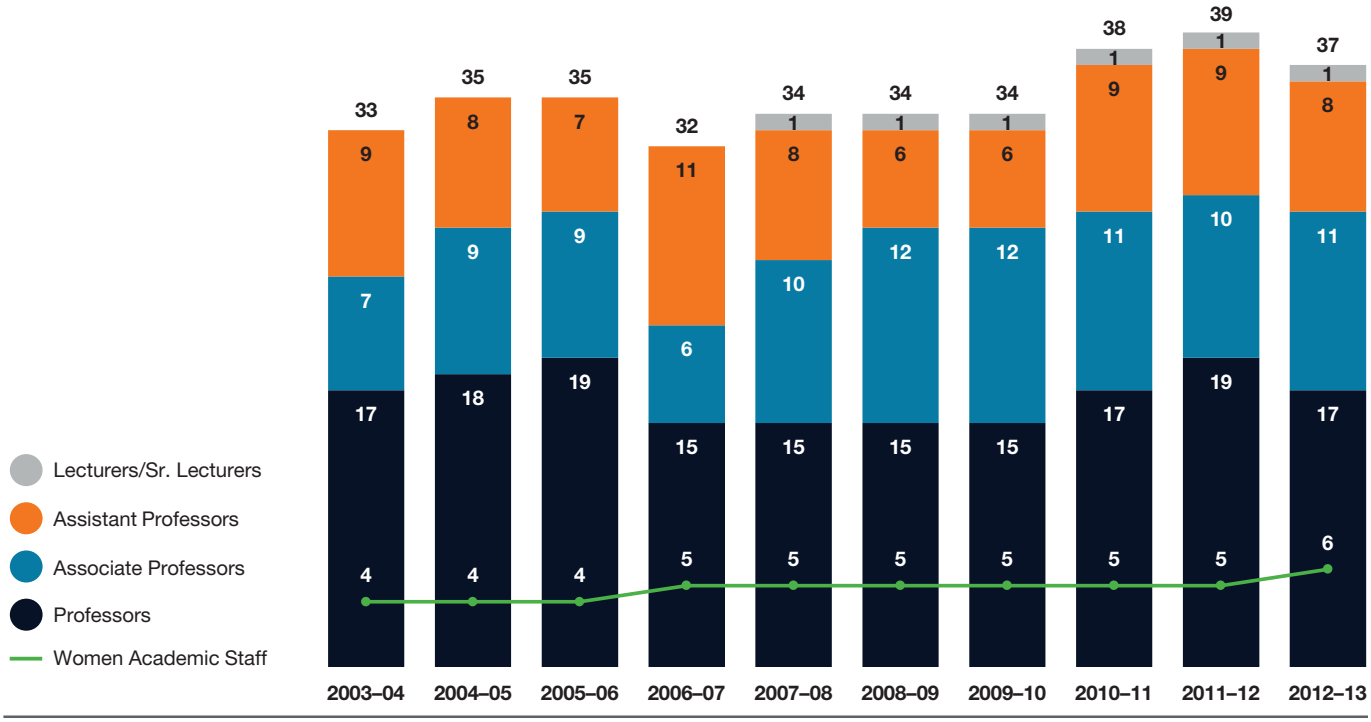
	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Assistant Professors	5	4	3	3	3	6	5	3	5	6
Women Assistant Professors	1	1	2	2	2	4	4	2	2	3
% Women Assistant Professors	**20.0%**	**25.0%**	**66.7%**	**66.7%**	**66.7%**	**66.7%**	**80.0%**	**66.7%**	**40.0%**	**50.0%**
Associate Professors	0	1	3	3	3	3	1	3	3	2
Women Associate Professors	0	0	0	0	0	0	0	2	2	2
% Women Associate Professors	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**66.7%**	**66.7%**	**100.0%**
Professors	0	0	0	0	1	1	4	4	3	4
Women Professors	0	0	0	0	0	0	0	0	0	0
% Women Professors	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Lecturers/ Sr. Lecturers	0	0	0	0	0	0	0	0	0	0
Women Lecturers/ Sr. Lecturers	0	0	0	0	0	0	0	0	0	0
% Women Lecturers/ Sr. Lecturers	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Total Tenured and Tenure Stream	5	5	6	6	7	10	10	10	11	12
Women Tenured and Tenure Stream	1	1	2	2	2	4	4	4	4	5
% Women Tenured and Tenure Stream	**20.0%**	**20.0%**	**33.3%**	**33.3%**	**28.6%**	**40.0%**	**40.0%**	**40.0%**	**36.4%**	**41.7%**
Total Academic Staff	5	5	6	6	7	10	10	10	11	12
Women Academic Staff	1	1	2	2	2	4	4	4	4	5
% Women Academic Staff	**20.0%**	**20.0%**	**33.3%**	**33.3%**	**28.6%**	**40.0%**	**40.0%**	**40.0%**	**36.4%**	**41.7%**

Figure H.4 **Department of Chemical Engineering & Applied Chemistry: Academic Staff by Position with Percentage of Women, 2003–2004 to 2012–2013**



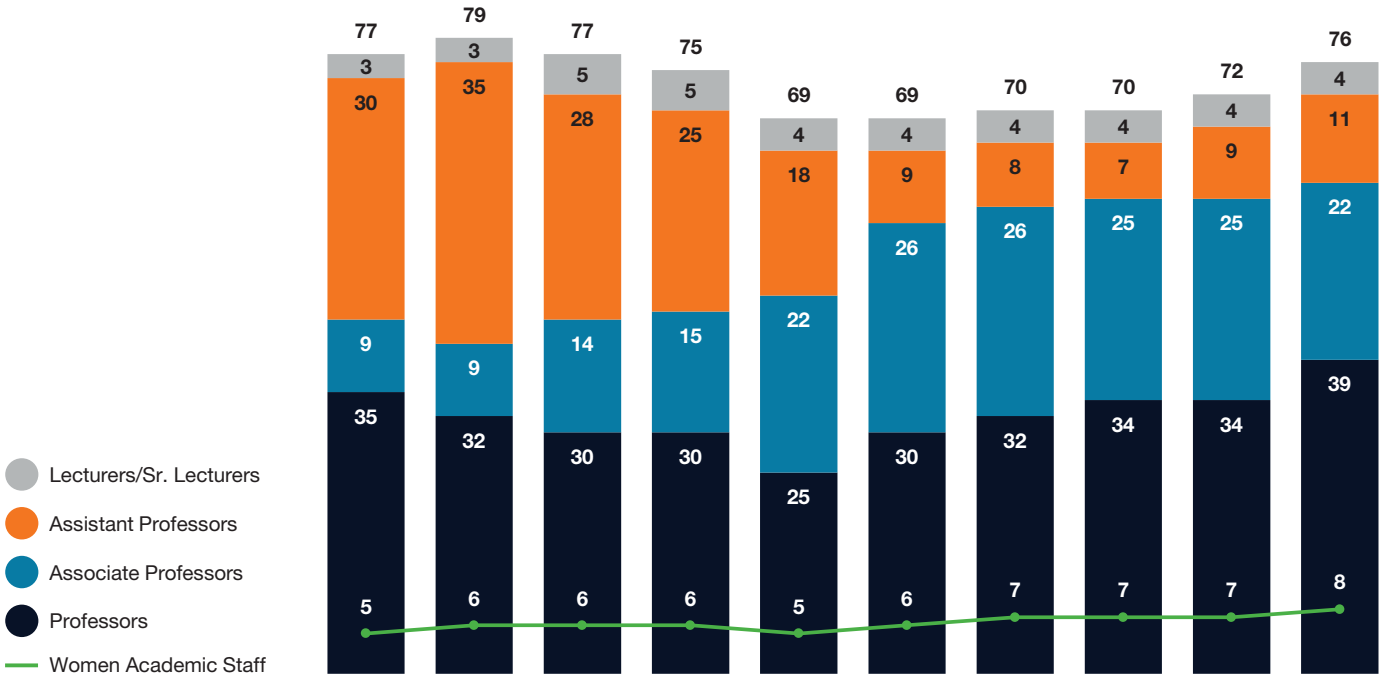
	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Assistant Professors	1	1	2	4	5	5	6	7	5	6
Women Assistant Professors	0	0	0	2	2	2	2	3	2	2
% Women Assistant Professors	**0.0%**	**0.0%**	**0.0%**	**50.0%**	**40.0%**	**40.0%**	**33.3%**	**42.9%**	**40.0%**	**33.3%**
Associate Professors	6	6	2	3	3	3	2	2	3	3
Women Associate Professors	3	3	1	1	0	0	0	0	1	1
% Women Associate Professors	**50.0%**	**50.0%**	**50.0%**	**33.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**33.3%**	**33.3%**
Professors	24	22	22	22	20	17	17	18	18	18
Women Professors	1	1	3	3	4	3	3	3	3	3
% Women Professors	**4.2%**	**4.5%**	**13.6%**	**13.6%**	**20.0%**	**17.6%**	**17.6%**	**16.7%**	**16.7%**	**16.7%**
Lecturers/ Sr. Lecturers	4	4	3	3	4	6	6	4	4	4
Women Lecturers/ Sr. Lecturers	2	2	1	1	1	2	2	1	1	1
% Women Lecturers/ Sr. Lecturers	**50.0%**	**50.0%**	**33.3%**	**33.3%**	**25.0%**	**33.3%**	**33.3%**	**25.0%**	**25.0%**	**25.0%**
Total Tenured and Tenure Stream	31	29	26	29	28	25	25	27	26	27
Women Tenured and Tenure Stream	4	4	4	6	6	5	5	6	6	6
% Women Tenured and Tenure Stream	**12.9%**	**13.8%**	**15.4%**	**20.7%**	**21.4%**	**20.0%**	**20.0%**	**22.2%**	**23.1%**	**22.2%**
Total Academic Staff	35	33	29	32	32	31	31	31	30	31
Women Academic Staff	6	6	5	7	7	7	7	7	7	7
% Women Academic Staff	**17.1%**	**18.2%**	**17.2%**	**21.9%**	**21.9%**	**22.6%**	**22.6%**	**22.6%**	**23.3%**	**22.6%**

