

University of Toronto **Engineering** | **Annual Report 2011**

# Performance Indicators



UNIVERSITY OF TORONTO  
FACULTY OF APPLIED SCIENCE & ENGINEERING

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# Message from the Dean

I am pleased to share our third annual report of performance indicators outlining our initiatives and the programs we developed in 2010–2011. The report highlights the learning, work, research and collaboration at the heart of our Faculty. With the data collected over the last ten years, we have been able to assess our progress as Canada's premier engineering Faculty. All of this is made possible through the dedicated work and planning of faculty and staff, along with the encouragement and contributions of our students, alumni and partners in academia, government and industry.

In parallel, we completed the development of our Academic Plan for 2011–2016. The Plan summarizes our academic and related administrative aspirations, within the context of U of T's *Towards 2030*. The Academic Plan will allow us to continue to achieve our goals of:

- heightening excellence in student experience;
- increasing academic rigour;
- strengthening our research-intensive culture;
- enhancing our global reputation and visibility;
- balancing our undergraduate-graduate enrolment mix;
- increasing internal and external collaboration; and
- developing a culture of outreach and influence.

By carefully assessing our progress and measuring it against these goals, we are able to further monitor our ongoing pursuit of excellence. Together, we have created a Faculty with an enviable global reputation for collaboration, innovative research, and vibrant teaching and learning. Your input will continue to play a critical role in ensuring our success as we implement our Academic Plan over the next five years.

I am proud of what we have accomplished together, and I am honoured to present this summary of our new programs and remarkable achievements for 2010–2011.



**Cristina Amon**, Dean

## Faculty Leadership, 2010–2011

**Dean**

Cristina Amon

**Vice-Dean, Graduate Studies**

Chris Damaren

**Vice-Dean, Research**

Stewart Aitchison

**Vice-Dean, Undergraduate**

Grant Allen and Sanjeev Chandra (Acting)

**Associate Dean, Cross-Disciplinary Programs**

Bryan Karney

**Chair, First Year**

Susan McCahan

**Chair, Department of Chemical Engineering  
& Applied Chemistry**

Doug Reeve

**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**

Will Cluett

**Chair, Department of Mechanical  
& Industrial Engineering**

Jean Zu

**Chair, Department of Materials  
Science & Engineering**

Jun Nogami

**Director, University of Toronto  
Institute for Aerospace Studies**

David Zingg

**Director, Institute of Biomaterials  
& Biomedical Engineering**

Paul Santerre

**Chief Administrative Officer**

Catherine Gagne

**Executive Director, Advancement**

Vanessa Abaya

**Executive Director, Communications  
& Public Affairs**

Madelyn Herschorn

**Faculty Registrar**

Barbara McCann

# Comparison of U of T Engineering with Ontario and Canada 2010–2011

The table below presents key metrics from our Faculty and compares them with those of engineering Faculties in Ontario and Canada for 2010 and 2010–2011. Within Canada, we award 8.5% of all undergraduate engineering degrees and more than 10% of all graduate engineering degrees.

Even though 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 almost 50% of major awards granted to Ontario institutions, and over 33% of those awarded to Canadian engineering schools in 2010–2011.

	U of T Engineering	Ontario	U of T % of Ontario	Canada	U of T % of Canada
<b>Undergraduate</b>					
Enrolment (FTE)	4,294	24,871	17.3%	61,386	7.0%
Degrees Awarded	931	4,692	19.8%	11,041	8.5%
<b>Masters (MEng, MASc and MHSc)</b>					
Enrolment (FTE)	763	3,887	19.6%	11,127	6.9%
Degrees Awarded	391	1,958	20.0%	3,907	10.0%
<b>Doctoral (PhD)</b>					
Enrolment (FTE)	676	2,714	24.9%	7,479	9.0%
Degrees Awarded	101	426	23.7%	980	10.3%
<b>Faculty</b>					
Tenured and Tenure-Stream	210	1,341	15.6%	3,358	6.2%
<b>Major Awards</b>					
Major Awards Received	26	54	48.1%	78	33.3%
<b>Research Funding</b>					
NSERC Funding for Engineering	\$24.1M	\$102.2M	23.6%	\$274.1M	8.8%

**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 2010 calendar year and come from Engineers Canada ([www.engineerscanada.ca](http://www.engineerscanada.ca)). Faculty data (tenured and tenure-stream) are based on November 2010 counts by Engineers Canada. Major awards and research funding statistics are based on the 2011 grant year (April 2010 to March 2011).

# Comparison of U of T Engineering with St. George Campus and University of Toronto, 2010–2011

The following table compares our Faculty with the rest of the University of Toronto based on key metrics. Since U of T Engineering's activities are concentrated on the St. George campus, we also present our metrics relative to the downtown campus of the University of Toronto, where possible.

	U of T Engineering	St. George Campus	Engineering % of St. George	University of Toronto	Engineering % of U of T
<b>Student Enrolment</b>					
Undergraduate	4,936	36,153	13.7%	57,713	8.6%
Professional Masters (MEng and MHSc)	406	5,573	7.3%	5,909	6.9%
Research Masters (MASc)	568	2,715	20.9%	2,807	20.2%
Doctoral (PhD)	695	5,498	12.6%	5,727	12.1%
All Students	6,605	49,939	13.2%	71,156	9.2%
<b>Degrees Awarded</b>					
Undergraduate	899	7,743	11.6%	11,514	7.8%
Professional Masters (MEng and MHSc)	205	2,484	8.3%	2,668	7.7%
Research Masters (MASc)	190	1,295	14.7%	1,339	14.2%
Doctoral (PhD)	107	777	13.8%	804	13.3%
Total Degrees	1,401	12,299	11.4%	16,325	8.6%
<b>Faculty and Staff</b>					
Professoriate	235			2,713	8.6%
Administrative and Technical Staff	257			5,812	4.4%
<b>Research Funding</b>					
Sponsored-Research Funding	\$70.7M			\$408.2M	17.3%
Industry Research Funding	\$5.9M			\$14.2M	41.8%
<b>Space</b>					
Space (NASMs)	61,840	626,012	9.9%	779,090	7.9%
<b>Revenue</b>					
Total University-Wide Costs	\$44.7M			\$392.8M	12.0%
Total Revenue	\$142.1M			\$1,353.4M	11.1%

**Note:** Student enrolment is shown as of November 1, 2010. Degrees awarded are based on the 2010–2011 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 grant year (April to March). Space is measured in Net Assignable Square Metres (NASMs). Revenue is based on the 2011 U of T fiscal year (May to April).

# 1 Undergraduate Studies

It has been a significant year of achievement in Engineering undergraduate studies. The number of student applications in 2010 set a new record at 7,881, exceeding the large numbers experienced during the 2003 double cohort. Our incoming class boasted the highest overall entrance average in the past decade: 89.2%, and there was a 24% increase in registered international students over 2009.

Given the number and quality of applicants, we have been able to be more selective in offering admission to the brightest future engineers. With more international students and a steady number of women in our programs, we are benefiting from the diverse perspectives they bring to our classrooms. The variety of Engineering student clubs and teams move that rich diversity beyond the classrooms.

New programs such as the Engineering Mathematics, Statistics & Finance Major for Engineering Science students, and minors in Engineering Business and Robotics & Mechatronics continue to increase the choices available to our undergraduates. Programs like the Professional Experience Year (up 20% over 2009), along with summer research opportunities enhance our students' experiences and increase their competitiveness upon graduation.

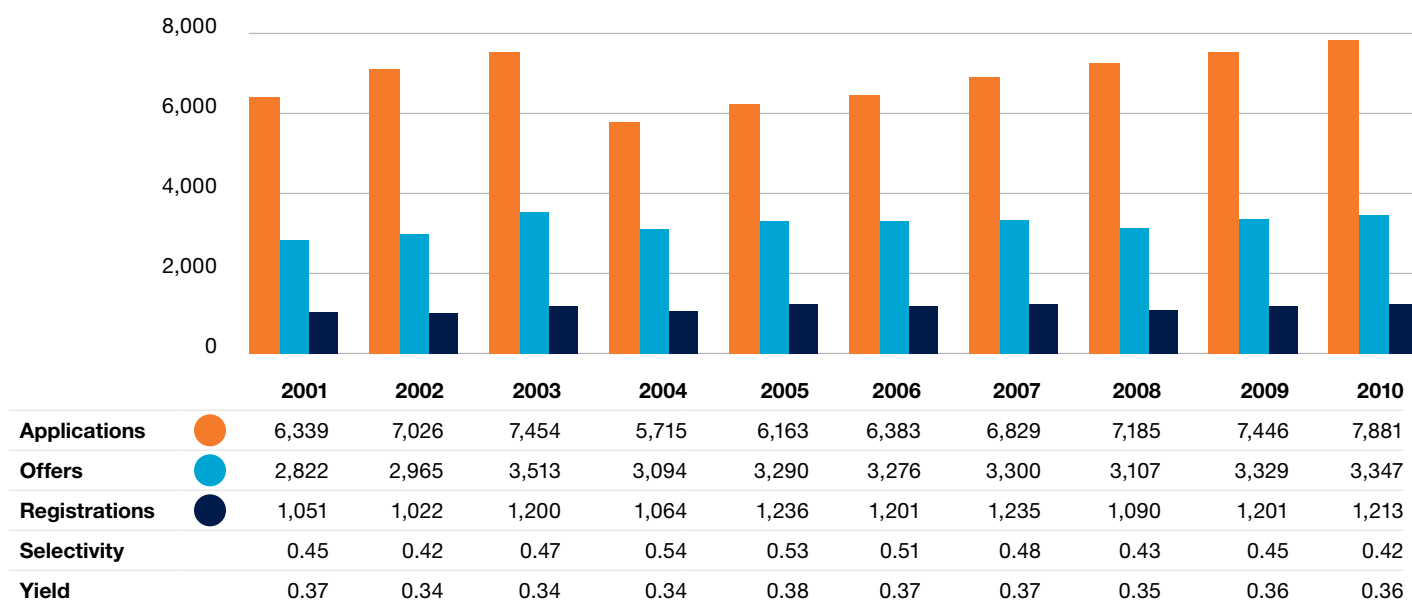
Our students can acquire leadership and teaching experience by participating in the Faculty's pre-university outreach activities. Established programs like the DEEP Summer Academy and Go ENG Girl were joined by six new initiatives in 2010–2011, including Aboriginal Jr. DEEP and March Math & Engineering. These outreach activities are designed to inspire young people to explore their interests in engineering, helping the Faculty build relationships with an ever-expanding community.

The breadth of the undergraduate experience also benefits from the opportunity to get involved in Engineering clubs and teams. Several of these groups have won international recognition for their achievements. The Human Powered Vehicles Design Team and the University of Toronto Robotics Association were among many teams to bring home first-place finishes. Numerous groups, such as the Professional Engineers Ontario student chapter and Women in Science and Engineering, also hosted successful conferences or events in the 2010–2011 academic year.

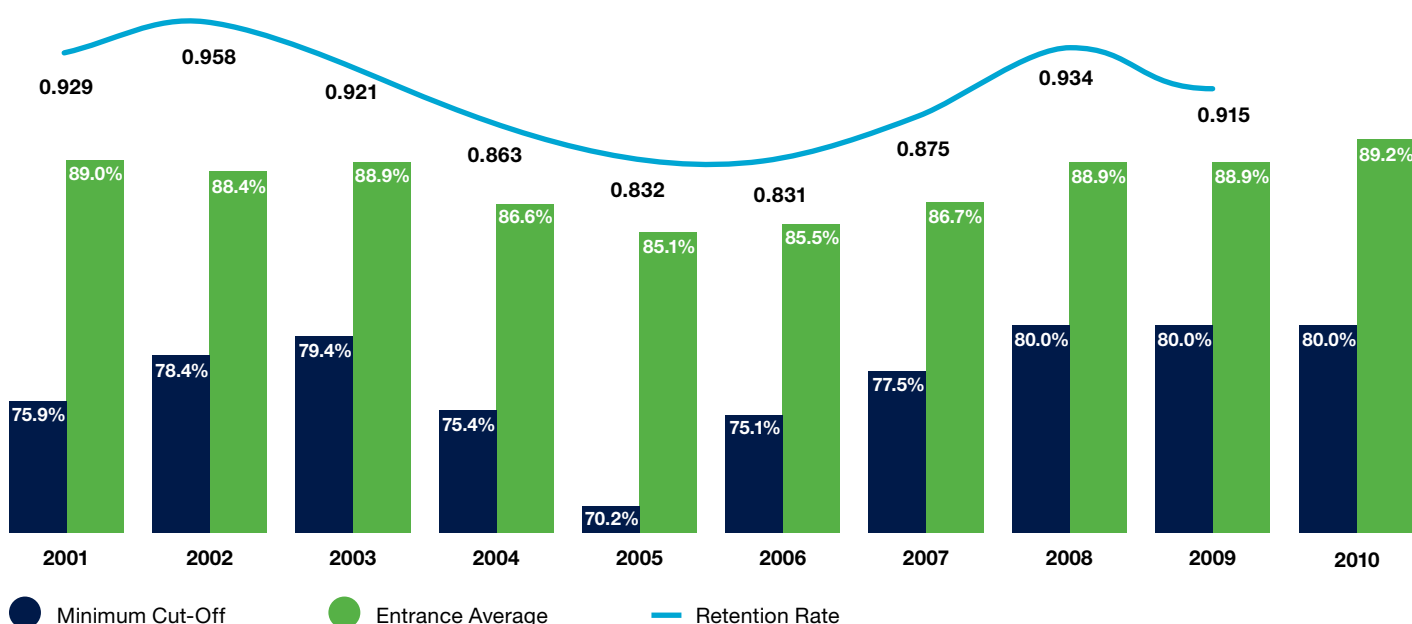
## Undergraduate Admissions and First-Year Students

We received a record number of applications in 2010, exceeding the number achieved in the 2003 double cohort year. The larger pool of applicants, indicating the popularity of U of T Engineering among qualified applicants, has allowed us to be more selective in our offers of admission, which leads to stronger classes and better retention. As we continue to increase selectivity, we will also ensure that our yield continues to increase.

**Figure 1.1** Applications, Offers, Registrations, Selectivity and Yield of First-Year Undergraduates, Fall 2001 to Fall 2010



**Figure 1.2** Ontario Secondary School Averages of Incoming First-Year Undergraduates and Retention Rate Between First and Second Year with Minimum Cut-Off, Fall 2001 to Fall 2010



**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.



Evidence of our ability to attract academically strong students can be found in the 2010 overall entrance average of 89.2%, the highest it has been in more than a decade. The minimum cut-off grade (the average of the ten lowest Ontario Secondary School entering grades among all students who were admitted in a given year) has remained steady at 80.0% for the third year in a row. Most of our undergraduate programs have significantly higher cut-off entering grades.

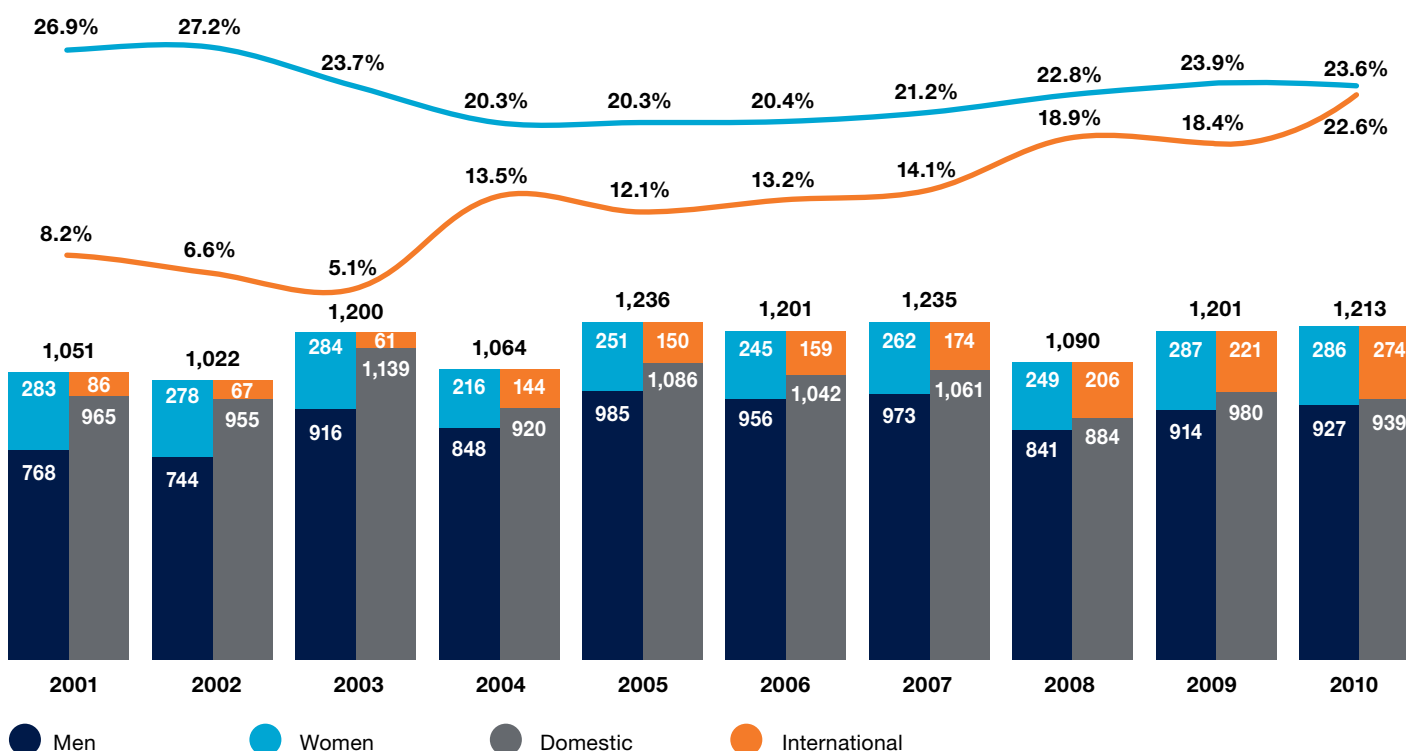
As seen in Figure 1.2, the rising entrance averages since 2006 — together with programs like Success 101 — have had a positive effect on retention rates, which remained relatively steady in 2010. Students who are better prepared to do well in the Faculty's intellectually challenging environment are also more likely to successfully complete their degrees.

The combination of our enhanced recruitment efforts and strong international rankings resulted in a record number of international first-year students for 2010 — both in numbers and as a percentage. Increasing the number of women

choosing Engineering remains an ongoing priority. Shown in Figure 1.3, enrolment of women in first year held steady at nearly 290 students, which is just one student less than our top year for women entering undergraduate studies in 2009. The diversity of our students enriches their experiences and brings different perspectives to the classroom, ultimately creating well-rounded engineers who are ready to take on increasing challenges, anywhere in the world.

In recent years, we have focused our international recruitment efforts on Southeast Asia and the Middle East. Trips twice a year to these regions have helped us develop valued relationships with top high schools. This year, we also added Turkey to our recruitment efforts as this is an emerging market with strong students interested in studying engineering. Coordinated online chats and student video blogs have linked us to prospective students from around the world, giving them a chance to ask questions and learn more about academic and student life at U of T.

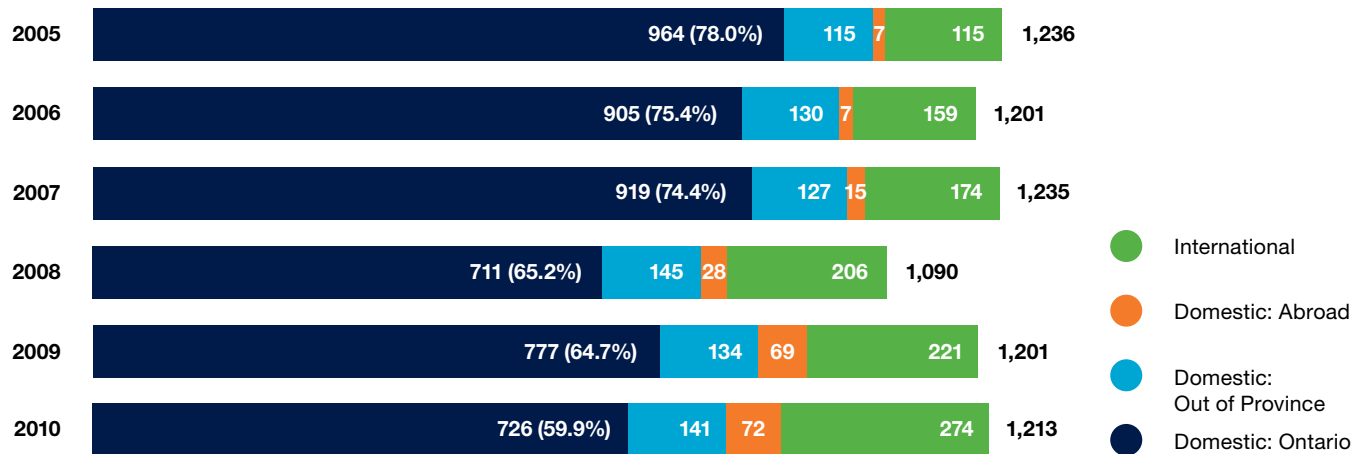
**Figure 1.3 Incoming First-Year Undergraduates with Percentage of Women and International Students, Fall 2001 to Fall 2010**



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

A significant increase in international students during the past year, along with increases in the number of domestic students from outside of Ontario and Canada, has further strengthened the global perspectives found in our classrooms. Students from beyond Ontario's borders now represent 40% of the total enrolment in first year. Particularly strong are the growing numbers of domestic students returning to Canada after living abroad.

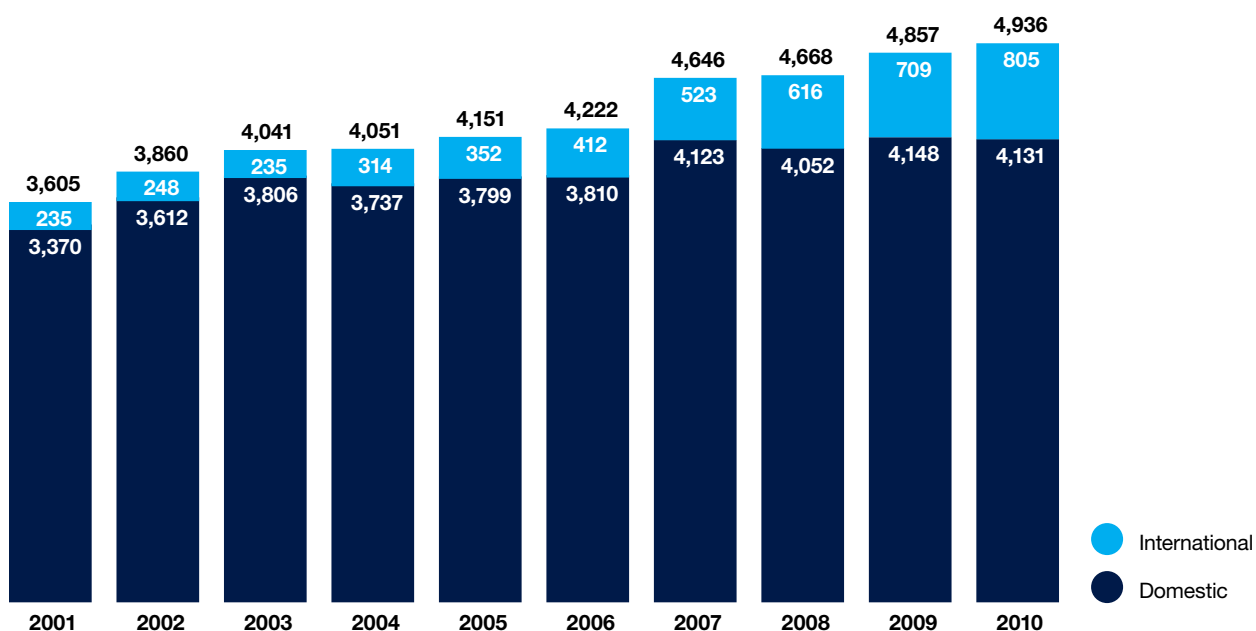
**Figure 1.4 Incoming First-Year Domestic and International Undergraduates, Fall 2005 to Fall 2010**



## Undergraduate Enrolment

The 4,936 Engineering students in the fall of 2010 represented our largest-ever undergraduate enrolment. The biggest factor contributing to the increase was the growth in the number of international students by 14% over 2009. This increase reflects our recruitment efforts to attract students from around the world to U of T Engineering for undergraduate studies.

**Figure 1.5 International and Domestic Undergraduates, Fall 2001 to Fall 2010**



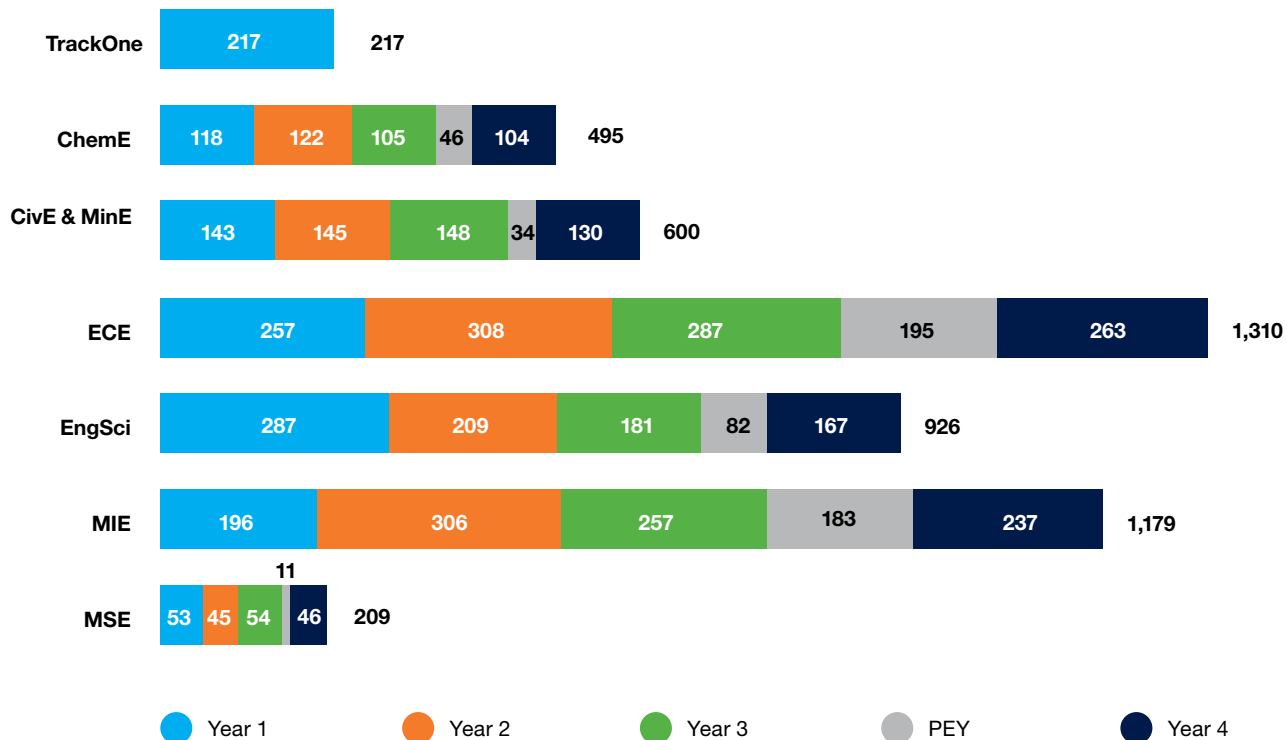
**Note 1.4:** Domestic students are defined as Citizens or Permanent Residents of Canada. Student counts are shown as of November 1.

**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.

More than six out of every ten incoming students in 2010 chose one of our Core 8 programs (Chemical, Civil, Computer, Electrical, Industrial, Materials, Mechanical, Mineral) for first-year studies. Enrolment in TrackOne grew by 14% over 2009, reflecting an interest by some students to have the option of choosing their area of study at the end of first year.

Engineering Science students all follow a common curriculum in their first two years, then select one of eight majors available to them for years three and four as seen in the chart below. At several points during their first year, Engineering Science students also have the option of transferring into one of our Core 8 programs.

**Figure 1.6 Undergraduates by Academic Area, Year of Study and PEY, Fall 2010**

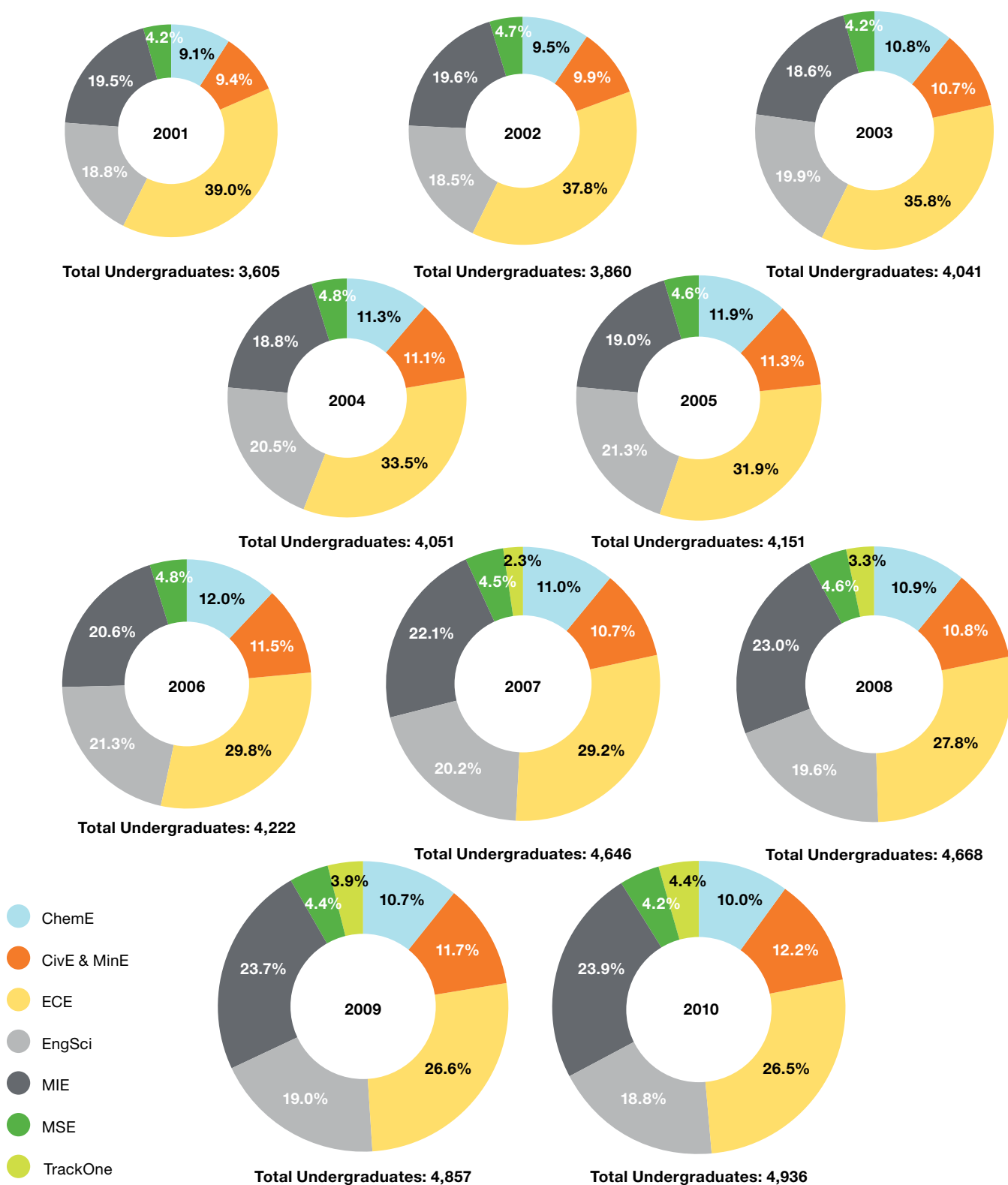


Engineering Science Majors	Enrolment
Aerospace Engineering	65
Biomedical Engineering	50
Electrical & Computer Engineering	109
Energy Systems	34
Engineering Mathematics, Statistics & Finance	31
Infrastructure Engineering	22
Manufacturing Systems	8
Nanoengineering	12
Physics	17
<b>Total</b>	<b>348</b>

**Note 1.6:** Student counts are shown as of November 1. “Academic Area” refers to the following departments, divisions and institutes: UTIAS, IBBME, ChemE, CivE, ECE, EngSci, MIE and MSE. TrackOne is also included for comparison. See the Glossary for a full list of academic terms used in the Annual Report. For Engineering Science Majors, “Electrical & Computer Engineering” includes those fourth-year students enrolled in the separate Electrical Engineering and Computer Engineering options that are now combined. Enrolment in Engineering Science Majors includes students who are completing the Manufacturing Systems Major, which has been discontinued. The Engineering Mathematics, Statistics & Finance Major is new for 2010–2011.

Our steady growth in the past decade is illustrated in our undergraduate population. In the fall of 2010, student enrolment rose by 1.6% over the previous year. Since its launch in 2007, TrackOne has more than doubled in size. Enrolment in ChemE, CivE & MinE, MIE and MSE has remained steady.

**Figure 1.7 Undergraduates by Academic Area, Fall 2001 to Fall 2010**



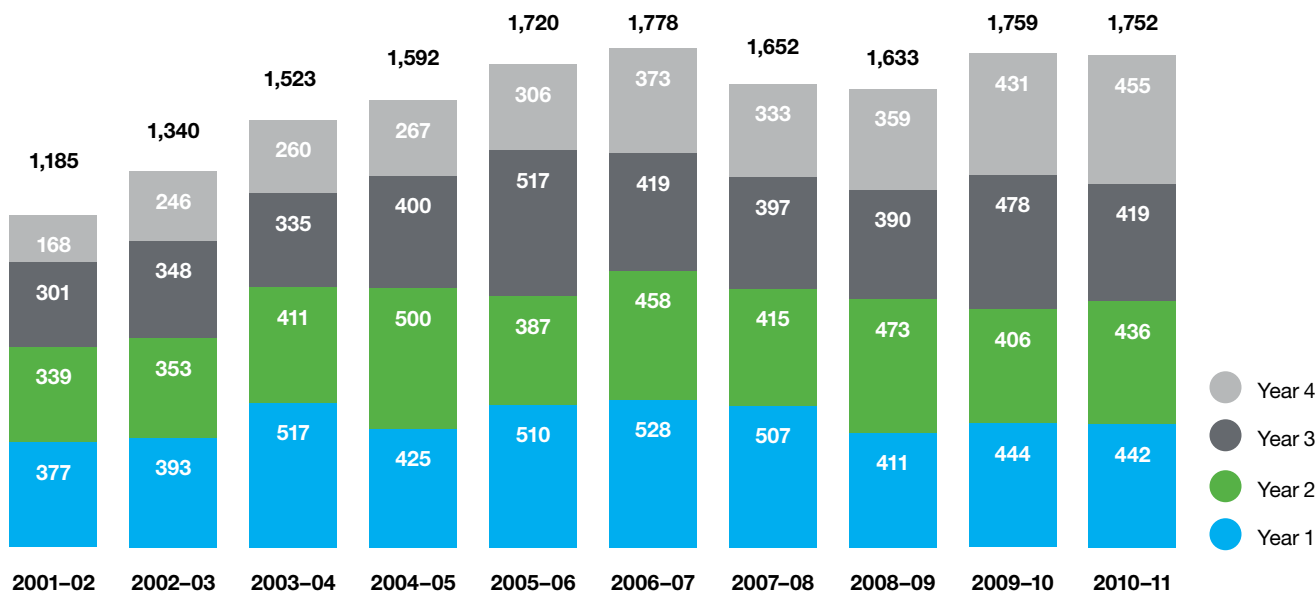
**Note 1.7:** Student counts are shown as of November 1.

## Undergraduate Student Funding

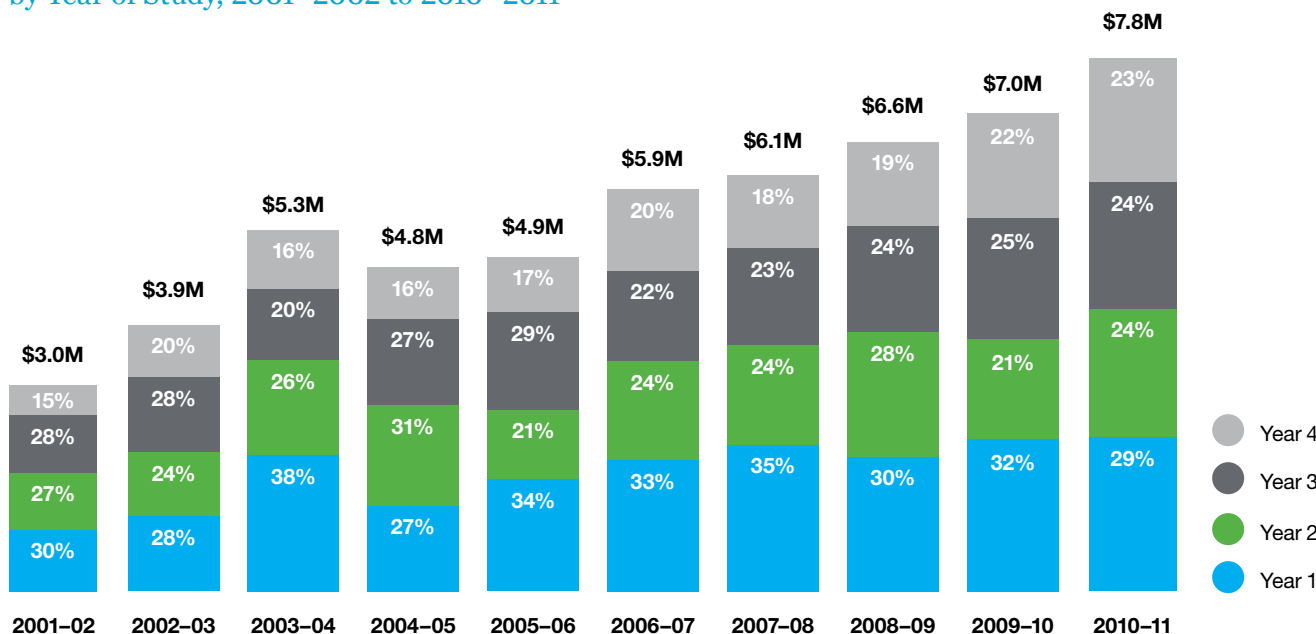
Funding awarded to students in their third and fourth years continued to climb, with nearly half of our fourth-year students receiving financial assistance. The Faculty is grateful to donors who provide the awards, which are allocated on the basis of merit and financial need.

Figure 1.8b represents the amount of financial assistance awarded to students from admission through to graduation. This funding includes all University sources, grants, UTAPS funding and need-based awards. The value of financial assistance rose by 12% since 2009–2010, with the total funds being evenly distributed by cohort. Funding is more than two and a half times greater than a decade ago.

**Figure 1.8a** Number of Awards Received by Cohort with Total Number of Undergraduate Award Recipients, 2001–2002 to 2010–2011



**Figure 1.8b** Total Value of Undergraduate Financial Assistance and Percentage Distributed by Year of Study, 2001–2002 to 2010–2011



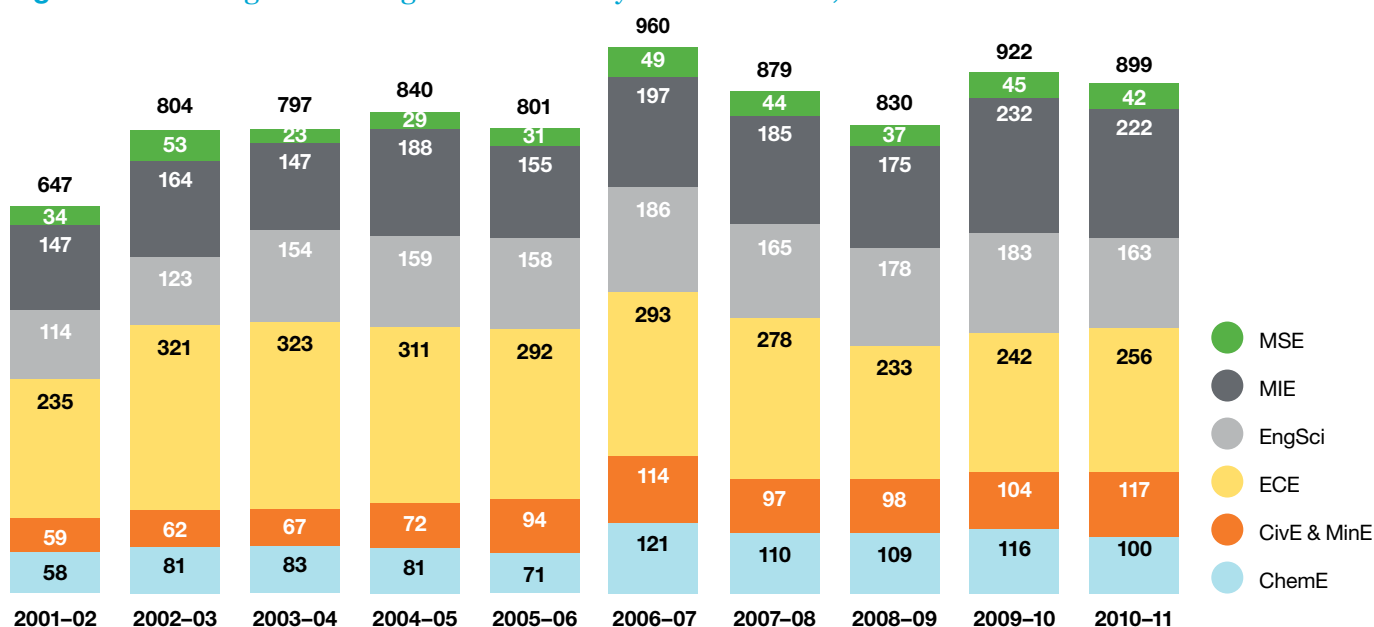
**Note 1.8a and 1.8b:** Data reported by academic year (September to August).

## Degrees Awarded

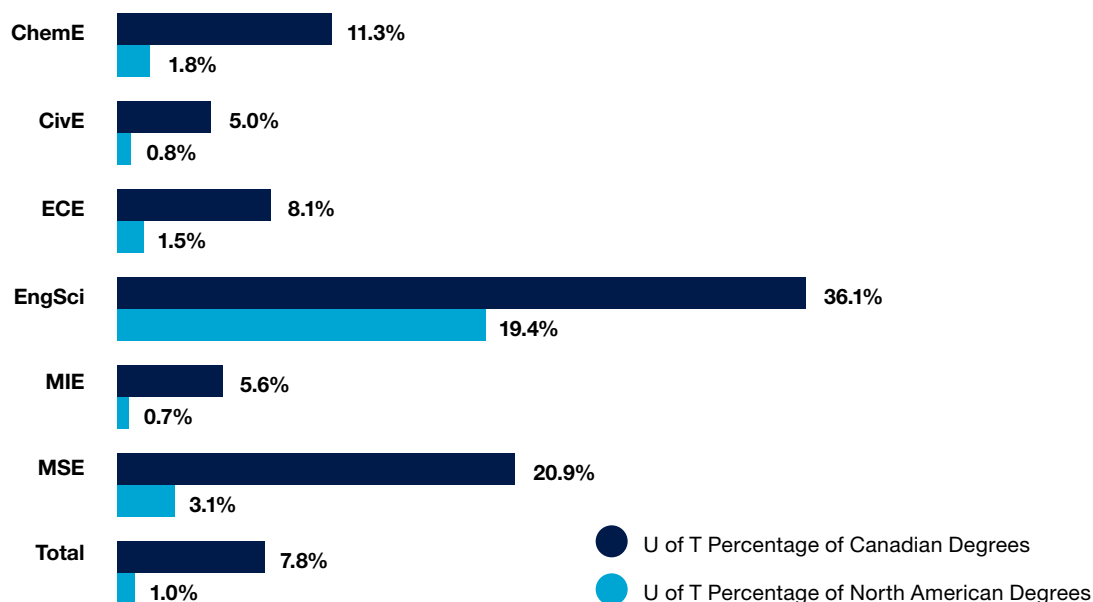
U of T Engineering awards two types of degrees at the undergraduate level: Bachelor of Applied Science (BASc) and Bachelor of Applied Science in Engineering Science (BASc EngSci). Each academic year, convocation occurs in November, March and June. Factors that have an impact on how long it takes to graduate include decisions to pursue the PEY program and the ability or choice to complete all requirements within less or more than four years. The unusually high number of degrees conferred in 2006–2007 is the result of the graduation of double cohort students.

The undergraduate degrees we awarded accounted for 1.0% of all undergraduate engineering degrees awarded in North America and 7.8% of all undergraduate degrees awarded in Canada in 2009, as seen in Figure 1.9b.

**Figure 1.9a Undergraduate Degrees Awarded by Academic Area, 2001–2002 to 2010–2011**



**Figure 1.9b U of T Engineering Degrees Awarded by Academic Area Compared with Canadian and North American Degree Totals, 2009**



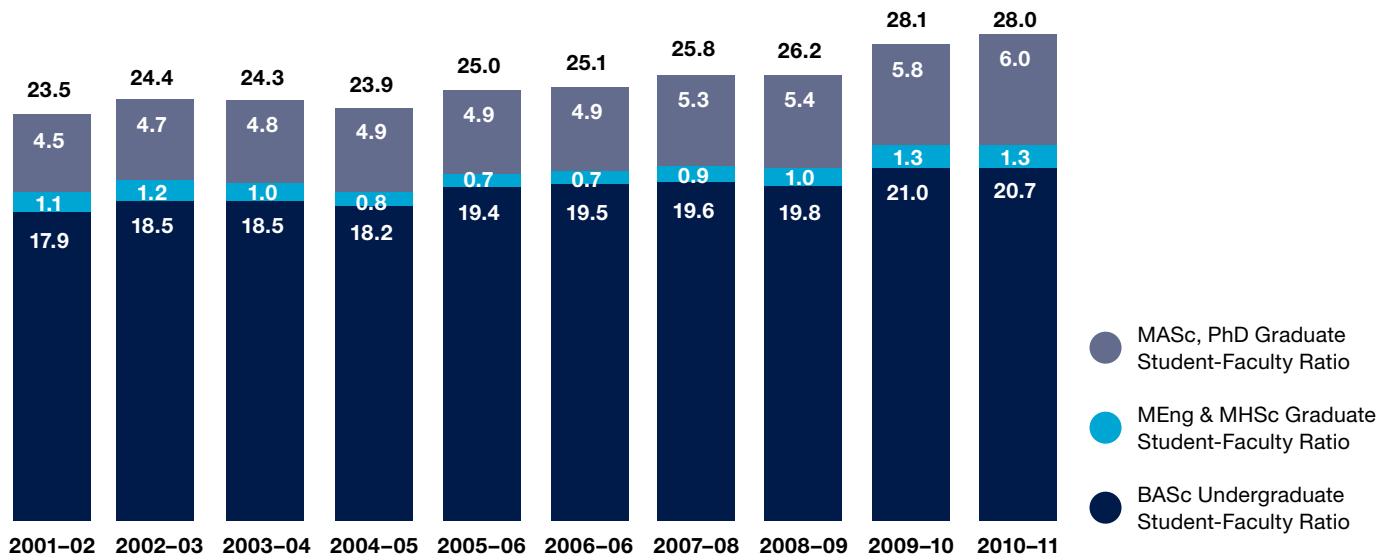
**Note 1.9a:** Data reported by academic year (September to August).

**Note 1.9b:** Data sourced from reports produced by Engineers Canada and the American Society of Engineering Educators. Total percentages represent all engineering degrees awarded in North America, including those in fields that are not specifically identified at U of T.

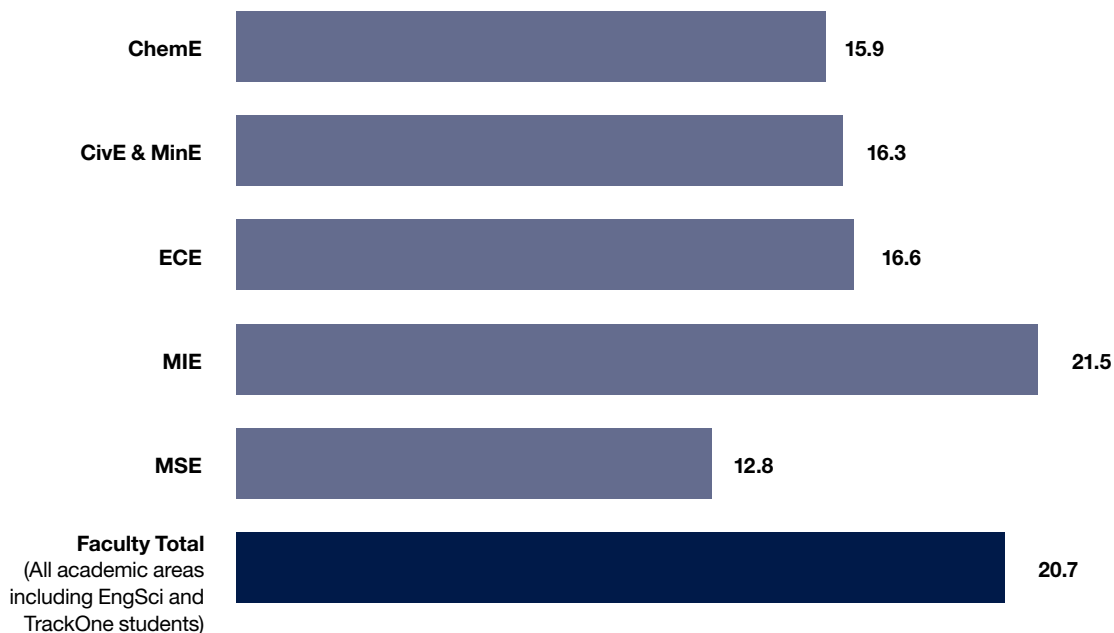
## Student-Faculty Ratios

Despite growing student numbers, we have been able to minimize impact on student-faculty ratios in the past year. A key feature of a U of T Engineering education is the opportunity to interact with our internationally renowned faculty. In 2010–2011, intense recruitment took place to fill 14 faculty positions. Of those, eight searches were finalized by mid-summer 2011.

**Figure 1.10a** Undergraduate and Graduate Full-Time Equivalent Student-Faculty Ratios, 2001–2002 to 2010–2011



**Figure 1.10b** Undergraduate Student-Faculty Ratios by Academic Area, 2010–2011



**Note 1.10a:** Student counts are shown as of November 1.

**Note 1.10b:** Student counts are shown as of November 1 from the U of T undergraduate reporting cube. Special status students and students on PEY are not included. Engineering Science and TrackOne students are only included in the Faculty Total. FTE faculty counts are taken from 2011–2012 (FY12) budget calculations, based on data from 2010–2011, and include both tenure-stream and teaching-stream faculty.

## Improving the Undergraduate Learning Experience

All students are encouraged to complete an evaluation for each of their courses at the end of the fall and winter terms. Most of the 28 questions on the evaluation are scored out of seven, including Question 16 (shown in Figure 1.11) which asks students to provide an overall rating of their instructor as a teacher. The Faculty average of 5.54 in the fall of 2010 was the highest it has been in the past six years.