Figure H.5 **Department of Civil Engineering: Academic Staff by Position with Percentage of Women, 2003–2004 to 2012–2013**



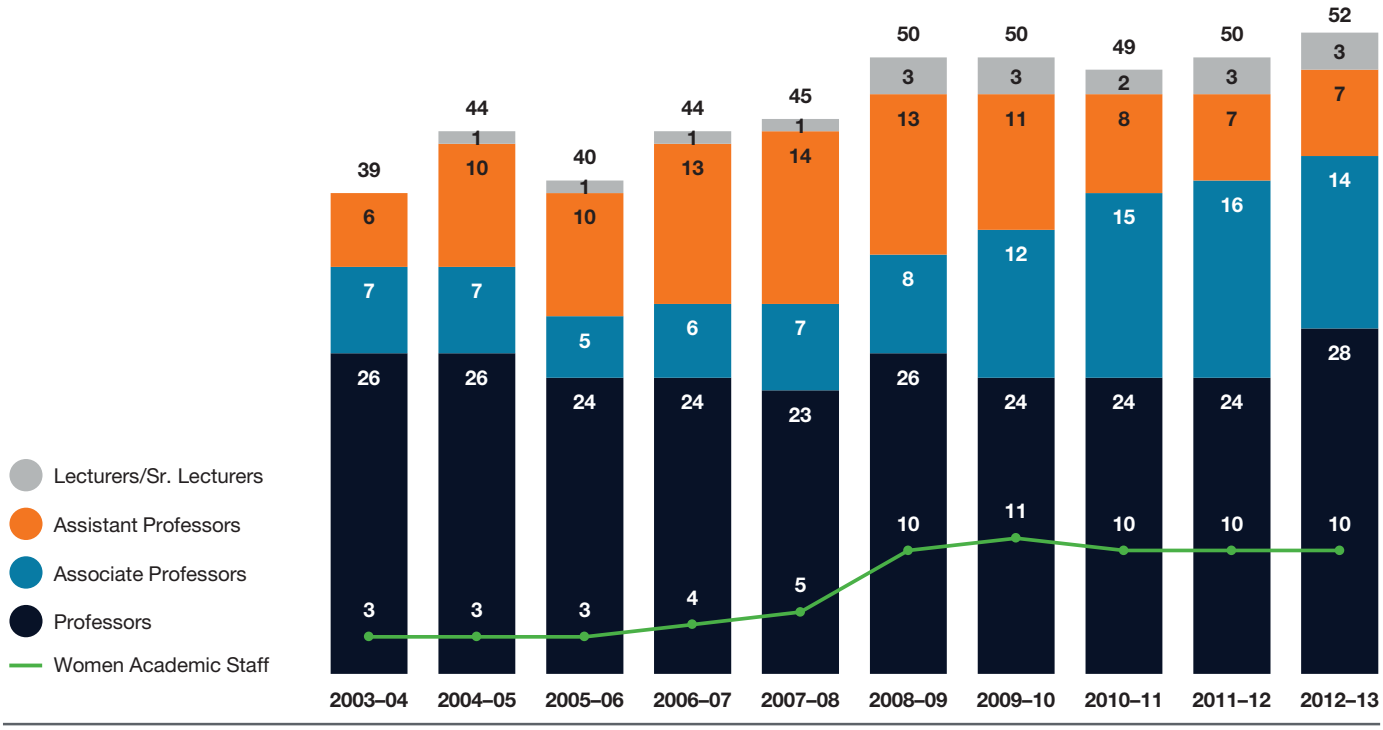
	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Assistant Professors	9	8	7	11	8	6	6	9	9	8
Women Assistant Professors	3	3	3	4	3	2	2	2	2	3
% Women Assistant Professors	**33.3%**	**37.5%**	**42.9%**	**36.4%**	**37.5%**	**33.3%**	**33.3%**	**22.2%**	**22.2%**	**37.5%**
Associate Professors	7	9	9	6	10	12	12	11	10	11
Women Associate Professors	1	1	1	1	2	3	3	3	2	2
% Women Associate Professors	**14.3%**	**11.1%**	**11.1%**	**16.7%**	**20.0%**	**25.0%**	**25.0%**	**27.3%**	**20.0%**	**18.2%**
Professors	17	18	19	15	15	15	15	17	19	17
Women Professors	0	0	0	0	0	0	0	0	1	1
% Women Professors	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**5.3%**	**5.9%**
Lecturers/ Sr. Lecturers	0	0	0	0	1	1	1	1	1	1
Women Lecturers/ Sr. Lecturers	0	0	0	0	0	0	0	0	0	0
% Women Lecturers/ Sr. Lecturers	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Total Tenured and Tenure Stream	33	35	35	32	33	33	33	37	38	36
Women Tenured and Tenure Stream	4	4	4	5	5	5	5	5	5	6
% Women Tenured and Tenure Stream	**12.1%**	**11.4%**	**11.4%**	**15.6%**	**15.2%**	**15.2%**	**15.2%**	**13.5%**	**13.2%**	**16.7%**
Total Academic Staff	33	35	35	32	34	34	34	38	39	37
Women Academic Staff	4	4	4	5	5	5	5	5	5	6
% Women Academic Staff	**12.1%**	**11.4%**	**11.4%**	**15.6%**	**14.7%**	**14.7%**	**14.7%**	**13.2%**	**12.8%**	**16.2%**

Figure H.6 **The Edward S. Rogers Sr. Department of Electrical & Computer Engineering: Academic Staff by Position with Percentage of Women, 2003–2004 to 2012–2013**



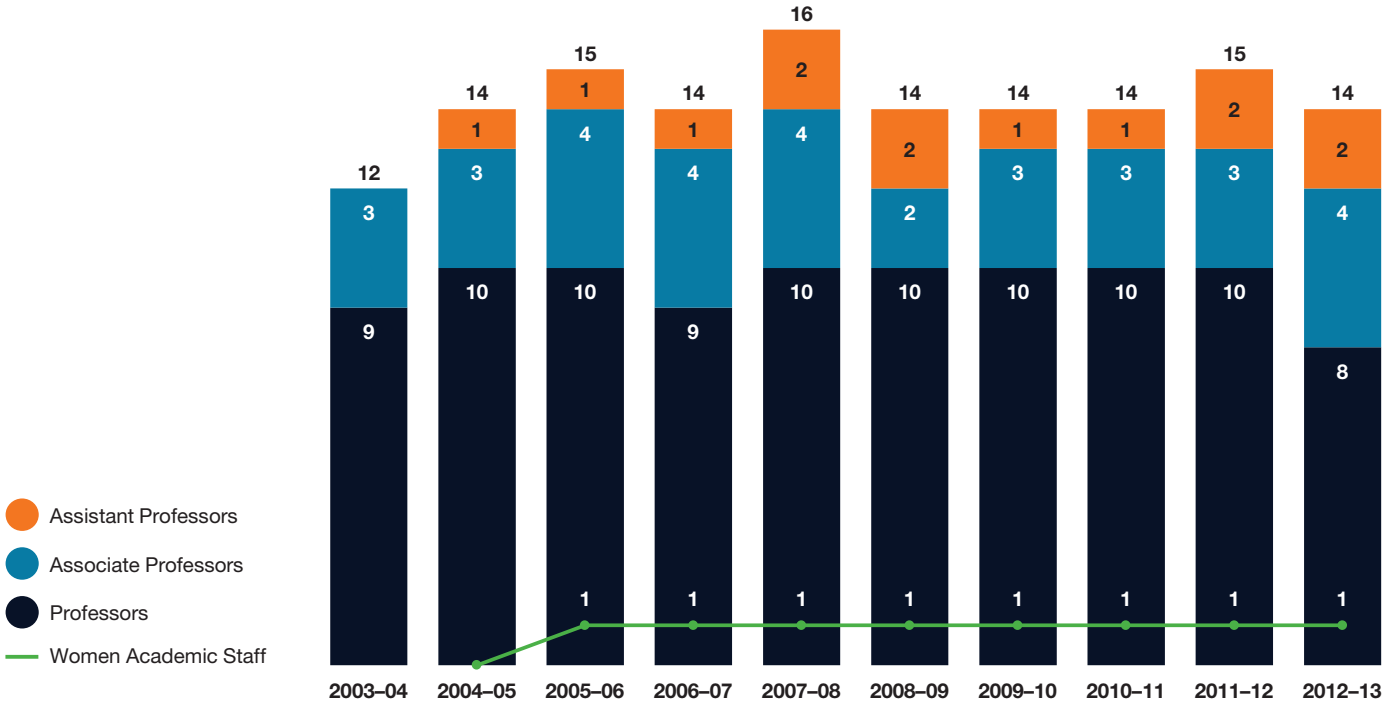
	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Assistant Professors	30	35	28	25	18	9	8	7	9	11
Women Assistant Professors	3	4	4	5	3	2	2	2	2	2
% Women Assistant Professors	**10.0%**	**11.4%**	**14.3%**	**20.0%**	**16.7%**	**22.2%**	**25.0%**	**28.6%**	**22.2%**	**18.2%**
Associate Professors	9	9	14	15	22	26	26	25	25	22
Women Associate Professors	1	1	1	0	1	3	4	4	4	4
% Women Associate Professors	**11.1%**	**11.1%**	**7.1%**	**0.0%**	**4.5%**	**11.5%**	**15.4%**	**16.0%**	**16.0%**	**18.2%**
Professors	35	32	30	30	25	30	32	34	34	39
Women Professors	0	0	0	0	0	0	0	0	0	1
% Women Professors	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**2.6%**
Lecturers/ Sr. Lecturers	3	3	5	5	4	4	4	4	4	4
Women Lecturers/ Sr. Lecturers	1	1	1	1	1	1	1	1	1	1
% Women Lecturers/ Sr. Lecturers	**33.3%**	**33.3%**	**20.0%**	**20.0%**	**25.0%**	**25.0%**	**25.0%**	**25.0%**	**25.0%**	**25.0%**
Total Tenured and Tenure Stream	74	76	72	70	65	65	66	66	68	72
Women Tenured and Tenure Stream	4	5	5	5	4	5	6	6	6	7
% Women Tenured and Tenure Stream	**5.4%**	**6.6%**	**6.9%**	**7.1%**	**6.2%**	**7.7%**	**9.1%**	**9.1%**	**8.8%**	**9.7%**
Total Academic Staff	77	79	77	75	69	69	70	70	72	76
Women Academic Staff	5	6	6	6	5	6	7	7	7	8
% Women Academic Staff	**6.5%**	**7.6%**	**7.8%**	**8.0%**	**7.2%**	**8.7%**	**10.0%**	**10.0%**	**9.7%**	**10.5%**