Course teaching evaluations are one part of our effort to improve the learning experience of our undergraduates. The Canadian Engineering Accreditation Board is introducing a new outcomes-based system to augment the existing accreditation system. The new system requires programs to

develop a continuous curriculum improvement process that involves setting learning objectives and measuring how well graduating engineers meet those goals. The results of the measurements will be used to inform curriculum changes. The process requires that we evaluate student learning in 12 essential areas, called graduate attributes. These include important engineering abilities such as design, problem analysis and the ability to apply ethics in engineering work. The Faculty Graduate Attributes Committee has been working this year to develop a set of learning objectives that will be used by the programs for this process.

**Figure 1.11 Undergraduate Course Teaching Evaluations by Academic Area, 2005–2006 to 2010–2011**

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
<b>First-Year</b>	5.21	5.30	5.23	5.41	5.33	5.43
<b>UTIAS</b>	5.51	5.46	5.50	5.39	5.57	5.58
<b>ChemE</b>	5.23	5.33	5.33	5.32	5.45	5.51
<b>CivE &amp; MinE</b>	5.47	5.40	5.36	5.46	5.33	5.29
<b>ECE</b>	5.46	5.44	5.67	5.57	5.69	5.73
<b>MIE</b>	5.28	5.23	5.33	5.42	5.39	5.42
<b>MSE</b>	4.98	5.15	5.21	5.36	5.42	5.39
<b>Other</b>	5.08	5.15	5.39	5.54	5.54	5.26
<b>Faculty Average</b>	<b>5.28</b>	<b>5.32</b>	<b>5.38</b>	<b>5.44</b>	<b>5.46</b>	<b>5.47</b>

## Summer Research Opportunities

**Figure 1.12 Undergraduate Participation in Summer Research Opportunities, Summer 2011**

Research Participation:	Local	International	Total
<b>ChemE</b>	37	4	<b>41</b>
<b>CivE &amp; MinE</b>	7	0	<b>7</b>
<b>ECE</b>	48	1	<b>49</b>
<b>EngSci</b>	58	11	<b>69</b>
<b>MIE</b>	20	2	<b>22</b>
<b>MSE</b>	14	0	<b>14</b>
<b>Total</b>	<b>184</b>	<b>18</b>	<b>202</b>

Summers are an opportune time for undergraduates to put their skills to practice while contributing to ongoing research. In the summer of 2011, 202 of our students held research positions both locally and abroad, giving them incredible exposure to top engineering research.

**Note 1.11:** “First-Year” includes first-year courses from all departments; departmental results are based on second-, third- and fourth-year courses. Each department’s results include any courses taught by professors of that department, including courses for the Engineering Science program. “Other” includes second-, third- and fourth-year courses with the following designations: APS, BME, MAT, PHY, CSC, STA and HPS, as well as EngSci Option Seminars, Capstone design courses and Theses.

**Note 1.12:** Of the 202 students listed, 14 undergraduates were hosted by UTIAS and nine were hosted by IBBME. All international research opportunities were coordinated by the University’s Centre for International Exchange.



## Engineering Career Centre

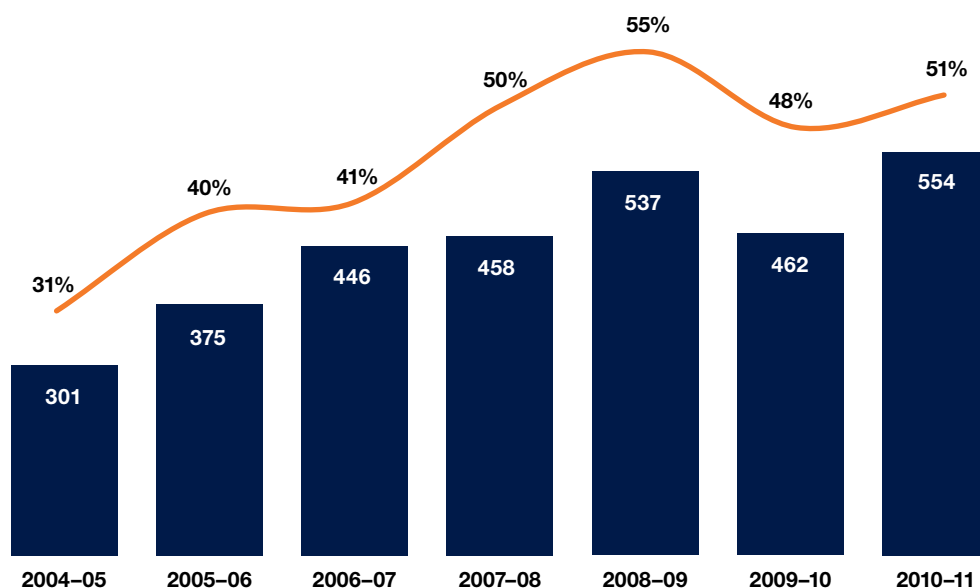
The Engineering Career Centre supports the career-related opportunities available to our students through a range of programs, including the Professional Experience Year (PEY), Engineering Summer Internship Program (eSIP) and Infrastructure Opportunity Program (IOP).

PEY provides students the opportunity to work as engineering professionals for 12 to 16 months after their second or third year of study. As seen in Figure 1.13a, more than half the students who were in third-year in 2009–2010 went on PEY in 2010–2011. While we experienced our highest number of placements last year, fewer international opportunities were available to our students as a result of countries

recovering from the recent global economic recession. We continue to maintain relationships with our existing international industry partners, follow up on old connections and pursue new partnerships.

The Engineering Career Centre actively refines and builds upon strategies that enhance the quality of our students' experience. This year, the Engineering Career Centre formed an Advisory Board to create a network of students, staff, faculty, professionals and employers to consider how to best prepare our students for employment within industry or academia.

**Figure 1.13a** PEY Internship Placements for Engineering Undergraduates with Percentage Participation from Previous Third-Year Class, 2004–2005 to 2010–2011



**Figure 1.13b** Canadian and International PEY Internship Placements for Engineering Undergraduates, 2004–2005 to 2010–2011

	Canadian Placements	International Placements
2004–05	275	26
2005–06	348	27
2006–07	423	23
2007–08	427	31
2008–09	490	47
2009–10	426	36
2010–11	530	24

**Note 1.13a and 1.13b:** The number of PEY placements reported here exceeds the number of students on PEY as reported in Figure 1.6 due to those who started their placements and did not complete them.

## Pre-University Engineering Outreach

The Engineering Student Outreach Office (ESOO) serves as our hub of outreach activities, promoting Science, Technology, Engineering and Math (STEM) education. In addition to designing and delivering our own suite of programming for youth, we also coordinate outreach activities with students clubs, faculty members and other offices within the University. Cumulatively, the Faculty's outreach activities achieve four goals: 1) Educate youth about engineering; 2) Attract qualified students to apply for admission within our Faculty; 3) Help our current undergraduate and graduate students build leadership skills; and 4) Build positive relationships within a variety of communities.

Along with ESOO's regular programming of DEEP (Da Vinci Engineering Enrichment Program) Summer Academy, Jr. DEEP, Go ENG Girl and Saturday Science & Engineering Academy, ESOO launched six additional initiatives in 2010–2011:

### Aboriginal Jr. DEEP

Funded through the Ontario Ministry of Training, Colleges and Universities and in partnership with U of T's First Nations House, ESOO created a stream within the Jr. DEEP program for Aboriginal youth. Through this program, 13 students from across the Greater Toronto Area participated in a week of interactive science, technology and engineering activities at the St. George campus.

### Girls' Science & Engineering Saturdays

Offered in the fall and spring to girls in grades 5 through 12, Girls' Science & Engineering Saturdays was created to encourage girls to explore their interests in science, engineering and technology in a comfortable, confidence-inspiring, all-female environment. Students participated in discovery-based science and engineering activities and sessions led by women in Engineering.

### Google Girls

In partnership with Pathways to Education, ESOO coordinated a visit to Google's Toronto office for 55 girls in grades 7 to 10 from Toronto's inner-city neighbourhood of Regent Park. Students toured Google's facilities, participated in a design challenge and explored real-world applications of engineering and science.

### March Math & Engineering

In collaboration with U of T's Department of Mathematics, ESOO offered a three-day, math-intensive program during March Break 2011 for students in grades 7 through 12. This program introduced 54 students to the exciting scope and application of engineering and mathematics.

### Outreach for Children and Grandchildren of Alumni

In 2010–2011, ESOO and our Alumni Relations team collaborated to offer two special programs to children and grandchildren of alumni. March Skule™ Kids during March Break had 49 participants and the Skule™ Kids' program during Spring Reunion had 19 participants.

### Pathways to Science & Engineering

Working with Pathways to Education, 70 grade 10 and 11 students and their parents attended our first Pathways to Science & Engineering event. Participants spent the day exploring our facilities, meeting current students and learning about engineering concepts through activities.

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**Note:** Pathways to Education is a not-for-profit organization that helps youth in low-income families graduate from high school and successfully transition into post-secondary education. Pathways to Education operates in 11 communities across Canada. For more information, please visit [www.pathwaystoeducation.ca](http://www.pathwaystoeducation.ca)

# Student Clubs and Teams

Involvement outside of the classroom enables our students to put their skills to practice while gaining valuable team and leadership experiences within several communities. In collaboration with the Engineering Society, the clubs and teams below enjoyed notable achievements in the 2010–2011 academic year. For a complete list of student clubs, please see Appendix A.

## Destination Imagination

- Participates annually at creativity and problem-solving competitions
- Placed third internationally at the Global Finals in the Technical Focused Challenge (held in Tennessee)
- Mentored more than 20 high school and elementary teams; some of which placed second in their age categories at the Global Finals

## Eyes of Hope

- Co-hosted Habitat Week with Take Action! and U of T's Habitat for Humanity to raise funds and bring awareness to the work of Habitat for Humanity Toronto
- Organized more than 25 painting sessions through the Out of the Cold dinner program for street-involved youth
- Raised funds to provide relief in Japan and to complete the construction of a school in Sierra Leone through Free the Children
- Coordinated volunteer activities at the Scott Mission soup kitchen and the Daily Bread Food Bank, and organized sandwich runs for Toronto's homeless

## Human Powered Vehicles Design Team

- Placed first in the American Society of Mechanical Engineers Human Powered Vehicle Challenge in Indiana with a second-place finish in the Men's Sprint, first-place in the Women's Sprint and first-place in Speed Endurance
- Achieved the Men's Collegiate World Record (102 km/h) and Women's Collegiate World Record (90 km/h) at the World Human Powered Speed Challenge in Nevada
- Placed first, set a new track record and finished in the top 10 in all events at the Michigan Human-Powered Vehicle Rally
- Placed second and third at the Kenosha Challenge Sprint Event in Wisconsin

## Iron Dragons

- Achieved the fastest 500m race time in Iron Dragons' 14-year history at the Toronto International Dragon Boat Race Festival
- Won the 2,000m race at the Milton Dragon Boat Race Festival and the University & Education Cup at the Great White North Dragon Boat Challenge

## Nspire

- Hosted the National Business and Technology Conference attended by 250 students from across Canada and the United States (featured high-profile speakers such as Bruce Ross, President of IBM Canada and Isadore Sharp, Founder of Four Seasons Hotels)
- Organized a four-part series to educate more than 500 students on networking, social media, mobile technology and building a team

## Professional Engineers Ontario (PEO) Student Conference

- Hosted one of the most successful PEO conferences to-date with the theme: Engineering—Yours to Discover
- Speakers discussed a broad range of topics to help students explore their career options

## Sustainable Engineers Association

- Hosted the Sustainable Engineers Association Conference to educate engineers in the technical, social and economical aspects of sustainability
- Held three seminars titled Smart Grid, Aviation and the Environment, and Sustainability Consulting
- Organized a Steam Whistle sustainability field trip and Model Copenhagen Conference to explore the economical and political dimensions of sustainability
- Won the U of T Student Union (UTSU) Sustainability Commission Leadership Award

## University of Toronto Robotics Association

- Won the gold medal at RoboGames in California for the second consecutive year
- Received a silver medal in the Unmanned Ground Vehicle Competition
- Partnered with U of T Architecture to design the first-ever responsive actuated truss, which was published at the International Conference of Robotics and Automation in Alaska

## Women in Science and Engineering

- Hosted the 'Towards Balancing the Equation: Women in Engineering Panel' event in collaboration with UTSU as part of the Expression Against Oppression Event series
- Conducted extensive middle-school outreach, including organizing four interactive workshops at Valley Park Middle School
- Received the UTSU Social Justice Award

## 2 Graduate Studies

Our Faculty continues to attract top students from around the world to our graduate programs. As our students complete their graduate degrees, they enter the profession as researchers, innovators, knowledge leaders and agents of change.

Since 2006, our Faculty has seen a steady rise in the number of students in our research and professional graduate programs. While 2010–2011 marked our highest overall enrolment for graduate studies to date, our efforts to grow our PhD program has been particularly rewarding with an 81% increase in enrolment over the last decade.

Scholarship funding for our students grew in the past year by 23%, with an encouraging infusion from organizations not usually associated with engineering research. Total funding from all sources went up 10% during the same period.

A new IBBME clinical engineering PhD concentration for graduate students will begin in the fall of 2011, giving PhD candidates an opportunity to tackle biomedical engineering with a focus on patient safety, quality care and leadership roles in clinical research. Doctoral graduates in the new concentration will be eligible for certification by the American College of Clinical Engineers.

Another initiative starting in the fall of 2011 is a certificate in Robotics & Mechatronics, making it possible for graduate students to explore technologies that turn robotic and mechatronic systems into viable consumer products. It is a joint initiative by MIE, ECE, CivE, IBBME and UTIAS. As well, there are three new MIE certificates in Energy Studies, Healthcare Engineering and Computational Mechanics in Design. They join the existing MEng certificates: ELITE (Entrepreneurship, Leadership, Innovation & Technology in Engineering); EPP (Engineering & Public Policy); and Engineering & Globalization. Combined with the fast-track option to move exceptional MASc students to a PhD program, we are providing a growing array of choices to our graduate students.

## Graduate Student Admissions

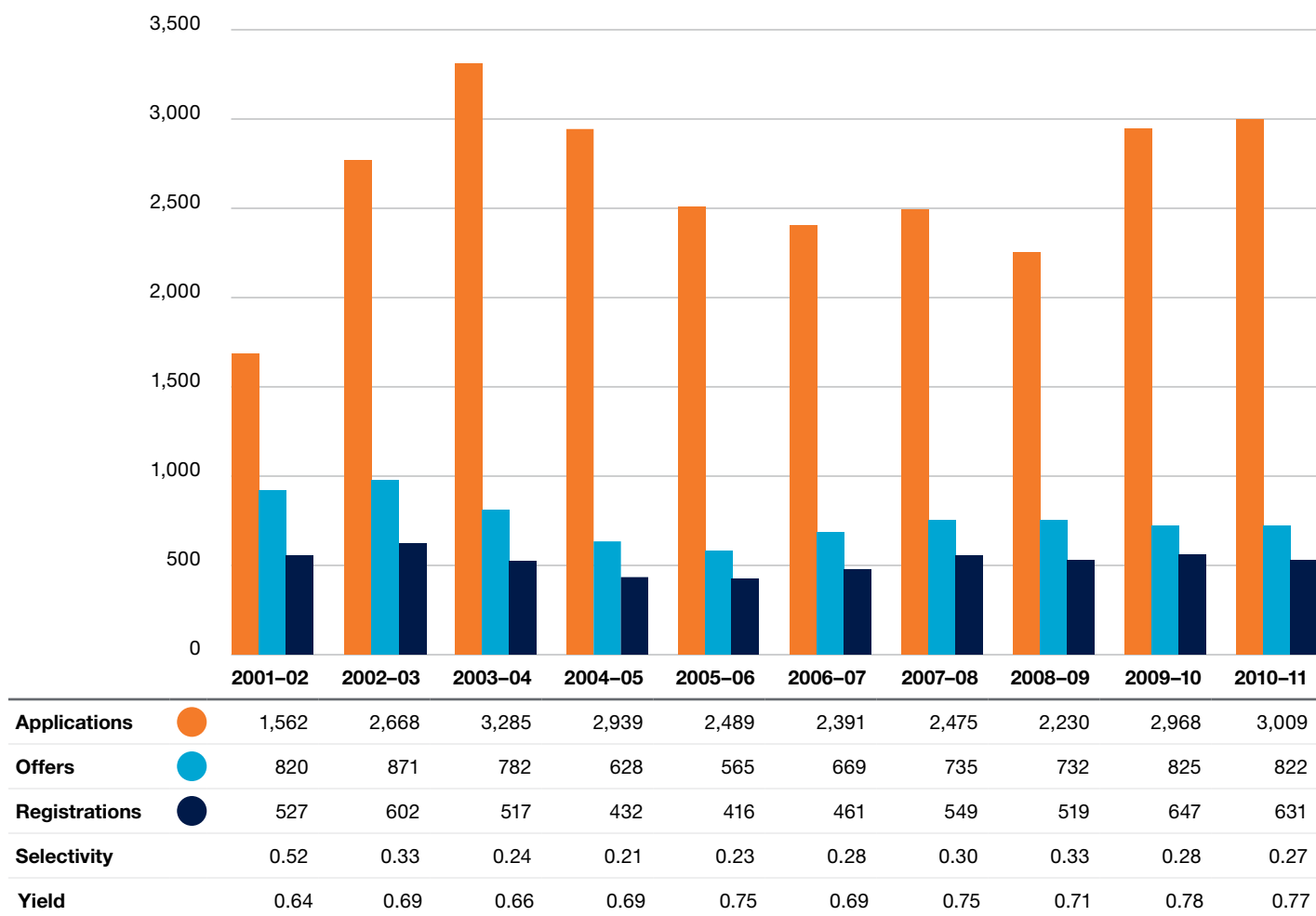
Applications to our graduate programs continued to rise in 2010–2011, following the dramatic 33% increase in the previous year. The numbers are partly a result of the recruitment campaign to attract engineers to continue their studies. The modest increase in applicants in the past year combined with slight decreases in the number of offers and registrations is reflected in the trend toward greater selectivity.

Applications to the MASc program grew by 4% in the past year, while the MEng program held steady and PhD applications were slightly down. However, compared to 2008–2009, applications have risen by 41% (MASc), 22% (MEng) and 34% (PhD).

The selectivity and yield rates in Figure 2.1b, which remained largely unchanged in the past year, indicate that the rapid growth of two years ago continues to be sustained. The percentage of admitted students choosing to do their graduate degrees at U of T Engineering remains strong.

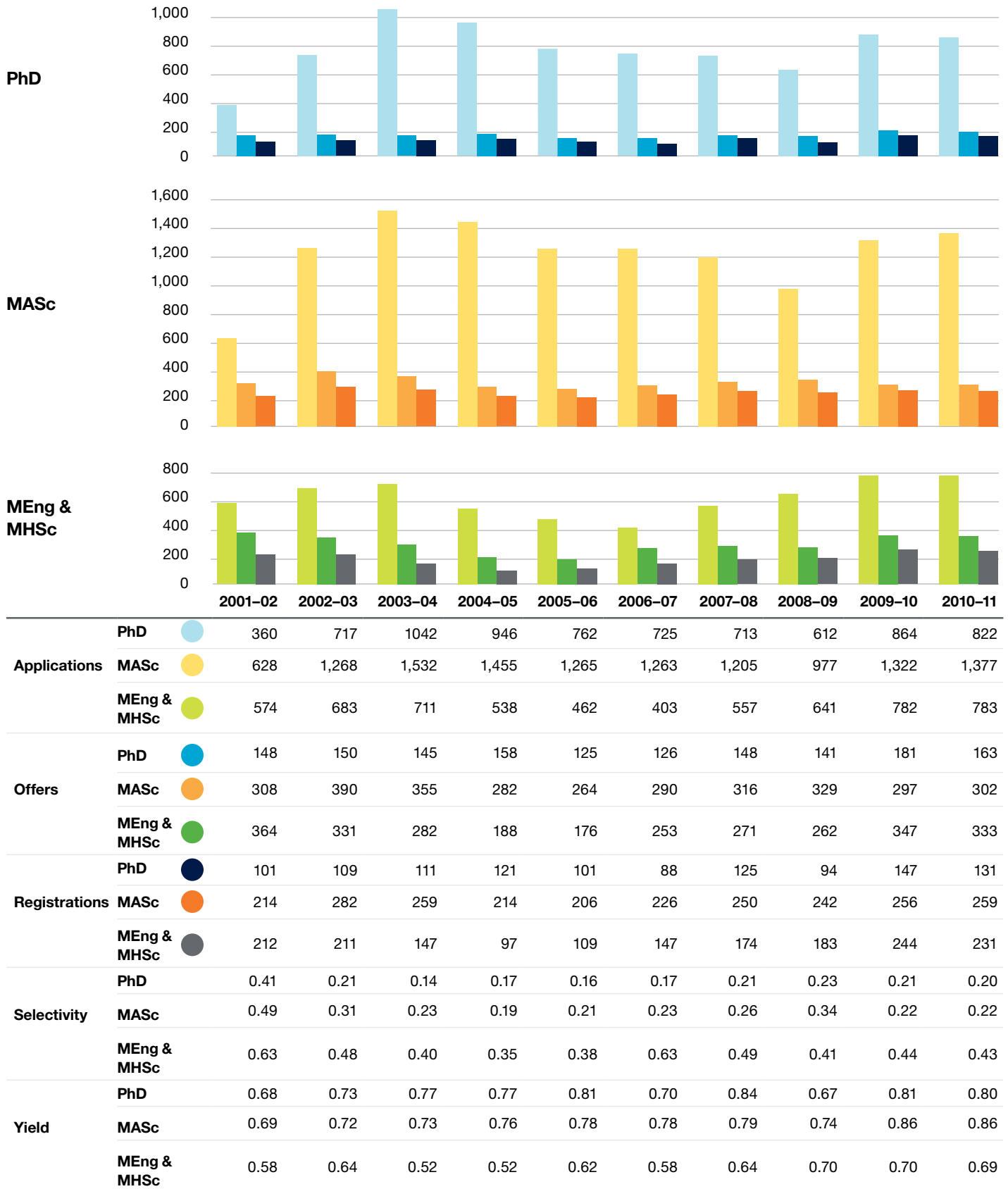
Our graduate student recruitment has been supported by a Faculty presence at graduate fairs, online, and in printed marketing materials. Recruitment events continue to attract exceptionally qualified graduate students.

**Figure 2.1a** Applications, Offers, Registrations, Selectivity and Yield of Graduate Students, 2001–2002 to 2010–2011



**Note 2.1a:** 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, 2001–2002 to 2010–2011



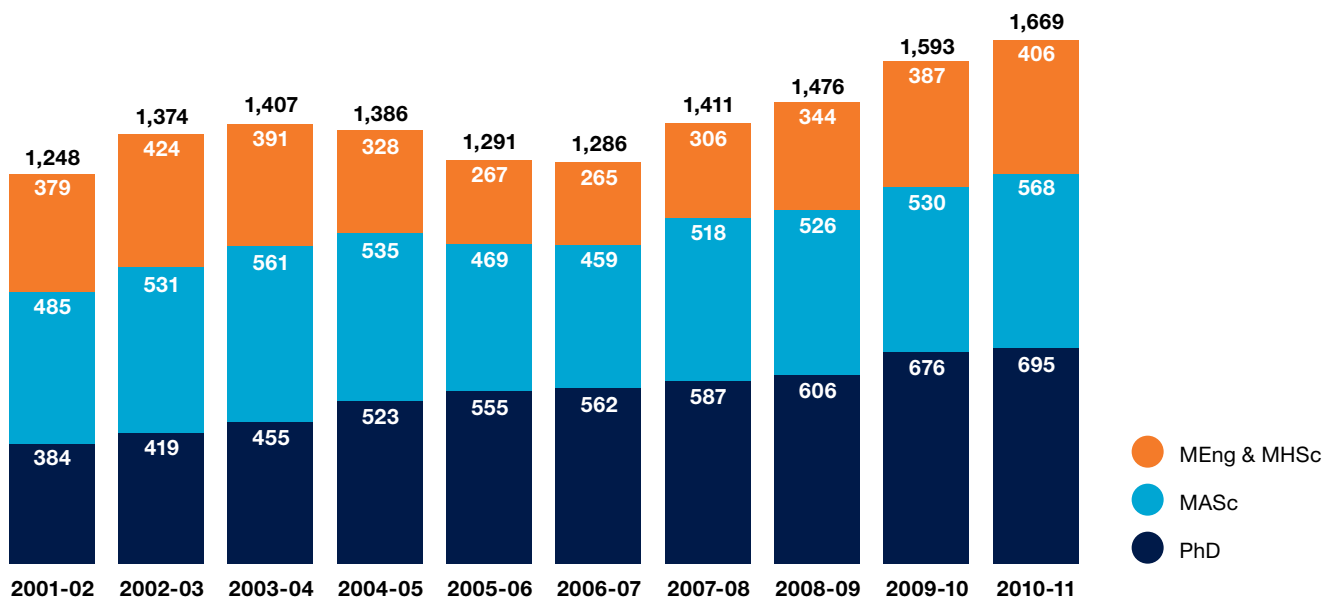
**Note 2.1b:** Student counts are shown as of November 1. Applications and offers represent a full-year admission cycle. Selectivity = Offers ÷ Applications; Yield = Registrations ÷ Offers.

## Graduate Student Enrolment

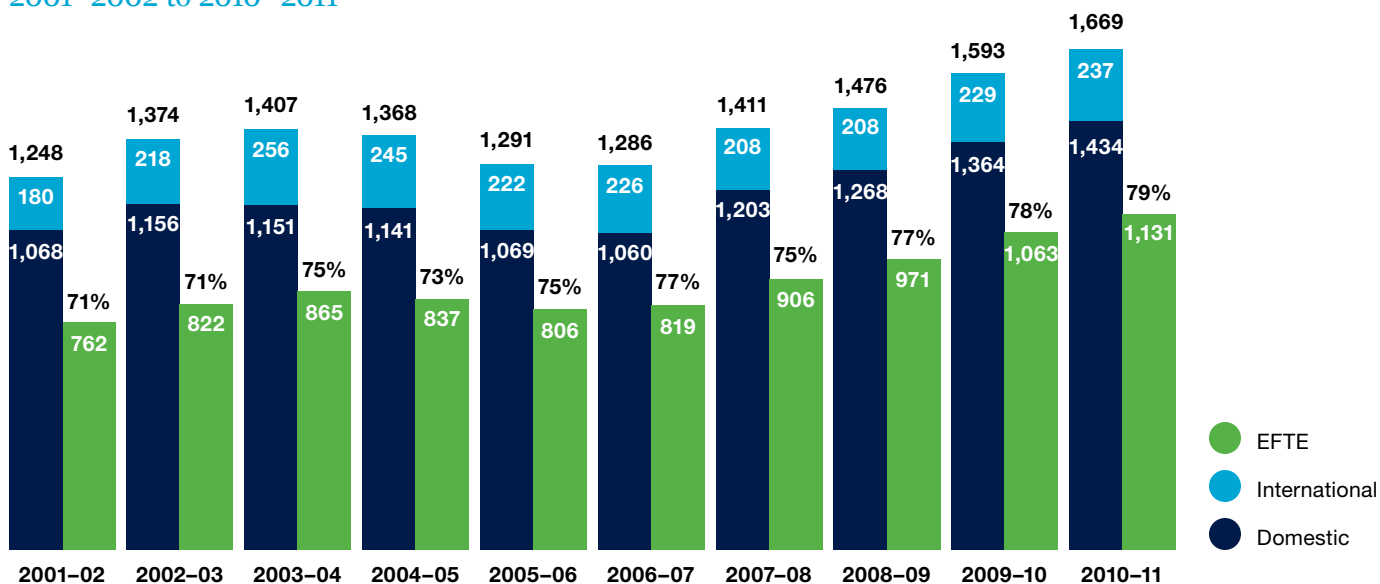
Total enrolment in graduate programs is at its highest peak ever, reaching 1,669 students in the fall of 2010. The numbers of students in all graduate programs are up over 2009. Government incentives, combined with our goal to expand graduate programs, have played a crucial part in boosting enrolment 34% in the past four years, with a 5% increase in the last year. Our effort to increase the number of doctoral students in the past decade has been most rewarding — a steady rise that has resulted in an 81% increase.

The number of international students pursuing graduate studies in our Faculty is the highest it has been since 2004. Their contributions have had a significant impact on our global perspective and research reputation. Domestic graduate students who exceed the eligibility period no longer attract government grants, which means operating funds or additional research grants are typically required to support their studies. The increase in the proportion of our students who are eligible for grant funding, now nearly 80%, is a welcome trend.

**Figure 2.2a Graduate Students by Degree Type, 2001–2002 to 2010–2011**



**Figure 2.2b Graduate Students: International, Domestic and Eligible Full-Time Equivalent (EFTE), 2001–2002 to 2010–2011**



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

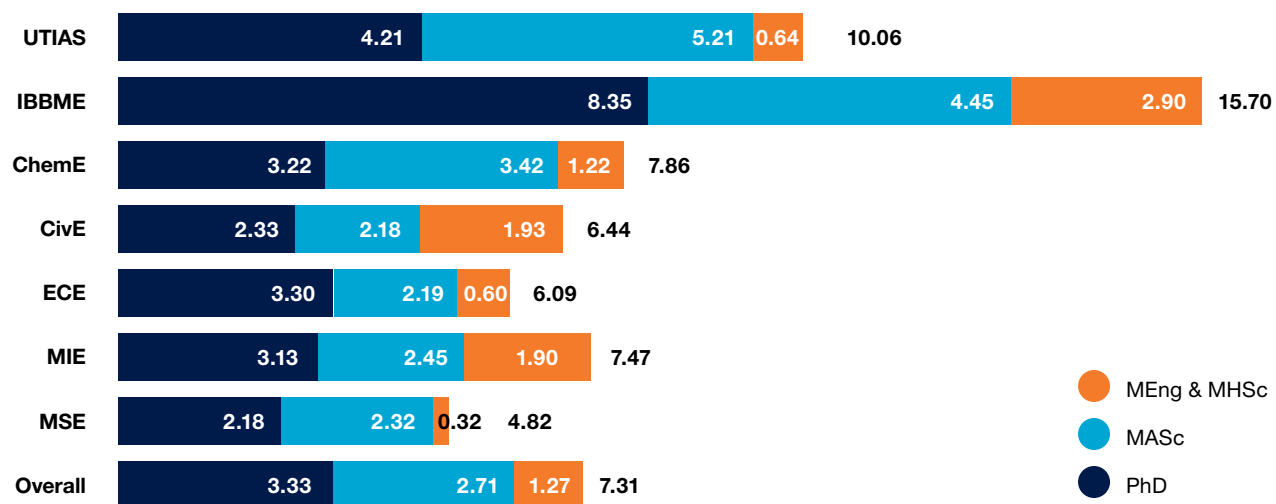
**Note 2.2b:** Student counts are shown as of November 1. EFTE is calculated on a 12-month basis (e.g., May to April).

**Figure 2.2c** Graduate Student Enrolment by Full-Time Equivalent (FTE) and Headcount (HC) by Academic Area, 2001–2002 to 2010–2011

		UTIAS	IBBME	ChemE	CivE	ECE	MIE	MSE	Total
2001–02	FTE	68.2	15.0	153.3	175.9	310.4	293.7	57.2	1,073.7
	HC	71	15	161	213	372	356	60	1,248
2002–03	FTE	84.2	22.0	148.3	196.1	358.0	313.2	68.8	1,190.6
	HC	87	22	156	236	421	379	73	1,374
2003–04	FTE	89.9	48.0	159.4	184.2	383.6	228.5	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	380.5	278.8	71.1	1,160.2
	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	68.2	1,527.6
	HC	143	168	208	256	431	391	72	1,669

The student-faculty ratio is an approximate calculation, where the formula includes tenure stream faculty and FTE enrolments of graduate students in each academic area. What it does not easily include is the interdisciplinary, collaborative, cross-departmental activity that is a hallmark of our Faculty. For example, IBBME draws on faculty expertise in Medicine and Dentistry, as well as Engineering. And in UTIAS, not all faculty who supervise students are tenure stream. The ratios expressed in Figure 2.3 are our attempt to balance hard numbers with our strength in cross-disciplinary research and education.

**Figure 2.3** Full-Time Equivalent (FTE) Graduate Student-Faculty Ratios by Academic Area and Degree Type, 2010–2011



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

**Note 2.3:** Data reported by academic year (September to August).



## Graduate Student Funding

In the past nine years, the amount of external scholarship funding attracted by our graduate students has nearly doubled. It is an impressive trend considering our graduate student population grew by 28% in the same period.

The Faculty's success in securing funding beyond our traditional agencies — the Natural Sciences and Engineering Research Council (NSERC) and the Ontario Graduate Scholarship (OGS) program — can be seen in the major boost that more than doubled the External–Other category. Most of that funding has recently come from organizations

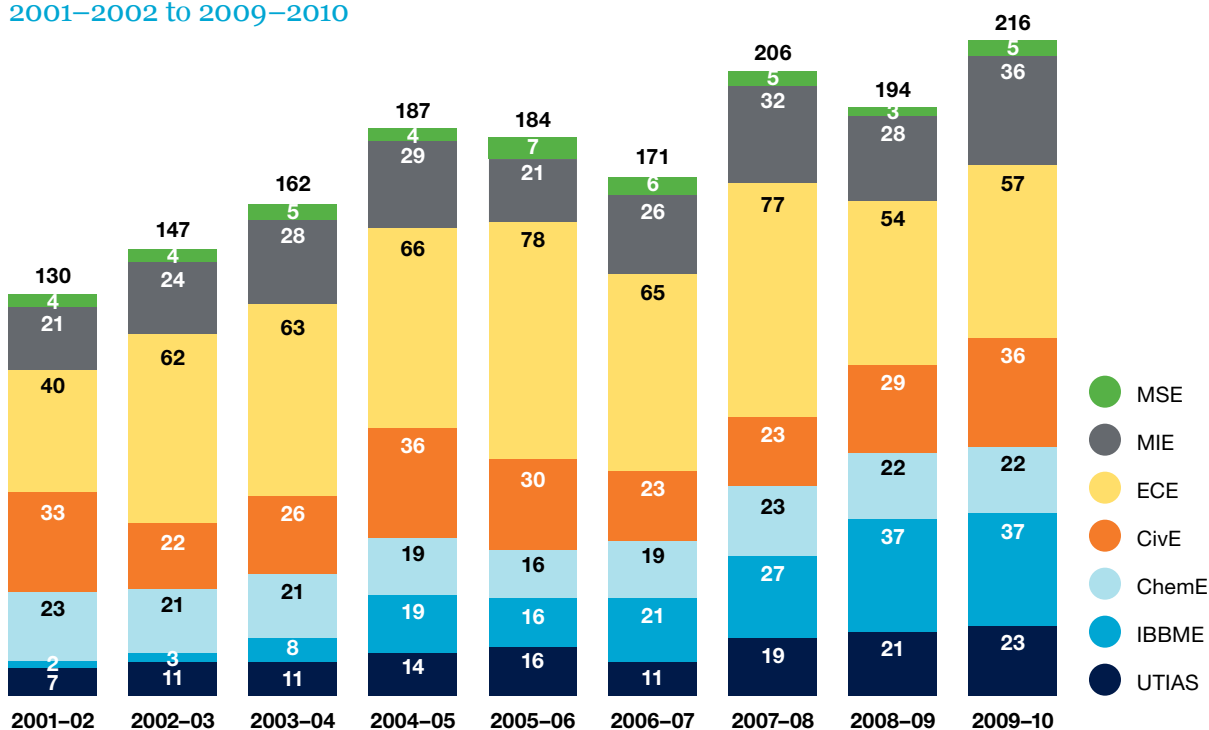
not typically linked to engineering research: the Canadian Institutes of Health Research (CIHR) and the Social Sciences and Humanities Research Council (SSHRC). Other awards in the category come from foundations and industry sources.

External awards in 2009–2010 represented 47% of graduate awards. The remainder came from University of Toronto Fellowships and other internal grants and funds. Because the tabulation of external awards continues into the fall period, the data in Figures 2.4a and 2.4b have not been adjusted since the 2010 Annual Report was published.

**Figure 2.4a External Graduate Student Scholarships by Source, 2001–2002 to 2009–2010**

	NSERC	OGS	External–Other	Total
2001–02	\$1,965,512	\$776,859	\$52,440	\$2,794,811
2002–03	\$2,260,280	\$1,328,342	\$14,705	\$3,603,327
2003–04	\$2,764,450	\$1,479,994	\$56,240	\$4,300,684
2004–05	\$3,221,367	\$1,161,671	\$77,334	\$4,460,372
2005–06	\$3,400,236	\$1,106,665	\$23,500	\$4,530,401
2006–07	\$3,228,150	\$1,088,332	\$31,100	\$4,347,582
2007–08	\$3,827,494	\$930,000	\$68,167	\$4,825,661
2008–09	\$3,737,157	\$868,332	\$111,770	\$4,717,259
2009–10	\$4,255,856	\$838,334	\$226,563	\$5,320,753

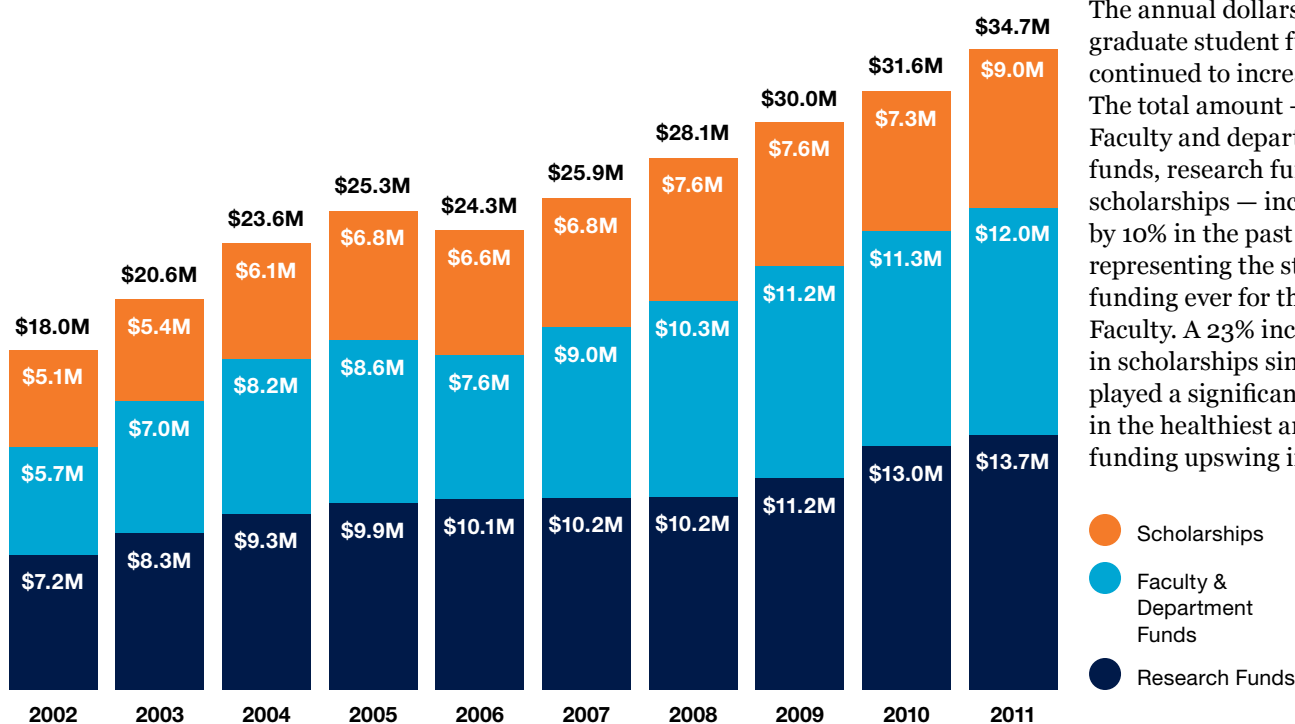
**Figure 2.4b Number of NSERC Graduate Student Award Recipients by Academic Area, 2001–2002 to 2009–2010**



**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).

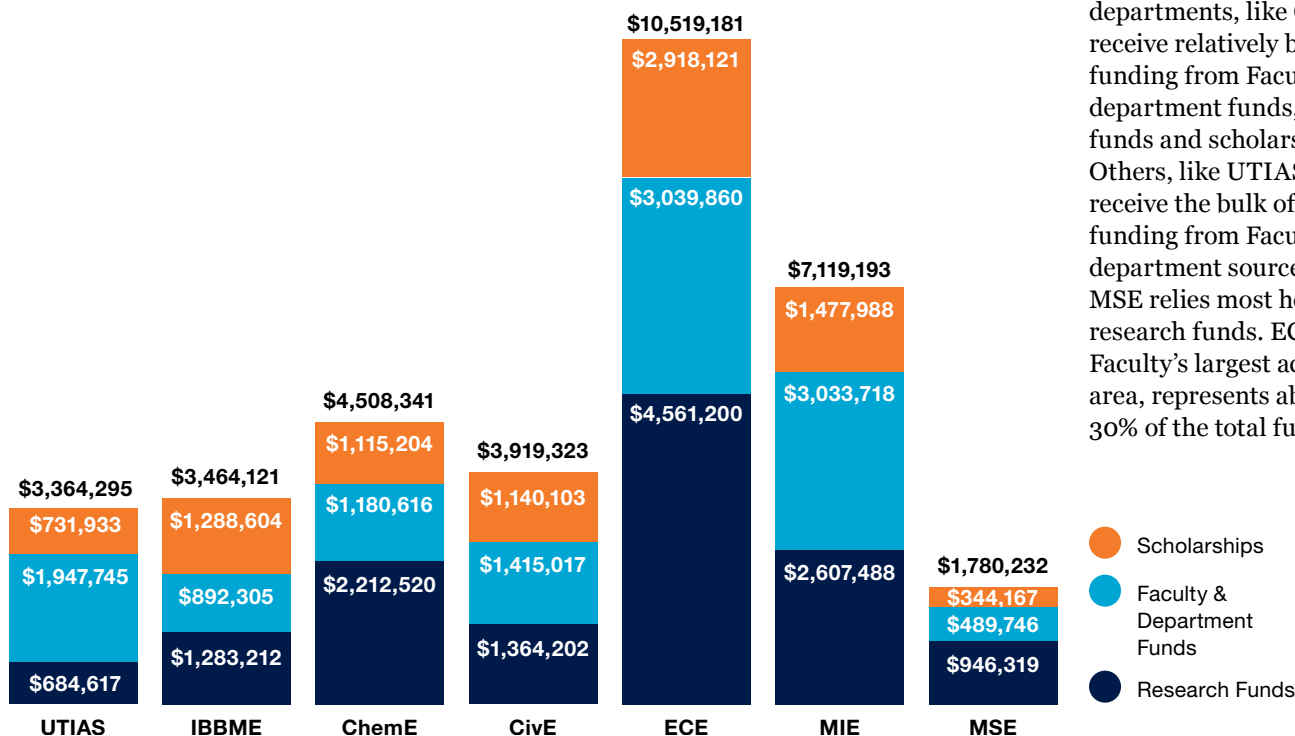
**Note 2.4b:** Data reported by academic year (September to August).

**Figure 2.5a** Graduate Student Funding by Category, Fiscal Years 2002 to 2011



The annual dollars of graduate student funding continued to increase in 2011. The total amount — from Faculty and department funds, research funds and scholarships — increased by 10% in the past year, representing the strongest funding ever for the Faculty. A 23% increase in scholarships since 2010 played a significant part in the healthiest annual funding upswing in 10 years.

**Figure 2.5b** Graduate Student Funding by Category and Academic Area, 2011 Fiscal year



Sources of funding for graduate students vary from area to area. Some departments, like CivE, receive relatively balanced funding from Faculty and department funds, research funds and scholarships. Others, like UTIAS, receive the bulk of their funding from Faculty and department sources, while MSE relies most heavily on research funds. ECE, the Faculty's largest academic area, represents about 30% of the total funding.

**Note 2.5a and 2.5b:** Data reported by fiscal year (May to April). Scholarships include all awards from external sources plus University-administered sources such as Ontario Graduate Scholarships in Science and Technology, the Connaught Fund and various U of T endowed scholarships. Research Funds represent funds obtained by professors from contestable sources such as NSERC and CIHR. Faculty and Departmental Funds include operating funds, University of Toronto Fellowships (UTF) and Teaching Assistantships; for IBBME, they also include clinical internships.

## Graduate Studies Completion

The PhD fast-track option is available to qualified, academically strong MAsC students at the end of their first year. Fast-tracking makes it possible for students to achieve their doctoral degrees in a shorter period of time, allowing them to launch their careers and apply their knowledge in the workplace sooner. Each academic area has different policies determining when the option takes place. New data with fast-track numbers have not been issued since the 2010 Annual Report was published.

Graduate students typically begin their programs in September, but the pathways to convocation, which occurs three times each year, can vary. Shown in Figure 2.7, the time-to-graduation numbers for masters students have remained constant in the past four years: 1.8 being the median number of years for MEng & MHSc students, and 2.2 years for MAsC students.

**Figure 2.6** Number of Students Fast-Tracked from MAsC to PhD, by Academic Area, 2006–2007 to 2009–2010

Fast-tracked during	2006–07	2007–08	2008–09	2009–10
Most began PhD in	Sept. 2007	Sept. 2008	Sept. 2009	Sept. 2010
<b>UTIAS</b>	1	2	8	4
<b>IBBME</b>	2	8	9	5
<b>ChemE</b>	7	4	10	10
<b>CivE</b>	5	4	3	4
<b>ECE</b>	2	2	2	1
<b>MIE</b>	3	8	9	4
<b>MSE</b>	2	2	1	3
<b>Total</b>	<b>22</b>	<b>30</b>	<b>42</b>	<b>31</b>

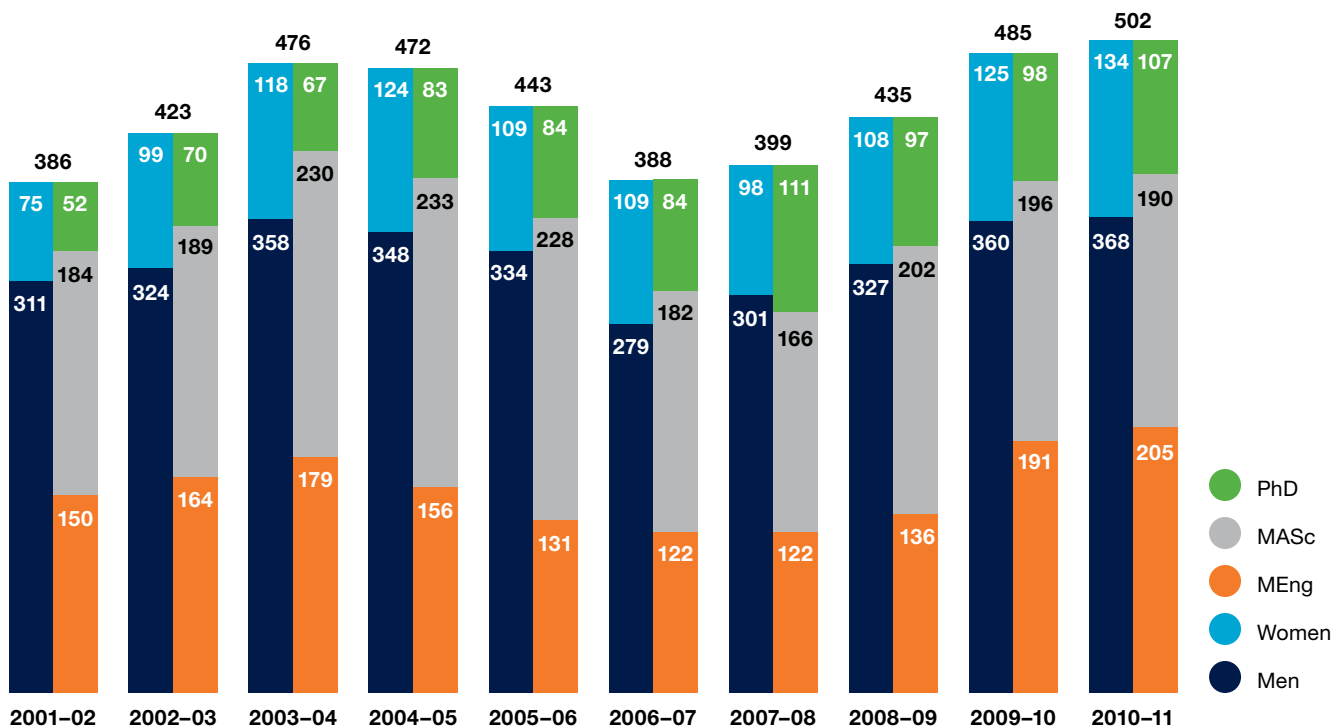
**Figure 2.7** Time-to-Graduation for PhD, MAsC and MEng & MHSc Graduate Students, 2001–2002 to 2010–2011

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11
<b>PhD</b>	4.8	4.8	5.2	4.8	4.8	5.2	4.8	4.8	5.2	5.8
<b>MAsC</b>	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
<b>MEng &amp; MHSc</b>	2.2	1.8	2.1	2.2	2.4	2.2	1.8	1.8	1.8	1.8

**Note 2.6 and 2.7:** Date reported by academic year (September to August).

In 2010–2011, the number of graduate degrees awarded topped the 500 mark for the first time. New records were also set for the most doctoral degrees, most masters degrees, most women graduates and most men graduates. The number of women graduates rose by 7% in the past year.

**Figure 2.8** Graduate Degrees Awarded by Degree Type and Gender, 2001–2002 to 2010–2011



## Certificates and Programs for Graduate Students

### IBBME PhD Concentration in Clinical Engineering

Effective September 2011, IBBME will add a clinical engineering concentration to the existing PhD program in Biomedical Engineering. Changes entail the addition of an option in the PhD program to allow the continuation of MHSc clinical engineering graduate students into the PhD program. A half-course requirement has also been added for graduate students without a clinical engineering background. Other requirements include joint engineering-health scientist supervision and research in a clinical healthcare environment.

Clinical engineering has become a unique sub-specialty of biomedical engineering with an emphasis on enhancing patient safety, quality of care, and quality of life. Certification in clinical engineering was introduced in Canada in 2010 by the American College of Clinical Engineers in recognition of the speciality's maturing field. IBBME has confirmed that doctoral graduates in the new concentration will be eligible for certification.

### Graduate Certificate in Robotics & Mechatronics

A joint effort of MIE, ECE, CivE, UTIAS and IBBME, the new Robotics & Mechatronics Certificate is open to all our graduate students. It provides the opportunity to develop knowledge in areas that are key to creating smart and high performance robotic and mechatronic systems. To earn the certificate, students must take four courses, including one each from three of the following four groups: Control Systems, Signal and Image Processing, Dynamics and Modeling, and Systems Integration.

**Note 2.8:** Date reported by academic year (September to August).

## Master of Engineering (MEng) Certificates

In 2010–2011, we offered the following certificates and programs to MEng students:

**MEng/ELITE Certificate (Entrepreneurship, Leadership, Innovation & Technology in Engineering)** was launched in 2007 for engineers interested in being leaders, team-builders and innovators in their technical field. In 2010–2011, we had 657 enrolments in 17 ELITE courses, with the highest number of students taking project management and financial engineering courses. The number of certificates awarded last year rose by 168% over the previous year (see Figure 2.9).