Figure H.7 **Department of Mechanical & Industrial Engineering: Academic Staff by Position with Percentage of Women, 2003–2004 to 2012–2013**



	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Assistant Professors	6	10	10	13	14	13	11	8	7	7
Women Assistant Professors	0	0	0	0	1	5	6	5	5	4
% Women Assistant Professors	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**7.1%**	**38.5%**	**54.5%**	**62.5%**	**71.4%**	**57.1%**
Associate Professors	7	7	5	6	7	8	12	15	16	14
Women Associate Professors	3	3	2	2	2	2	2	3	3	3
% Women Associate Professors	**42.9%**	**42.9%**	**40.0%**	**33.3%**	**28.6%**	**25.0%**	**16.7%**	**20.0%**	**18.8%**	**21.4%**
Professors	26	26	24	24	23	26	24	24	24	28
Women Professors	0	0	1	2	2	2	2	2	2	3
% Women Professors	**0.0%**	**0.0%**	**4.2%**	**8.3%**	**8.7%**	**7.7%**	**8.3%**	**8.3%**	**8.3%**	**10.7%**
Lecturers/ Sr. Lecturers	0	1	1	1	1	3	3	2	3	3
Women Lecturers/ Sr. Lecturers	0	0	0	0	0	1	1	0	0	0
% Women Lecturers/ Sr. Lecturers	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**33.3%**	**33.3%**	**0.0%**	**0.0%**	**0.0%**
Total Tenured and Tenure Stream	39	43	39	43	44	47	47	47	47	49
Women Tenured and Tenure Stream	3	3	3	4	5	9	10	10	10	10
% Women Tenured and Tenure Stream	**7.7%**	**7.0%**	**7.7%**	**9.3%**	**11.4%**	**19.1%**	**21.3%**	**21.3%**	**21.3%**	**20.4%**
Total Academic Staff	39	44	40	44	45	50	50	49	50	52
Women Academic Staff	3	3	3	4	5	10	11	10	10	10
% Women Academic Staff	**7.7%**	**6.8%**	**7.5%**	**9.1%**	**11.1%**	**20.0%**	**22.0%**	**20.4%**	**20.0%**	**19.2%**

Figure H.8 **Department of Materials Science & Engineering: Academic Staff by Position with Percentage of Women, 2003–2004 to 2012–2013**

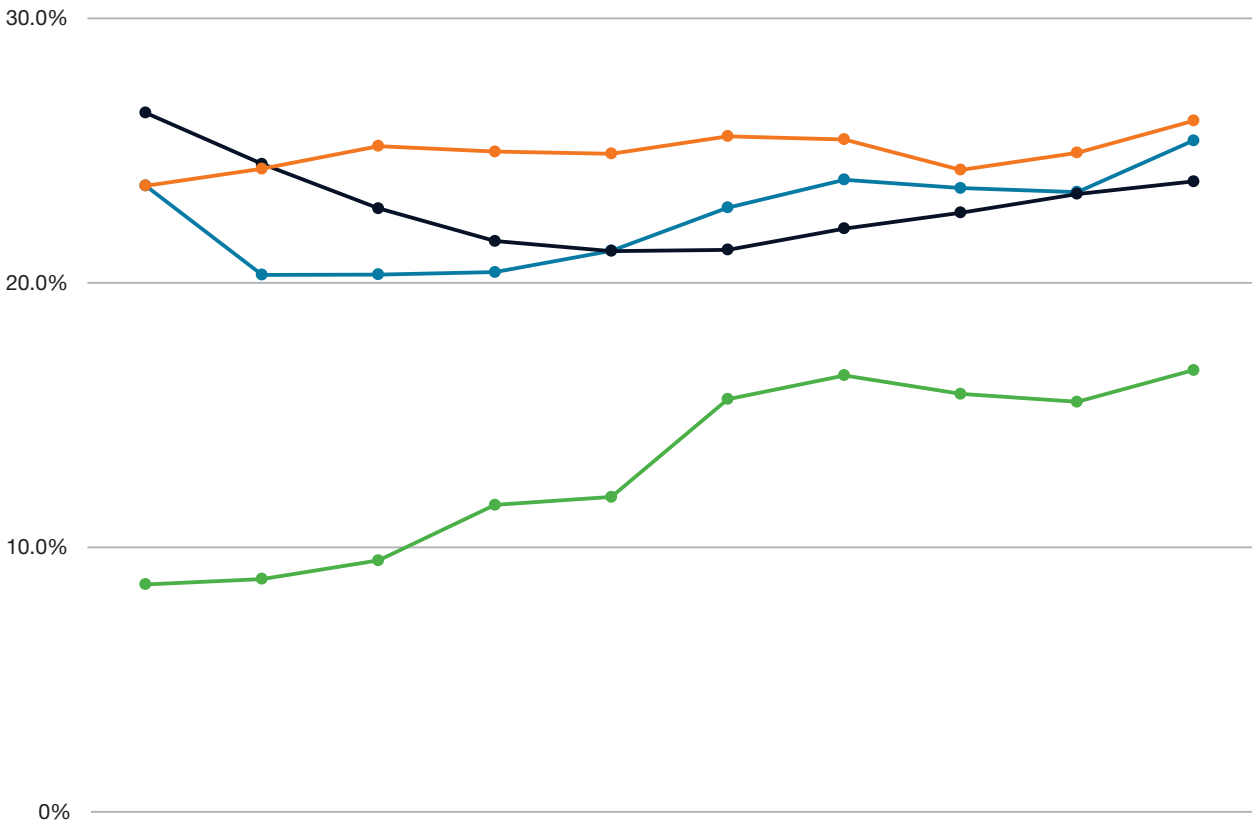


	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Assistant Professors	0	1	1	1	2	2	1	1	2	2
Women Assistant Professors	0	0	0	0	0	0	0	0	0	0
% Women Assistant Professors	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Associate Professors	3	3	4	4	4	2	3	3	3	4
Women Associate Professors	0	0	1	1	1	1	1	1	1	1
% Women Associate Professors	**0.0%**	**0.0%**	**25.0%**	**25.0%**	**25.0%**	**50.0%**	**33.3%**	**33.3%**	**33.3%**	**25.0%**
Professors	9	10	10	9	10	10	10	10	10	8
Women Professors	0	0	0	0	0	0	0	0	0	0
% Women Professors	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Lecturers/ Sr. Lecturers	0	0	0	0	0	0	0	0	0	0
Women Lecturers/ Sr. Lecturers	0	0	0	0	0	0	0	0	0	0
% Women Lecturers/ Sr. Lecturers	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Total Tenured and Tenure Stream	12	14	15	14	16	14	14	14	15	14
Women Tenured and Tenure Stream	0	0	1	1	1	1	1	1	1	1
% Women Tenured and Tenure Stream	**0.0%**	**0.0%**	**6.7%**	**7.1%**	**6.3%**	**7.1%**	**7.1%**	**7.1%**	**6.7%**	**7.1%**
Total Academic Staff	12	14	15	14	16	14	14	14	15	14
Women Academic Staff	0	0	1	1	1	1	1	1	1	1
% Women Academic Staff	**0.0%**	**0.0%**	**6.7%**	**7.1%**	**6.3%**	**7.1%**	**7.1%**	**7.1%**	**6.7%**	**7.1%**

Appendix I: Women at U of T Engineering

Recruiting women students and faculty members continues to be a priority across our Faculty. Appendix I presents a series of figures that illustrate the number of women undergraduates, graduate students and faculty within U of T Engineering.

Figure I.1 Percentage of Women Students and Faculty in Engineering, 2003–2004 to 2012–2013



	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
First-year Undergrad	23.7%	20.3%	20.3%	20.4%	21.2%	22.8%	23.9%	23.6%	23.4%	25.4%
All Undergrad	26.4%	24.5%	22.8%	21.6%	21.2%	21.3%	22.1%	22.7%	23.4%	23.8%
Graduate Students	23.7%	24.3%	25.2%	25.0%	24.9%	25.5%	25.4%	24.3%	24.9%	26.1%
Faculty	8.6%	8.8%	9.5%	11.6%	11.9%	15.6%	16.5%	15.8%	15.5%	16.7%

Figure I.2 **Total Number of Faculty with Percentage of Women, 2003–2004 to 2012–2013**

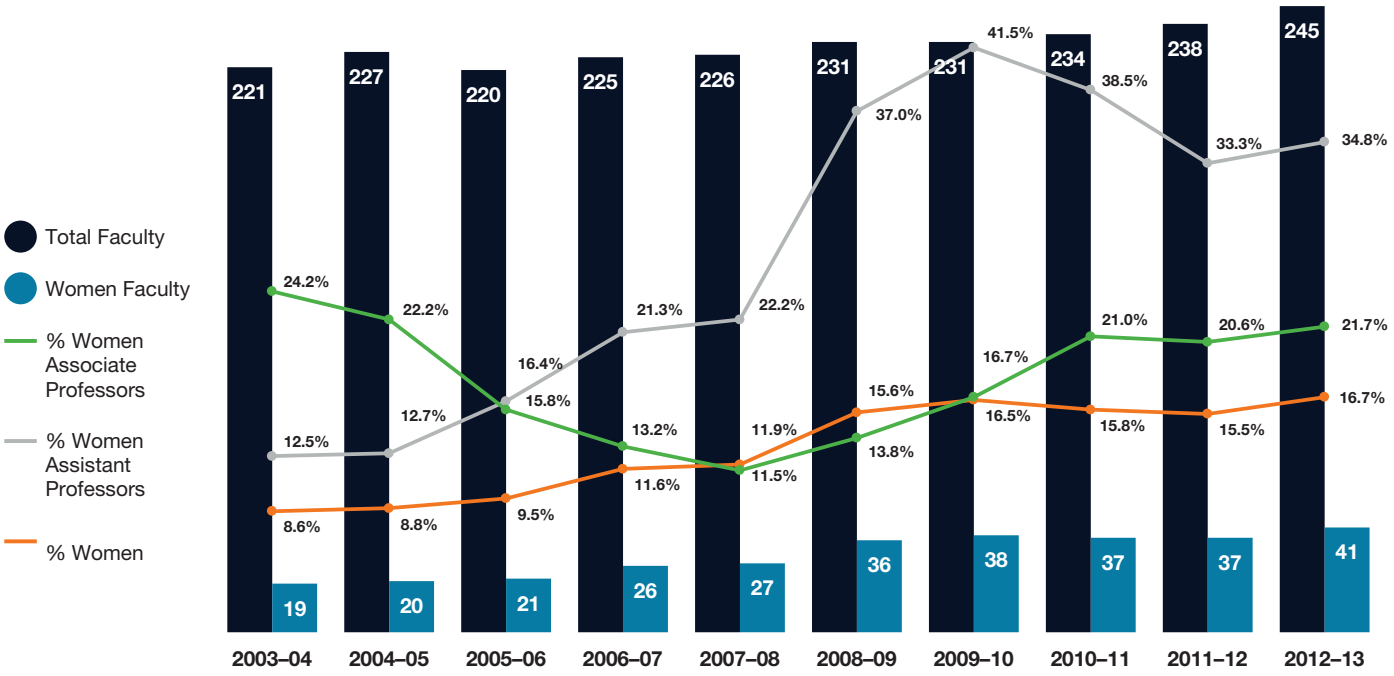
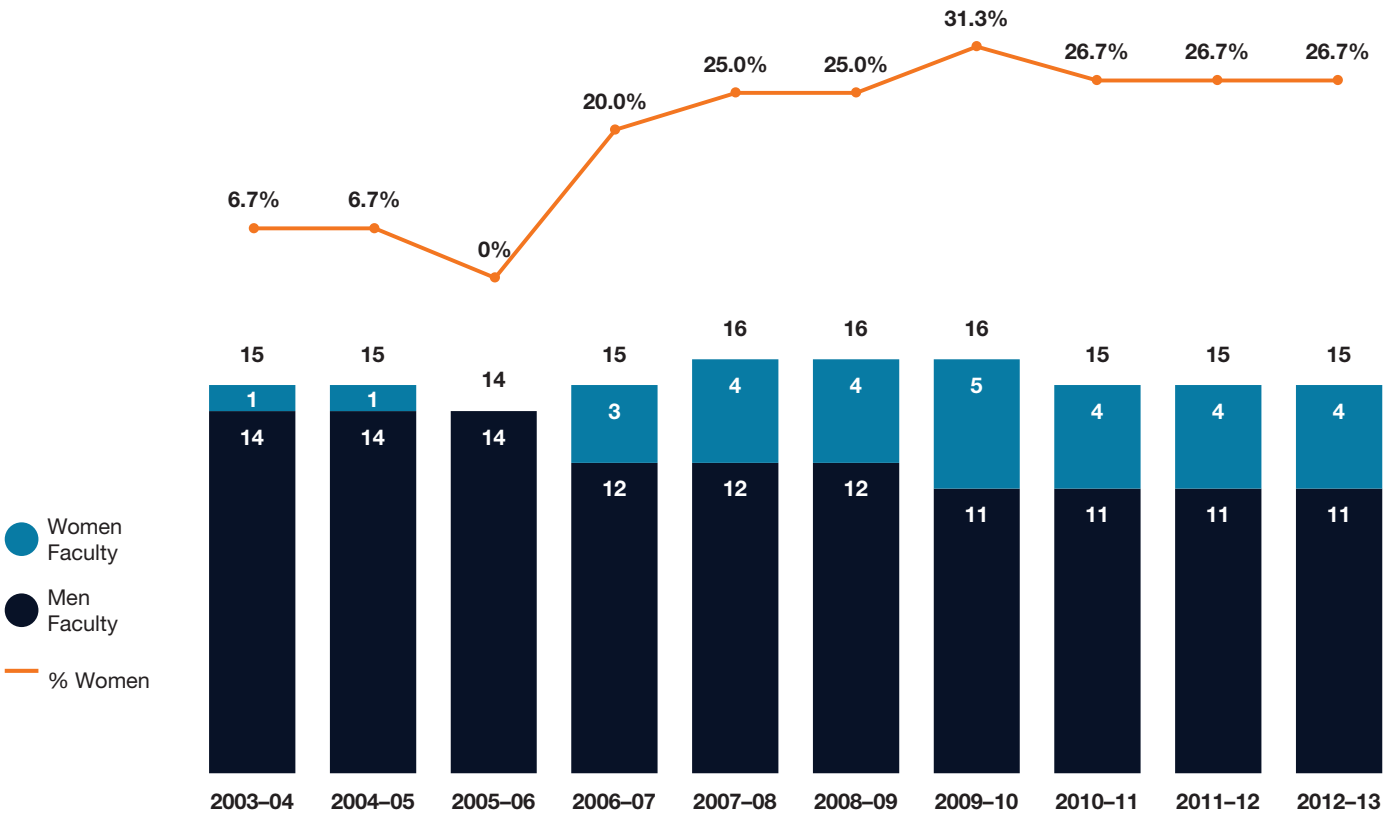
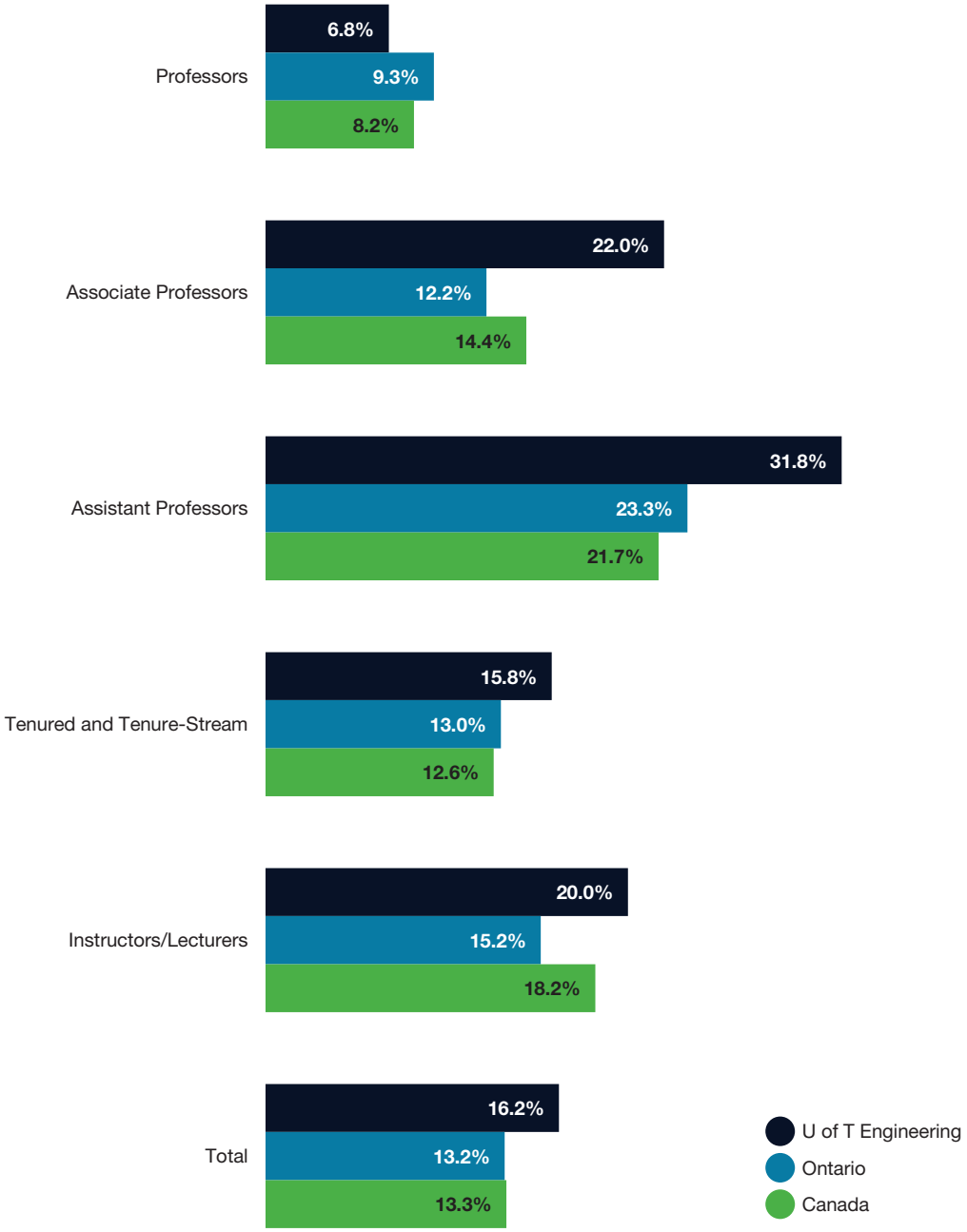