**MEng/EPP Certificate (Engineering & Public Policy)** is a collaboration with the School of Public Policy and Governance. Since 2009, it has offered MEng graduate students training in policy issues related to engineering.

**MEng/Global Certificate (Engineering & Globalization)**, first offered in September 2010, provides graduate students with a global look at engineering opportunities through four half-courses.

**MEng/SCFI Magna Program (Stronach Centre for Innovation)** is a joint initiative with Magna International Inc., giving employees an opportunity to pursue a specialized MEng at U of T. Students complete a major technical project as well as a range of courses. Total enrolment in the program has more than doubled in the past year (see Figure 2.10).

**MEng Certificate in Energy Studies**, being offered to graduate students by MIE, looks at the environmental impact of energy production and consumption. It not only hones their expertise in traditional energy sources, but also alternative and low-carbon energy systems. This program will begin in 2011–2012.

**MEng Certificate in Healthcare Engineering**, a second MIE program starting in 2011–2012, recognizes the positive impact engineers can have on making the healthcare system more efficient and effective. That could include reducing wait times, improving access to information, and streamlining scheduling.

**MEng Certificate in Computational Mechanics in Design** helps graduate students solve complex engineering problems using numerical approximation techniques. Like the MIE certificates mentioned above, this certificate will be offered in 2011–2012.

## Prospective Professors in Training Program

The PPIT Program (Prospective Professors in Training) has been preparing senior doctoral students for careers in academia since 2006. They spend approximately two years learning about pedagogical fundamentals, effective lecturing, curriculum design, grading, grant applications and university administration. In 2010–2011, 20 students graduated from PPIT.

**Figure 2.9 ELITE Certificates Awarded, 2008–2009 to 2010–2011**

	2008–09	2009–10	2010–11
<b>AeroE</b>		1	1
<b>ChemE</b>		1	14
<b>CivE</b>	2	7	13
<b>ECE</b>	1	3	4
<b>MIE</b>		7	17
<b>MSE</b>			1
<b>Total</b>	<b>3</b>	<b>19</b>	<b>51</b>

**Figure 2.10 MEng/SCFI Program Enrolment, Fall 2008 to Winter 2011**

	Enrolment
<b>Fall 2008</b>	9
<b>Fall 2009</b>	8
<b>Winter 2010</b>	12
<b>Fall 2010</b>	30
<b>Winter 2011</b>	33

# 3 Research

Our commitment to faculty research has continued to bring dynamic innovative activity together with appreciated financial support in 2010–2011. The largest funding we have ever received was channeled to a wide variety of initiatives that kept us at the forefront of engineering research. In fact, the average of \$338,044 in research grants per faculty represented a 30% increase in the last two years.

Our Faculty's proportion of grants from the Natural Sciences and Engineering Research Council (NSERC) remained the highest of all Canadian engineering universities, at a five-year share of 9%. The largest portion of NSERC grants continues to be Discovery Grants, but there have also been encouraging hikes in other NSERC funding areas. Funding from NSERC CREATE (Collaborative Research and Training Experience) continues to grow because of new projects like Distributed Generation for Remote Communities that will help bring cleaner renewal energy options to remote Aboriginal communities. Our Industrial Partnership funding supported by NSERC has jumped by 11% in the past year due to increases in Strategic Network grants, Idea to Innovation grants and other collaborative partnerships in the workplace. We attracted almost \$900,000 from NSERC's new Engage program, designed to forge connections between academic researchers and companies that have never worked together before.

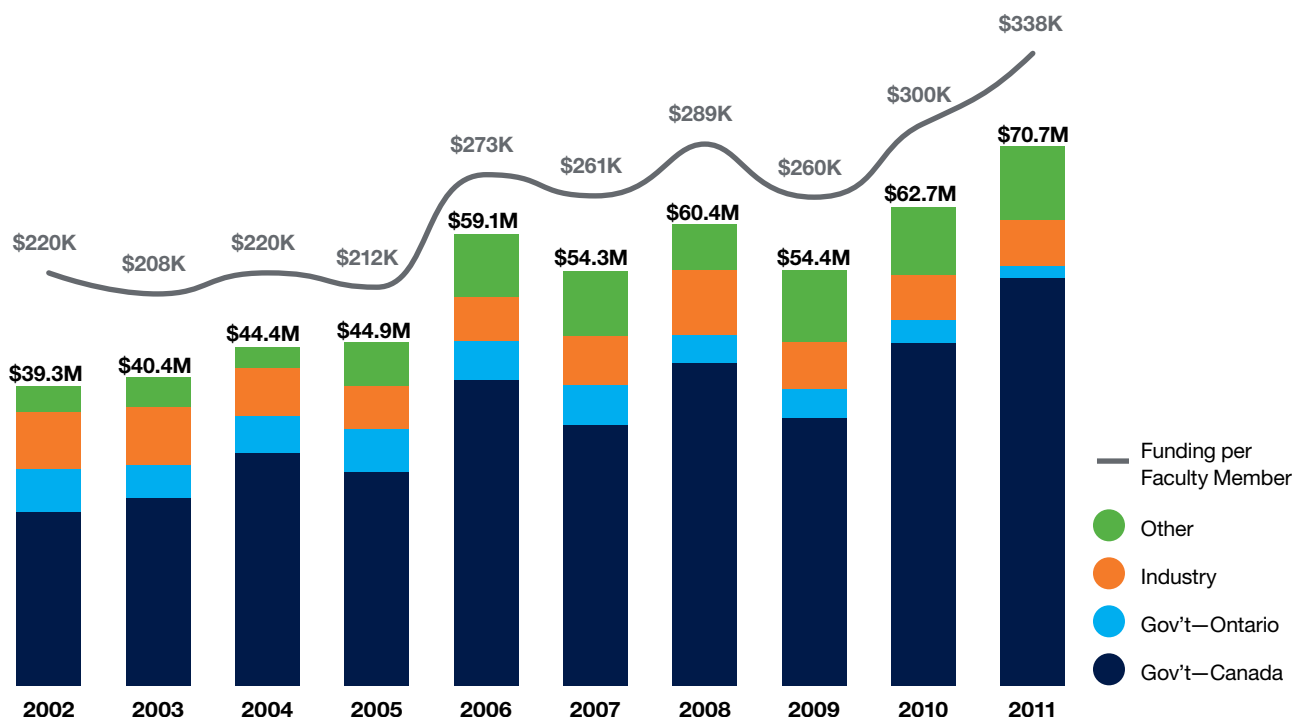
Among our innovative research initiatives in 2010–2011 are the formal launch of BioZone, a \$15-million grant for the Centre for Commercialization of Regenerative Medicine (CCRM) approved by the federal Networks of Centres of Excellence (NCE), and an Ontario Research Fund (ORF) Research Excellence project to enable smart applications for transportation systems. The impressive lists of Industry Partners and Invention Disclosures found in this chapter are further testament to the scope of research ventures in our Faculty.

## Research Funding

After fluctuations in the latter half of the last decade, our research funding has experienced healthy growth in the last two years. We have done particularly well in attracting federal research funding. Even though 2011 already marks our best funding year ever, the processing of grants continues and the total amount will likely grow further. In last year's Annual Report, 2010 funding stood at \$54,674,402. However, the final tally, reflected in this year's report, rose to \$62,664,423. In the last two years, research funding per faculty member has increased by 30%.

A breakout of research funding for each of our academic areas from 2002 to 2011 can be found in Appendix B. A list of Research Chairs for 2010–2011 appears in Appendix C.

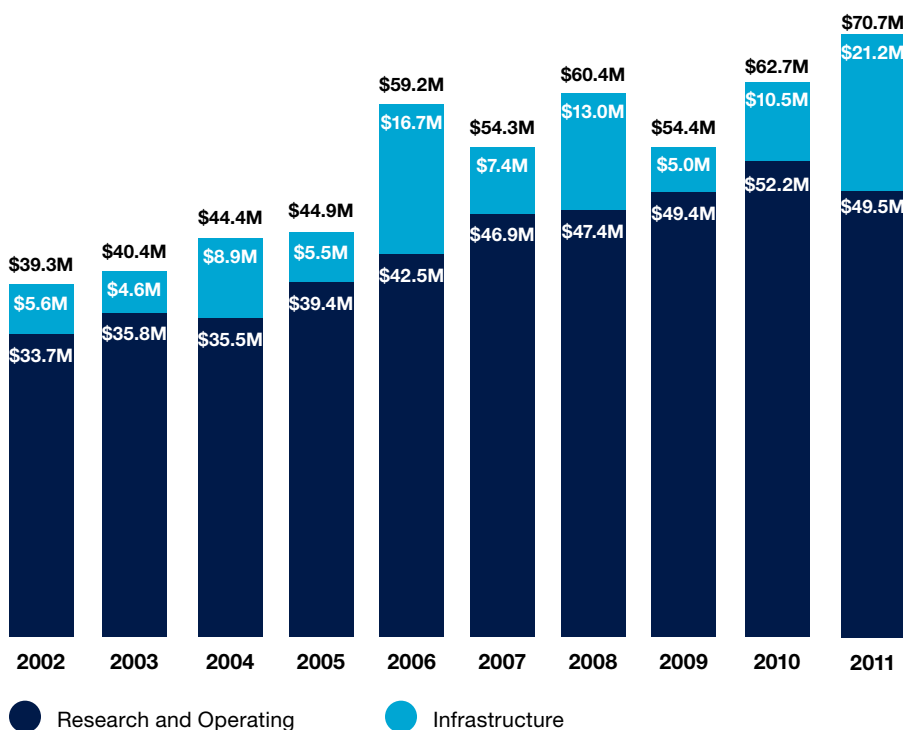
**Figure 3.1a** Research Funding by Year and Source, and Funding Per Faculty Member, 2002 to 2011



	Funding per Faculty Member	Gov't—Canada	Gov't—Ontario	Industry	Other	Total
2002	\$219,635	\$22,718,405	\$5,706,641	\$7,494,002	\$3,395,584	\$39,314,632
2003	\$208,280	\$24,606,301	\$4,342,650	\$7,562,082	\$3,895,246	\$40,406,279
2004	\$219,633	\$30,439,902	\$4,930,505	\$6,294,731	\$2,700,674	\$44,365,812
2005	\$211,906	\$28,108,019	\$5,511,925	\$5,637,079	\$5,667,067	\$44,924,090
2006	\$272,598	\$40,044,085	\$5,166,514	\$5,804,219	\$8,138,939	\$59,153,757
2007	\$261,174	\$34,207,532	\$5,165,227	\$6,522,440	\$8,429,091	\$54,324,290
2008	\$289,105	\$42,239,887	\$3,774,618	\$8,419,644	\$5,988,696	\$60,422,845
2009	\$260,468	\$35,128,174	\$3,717,781	\$6,252,621	\$9,339,146	\$54,437,722
2010	\$299,830	\$44,844,864	\$3,133,597	\$5,863,593	\$8,822,369	\$62,664,423
2011	\$338,044	\$53,395,576	\$1,672,076	\$5,931,284	\$9,652,298	\$70,651,234

**Note 3.1a:** Data from the U of T research reporting cube is current as of July 29, 2011, and is shown by grant year (2011 represents April 2010 to March 2011). "Gov't—Canada" includes funding from the Tri-Council (CIHR, NSERC, SSHRC), Canada Foundation for Innovation, Canada Research Chairs, and National Centres of Excellence. "Gov't—Ontario" includes the Ministry of Research and Innovation, Ontario Research Fund, and Ontario Centres of Excellence. A listing of industry partners can be found in Figure 3.2b. "Other" includes industry, research foundations, not-for-profit organizations and other universities.

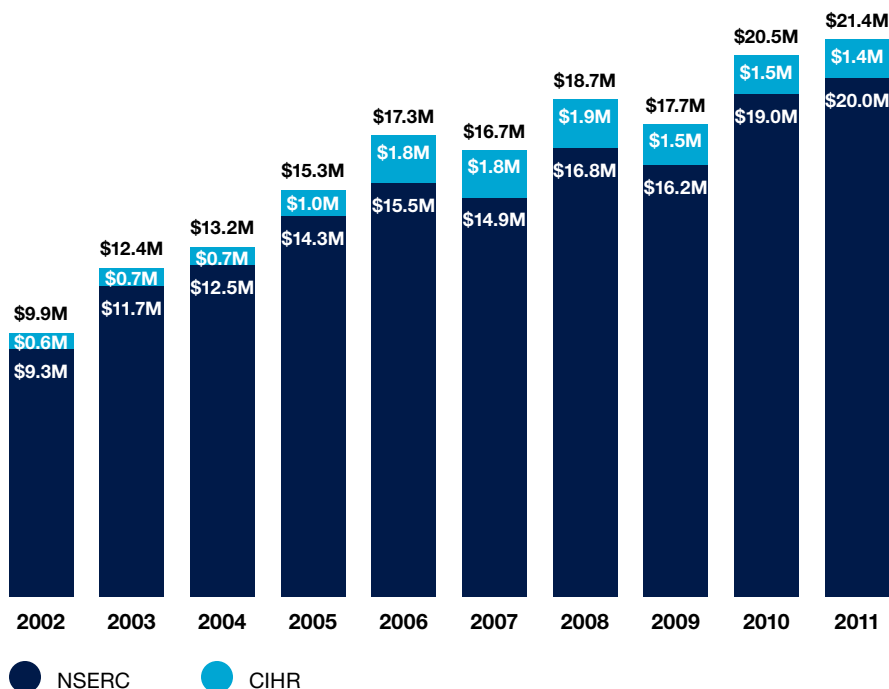
**Figure 3.1b Infrastructure Funding as a Proportion of Total Research Funding, 2002 to 2011**



Infrastructure funds to support research have more than doubled in each of the past two years, representing over 30% of 2011's total research funding. The significant increase is largely the result of research projects proposed two years ago that have reached the building phase — projects like the Microsatellite Science and Technology Centre, Phase 2 of BioZone, and the Centre for Industrial Applications of Microcellular Plastic.

The primary sources of research funding designated for infrastructure are the Canada Foundation for Innovation (CFI), the Ontario Research Fund (ORF) and the NSERC Research Tools and Instruments (RTI) program.

**Figure 3.1c Canadian Institutes of Health Research (CIHR) and Natural Sciences and Engineering Research Council (NSERC) Funding by Year and Source, 2002 to 2011**



Federal research funding from the Tri-Council is at its highest point in a decade, showing 4.9% growth in 2011 over the previous year. NSERC funds represent about 93% of the total, with the remaining amount from CIHR. Funding from NSERC has increased more than 23% since 2009, while CIHR support has remained steady during the same period.

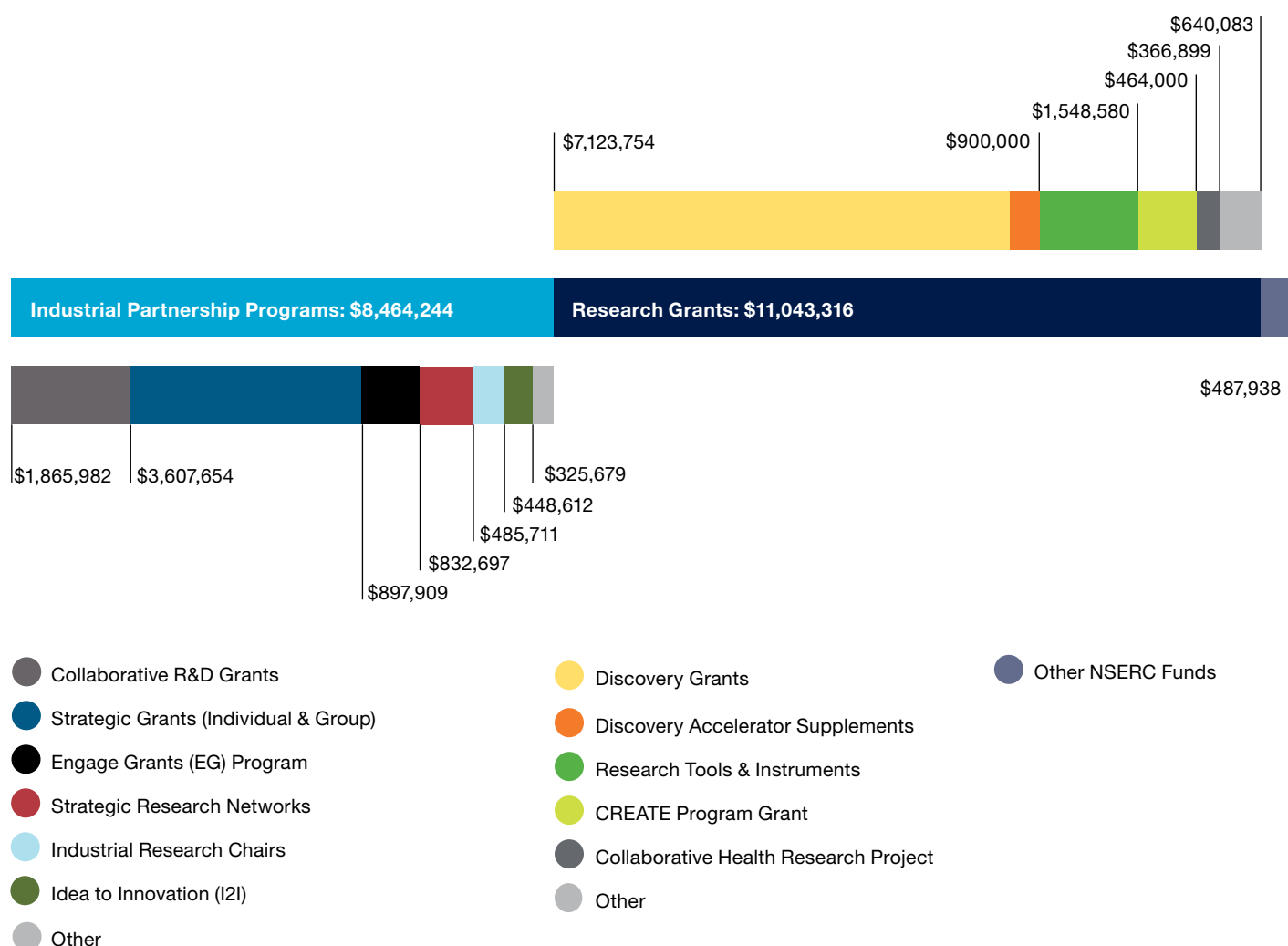
The Social Sciences and Humanities Research Council (SSHRC) has provided modest funding to the Faculty in the past, primarily in the years 2003 to 2005, but not enough to be reflected in the graph.

**Note 3.1b:** Some spending on infrastructure will occasionally come from regular research grants, typically for smaller costs under \$7,500 that were not specifically requested in the original application. Funding shown by grant year (April to March).

**Note 3.1c:** 2011 data is current as of July 29, 2011. The grant year runs from April to March. Tri-Council refers to the three main federal government research funding agencies: the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC), and the Social Sciences and Humanities Research Council (SSHRC).



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



Our NSERC funding for Industrial Partnership programs has grown by 11% in the last year and represents 42% of the Faculty's total NSERC funding. It is an increase that reflects our faculty members' active work with industry partners to collaboratively seek engineering solutions.

Particularly strong have been the increases in the Engage Grants, Strategic Network Grants, and Idea to Innovation (I2I) program. I2I moves promising technology from university research to industry business plans in established and new Canadian companies. Evidence of U of T's practical creativity in this area is demonstrated in the brisk Invention Disclosure activity found in Figure 3.4.

Strategic Network Grants fund large-scale, multi-disciplinary research projects in targeted areas aimed at enhancing Canada's economy, society and environment over the next decade.

The new NSERC Engage program creates research connections between academic researchers and companies that have never collaborated together before. The Faculty received funding for 37 Engage projects, adding \$898,000 of NSERC investment to support short-term research that addresses company-specific needs. Some of these initial collaborations are developing into ongoing relationships with industry.

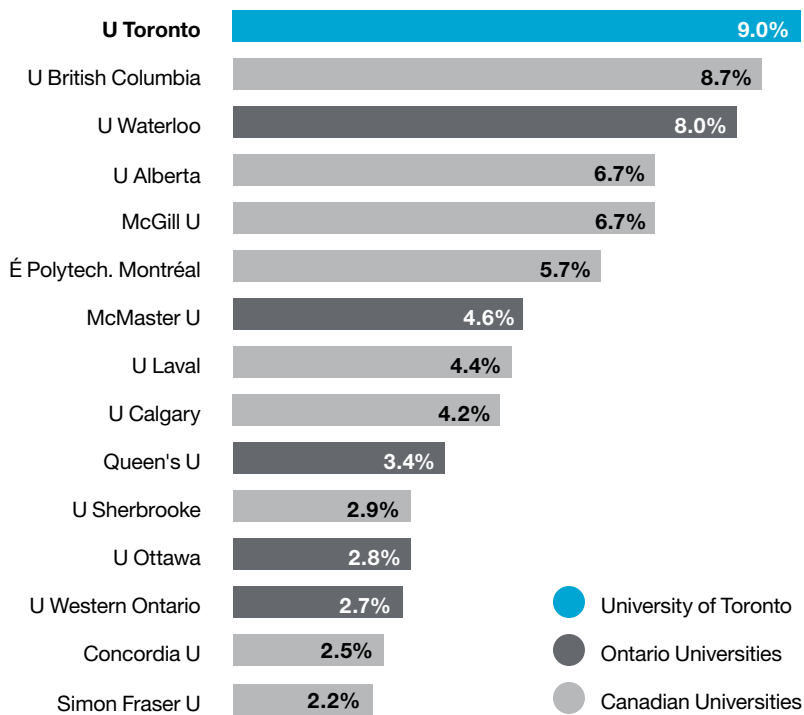
Discovery Grants from NSERC continue to provide the strongest foundation for long-term research. Funding from NSERC CREATE (Collaborative Research and Training Experience) nearly doubled in the past year thanks to the approval of additional new projects like the Distributed Generation for Remote Communities (DGRC). The initiative will explore ways to provide cleaner renewal energy options to remote Aboriginal communities that currently rely on diesel generators.

**Note 3.2a:** Funding show for 2011 grant year (April to March)

**Figure 3.2b Industrial Partners, 2010–2011**

- AbitibiBowater
- Advanced Measurement & Analysis Group
- AEG Power Solutions
- Alberta Pacific Forest Industries
- Altera Corporation
- AMD
- Andec Manufacturing
- Andritz Oy
- AUG Signals
- Automotive Fuel Cell Cooperation
- Babcock & Wilcox
- Bank of Montreal
- Barrick Gold Corporation
- Bell Canada
- Biox Corporation
- BMO Financial Group
- Boise Inc.
- Bombardier
- Brican
- Broadcom Corporation
- Calgon Carbon Corporation
- Campbell Soup Company
- Carinthia Tech Institute
- Carter Holt Harvey Pulp & Paper
- Celulose Nipo-Brasileira
- Clyde-Bergemann Inc.
- COM DEV Canada
- Daishowa-Marubeni International Ltd.
- Dana Canada Corporation
- Digital Predictive Systems Inc.
- DTE Petcoke
- Eastman Kodak Company
- Eco-Tec Inc.
- Enbridge Gas Distribution Inc.
- Engineering Services Inc.
- ERCOWorldwide
- Exar Corporation
- Facca Inc.
- Fibria
- FP Innovations
- Fuji Electric Holdings
- Fuji Electric Systems
- Fujitsu Laboratories Ltd.
- GMA Cover Corp.
- GM Canada
- Gennum Corporation
- GeoSyntec Consultants
- Google Inc.
- Greater Toronto Airports Authority
- Hitachi High-Technologies
- Hokeutsu Paper Mills Ltd.
- Holcim (Canada) Inc.
- IBM Canada
- Inco Technical Services Ltd.
- Inmet Mining Corporation
- Integran Technologies Inc.
- Integrity Testing
- Intel Corporation
- InteraXon
- International Paper Company
- Ionics Mass Spectrometry Group Inc.
- ISTEP Canada
- IVG Fiber
- Jammbo
- Johnson & Johnson
- Kiln Flame Systems
- MacDonald, Dettwiler and Associates
- MAHLE Filter Systems Canada
- Mark IV Industries Corp
- Marksman Cellject
- MaRS Innovation
- MeadWestvaco
- Metso Power
- Mitsubishi Electric Research Laboratories
- Morgan Solar
- Morrison Hershfield
- NEO Material Technologies
- Nippon Paper Inc.
- Nippon Steel Corporation
- Noranda-Falconbridge
- Northwest Mettech Corp
- Novelis Inc.
- Nuclear Waste Management Organization
- NXP Semiconductors Netherlands
- Oji Paper Co. Ltd.
- Pratt & Whitney Canada
- Quanser
- Quorum Technologies Inc.
- Rambus
- RBC Financial Group
- Redline Communications
- Robert Bosch Corporation
- Rolls Royce Canada
- Sandvik Canada
- Sanofi Pasteur Ltd.
- Saudi Basic Industries Corporation
- Schlumberger Canada Limited
- Semiconductor Research Corporation
- Shell Canada Limited
- Shock Bauteile GmbH
- Siltech Corporation
- Silver Creek Pharmaceuticals
- SiREM Laboratories
- Solana Networks
- Stantec
- Stora Enso
- Svensk Kärnbränslehantering Ab
- Syncrude Canada
- Taiwan Semiconductor Manufacturing
- TD Canada Trust
- Teck Resources Limited
- Tembec Inc.
- Tenova Goodfellow
- Toronto Electric
- Total American Services
- TOYO Aluminium K.K.
- Trojan Technologies Inc.
- Vale
- Vicicog
- Wuzhong Instrument
- Xerox
- Xilinx Inc.
- Xogen Technologies Inc.
- Zellstoff Celgar

**Figure 3.3a** Canadian Peer Universities and University of Toronto Share of NSERC Funding for Engineering, Cumulative Five-Year Share, 2007 to 2011



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

2002	8.9%
2003	9.0%
2004	8.2%
2005	8.9%
2006	9.1%
2007	9.0%
2008	9.2%
2009	8.5%
2010	9.4%
2011	8.8%

U of T remains the leading Canadian peer institution in attracting NSERC research grants in Engineering, with a five-year average of 9%. The Faculty's share of funding fluctuates from year to year — influenced by variations in the total funding distributed by NSERC — and the 2011 amount shown in Figure 3.3b is around the ten-year average of 8.9%.