Figure I.3 **Academic Administrative Faculty Roles and Percentage of Women, 2003–2004 to 2012–2013**



Note I.3: Positions included in the total number of academic administrative roles: Dean; Vice-Deans of Undergraduate, Graduate and Research; Associate Dean, Cross-Disciplinary Programs; Chair, First Year; Chairs/Directors of ChemE, CivE, ECE, EngSci, MIE, MSE, UTIAS, IBBME; and, Faculty Council Speaker.

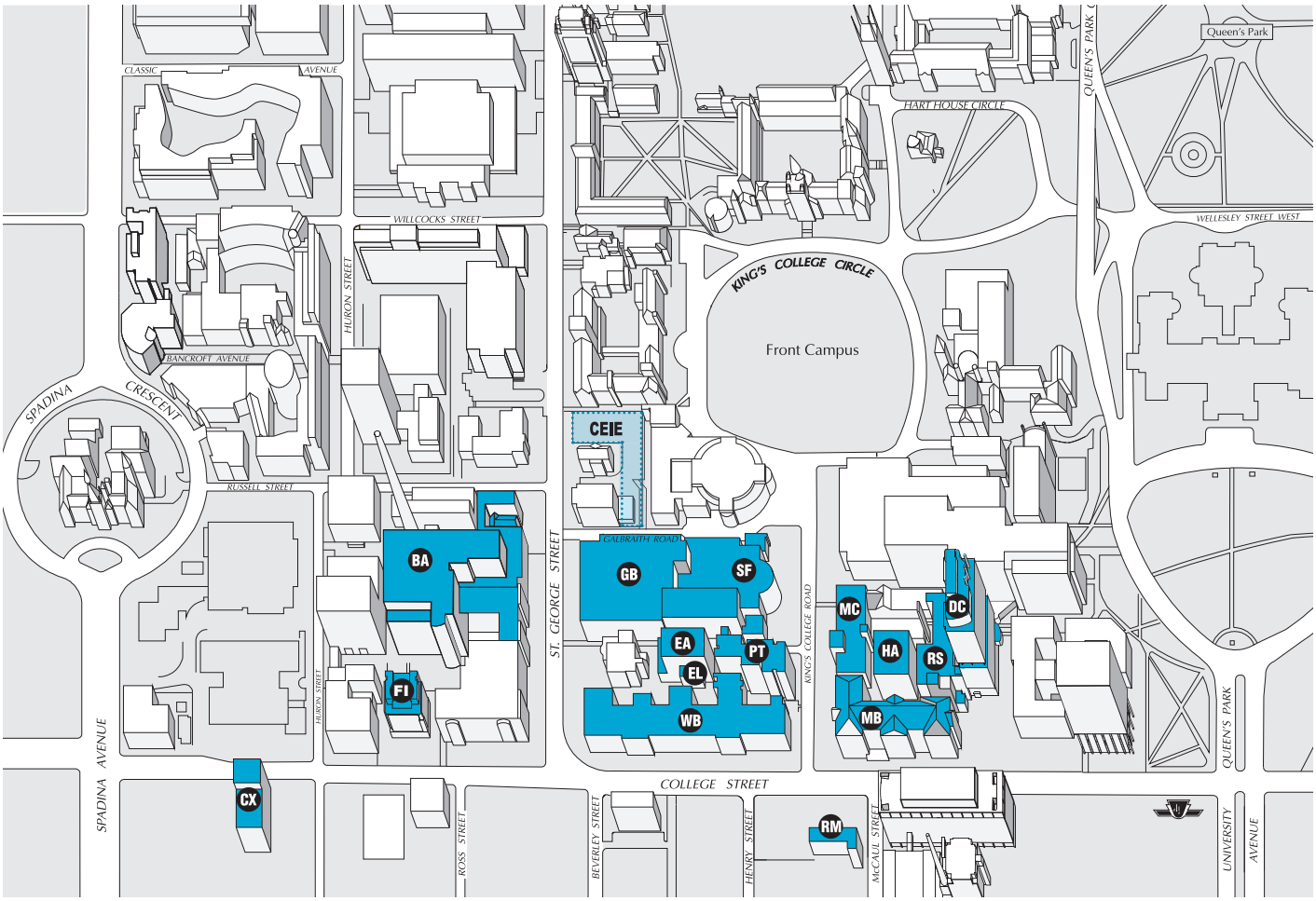
Figure I.4 **Percentage of Women Faculty at U of T Engineering Compared with Women Faculty in Ontario and Canadian Engineering Faculties, 2012**



Note I.4: Based on November 15, 2012 data analyzed by Engineers Canada.

Appendix J: The Engineering Precinct

The map below highlights buildings on the St. George campus that form the Engineering Precinct. Most of our buildings reside on the southern-most part of campus. Along with UTIAS in Downsview (not pictured below), these 16 buildings house our students, faculty, staff, research and teaching spaces. For details on the buildings we occupy, please see the Space chapter.



BA	Bahen Centre for Information Technology
DC	Donnelly Centre for Cellular and Biomolecular Research (CCBR)
EA	Engineering Annex / Electro-Metallurgy Lab Building (South Side)
EL	Electrometallurgy Lab
FI	Fields Institute
GB	Galbraith Building
HA	Haultain Building
MB	Lassonde Mining Building
MC	Mechanical Engineering Building
PT	D.L. Pratt Building
RS	Rosebrugh Building
SF	Sandford Fleming Building
WB	Wallberg Building
CX	245 College Street
RM	256 McCaul Street
–	UTIAS (Downsview)
CEIE	Centre for Engineering Innovation & Entrepreneurship (future home)

Data Sources

This section indicates the sources for data and information presented throughout this report. Sources are organized in order of appearance by page number, figure number and title.

Page	Figure	Data Source
		Faculty Leadership, 2012–2013 Information provided by Assistant Dean, Academic HR & Diversity, Faculty of Applied Science & Engineering. A current organizational chart is also available online at www.engineering.utoronto.ca/About/deans_office/Academic_Administrative_Leadership.htm.
		Comparison of U of T Engineering with Ontario and Canada, 2012–2013 Enrolment, degrees granted and faculty data are based on the 2012 calendar year and come from the National Council of Deans of Engineering and Applied Science (NCDEAS) 2012 Resources Report, prepared by Engineers Canada and circulated to Canadian engineering deans in July 2013. Undergraduate enrolment figures exclude non-degree students and those doing a Professional Experience Year (PEY). Full-time equivalent (FTE) enrolment statistics represent averages that take into account all three terms of the year (winter, summer and fall). Undergraduate FTE shows the three-term total divided by two; Graduate FTE shows the three-term total divided by three. Research funding data comes from the Natural Sciences and Engineering Research Council (NSERC) search engine (www.outil.ost.uqam.ca/CRSNG/Outil.aspx?Langue=Anglais) and includes grants only for the 2011–2012 NSERC fiscal year (April to March). NSERC data for 2012-13 was not yet available at time of publication. Major awards data comes from the Director, Awards and Honours, Faculty of Applied Science & Engineering, based on press releases and websites of individual awards for the 2012–2013 grant year (April to March).
		Comparison of U of T Engineering with St. George Campus and University of Toronto, 2012–2013 All student enrolment statistics are based on headcount for the fall of 2012 from the U of T Enrolment Reporting Cube (St. George and U of T statistics do not include Toronto School of Theology). All degrees awarded statistics come from ROSI and reflect September 2012 to June 2013 dates (St. George and U of T statistics do not include Toronto School of Theology). All sponsored-research funding statistics come from the U of T Research Reporting Cube, based on 2011–2012 grant year and exclude partner hospitals; includes all program types; data current as of May 2013. Engineering academic staff statistics provided by Assistant Dean, Academic HR & Diversity, Faculty of Applied Science & Engineering (based on HRIS and published lists of faculty members). Engineering administrative and technical staff statistic from 2012 Resources Survey prepared by Engineers Canada for NCDEAS (based on calendar year). U of T academic and administrative staff statistics come from U of T Facts and Figures 2012. Engineering total revenue provided by Chief Financial Officer, Faculty of Applied Science & Engineering. U of T total revenue provided by the Office of the Vice-Provost, Planning & Budget. Engineering space statistic from U of T Office of Space Management data, May 2013. U of T and St. George space statistics from U of T Facts and Figures 2012, which is available online at: www.utoronto.ca/about-uoft/quickfacts/factsandfigures/Facts___Figures_2012.htm
		Chapter 1: Undergraduate Studies
	1.1	**Applications, Offers, Registrations, Selectivity and Yield of First-year Undergraduates, 2003 to 2012** All years data for applications and offers are based on annual Admissions Committee reports to Faculty Council (November), counting new admissions only, FT and PT, all years of study. Excludes students with special status. Registrations only are from U of T Undergraduate Enrolment Reporting Cube: Faculty = Faculty of Applied Science & Engineering, New Students Only (based on candidacy session). Cube Parameters: All Fall Terms for 2003–2012, Year 1 (SESLEV), First Time Registered (LEVSTAT), Measure = Headcount.
	1.2	**Ontario Secondary School Averages of Incoming First-year Undergraduates and Retention Rate Between First and Second Year, 2003 to 2012** Averages of incoming first-year students from Admissions Committee Report to Faculty Council (November). Retention rates based on Undergraduate Enrolment Projections documents, published by the U of T Planning and Budget Office, October 2012 and January 2013.