**Figure 3.4** Engineering Invention Disclosures by Academic Area, 2007 to 2011

Nearly half of the inventions generated by U of T in the 2011 fiscal year originated in Engineering. Three of the University's top four departments were from our Faculty: ECE, MIE and IBBME.

All U of T inventors are required by the Inventions Policy to fully and completely disclose their inventions to the University. Rights to the inventions are, in most cases, jointly owned by the University and the inventor. In the past year we added three companies to our list of more than 100 Engineering spin-off companies: Xagenic Canada Inc., Filaser Inc., and RenWave. For a complete list of Engineering spin-off companies since 1970, see Appendix D.

The fractional numbers are a result of proportioning a disclosure when the inventors come from different academic areas — evidence of the Faculty's collaborative approach to research.

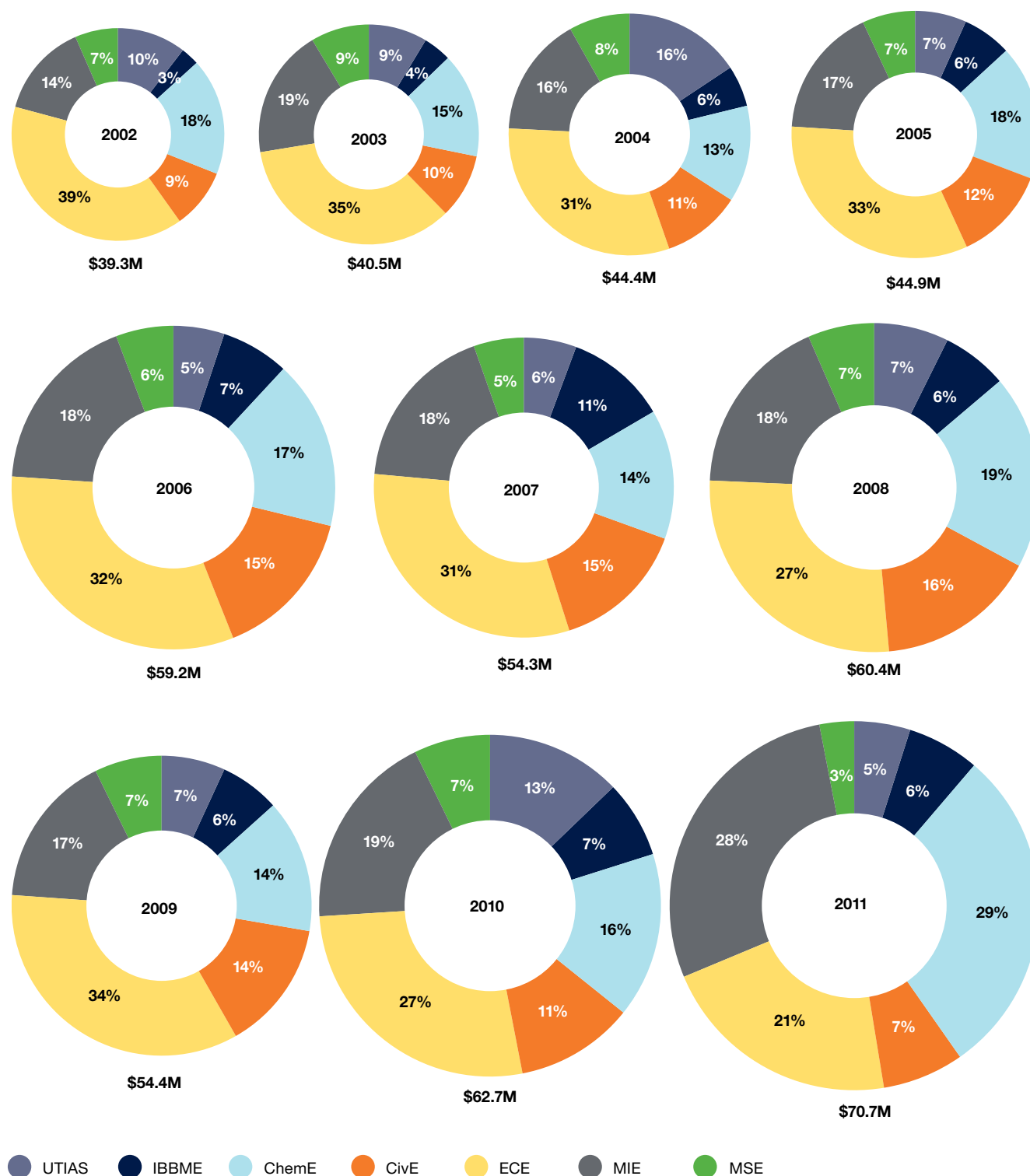
	2007	2008	2009	2010	2011	5-Yr Total
UTIAS	0.0	0.5	1.0	1.0	1.0	3.5
IBBME	7.1	11.9	8.7	7.0	9.3	44.0
ChemE	2.7	6.4	2.8	6.8	13.2	31.9
CivE	1.0	1.2	1.0	0.5	6.4	10.1
ECE	50.3	38.5	34.1	32.8	42.2	197.8
EngSci	0.0	0.3	0.0	0.0		0.3
MIE	6.0	23.0	8.7	6.3	14.1	58.1
MSE	2.0	5.4	2.5	1.9	4.0	15.8
<b>Annual Total</b>	<b>69.0</b>	<b>87.1</b>	<b>58.8</b>	<b>56.4</b>	<b>90.2</b>	<b>361.5</b>
<b>University Annual Total</b>	<b>140.0</b>	<b>159.0</b>	<b>150.0</b>	<b>140.0</b>	<b>196.0</b>	<b>785.0</b>
<b>Engineering Percentage</b>	<b>49%</b>	<b>55%</b>	<b>39%</b>	<b>40%</b>	<b>46%</b>	<b>46%</b>

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

**Note 3.4:** Data is shown by U of T's fiscal year (May to April). When all inventors are from the same academic area, that area is credited with one disclosure; when inventors are from different academic areas, each area is credited with a proportion of the disclosure.

Research funding has experienced pronounced growth in the last two years. Some academic areas have particularly benefited from specific research initiatives. For example, the official launch of BioZone has contributed to ChemE's growth in research activity, while work by the microcellular and nanocellular group to develop innovative plastics has boosted activity in MIE. The successful annual symposia in microfluidics have been a factor in both MIE and ChemE funding.

**Figure 3.5** Distribution of Research Funding by Academic Area, 2002 to 2011



**Note 3.5:** The research funding attributed to IBBME for 2011 represents 21% 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 Faculties of Medicine or Dentistry. The figure above shows only the funding that comes through the Faculty of Applied Science & Engineering and is presented by grant year (April to March).

# Major Group Research Initiatives in 2010–2011

## BioZone officially launched

In 2010, the Faculty's multidisciplinary bioengineering research centre — BioZone — was formally established. BioZone engages in research and scholarly work in applied bioscience and bioengineering, providing viable technological innovation in energy, environment and health. Led by Professor Elizabeth Edwards (ChemE), BioZone involves more than 130 people, university-wide, including undergraduates, graduate students, professors, research associates, and administrative and technical staff.

The first phase of BioZone's development was recently completed, with a \$550,000 grant from the Canada Foundation for Innovation (CFI) and the Ontario Ministry of Research and Innovation (MRI). A second phase is under development, scheduled for completion in the fall of 2011. With \$6.3 million in funding from CFI, MRI and the University of Toronto, the second phase will include expanding the fourth floor of the Wallberg Building.

## Distributed Generation for Remote Communities seeks clean energy alternatives

Eight U of T Engineering researchers received a \$1.65 million, six-year grant from NSERC's CREATE (Collaborative Research and Training Experience) program to bring clean alternative energy technologies — and the skills to install the technology — to remote Aboriginal communities in Canada. Through the Distributed Generation for Remote Communities project, we are exploring renewable energy options that will better serve communities currently relying on diesel generators. The grant will also help support the Faculty's Centre for Sustainable Energy by bringing academic researchers together with partners from industry and government to increase energy efficiency.

## Engage initiates new partnerships

In the first year of the Engage program to promote new collaborations between researchers and industry, 37 Faculty research projects received funding, representing \$898,000 in NSERC grants. The short-term collaborations are designed to support a six-month research project so that the company and the U of T researcher can work towards establishing a longer-term partnership. And that is exactly what has happened. Many of the projects have developed into continuing relationships.

## Ontario-on-a-Chip and MATCH annual spring events

The annual Ontario-on-a-Chip Symposium brings Faculty researchers together with chemical, pharma, biotech, advanced materials and analytical device companies each spring. More than 130 people interested in microfluidics, microreactors and labs-on-a-chip took part in the 2011 event. It was held in conjunction with MATCH, the Microfluidic Applications and Training in Cardiovascular Health symposium organized by the Microfluidics Graduate Training Program. An NSERC CREATE program, MATCH is an innovative interdisciplinary initiative involving U of T's IBBME and York University.

## Two Engineering Regenerative Medicine groups formed

The creation of the Centre of Commercialization of Regenerative Medicine (CCRM), led by Professor Peter Zandstra (IBBME), and the Ontario Stem Cell Initiative (OSCI), in spring 2011, support regenerative medicine and stem cell research that has the potential to alleviate suffering caused by some of the world's most debilitating diseases. The collaboration between OSCI researchers and CCRM is a key to translating medical breakthroughs into viable therapies, moving them from the labs to the hospitals. CCRM's launch is supported by a \$15-million Canadian government grant from the Centres of Excellence for Commercialization and Research competition. OSCI received infrastructure grants worth \$25 million from the Canadian Foundation for Innovation (CFI) and the Ontario Research Fund (ORF).

## Connected Vehicles and Smart Transportation

The Ontario Research Fund (ORF) Research Excellence project on Connected Vehicles and Smart Transportation (CVST) is a collaboration between industry, government and academia to develop an information gathering and sharing platform to enable smart applications for transportation and transit in the public and private domains. Led by Professor Alberto Leon-Garcia (ECE), CVST systems leverage the sensing capabilities of mobile devices and public sector sensors to provide real-time information that enables users to make decisions that reduce travel time, increase productivity, and reduce energy consumption and vehicle emissions. This project received funding for five years with \$2.5 million from the Province of Ontario with equal matching funds from industry and the University of Toronto.

# 4 Cross-Faculty Education and Research

Our commitment to encouraging multidisciplinary and multi-department approaches to tackling engineering issues can be illustrated with the cross-Faculty minors and the five EDU-Cs (Extra-Departmental Units) that have been firmly established in the past two years.

The latest addition to these collaborative research initiatives is BioZone. This centre fosters interdisciplinary bioengineering and environmental microbiology research by students and faculty in Chemical Engineering & Applied Chemistry, Civil Engineering, Mechanical Engineering, IBBME, Cell and Systems Biology, Biochemistry, Geology, Medicine, and Geography.

Other educational cross-Faculty opportunities exist in the growing number of undergraduate minor and certificate options for students. In the fall of 2011, minors in Engineering Business and Robotics & Mechatronics will begin, as will certificates in Engineering Business and Global Engineering. Many of the new course offerings tend to match activity in the EDU-Cs. In both cases, they reflect societal issues where engineering has an important role to play.

Majors are also reflecting cross-Faculty collaboration. Engineering Science's new Engineering, Mathematics, Statistics & Finance Major has been well-received, with 31 students registered in the first year the major was offered. This program, which began in September 2010, is delivered by faculty from MIE and several departments in Arts & Science and the Rotman School of Management.

Graduate program initiatives that span departments or other schools include MEng certificates like ELITE (Entrepreneurship, Leadership, Innovation & Technology in Engineering), EPP (Engineering & Public Policy), and Global (Engineering & Globalization).

Research centres at the department level, often defined as EDU-Ds, continued to grow in both scope and activity in 2010–2011. Two such centres — Centre for Advanced Coating Technologies (CACT) and Emerging Communications Technology Institute (ECTI) — along with one EDU-C — Identity, Privacy and Security Institute (IPSI) — are profiled in this chapter.



## Extra-Departmental Units

Extra-Departmental Units (EDU) are interdisciplinary educational or research centres that provide organizational focus and structure for defined academic areas. An EDU-C is typically a Faculty-wide multidisciplinary and multidepartmental unit that exists to foster research and scholarly interest in a particular area of academic work. An EDU-D, which usually exists within a department, is a group of scholars who pursue specific research objectives or offer a set of courses in an area of academic interest.

In 2011, the Faculty launched one new EDU-C called BioZone. We also profile three existing research centres below: Centre for Advanced Coating Technologies (CACT), Identity, Privacy and Security Institute (IPSI), and Emerging Communications Technology Institute (ECTI).

### BioZone

BioZone is a centre for collaborative and interdisciplinary bioengineering research that brings together researchers, students and industry partners to provide viable technological innovation to some of our most urgent societal needs in energy, environment and health. It arose from an informal collaboration within ChemE and has grown to include nine faculty members and their research groups and collaborators. In January 2011, BioZone was established as an EDU-C. Extensive renovations on the third and fourth floors of the Wallberg Building are underway to add significant research space and enhanced research strength in biocatalysis, enzymology and protein characterization.

BioZone has four main objectives:

1. Develop and deploy technically, socially and economically viable solutions to optimize use of natural resources, reuse waste material, remediate contaminated water and land, develop robust and healthy ecosystems, curtail disease and offer renewable fuels and products that foster long-term sustainability
2. Provide access to state-of-the-art tools, techniques and expertise to capitalize on the dramatic progress in genome science and genome analysis
3. Impart to trainees the sound knowledge and critical thinking to accurately debate and defend policies and positions that promote sustainable development
4. Serve as a clearinghouse for information on applied and environmental bioengineering for students, the wider research community, government and industry

### Emerging Communications Technology Institute (ECTI)

ECTI is the University of Toronto's main centre for micro- and nanofabrication. Originally established in 1997 as an EDU-D with funding from Nortel, it evolved from a combination of the Nortel Institute, the Very Large Scale Integration lab in the Pratt Building and the "Nanofabrication of Metamaterials" project, which was funded by the Canada Foundation for Innovation. It was renamed as ECTI in 2004, and also includes electromagnetics research labs.

A nucleus for researchers working in the micro- and nanofabrication areas, ECTI also promotes collaborative research with strategic partners and provides researchers with access to state-of-the-art equipment. Over the years, it has attracted researchers from across the University of Toronto, from other universities in southern Ontario and beyond, as well as industrial partners. In 2010, 150 U of T students and post-doctoral fellows working with 40 different professors made regular use of the facility.

ECTI also facilitates advanced educational opportunities and information exchange events. In 2011, it hosted the Connaught Summer Institute in Nanofabrication for attendees from across Canada. The intensive nine-day event featured discussions led by international experts, networking opportunities and hands-on nanofabrication labs.

## Centre for Advanced Coating Technologies (CACT)

Now in its 13th year of operation, CACT was established as an EDU-D as a collaborative effort between MSE and MIE to conduct fundamental and applied research in the area of industrial coatings application. CACT works closely with industries, other universities and research institutions such as GE Global Research, BMW USA, VacAero International, Hydro Quebec, NRC-Industrial Materials Institute and the University of Tokyo.

In 2010, CACT received an Ontario Research Fund grant of close to \$3.5 million for a project called “High-efficiency spray-formed metal foam heat exchangers for high temperature energy conversion and recovery” with Plasco Energy Group Inc., Pratt and Whitney Canada Inc., Centerline Ltd. and the University of Ottawa. CACT hopes to revolutionize heat recovery for Ontario-based manufacturers with technology that is lightweight, low-cost and high efficiency.

## Identity, Privacy and Security Institute (IPSI)

Established in 2009 as an EDU-C, IPSI is a leading interdisciplinary research institute that explores new approaches to maintaining the privacy, security, freedom and safety of users and the broader community. Through our Faculty’s administrative support and in partnership with the Faculty of Information, IPSI’s research community is vast and includes collaborators from the Faculties of Medicine, Arts & Science and Law.

The past year has been rich with activity, ranging from offering public lectures on topics such as internet privacy, to working with policy-makers, industry partners and regulatory agencies to help inform their identity, privacy and security decisions. In fact, members of IPSI showcased their video encryption technology at an event hosted by the Ontario Privacy Commissioner in 2010. This technology masks the images of individuals captured on video surveillance but allows authorized staff to unmask the images for security or safety purposes. Now ready for commercialization, the Toronto Transit Commission may be one of the first to use this surveillance technique.

## New Engineering Science Major: Engineering Mathematics, Statistics & Finance

In September 2010, the Division of Engineering Science welcomed 31 third-year students into its new Engineering Mathematics, Statistics & Finance Major — the first undergraduate program of its kind in Canada. Created in response to student demand, this new major provides graduates with a competitive advantage in the marketplace. With a quantitative/engineering background, graduates are equipped to apply their skills across many different fields, including engineering consulting, government, energy, mining, insurance, banking, aerospace and manufacturing.

Faculty members from the Department of Mechanical & Industrial Engineering lead the new major in cooperation with the Department of Statistics, Department of Mathematics and the Rotman School of Management.



# Interdisciplinary Minors and Certificates for Undergraduates

To support cross-Faculty initiatives at the undergraduate level, we created the Cross-Disciplinary Programs Office in 2009. This Office provides academic and administrative leadership to enhance educational activities that transcend departmental boundaries. In 2010–2011, we expanded our offerings with the creation of two new minors — Engineering Business and Mechatronics & Robotics — and two new certificates — Global Engineering and Engineering Business — for undergraduates.

As seen in Figure 4.1, we have had steady interest in our minors, with a notable increase in the number of students enrolled in the Sustainable Energy Minor over last year's enrolment.

## Bioengineering Minor

Through the Bioengineering Minor, students can enhance their education in a wide range of bioengineering-related fields including biomedical engineering, bio-imaging, nanotechnology in medicine and environment as well as engineering design for human interfaces. Several students are now using their thesis or design project to complete their minor requirements. More than 50 graduating students this year completed the Bioengineering Minor.

## Engineering Business Minor

Beginning in September 2011, the Engineering Business Minor is already attracting considerable interest. This minor is a joint effort between the Rotman School of Management and our Faculty. At the core of the minor are three new courses being taught by Rotman faculty exclusively to our undergraduates. Students can use their complementary studies requirements to complete this minor as part of their degree.

## Environmental Engineering Minor

Now in its second year, this minor explores topics such as ecology, waste management, water treatment, environmental microbiology, hydrology, preventive engineering and the social and environmental impacts of technology. By turning the former Collaborative Program into a minor, we have opened up this stream of learning to all departments across the Faculty. Thirty-three graduating students completed the Environmental Engineering Minor in 2011.

## Mechatronics & Robotics Minor

Following the launch of the Institute for Robotics & Mechatronics in 2010, this new minor was approved in April 2011. The program focuses on courses in dynamics and control, electronics, and mechanical design. Given the strong interest in this field, this minor should prove to be a popular cross-disciplinary program, particularly with ECE and MechE students.

## Sustainable Energy Minor

As our most popular minor with the broadest appeal across our departments, students learn about energy, its sustainable use, energy demand management and public policy relating to sustainability. More than 70 graduating students completed the Sustainable Energy Minor in 2011.

## Undergraduate Certificates

Certificate programs allow students to explore different topics without the curricular demands of the minors. Students can pursue certificates in the following areas:

- Entrepreneurship, Innovation & Small Business
- Preventive Engineering & Social Development
- Global Engineering (new in 2010)
- Engineering Business (new for 2011)

In 2011, 27 students graduated from our Faculty with a certificate in Entrepreneurship, Innovation & Small Business and 17 students graduated with a certificate in Preventive Engineering & Social Development.

**Figure 4.1** Engineering Minor Enrolment, 2007–2008 to 2010–2011

	2007–08	2008–09	2009–10	2010–11
Bioengineering	111	138	195	168
Environmental Engineering (Collaborative Program)	(95)	(74)	135	105
Sustainable Energy			198	241
<b>Total Enrolment</b>	<b>206</b>	<b>212</b>	<b>528</b>	<b>514</b>

# 5 Awards and Honours

Over the 2010–2011 academic year, we have maintained our strong record in awards and honours. We continue to be recognized for excellence in teaching, research and professional service. In 2010, our faculty members garnered one-third of the major provincial, national and international awards received by engineering professors in Canada, despite comprising only 5.5% of Canadian engineering faculty members.

While continuing to achieve major international honours such as induction into the U.S. National Academy of Engineering, this year the Faculty also excelled in discipline-based awards. For example, our professors swept the 2011 Canadian Society for Mechanical Engineering awards, winning in every category. Our goal is to continue to strengthen the departmental nomination system for these kinds of awards in order to increase recognition for our junior faculty and build a solid foundation for continued success in major national and international awards in the years to come.

This year, we also focused on nominations and achieved remarkable recognition for our outstanding alumni. As an example, 20% of 2011 Fellows of the Canadian Academy of Engineering are U of T alumni. In addition, two of our alumni were named to Canada's Top 40 Under 40 this year and three of our graduates were selected to receive Honorary Degrees from the University of Toronto.

Our staff also garnered recognition with Chancellor's Awards, the University's highest honour for administrative excellence, in both the Emerging Leader and Influential Leader categories. Our new staff awards program, introduced last year, has proven extremely successful, with a strong and competitive slate of nominations. These awards, as well as our teaching awards, were recently presented at our 4th annual Celebrating Engineering Success Reception, attended by approximately 150 faculty and staff. We also recently created a Teaching Assistant Award, to recognize the dedication and excellence of those graduate students who will become the next generation of engineering educators.

## Selected Awards Received by Faculty Members and Alumni, 2010–2011

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**

Stewart Aitchison, ECE  
Nasser Ashgriz, MIE  
Elizabeth Edwards, ChemE  
Jun Nogami, MSE  
Paul Santerre, IBBME  
Molly Shoichet, ChemE/IBBME

#### **American Concrete Institute: Arthur R. Anderson Medal**

Doug Hooton, CivE

#### **American Oil Chemists' Society: Young Scientist Research Award**

Edgar Acosta, ChemE

#### **Institute of Electrical and Electronics Engineers: Fellow**

Ted Sargent, ECE

#### **Institute of Industrial Engineers: Medallion Award**

David Poirer, IndE 8T9

#### **National Academy of Engineering: Foreign Associate**

Jonathan Rose, ECE  
Prabha Kundur, ElecE MASc 6T5,  
ElecE PhD 6T7

#### **Society for Biomaterials: Acta Biomaterialia Gold Medal**

Michael Sefton, ChemE/IBBME

#### **Steel Structures Education Foundation: H.A. Krentz Award**

Jeffrey Packer, CivE

### National

#### **Canada Mortgage and Housing Corporation: Excellence in Education Award**

Christopher Kennedy, CivE

#### **Canadian Academy of Engineering: Fellow**

John Bianchini, ChemE 8T5  
Allan Carswell, EngPhys 5T6  
David Colcleugh, ChemE 5T9,  
MASc 6T0, PhD 6T2  
Anton Davies, MechE 7T2,  
MASc 7T4, PhD 7T7  
Hank Edamura, CivE 6T0  
Elizabeth Edwards, ChemE  
Peter Halsall, CivE 7T7  
Gino Palumbo, MMS 8T3,  
MASc 8T5, PhD 8T9  
Dawn Demetrick-Tattle, CivE 8T5  
Thomas Tiedje, EngSci 7T3

#### **Canadian Mining Hall of Fame: Member**

Bert Wasmund, ChemE 6T6

#### **Canadian Society for Civil Engineering: Camille Dagenais Award**

Barry Adams, CivE

#### **Canadian Society for Mechanical Engineering**

**C.N. Downing Award:** Jean Zu, MIE  
**Fellow:** Markus Bussmann, MIE  
**G.H. Duggan Medal:**  
Lidan You, MIE/IBBME  
**I.W. Smith Award:** Aimy Bazylak, MIE  
**Jules Stachiewicz Medal:**  
Javad Mostaghimi, MIE  
**Robert W. Angus Medal:**  
Jim Wallace, MIE

#### **Engineering Institute of Canada**

**Fellow:** Grant Allen, ChemE  
Doug Hooton, CivE  
Shaker Meguid, MIE  
**Julian C. Smith Medal:**  
Robert Andrews, CivE  
**Canadian Pacific Railway Engineering Medal:** Mark Fox, MIE  
**Sir John Kennedy Medal:**  
Gordon Slemon, ECE

#### **Government of Canada: Order of Canada**

Julie Payette, ECE MASc 9T0

#### **Royal Society of Canada**

**Fellow:** Stewart Aitchison, ECE  
Harry Ruda, MSE/ECE  
**Miroslaw Romanowski Medal:**  
Donald Mackay, ChemE

#### **The Globe and Mail: 25 Transformational Canadians**

Tom Chau, IBBME

#### **The Globe and Mail: Canada's Top 40 Under 40**

John Poulos, ElecE 9T7  
Som Seif, IndE 9T9

#### **Women's Executive Network: Canada's Most Powerful Women Top 100**

Dawn Demetrick-Tattle, CivE 8T5  
Anne Sado, IndE 7T7

**Note:** The international, national and provincial awards listed on page 43 and 44 include honours received between July 2010 and June 2011.