1.3 Incoming First-year Undergraduates with Percentage of Women and International Students, 2003 to 2012

Headcount from U of T Undergraduate Enrolment Cube. Excludes students with special status. Cube Parameters: All Fall Terms for 2003–2012; First Time Registered (LEVSTAT); Measure = Headcount; [Gender] and [DOM_INTL] parameters used to calculate percentages of women and international students, respectively.

1.4 Incoming First-year Domestic and International Undergraduates, 2005 to 2012

Headcount from University of Toronto Enrolment Master Files, the source of U of T Reporting Cube. Includes new and returning students. Excludes students with special status. Cube Parameters: Year 1 (SESLEV); Fall Terms for 2005–2012; Degree Type = Undergraduate; excludes students with special status.

1.5 International and Domestic Undergraduate Enrolment, 2003–2004 to 2012–2013

Headcount from U of T Undergraduate Enrolment Reporting Cube. Excludes students with special status. Cube Parameters: Fall Terms for 2003–2012; Degree Type = Undergraduate; Excludes students with special status.

1.6 Undergraduates by Program, Year of Study and Professional Experience Year (PEY), 2012–2013

Headcount from U of T Undergraduate Enrolment Reporting Cube. Includes full-time students, part-time students and students on PEY internship. Excludes students with special status. Cube Parameters: Years 1–4; Fall 2012; Departments based on [Programs] field; Degree Type = Undergraduate.

1.7 Undergraduates by Program, 2003–2004 to 2012–2013

Headcount for the fall of each year from U of T Undergraduate Enrolment Reporting Cube. Includes full-time students, part-time students and students on PEY internship. Excludes students with special status. Cube Parameters: All Fall Terms for 2003–2012; Years 1–4 (SESLEV); Degree Type = Undergraduate; Measure = Headcount; Departments based on [Programs] field.

1.8a Number of Awards Received by Cohort with Total Number of Undergraduate Need-based Award Recipients, 2003–2004 to 2012–2013

Data provided by Assistant Registrar, Scholarships & Financial Aid, Office of the Faculty Registrar, Faculty of Applied Science & Engineering.

1.8b Total Value of Undergraduate Financial Assistance and Percentage Distributed by Year of Study, 2003–2004 to 2012–2013

Data provided by Assistant Registrar, Scholarships & Financial Aid, Office of the Faculty Registrar, Faculty of Applied Science & Engineering.

1.9a Undergraduate Degrees Awarded by Program, 2003–2004 to 2012–2013

All data from ROSI download: 5EA (Graduated Students); Faculty = Faculty of Applied Science & Engineering.

1.9b U of T Engineering Degrees Awarded by Academic Area Compared with Canadian and North American Degree Totals, 2011

U of T and Canadian statistics are based on the 2011 calendar year and come from Engineers Canada Report of Enrolment & Degrees Granted (Canadian Engineers for Tomorrow, 2007–2011), revised December 2012, and available online at: www.engineerscanada.ca/files/w_report_enrolment_eng.pdf. American statistics used to calculate North American percentages are based on the 2010–2011 academic year and come from the 2012 American Society of Engineering Educators (ASEE) Report, available online at: www.asee.org/papers-and-publications/publications/college-profiles.

1.10 Undergraduate Student-Faculty Ratios by Academic Area, 2012–2013

Number of undergraduates from U of T Undergraduate Enrolment Reporting Cube. Excludes students on PEY internship and students with special status. Cube Parameters: Fall 2012, Degree Type = Undergraduate; AssocOrg = blank (to exclude PEYs); Measure = Headcount. Faculty Total does not include teaching done for Engineering by extra-divisional units (especially Arts & Science departments). Results are not adjusted for departmental contributions to shared first-year curriculum, Engineering Science or Engineering minors. FTE faculty counts are derived from 2013–2014 (FY13) budget calculations, based on data from 2012–2013. Calculation includes tenured / tenure-stream and lecturers / teaching stream faculty.

1.11	**Undergraduate Course Teaching Evaluations by Academic Area, 2005–2006 to 2012–2013** Course evaluation average scores are based on data obtained from the Office of the Registrar, Faculty of Applied Science & Engineering, which administers the evaluations. Data shown here summarizes the results of Question #16 that asks students for their overall rating of the instructor as a teacher.
1.12a	**PEY Internship Placements for Engineering Undergraduates with Percentage Participation from Previous Third-year Class, 2004–2005 to 2012–2013** Statistics provided by Assistant Director, Engineering Career Centre, Faculty of Applied Science & Engineering.
1.12b	**PEY Internship Placements, 2008–2009 to 2012–2013** Statistics provided by Assistant Director, Engineering Career Centre, Faculty of Applied Science & Engineering.
1.12c	**PEY Employers, 2008–2009 to 2012–2013** Statistics provided by Assistant Director, Engineering Career Centre, Faculty of Applied Science & Engineering.
1.13a	**Undergraduate Participation in Summer Research Opportunities, 2009–2010 to 2012–2013** Information regarding Canadian placements provided by each department and division within the Faculty of Applied Science & Engineering. International placement statistics provided by the University of Toronto's Centre for International Experience.
1.13b	**Undergraduate Participation in Summer Research Opportunities, 2012–2013** Information regarding Canadian placements provided by each department and division within the Faculty of Applied Science & Engineering. International placement statistics provided by the University of Toronto's Centre for International Experience.
Text	**Pre-University Engineering Outreach** Information and statistics provided by Associate Director, Engineering Student Outreach Office, Faculty of Applied Science & Engineering.
Text	**Student Clubs and Teams** Information from the Engineering Society: www.skule.ca

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2.1a	**Applications, Offers, Registrations, Selectivity and Yield of Graduate Students, 2003–2004 to 2012–2013** All data from annual Admission & Registration Statistics reports published by the School of Graduate Studies.
2.1b	**Applications, Offers, Registrations, Selectivity and Yield of Graduate Students by Degree Type, 2003–2004 to 2012–2013** All data from annual Admission & Registration Statistics reports published by the School of Graduate Studies.
2.2a	**International and Domestic Graduate Students by Degree Type, with Percentage of International Students, 2003–2004 to 2012–2013** Student counts for fall terms from U of T Graduate Enrolment Reporting Cube. Excludes special status students. Cube Parameters: All Fall Terms for 2003–2012; Measure = Headcount.
2.2b	**Graduate Students by Degree Type and Gender, with Percentage of Women, 2003–2004 to 2012–2013** Student counts for fall terms from U of T Graduate Enrolment Reporting Cube. Excludes special status students. Cube Parameters: All Fall Terms for 2003–2012; Measure = Headcount.

2.2c **Graduate Student Enrolment by Full-Time Equivalent (FTE) and Headcount (HC) by Academic Area, 2003–2004 to 2012–2013**

All enrolment counts are from U of T Graduate Enrolment Reporting Cube. Cube Parameters: Measure = Headcount or Total FTE (UAR). Headcounts are reported for all fall terms for 2003–2012. FTEs are counted by academic year as reported in the cube (May to April).

2.2d **Graduate Students: International and Domestic Full-Time Equivalent (FTE) and Domestic Eligible Full-Time Equivalent (EFTE), 2003–2004 to 2012–2013**

EFTE and headcount for fall terms from U of T Graduate Enrolment Reporting Cube. Cube Parameters: All Fall terms for 2003–2012, Measure = Headcount or Eligible FTE.

2.3a **Graduate and Undergraduate Full-Time Equivalent Student-Faculty Ratios, 2003–2004 to 2012–2013**

Number of undergraduates from U of T Undergraduate Enrolment Reporting Cube. Excludes students on PEY internship and students with special status. Cube Parameters: Fall terms 2003–2012; Degree Type = Undergraduate; Measure = Headcount. To exclude PEY: for 2003–2004 = FT only; for 2005+ AssocOrg = blank. Number of FTE graduate students from U of T Graduate Enrolment Reporting Cube. Cube Parameters: Fall terms 2003–2012; Measure = Total FTE (UAR); excludes students with special status. Number of faculty included in the calculation provided by Assistant Dean, HR & Diversity, Faculty of Applied Science & Engineering (based on HRIS and published lists of faculty).

2.3b **Full-Time Equivalent (FTE) Graduate Student-Faculty Ratios by Academic Area and Degree Type, 2012–2013**

Number of FTE graduate students from U of T Graduate Enrolment Reporting Cube. Cube Parameters: Fall 2012; Measure = Total FTE (UAR). Excludes students with special status. The number of graduate students per department is adjusted as per the budget calculation for inter-departmental graduate student supervision. Number of faculty included in the calculation provided by Assistant Dean, HR & Diversity, Faculty of Applied Science & Engineering (based on HRIS and published lists of faculty).

2.4a **External Graduate Student Scholarships by Source, 2002–2003 to 2011–2012**

All data from U of T Graduate Student Income Reporting Cube, current as of September 2012 (includes complete 2011–2012 academic year). Faculty = Faculty of Applied Science & Engineering. Award Income only.

2.4b **Number of NSERC Graduate Student Award Recipients by Academic Area, 2002–2003 to 2011–2012**

All data from U of T Graduate Student Income Reporting Cube, current as of September 2012 (includes complete 2011–2012 academic year). Faculty = Faculty of Applied Science & Engineering. Award Income only. Source = Federal — Natural Sciences and Engineering Research Council. Measure = Student Count.

2.5a **Graduate Student Funding by Category, 2002–2003 to 2011–2012**

All data from U of T Graduate Student Income Reporting Cube, current as of May 2013. Reported by academic year (September to August). Faculty = Faculty of Applied Science & Engineering. Includes funding from all sources except work-study employment income.

2.5b **Graduate Student Funding by Category and Academic Area, 2011–2012**

All data from U of T Graduate Student Income Reporting Cube, current as of May 2013. Reported by academic year (September to August). Faculty = Faculty of Applied Science & Engineering. Includes funding from all sources except work-study employment income.

2.6 **Number of Students Fast-Tracked from MASc to PhD by Academic Area, 2006–2007 to 2011–2012**

All data from ROSI 4FF downloads (Student Registrations). Fast-tracked students are identified by POSt codes that end in 'PHD U.'

2.7 **Time to Graduation for PhD, MASc, MEng and MHSc Graduate Students, 2003–2004 to 2012–2013**

All data from ROSI 4BEA downloads, originally created for Ontario Council of Graduate Studies (OCGS) reporting purposes. The data reflects median values based on the total number of terms in which a student is registered. Leaves, lapses and (in most cases) the term in which the convocation occurs are excluded. Where a student is fast-tracked from the MASc into a PhD, the total time for both programs is counted. Full-time and part-time MEng students are distinguished for greater clarity and accuracy.

2.8 **Graduate Degrees Awarded by Degree Type and Gender, 2003–2004 to 2012–2013**

All data from ROSI 5EA download (Graduated Students); Faculty = Faculty of Applied Science & Engineering.

2.9 **ELITE Certificates Awarded, 2008–2009 to 2012–2013**

Information provided by Faculty Graduate Coordinator, Vice-Dean Graduate Studies Office, Faculty of Applied Science & Engineering.

2.10 **MEng, SCFI Program Enrolment, Fall 2008 to Winter 2013**

Information provided by Graduate Program Administrator, Department of Mechanical & Industrial Engineering.

Chapter 3: **Research**

Text **Selected Research Highlights for 2012–2013**

Information provided by Vice-Dean Research, Faculty of Applied Science & Engineering.

3.1a **Overall Research Funding Breakdown: Research Infrastructure and Research Operating Funding, 2002–2003 to 2011–2012**

Data from the U of T Research Cube. Current as of May 2013. Organized by grant year. Faculty = Applied Science & Engineering. Infrastructure funding includes the Canada Foundation for Innovation (except the CFI Career Award), the Ontario Research Fund (ORF) and the NSERC Research Tools and Instruments (RTI) Program.

3.1b **Canadian Institutes of Health Research (CIHR) and Natural Sciences and Engineering Research Council (NSERC) Funding, 2002–2003 to 2011–2012**

Data from the U of T Research Cube. Current as of May 2013. Organized by grant year (e.g., 2012–2013 = April 2012 to March 2013 = Grant Year 2013). Faculty = Faculty of Applied Science & Engineering.

3.1c **Research Operating Funding by Year, Source and Funding per Faculty Member, 2002–2003 to 2011–2012**

Data from the U of T Research Cube. Current as of May 2013. Organized by grant year (e.g., 2012–2013 = April 2012 to March 2013 = Grant Year 2013). Faculty = Applied Science & Engineering. Categories as defined in footnote to Figure 3.1a. Number of faculty included in the calculation provided by Assistant Dean, HR & Diversity, Faculty of Applied Science & Engineering (based on HRIS and published lists of faculty). Includes tenured and tenure-stream faculty only.

3.2a **Natural Sciences and Engineering Research Council (NSERC) Funding, 2011–2012**

Data from the U of T Research Cube. Current as of May 2013. Organized by grant year (e.g., 2012–2013 = April 2012 to March 2013 = Grant Year 2013). Faculty = Faculty of Applied Science & Engineering.

3.2b **NSERC Industrial Partnership Funding by Program, 2002–2003 to 2011–2012**

Data from the U of T Research Cube. Current as of May 2013. Organized by grant year (e.g., 2012–2013 = April 2012 to March 2013 = Grant Year 2013). Faculty = Faculty of Applied Science & Engineering.

3.2c **Industrial Partnerships as a Proportion of Total NSERC Funding, 2002–2003 to 2011–2012**

Data from the U of T Research Cube. Current as of May 2013. Organized by grant year (e.g., 2012–2013 = April 2012 to March 2013 = Grant Year 2013). Faculty = Faculty of Applied Science & Engineering.

3.2d **Industrial Partnerships, 2012–2013**

Data from the U of T Research Cube. Current as of May 2013. Organized by grant year (e.g., 2012–2013 = April 2012 to March 2013 = Grant Year 2013). Faculty = Faculty of Applied Science & Engineering. Sponsor = Corporate.

3.3a **Canadian Peer Universities vs. University of Toronto Share of NSERC Funding for Engineering, Cumulative Five-year Share, 2007–2008 to 2011–2012**
All data from NSERC Award Search Engine: www.outil.ost.uqam.ca/CRSNG/Outil.aspx?Langue=Anglais. Grants only (no scholarships). Organized by grant year. Does not include Canada Research Chairs, Networks of Excellence or Indirect Costs of Research.

3.3b **U of T Annual Share of NSERC Funding in Engineering, 2002–2003 to 2011–2012**
All data from NSERC Award Search Engine: www.outil.ost.uqam.ca/CRSNG/Outil.aspx?Langue=Anglais. Grants only (no scholarships). Organized by grant year. Does not include Canada Research Chairs, Networks of Excellence or Indirect Costs of Research.

3.4a **Engineering Invention Disclosures by Academic Area, 2008–2009 to 2012–2013**
Report of U of T Commercialization Indicators, Annual Supplement for FY2013, provided by the Office of the Vice President, Research. Data current as of May 1, 2013.

3.4b **U of T Invention Disclosures by Faculty, 2012–2013**
Report of U of T Commercialization Indicators, Annual Supplement for FY2013, provided by the Office of the Vice President, Research. Data current as of May 1, 2013.

3.4c **U of T Patent Applications by Faculty, 2012–2013**
Report of U of T Commercialization Indicators, Annual Supplement for FY2013, provided by the Office of the Vice President, Research. Data current as of May 1, 2013.

3.5 **Distribution of Research Operating Funding by Academic Area, 2002–2003 to 2011–2012**
Data from the U of T Research Cube. Current as of May 2013. Organized by grant year. Faculty = Faculty of Applied Science & Engineering.

Chapter 4: **Cross-Faculty Education and Research**

Text **Selected Cross-Faculty Education and Research Initiatives**
Information taken from *The Engineering Newsletter*, Faculty of Applied Science & Engineering.

4.1 **Undergraduate Enrolment in Engineering Minors, 2007–2008 to 2012–2013**
Information provided by the Cross-Disciplinary Programs Office, Faculty of Applied Science & Engineering

Chapter 5: **Awards and Honours**

Text **Selected Awards Received by Faculty Members and Alumni, 2012–2013**
Information provided by Director, Awards and Honours, Faculty of Applied Science & Engineering.

5.1 **Summary of Major International, National and Provincial Awards and Honours, 2003–2004 to 2012–2013**
Information provided by Director, Awards and Honours, Faculty of Applied Science & Engineering.

5.2a **Number of Major Awards Received by U of T Engineering Compared to other Canadian Engineering Faculties, 2012–2013**
Information provided by Director, Awards and Honours, Faculty of Applied Science & Engineering.

5.2b **Percentages of Engineering Faculty and Total Major Awards Received in Canadian Engineering Faculties**
Information provided by Director, Awards and Honours, Faculty of Applied Science & Engineering.

5.3	**Number of Awards Received by U of T Engineering Faculty Compared to other Canadian Engineering Faculties, 2007 to 2012** Information provided by Director, Awards and Honours, Faculty of Applied Science & Engineering.
Text	**Selected Awards Received by Staff, 2012–2013** Information provided by Director, Awards and Honours, Faculty of Applied Science & Engineering.
Text	**University of Toronto Engineering Faculty Awards, 2003–2004 to 2012–2013** Information provided by Director, Awards and Honours, Faculty of Applied Science & Engineering.
Text	**Engineering Alumni Association Awards, 2012** Information provided by the Office of Advancement and Alumni Relations, Faculty of Applied Science & Engineering.