## Provincial

**Government of Ontario:  
Order of Ontario**  
Molly Shoichet, ChemE/IBBME

**Ontario Confederation of  
University Faculty Associations:  
OCUFA Teaching Award**  
Susan McCahan, MIE

**Professional Engineers Ontario  
Citizenship Award:**  
Anna Dunets Wills, CivE 7T6  
**Gold Medal:** Michael Charles, ChemE  
**Management Medal:**  
Anton Davies, MechE 7T2, MASc 7T4, PhD 7T7  
**Research and Development Medal:**  
Elizabeth Edwards, ChemE  
Doug Perovic, MSE  
David Zingg, UTIAS  
**Young Engineer Award:**  
Milica Radisic, ChemE/IBBME

**YWCA Toronto:  
Woman of Distinction  
Award**  
Cristina Amon, MIE

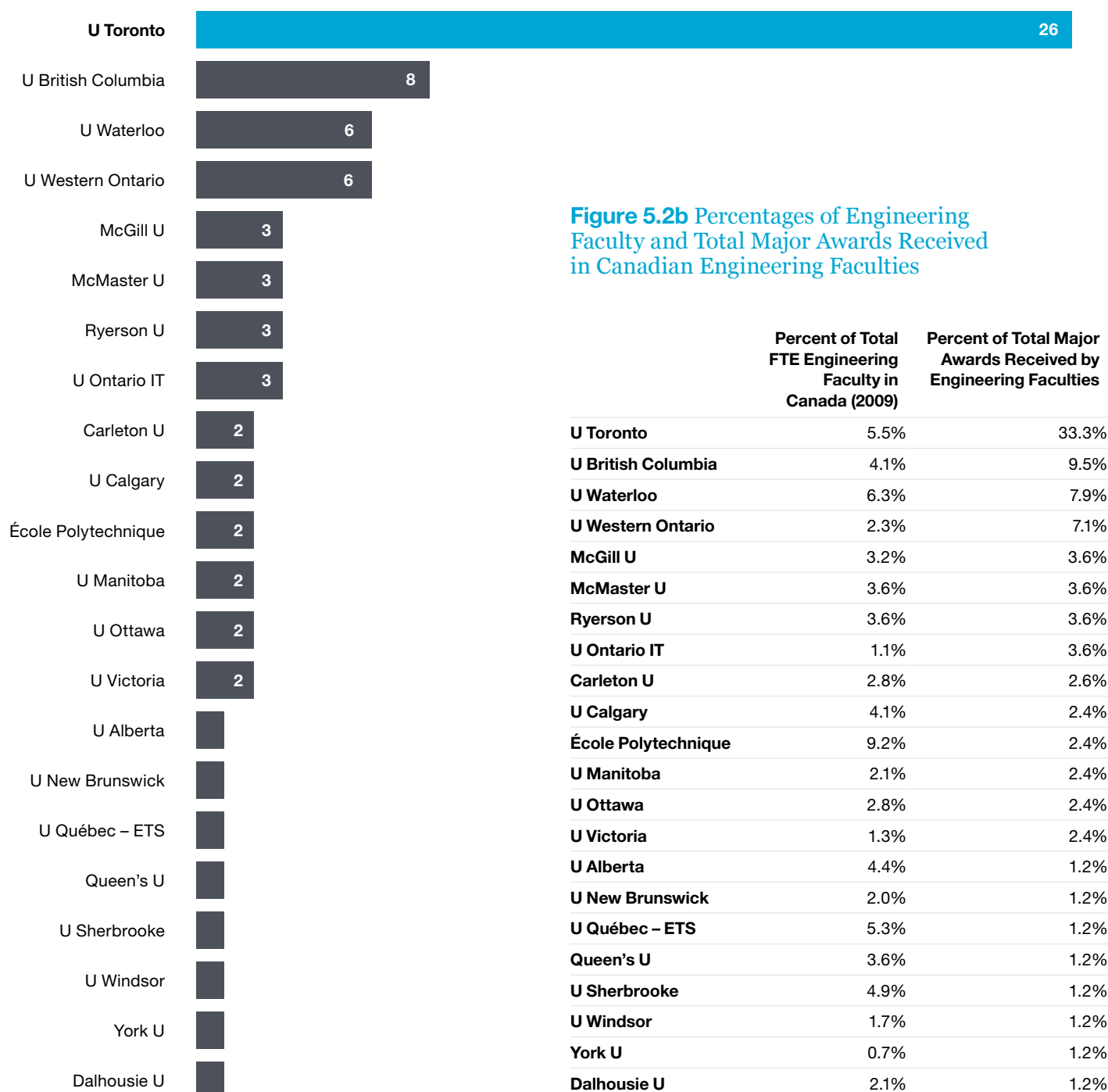
**Figure 5.1** Summary of Major International, National and Provincial Awards and Honours, 2001 to 2010

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>International</b>										
AAAS Fellowship*					1	1	2	4	4	6
Guggenheim Fellowship*				1			1			
MIT Top 35 Under 35					1			1		
NAE Fellowship*					1	1				1
<b>National</b>										
3M Teaching Fellowship*							1			
Alan Blizzard Award							1			
Canada's Top 40 Under 40			1			2	2	2		
CAE Fellowship (Faculty)					3	2	1	3	9	8
CAE Fellowship (Alumni)**	1	2	5	1	1	5	3	8	4	7
EIC Fellowship				1		2	2	3	4	3
Killam Research Fellowship*								2		2
Killam Prize*			1					1		
Royal Society of Canada Fellowship*	1		2		1	1	1	1	1	2
Steacie Fellowship*			2	1	1				1	
Synergy Award for Innovation				1	1	1			1	
<b>Provincial</b>										
PEO Medals		1	1	1	4	2	3	5	5	5
<b>Total</b>	<b>2</b>	<b>3</b>	<b>12</b>	<b>6</b>	<b>14</b>	<b>17</b>	<b>17</b>	<b>30</b>	<b>29</b>	<b>34</b>

**Note 5.1:** (\*) Denotes U of T performance indicator. Data is shown by calendar year (January to December). Includes faculty award recipients only except for (\*\*), which reflects alumni recipients only. To read descriptions of the awards and honours listed above, please see Appendix E.

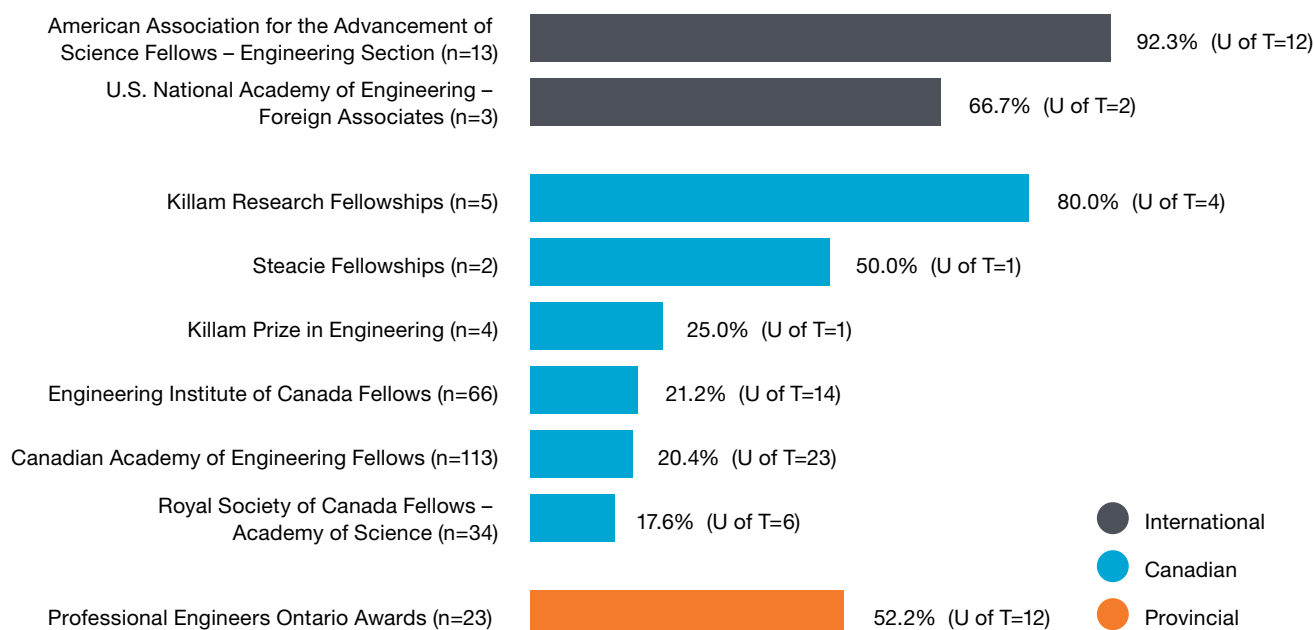
**Figure 5.2a** Number of Major Awards Received by U of T Engineering Compared to other Canadian Engineering Faculties, 2010

U of T Engineering professors received seven major international awards and 19 major national awards, comprising 33.3% of all major awards received by professors in Engineering Faculties in Canada.



**Note 5.2a and 5.2b:** The following major awards are included above: International—AAAS Fellowship (Engineering Section), MIT Top 35 Under 35, NAE Fellowship; National—Canada's Top 40 Under 40, CAE Fellowship, EIC Fellowship and Awards, Engineers Canada Awards, Killam Prize (Engineering), Royal Society of Canada Fellowship (Academy of Sciences), Steacie Fellowship, Synergy Awards for Innovation. For a list of Canadian universities which have accredited engineering programs, please visit [www.peo.on.ca/registration/Can\\_univer\\_offer\\_eng.htm](http://www.peo.on.ca/registration/Can_univer_offer_eng.htm)

**Figure 5.3** Number of Awards Received by U of T Engineering Faculty Compared to other Canadian Engineering Faculties, 2006 to 2010



## University of Toronto Awards Received by Engineering, 2010–2011

### Arbor Award

Presented by the University of Toronto Alumni Association to outstanding volunteers for their personal service to the University.

David Frederick Poirier, IndE 8T1  
 Fabian Papa, CivE 9T5  
 H. Ross Pitman, GeoE 7T4  
 Jim Burgess, CivE 5T6  
 John Barrie Blanshard, CivE 5T3  
 Margaret Kende, CivE 6T0  
 Michael Branch, CompE 0T3  
 Michael May, ChemE 9T1  
 Randy Sinukoff, ChemE 8T2  
 Sandra Odendahl, ChemE MASc 9T0

### Chancellor's Awards

Recognizes administrative staff for exceptional leadership in their role in advancing the University's mission.

#### Emerging Leader:

Helen Bright, Office of the Registrar

#### Influential Leader:

Catherine Gagne, Office of the Dean

### Excellence Through Innovation (Renamed from Stepping Up in 2010)

Presented to staff who contribute to one of the U of T academic plan's five major goals: enhancing the student experience; interdisciplinary activity; linking academic programs to research experiences; outreach; and equity and diversity.

**Group:** Joan Chen, ChemE;  
 Pauline Martini, ChemE; Liam Mitchell, ChemE; Deborah Peart, ChemE

### Honorary Degrees

Recognizes extraordinary achievement and contributions. Recipients serve, through example, as inspiration and leadership to our graduates.

Koh Yong Guan, MechE 7T0, MASc 7T2  
 Anne Sado, IndE 7T7  
 Bert Wasmund, ChemE PhD 6T6

### Inventor of the Year

Presented to inventors or teams of inventors who have made a significant contribution to the University of Toronto's innovation agenda since January 1, 2005 as a result of disclosure to the Innovations & Partnership Office.

Constantin Christopoulos, CivE  
 Yu Sun, MIE

**Note 5.3:** Data is shown by calendar year (January to December) and includes faculty award recipients only.

**Note:** The University of Toronto awards listed above include honours received between July 2010 and June 2011.

# University of Toronto Engineering Faculty Awards, 2001 to 2011

## Early Career Teaching Award

Presented in recognition of teaching excellence early in a career

2011: Sean Hum, ECE  
2010: Glenn Hibbard, MSE  
2009: Craig Simmons, MIE  
2008: Hani Naguib, MIE  
2007: Wei Yu, ECE  
2006: Ali Sheikholeslami, ECE  
2005: Evan Bentz, CivE  
2004: Paul Gauvreau, CivE  
2003: Parham Aarabi, ECE  
2002: R. Ben Mrad, MIE  
2001: Baher Abdulhai, CivE

## Faculty Teaching Award

The highest teaching tribute awarded by the Faculty

2011: Jim Wallace, MIE  
2010: Ali Sheikholeslami, ECE  
2009: John Carter, ECE  
2008: Tarek Abdelrahman, ECE  
2007: Raviraj Adve, ECE  
2006: Frank Kschischang, ECE  
2005: Ross Ethier, MIE  
2004: Kim Pressnail, CivE  
2004: Z.G. Vranesic, ECE  
2003: David Kuhn, ChemE  
2002: Bryan Karney, CivE  
2001: Tony Sinclair, MIE

## Teaching Assistant Award

Created in 2011 to recognize the excellence of a teaching assistant

2011: Bernie Fitzpatrick, UTIAS

# University of Toronto Engineering Staff Awards, 2001 to 2011

## Agnes Kaneko Citizenship Award

This award recognizes staff who have served the Faculty with distinction and made contributions to the Faculty's mission above and beyond their job description over a long period of time. The award was established in memory of a dedicated staff member in the Department of Civil Engineering.

2011: John MacDonald, CivE  
2010: Joe Baptista, MIE  
2009: Renzo Basset, CivE  
2008: Linda Espeut, ECE  
2007: Brenda Fung, MIE  
2006: Peter Leesti, CivE  
2005: Sandra Walker, EngSci  
2005: Yvonne MacNeil, IBBME  
2004: Kelly Chan, ECE  
2003: Bob Manson, ECF  
2002: Ella Lund-Thomsen, ECF  
2001: Teresa Miniaci, MSE

## Emerging Leader Award

This award recognizes staff who lead by example in their dedication to the Faculty's mission. Recipients are held in high regard by colleagues and demonstrate the potential to assume a more senior leadership role within the Faculty.

2011: Ryan Mendell, MIE  
2010: Helen Bright,  
Office of the Registrar

## Influential Leader Award

This award recognizes staff who demonstrate exemplary support for the Faculty's education and research endeavours. Recipients inspire others to realize their potential through their significant and sustained contributions to the Faculty.

2011: Nelly Pietropaolo, CivE  
2010: Arlene Smith, ChemE

## Innovation Award

This award recognizes 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.

2011: Bruno Korst, ECE; Steve Miszuk, Office of the Dean; Joe Wong, ECE  
2010: Joan Chen, ChemE; Pauline Martini, ChemE; Liam Mitchell, ChemE; Deborah Peart, ChemE

## Quality of Student Experience Award

This award recognizes staff who, working either directly with students or behind the scenes, have made significant improvements to the quality of student experience in the Faculty.

2011: Lesley Mak, Office of the Registrar  
2011: Annie Simpson, Institute for Leadership Education in Engineering  
2010: Pierina Filippone, Office of the Registrar



# Engineering Alumni Associations Awards, 2010

## 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 their support and dedication to U of T Engineering and its arts community.

Geoffrey Siu, EngSci Comp 0T9 + PEY

## 7T6 Early Career Award

This award is given to an alumnus/alumna celebrating their 10th year since graduation who is distinguished in their profession and community.

Nadine Ibrahim, CivE 0T0, MASc 0T3

## 2T5 Mid-Career Achievement Award

This award recognizes an alumnus/alumna celebrating their 25th year since graduation who has earned respect within the profession and broader community, attained significant achievement and exhibits promise of further contributions.

Dawn Demetrick-Tattle, CivE 8T5

## Malcolm R. 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 community.

Donald King, ChemE 5T0

## 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.

Manuel Fine, CivE 5T2

Marc A. Rosen, EngSci 8T1,

MechE MASc 8T3, PhD 8T7

Anne Sado, IndE 7T7

Joseph C. Paradi, ChemE 6T5,

MASc 6T6, PhD 7T5

## Engineering Alumni Medal

As the highest honour awarded by the Engineering Alumni Association, this award is presented to an alumnus/alumna who has demonstrated superior accomplishment and serves as an outstanding role model for students.

William Dimma, ChemE 4T8



# 6 World Recognition by Rankings

In a year marked by changing partners and revamped criteria among various ranking services, U of T Engineering continues to place first in Canada for all rankings and consistently places among the best worldwide.

The re-calibrated data does have an impact on the Faculty's international ranking. The separation of the Times Higher Education (THE) World University Ranking (now partnered with Thomson Reuters) and QS World University Rankings (still allied with U.S. News & World Report) sees U of T Engineering's 2009 ranking in 8th position shift to 13th on the THE chart and 14th on the QS chart. However, the revised methodology and additional performance indicators mean that only two Canadian institutions are on the THE top 50 in Engineering, while four are in the QS top 50.

The modified THE indicators now include teaching, research, citations, industry income and international mix of staff and students. In the five subject categories newly created by QS — Chemical Engineering, Civil & Structural Engineering, Computer Science & Information Systems, Electrical Engineering and Mechanical, Aeronautical & Manufacturing Engineering — our Faculty tops the Canadian list in every one.

We placed 19th again in the Academic Ranking of World Universities (ARWU) from Shanghai Jiao Tong, putting us at the top of the Canadian list. In the Higher Education Evaluation & Accreditation Council of Taiwan (HEEACT) Performance Ranking of Engineering Papers, we remain on top of the Canadian rankings and 31st in the world.

The bibliometric data captured in this chapter also appeared in last year's Annual Report — new rankings have not been released since that time. U of T Engineering is ranked 7th in the world in both the number of publications and number of citations. Our prodigious research output places us first in Canada in these categories, and in the statistics on citations per faculty and citations per publication.

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.

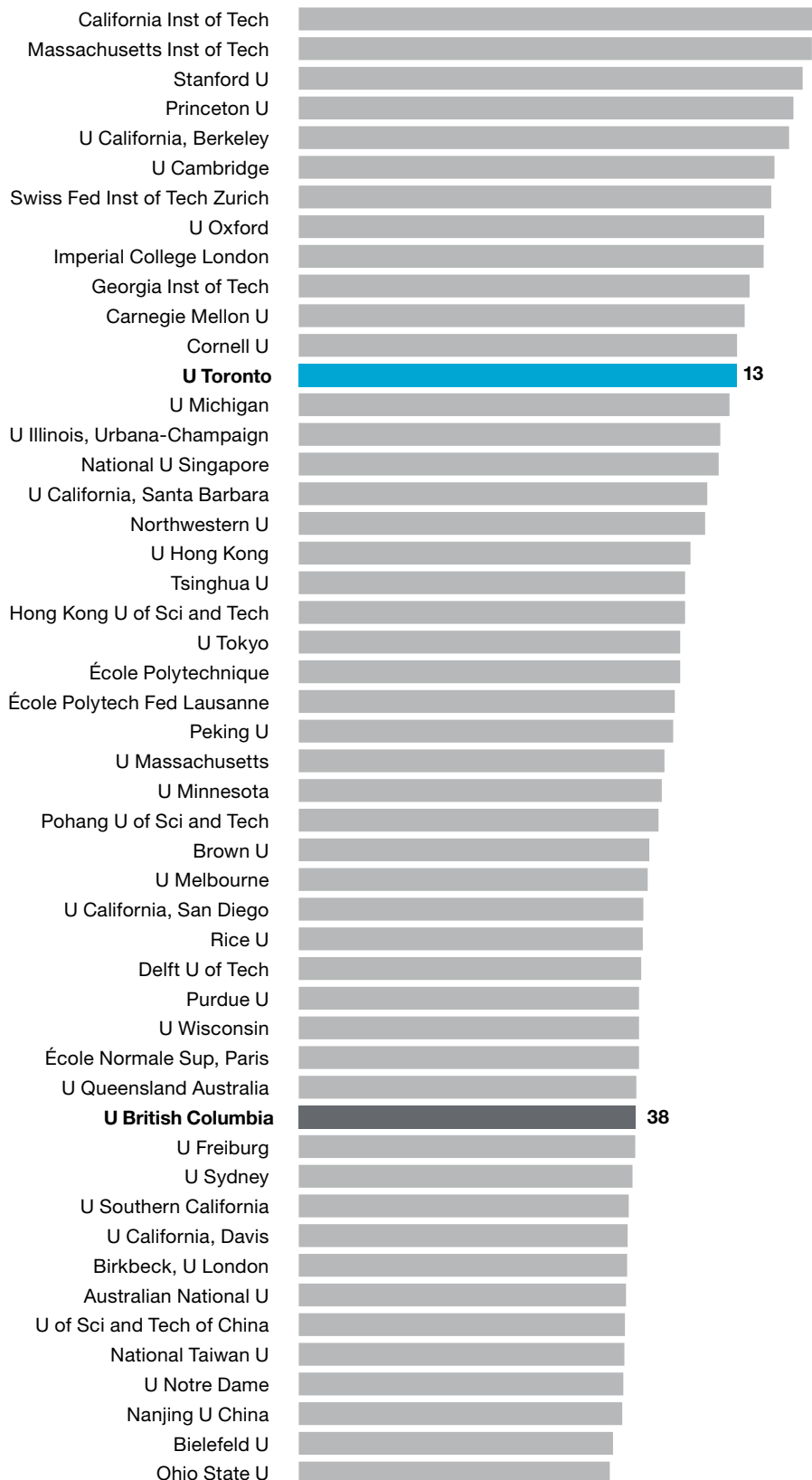
# Comprehensive University Rankings

**Figure 6.1** Times Higher Education-Thomson Reuters World University Ranking, Top 50 Universities for Engineering and Information Technology, 2010

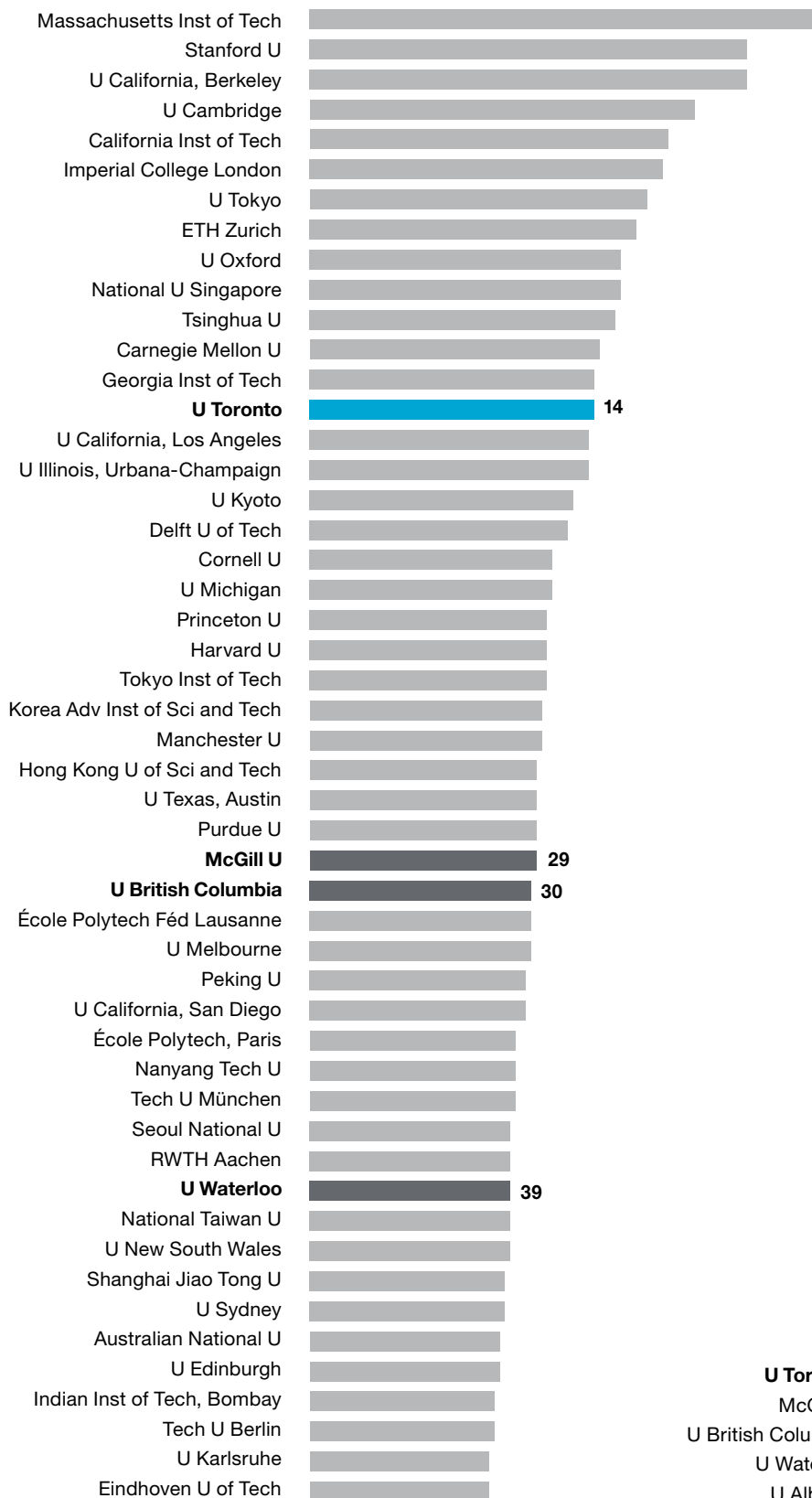
Our Faculty has maintained its position as Canada's top engineering school in the newly realigned and revised Times Higher Education (THE)-Thomson Reuters (September 2010) world rankings. THE suggests its rankings should be considered "the first of a new annual series" because of its changes, which includes a shift in partnership from QS to Thomson Reuters, its new data provider. THE also overhauled its methodology, increasing the number of performance indicators to 13 from six. These have been brought together into five categories, including a new teaching one, weighted as follows:

- Citations (32.5%)
- Teaching (30%)
- Research (30%)
- International mix: staff & students (5%)
- Industry income: innovation (2.5%)

In the new report, U of T Engineering ranks 13th and is one of only two Canadian universities to make the top 50 list. The University of British Columbia ranks 38th in that list.