Chapter 6: **World Recognition by Rankings**

6.1a	**Times Higher Education-Thomson Reuters World University Rankings, Top 50 Universities for Engineering and Information Technology, 2012** Data from THE World University Ranking website: http://www.timeshighereducation.co.uk/world-university-rankings/2012-13/subject-ranking/subject/engineering-and-IT
6.1b	**Top 25 North American Universities for Engineering and Information Technology** Data from THE World University Ranking website: http://www.timeshighereducation.co.uk/world-university-rankings/2012-13/subject-ranking/subject/engineering-and-IT
6.2a	**QS World University Rankings and U.S. News & World Report World's Best Colleges and Universities, Top 50 Universities for Engineering and Information Technology, 2012** Data from QS World University Ranking website: www.topuniversities.com/university-rankings/world-university-rankings/2012 and www.usnews.com/education/worlds-best-universities-rankings/best-universities-subjects.
6.2b	**Canadian U15 in Top 100 for Engineering and Information Technology** Data from QS World University Ranking website: www.topuniversities.com/university-rankings/world-university-rankings/2012 and www.usnews.com/education/worlds-best-universities-rankings/best-universities-subjects.
6.2c	**Top 20 North American Universities for Engineering and Information Technology** Data from QS World University Ranking website: www.topuniversities.com/university-rankings/world-university-rankings/2012 and www.usnews.com/education/worlds-best-universities-rankings/best-universities-subjects.
6.2d	**Canadian Universities in QS World Ranking by Discipline for Engineering and Information Technology, 2012** Data from QS World University Ranking website: www.topuniversities.com/university-rankings/world-university-rankings/2012
6.3a	**Shanghai Jiao Tong Academic Ranking of World Universities (ARWU), Top 50 Universities for Engineering/Technology and Computer Sciences, 2012** Data from ARWU website: www.shanghairanking.com/FieldENG2012.html
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6.3c	**Scoring Analysis of Canadian Universities in Top 100** Data from ARWU website: www.shanghairanking.com/FieldENG2012.html

6.4a **National Taiwan University (NTU) Performance Ranking of Engineering Papers for World Universities, 2012**
Data from National Taiwan University Performance Ranking of Scientific Papers for World Universities 2012 website: nturanking.lis.ntu.edu.tw/DataPage/TOP300.aspx?query=Engineering. Data compiled from Thomson Reuters' science citation indexes.

6.4b **Canadian Universities in NTU Performance Ranking of Engineering Papers by Subject, 2012**
Data from National Taiwan University Performance Ranking of Scientific Papers for World Universities 2012 website: nturanking.lis.ntu.edu.tw/DataPage/TOP300.aspx?query=Engineering. Data compiled from Thomson Reuters' science citation indexes.

6.5a **Number of Engineering Publications Indexed by Thomson Reuters Association of American Universities (AAU) Public and Canadian Institutions, 2006 to 2010**
Data from Thomson Reuters University Science Indicators 2010 Standard Edition, covering 2006 to 2010. Includes public peer institutions in Canada (U15) and U.S. (AAU plus University of California at San Francisco).

6.5b **Summary of U15 Bibliometrics for Publications**
Data from Thomson Reuters University Science Indicators 2010 Standard Edition, covering 2006 to 2010. Includes public peer institutions in Canada (U15) and U.S. (AAU plus University of California at San Francisco). Faculty counts for analysis of U15 publications per faculty member are from the Engineers Canada 2012 Resources Report.

6.6a **Number of Engineering Citations Indexed by Thomson Reuters Association of American Universities (AAU) Public and Canadian Peer Institutions, 2006 to 2010**
Data from Thomson Reuters University Science Indicators 2010 Standard Edition, covering 2006 to 2010. Includes public peer institutions in Canada (U15) and U.S. (AAU plus University of California at San Francisco).

6.6b **Summary of U15 Bibliometrics for Citations**
Data from Thomson Reuters University Science Indicators 2010 Standard Edition, covering 2006 to 2010. Includes public peer institutions in Canada (U15) and U.S. (AAU plus University of California at San Francisco). Faculty counts for analysis of U15 publications per faculty member are from the Engineers Canada 2012 Resources Report.

6.7 **Summary of U of T Engineering's Performance in International Rankings Relative to the World, North America and Canada, 2010 to 2012**
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7.1a **Advancement Results, 2012–2013**
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7.1b **Philanthropic Support, 2007–2008 to 2012–2013**
Statistics provided by the Office of Advancement and Alumni Relations, Faculty of Applied Science & Engineering.

7.1c **Gift Designations, 2012–2013**
Statistics provided by the Office of Advancement and Alumni Relations, Faculty of Applied Science & Engineering.

Text **Initiatives and Projects for 2012–2013**
Information provided by the Office of Advancement and Alumni Relations, Faculty of Applied Science & Engineering.

7.2 **Contactable Alumni by Academic Area, 2012–2013**
Statistics provided by the Office of Advancement and Alumni Relations, Faculty of Applied Science & Engineering.

7.3 **Geographic Location of Contactable Alumni, 2012–2013**
Statistics provided by the Office of Advancement and Alumni Relations, Faculty of Applied Science & Engineering.

7.4	**Alumni Events, 2012–2013** Statistics provided by the Office of Advancement and Alumni Relations, Faculty of Applied Science & Engineering.
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Chapter 8: **Communications**

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8.1a	**U of T Engineering in the Media, 2012–2013** Statistics provided by Engineering Strategic Communications, Faculty of Applied Science & Engineering.
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8.1d	**Engineering Story Traffic on U of T News Website, 2012–2013** Statistics provided by Engineering Strategic Communications, Faculty of Applied Science & Engineering.
8.2a	**Summary of Analytics for engineering.utoronto.ca, 2011–2012 to 2012–2013** Website statistics sourced from Google Analytics.
8.2b	**Summary of Analytics for undergrad.engineering.utoronto.ca, 2011–2012 to 2012–2013** Website statistics sourced from Google Analytics.
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Text	**Selected Highlights of Global Impact for 2012–2013** Information taken from *The Engineering Newsletter*, Faculty of Applied Science & Engineering.
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10.1	**Summary of Buildings Occupied by Engineering, 2012–2013** Data provided by Director, Facilities & Infrastructure Planning, Faculty of Applied Science & Engineering.

Text	**Projects Completed in 2012–2013** Information provided by Director, Facilities & Infrastructure Planning, Faculty of Applied Science & Engineering.
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11.2	**Total Central Costs, 2006–2007 to 2012–2013** Information provided by Chief Financial Officer, Faculty of Applied Science & Engineering.
11.3	**Budget Data, 2006–2007 to 2012–2013** Information provided by Chief Financial Officer, Faculty of Applied Science & Engineering.
11.4	**Revenue Sources, 2012–2013** Information provided by Chief Financial Officer, Faculty of Applied Science & Engineering.
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Text	**Dean's Strategic Fund** Information provided by Office of the Dean, Faculty of Applied Science & Engineering.
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A	**Outreach Programs** Information provided by Engineering Student Outreach Office, Faculty of Applied Science & Engineering.
B	**Student Clubs & Teams** Information from the Engineering Society: www.skule.ca
C	**Time to Completion for Graduate Students** All data from ROSI 4BEA downloads, originally created for Ontario Council of Graduate Studies (OCGS) reporting purposes. The data reflects median values based on the total number of terms in which a student is registered. Leaves, lapses and (in most cases) the term in which the convocation occurs are excluded. Where a student is fast-tracked from the MASc into a PhD, the total time for both programs is counted. Full-time and part-time MEng students are distinguished for greater clarity and accuracy.
D	**Research Chairs** Information from: Canada Research Chair website: www.chairs-chaires.gc.ca; Industrial Research Chair website: www.nserc-crsng.gc.ca/Professors-Professeurs/CFS-PCP/IRC-PCI_eng.asp; the Office of Advancement, Faculty of Applied Science & Engineering; the Office of the Vice-Dean, Research, Faculty of Applied Science & Engineering; and, Assistant Dean, HR & Diversity, Faculty of Applied Science & Engineering.

E Research Funding by Academic Area

Data is from the U of T Research Cube, current as of May 2013, and is organized by grant year. Faculty = Faculty of Applied Science & Engineering. Faculty data is provided by the Assistant Dean for Academic HR & Diversity, and here includes tenured and tenure-stream faculty only as reported each July. Faculty counts are used on a slip-year basis: e.g., those reported in July 2011 (for Academic Year 2010–2011) are linked to Grant Year 2012 (April 2011 to March 2012).

F Spin-off Companies

Report of U of T Commercialization Indicators, FY2013 Q4, provided by the Office of the Vice President, Research. Data current as of May 1, 2013.

G Descriptions of Major Awards

Information from the Director, Awards and Honours, Faculty of Applied Science & Engineering.

H Academic Staff by Academic Area

Information provided by Assistant Dean, HR & Diversity, Faculty of Applied Science & Engineering. Women academic staff include all ranks of professor plus lecturers and senior lecturers.

I Women at U of T Engineering

- **I.1:** Graduate, undergraduate and first-year headcount from U of T Enrolment Reporting Cube. Enrolment excludes students with special status. Number of faculty provided by Assistant Dean, HR & Diversity, Faculty of Applied Science & Engineering.
- **I.2:** Information provided by Assistant Dean, HR & Diversity, Faculty of Applied Science & Engineering.
- **I.3:** Information provided by Assistant Dean, HR & Diversity, Faculty of Applied Science & Engineering.
- **I.4:** Information from 2012 Resources Survey prepared by Engineers Canada for the National Council of Deans of Engineering and Applied Science. Data represents November 15, 2012 counts.

J The Engineering Precinct

Information from Office of Space Management. Visit map.utoronto.ca for a full campus map.

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