**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, 2010



In its first report (September 2010) since parting company with Times Higher Education, QS World University Rankings place U of T Engineering as one of four Canadian universities in the top 50, sitting in 14th position internationally. U of T Engineering is followed by McGill in 29th position, British Columbia at 30th and Waterloo tied for 39th.

The QS rankings are based primarily on six criteria:

- Academic Peer Review
- Employer Review
- Citations Per Faculty
- Student-Faculty Ratio
- Percentage of International Faculty
- Percentage of International Students

In addition to being first overall in Canada, U of T is the top Canadian university in each of QS's five new subject areas (see Figure 1.2c):

- Chemical Engineering
- Civil & Structural Engineering
- Computer Science & Information Systems
- Electrical Engineering
- Mechanical, Aeronautical & Manufacturing

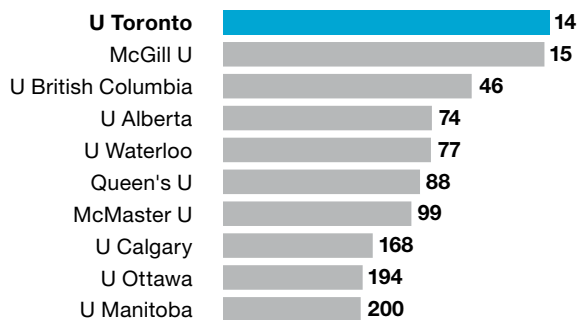
The QS results were also published in U.S. News & World Report in September 2010.

**Figure 6.2b** Canadian G13 in Top 100 from QS World University Rankings for Engineering and Information Technology

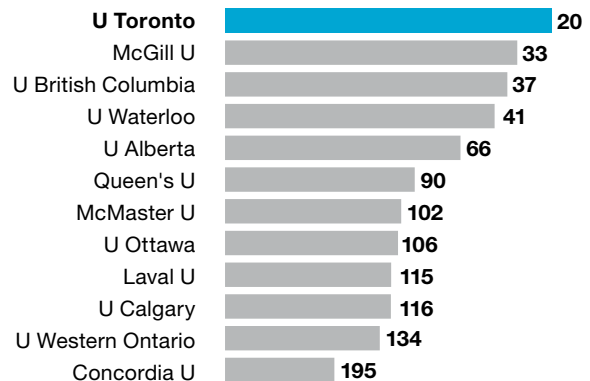


**Figure 6.2c** Canadian Universities in QS World Ranking by Discipline for Engineering and Information Technology, 2011

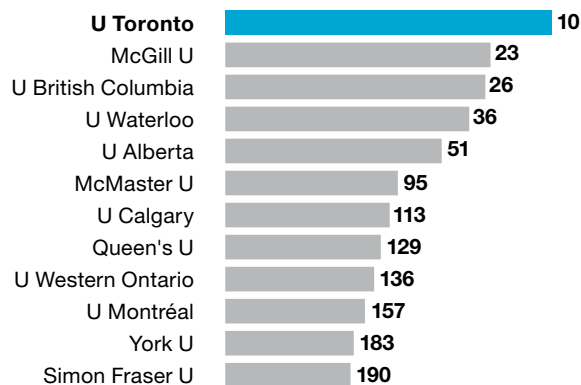
### Chemical Engineering



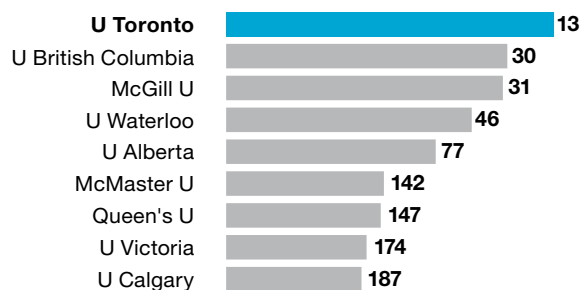
### Civil & Structural Engineering



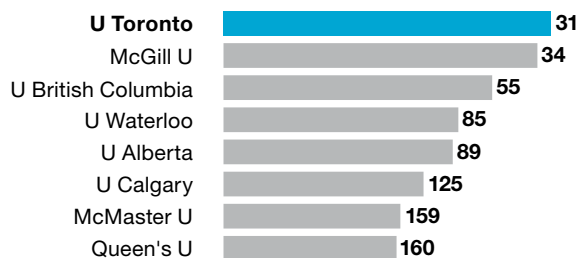
### Computer Science & Information Systems



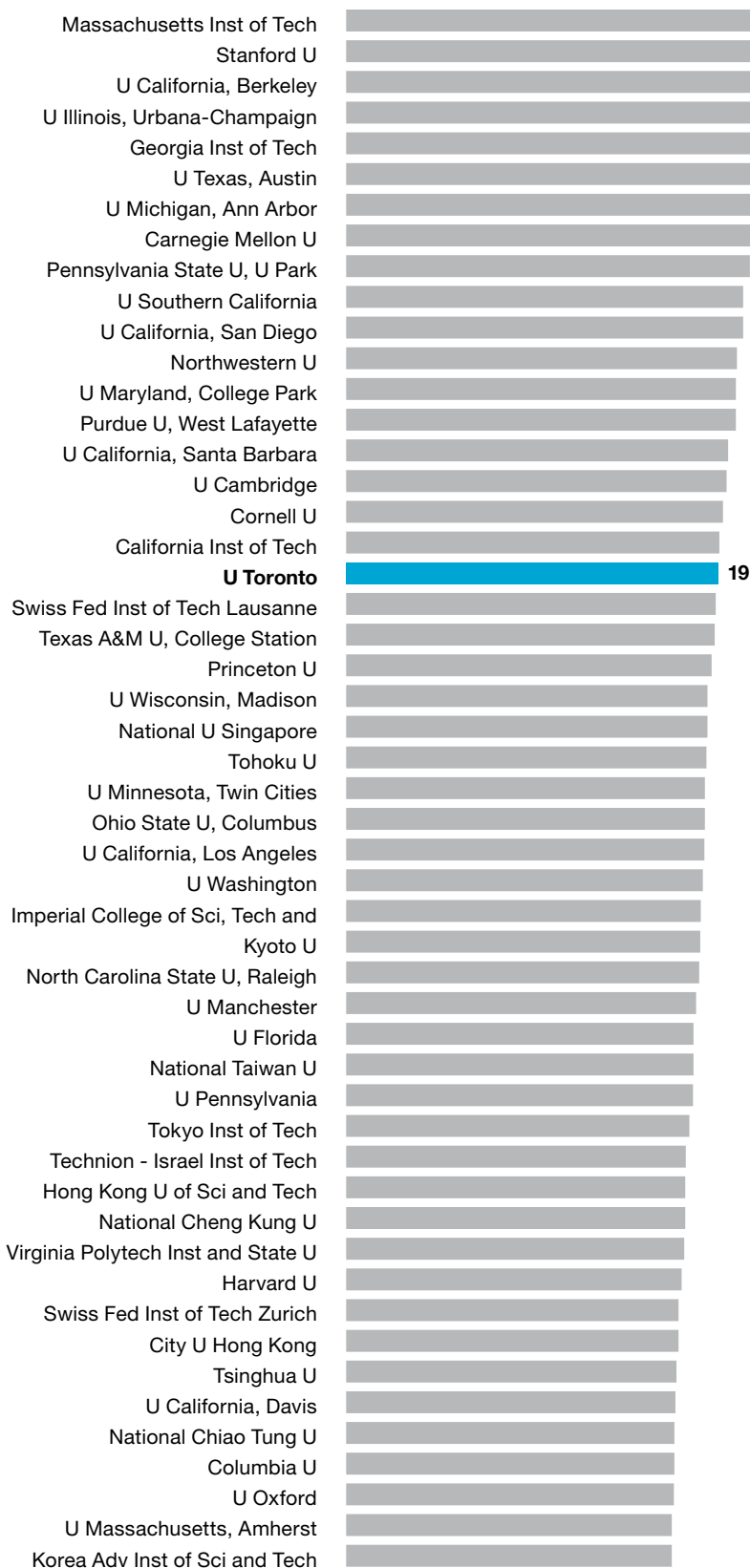
### Electrical Engineering



### 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, 2010



Once again, U of T placed 19th in the Shanghai Jiao Tong Academic Ranking of World Universities (ARWU), the only Canadian institution to make the top 50 list.

A score of 100 is assigned to the top institution, with others calculated as a percentage of that top score.

The ranking is based on four 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)
- Engineering research expenditure (FUND).

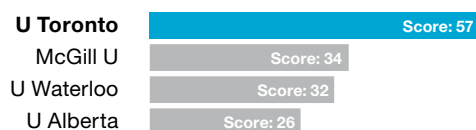
U of T was the top Canadian university for each indicator. Note that research expenditure (FUND) by Canadian universities is calculated and reported differently than for American institutions.

**Figure 6.3b** Canadian Universities in Top 100 from ARWU for Engineering/Technology and Computer Sciences, 2010



**Figure 6.3c** Scoring Analysis of Canadian Universities in Top 100 from ARWU for Engineering/Technology and Computer Sciences, 2010

#### Scoring on Highly Cited Research (HiCi) Indicator



#### Scoring on Articles in Top Journals (TOP) Indicator



#### Scoring on Published Articles (PUB) Indicator



#### Scoring on Research Expenditure (FUND) Indicator



## Rankings Based on Publications and Citations

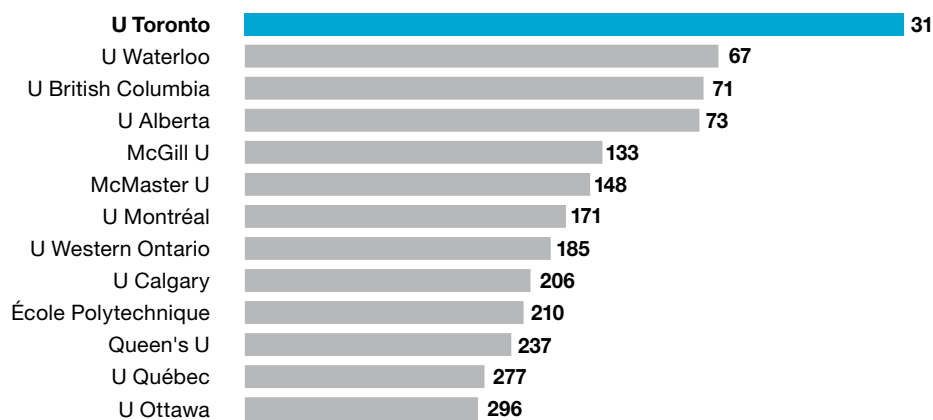
**Figure 6.4** Higher Education Evaluation & Accreditation Council of Taiwan (HEEACT)  
Performance Ranking of Engineering Papers for World Universities, 2010

The international ranking of engineering papers, by the Higher Education Evaluation & Accreditation Council of Taiwan (HEEACT), places U of T Engineering 31st among world universities and at the top of the list of Canadian universities.

HEEACT's ranking is based on four criteria:

- number of articles published in the past 11 years
- number of citations in the past 11 years
- number of articles published in the current year
- number of citations in the past two years.

Articles published in high-impact journals are also factored.



**Figure 6.4b** Canadian Universities in HEEACT Performance Ranking by Discipline, 2010

### Chemical Engineering



### Civil Engineering



### Electrical Engineering



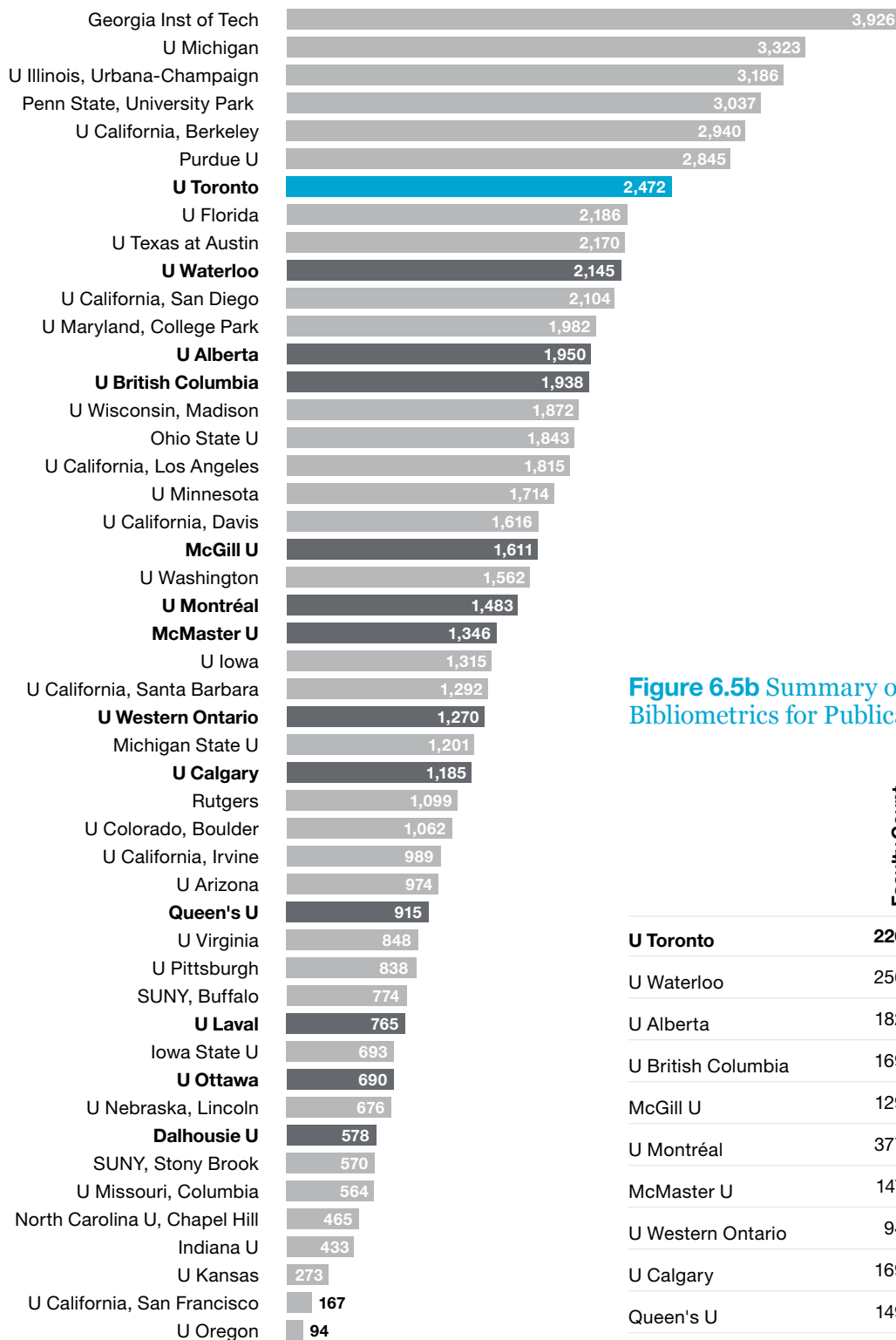
### Materials Science



### Mechanical Engineering



**Figure 6.5a** Number of Engineering Publications Indexed by Thomson Reuters Association of American Universities (AAU) Public and Canadian Peer Institutions, 2005 to 2009



In 2009, U of T Engineering ranked first nationally and 7th in the world for publication counts.

The AAU index (see Figure 6.5a) measures research output, as well as productivity and intensity based on publication counts. The faculty count in the bibliometrics table (see Figure 6.5b) is based on data from the *Engineers Canada 2009 Resources Report*.

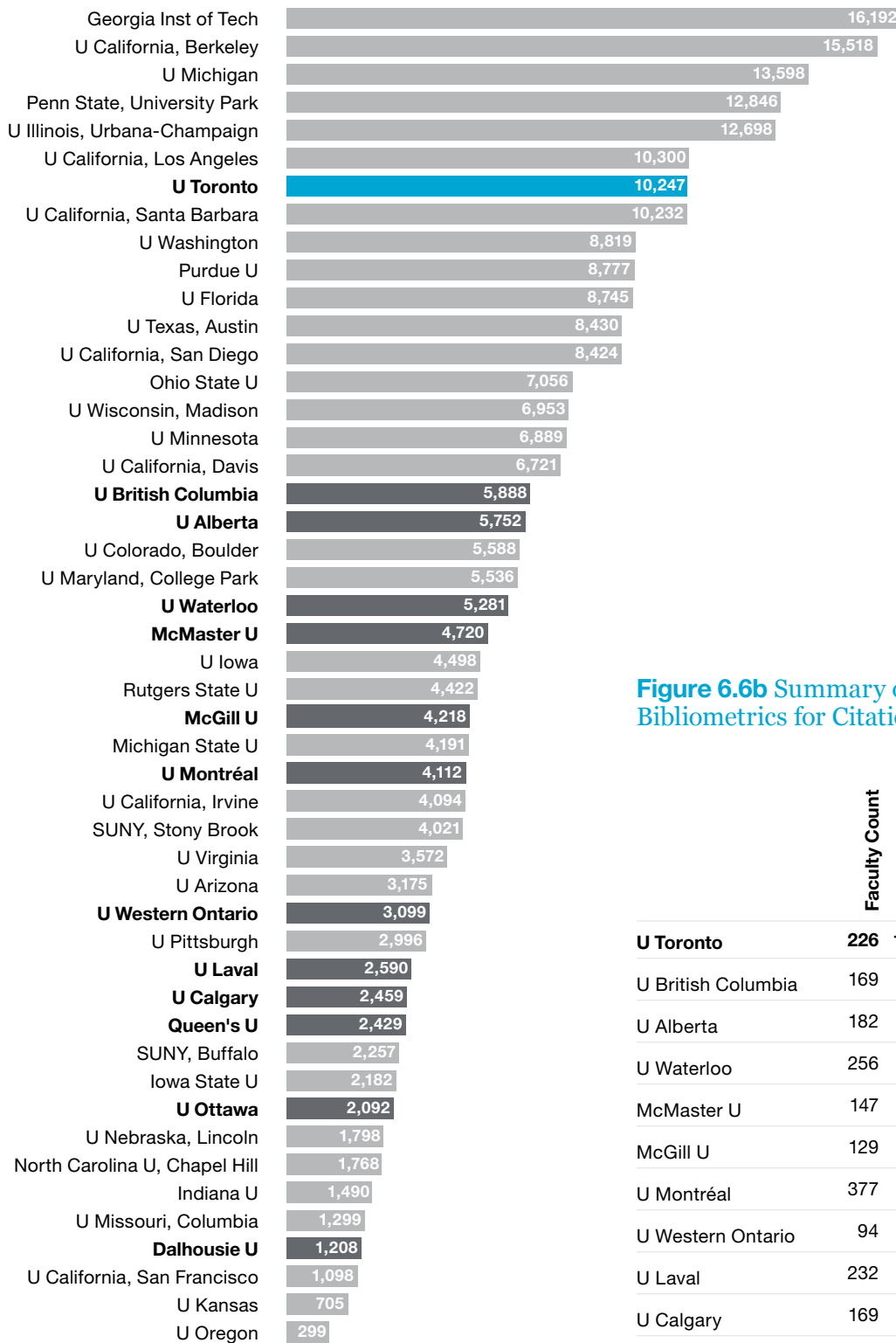
**Figure 6.5b** Summary of G13 Bibliometrics for Publications

	Faculty Count	Publications	Publications per Faculty	Rank on Pub per Faculty
<b>U Toronto</b>	226	2,472	10.9	4
U Waterloo	256	2,145	8.4	7
U Alberta	182	1,950	10.7	5
U British Columbia	169	1,938	11.5	3
McGill U	129	1,611	12.5	2
U Montréal	377	1,483	3.9	12
McMaster U	147	1,346	9.2	6
U Western Ontario	94	1,270	13.6	1
U Calgary	169	1,185	7.0	8
Queen's U	149	915	6.1	10
U Laval	232	765	3.3	13
U Ottawa	116	690	5.9	11
Dalhousie U	86	578	6.7	9

**Note 6.5a and 6.5b:** The information on this page also appeared in the 2010 Annual Report; new data has not been released since that time.



**Figure 6.6a** Number of Engineering Citations Indexed by Thomson Reuters Association of American Universities (AAU) Public and Canadian Peer Institutions, 2005 to 2009



Like the publications rankings in Figure 6.5a, U of T Engineering was first nationally in citations and 7th in the world.

Research output is measured in the AAU index, as are productivity and intensity based on citation counts. Data from the *Engineers Canada 2009 Resources Report* was used to determine the faculty count for citations (see Figure 6.6b).

**Figure 6.6b** Summary of G13 Bibliometrics for Citations

	Faculty Count	Citations	Citations per Faculty	Rank on Citations per Faculty	Citations per Publication	Rank on Citations per Publication
<b>U Toronto</b>	226	10,247	45.3	1	4.1	1
U British Columbia	169	5,888	34.8	2	3.0	4
U Alberta	182	5,752	31.6	6	2.9	6
U Waterloo	256	5,281	20.6	7	2.5	10
McMaster U	147	4,720	32.1	5	3.5	2
McGill U	129	4,218	32.7	4	2.6	9
U Montréal	377	4,112	10.9	13	2.8	7
U Western Ontario	94	3,099	33.0	3	2.4	11
U Laval	232	2,590	11.2	12	3.4	3
U Calgary	169	2,459	14.6	10	2.1	13
Queen's U	149	2,429	16.3	9	2.7	8
U Ottawa	116	2,092	18.0	8	3.0	5
Dalhousie U	86	1,208	14.0	11	2.1	12

**Note 6.6a and 6.6b:** The information on this page also appeared in the 2010 Annual Report; new data has not been released since that time.

## Summary of Ranking Results

**Figure 6.7a** Summary of U of T Engineering Performance in World Rankings, 2007 to 2010

Ranking Organization	Released	2007		2008		2009		2010	
		World	Canada	World	Canada	World	Canada	World	Canada
<b>THE-QS World's Best Colleges and Universities for Engineering and IT</b>		11	1	10	1	8	1		
<b>THE-Thomson Reuters World University Rankings for Engineering and IT</b>	Sept. 2010							13	1
<b>QS World University Ranking for Engineering and Technology</b>	Sept. 2010							14	1
<b>QS World University Rankings by Subject</b>	Apr. 2011								
– Chemical Engineering								14	1
– Civil & Structural Engineering								20	1
– Computer Sci. & Info. Systems								10	1
– Electrical Engineering								13	1
– Mech., Aero. & Manuf. Engineering								31	1
<b>U.S. News &amp; World Report: World's Best Universities for Engineering and IT</b>	Sept. 2010	11	1	10	1	8	1	14	1
<b>Shanghai Jiao Tong Academic Ranking of World Universities for Engineering/ Tech. and Comp. Sci.</b>	Aug. 2010	19	1	21	1	19	1	19	1

**Figure 6.7b** Summary of University of Toronto Performance in World Rankings, 2007 to 2010

Ranking Organization	Released	2007		2008		2009		2010	
		World	Canada	World	Canada	World	Canada	World	Canada
<b>THE-QS World's Best Colleges and Universities</b>		45	3	41	3	29	2		
<b>THE-Thomson Reuters World University Rankings</b>	Sept. 2010							17	1
<b>QS World University Ranking</b>	Sept. 2010							29	2
<b>U.S. News &amp; World Report World's Best Universities</b>	Sept. 2010	45	3	41	3	29	2	29	2
<b>Shanghai Jiao Tong Academic Ranking of World Universities</b>	Aug. 2010	24	1	24	1	27	1	27	1
– Alumni		43	2	42	2	42	2	43	2
– Award		59	1	58	1	57	1	59	1
– Highly Cited (HiCi)		38	1	41	1	39	1	41	1
– Published in <i>Nature</i> and <i>Science</i> (N&S)		30	1	30	1	33	1	28	1
– Publications (PUB)		3	1	3	1	3	1	3	1
– Weighted Score (PCP)		14	1	14	1	62	1	42	1
<b>Higher Education Evaluation &amp; Accreditation Council of Taiwan Performance Ranking of Papers for World Universities</b>	Sept. 2010	12	1	14	1	11	1	9	1

# 7 Advancement

We have continued to build on our Advancement efforts with the introduction of several new programs and improvements, with the aim of increasing alumni and donor engagement opportunities. Alumni outreach has become a top priority for our Faculty. For the first time, we hosted events in Shanghai, Singapore, Hong Kong and San Francisco. The Calgary Skule™ Alumni Chapter thrives under the leadership of its Board, hosting two annual events and raising funds in support of the Calgary Skule™ Admission Scholarship. This past year, we launched Gratitude and the GOLD Program to encourage philanthropy from among our youngest alumni.

In an effort to expand alumni involvement, we established new committees dedicated to advancement while departments renewed and strengthened their respective Boards of Advisors. Most notably, we formed a new Skule™ Society Committee, which will encourage alumni to invest in our Faculty at leadership levels. To provide our committees greater support and guidance, we hosted an advancement workshop for senior volunteers featuring an internationally recognized leader in philanthropic consulting. To further recognize and celebrate the contributions of our alumni volunteers, we introduced an annual Volunteer Recognition Event in May 2010.

We continue to prepare for the upcoming University-wide campaign. In partnership with academic leaders and professors from across the Faculty and the Division of University Advancement, we are actively reaching out to alumni, friends and potential supporters to discuss how their commitment will strengthen our Faculty's excellence. To that end, we are pleased to see a 44% increase of alumni and donor meetings in 2010.

Working with academic leaders across the Faculty and in coordination with the Division of University Advancement, we are developing the Faculty's Case for Support — a document that articulates how philanthropic investment will advance our efforts in engineering leadership, innovation, research and education.

# Philanthropic Fundraising for the 2011 Fiscal Year

Figure 7.1a Advancement Results, 2011

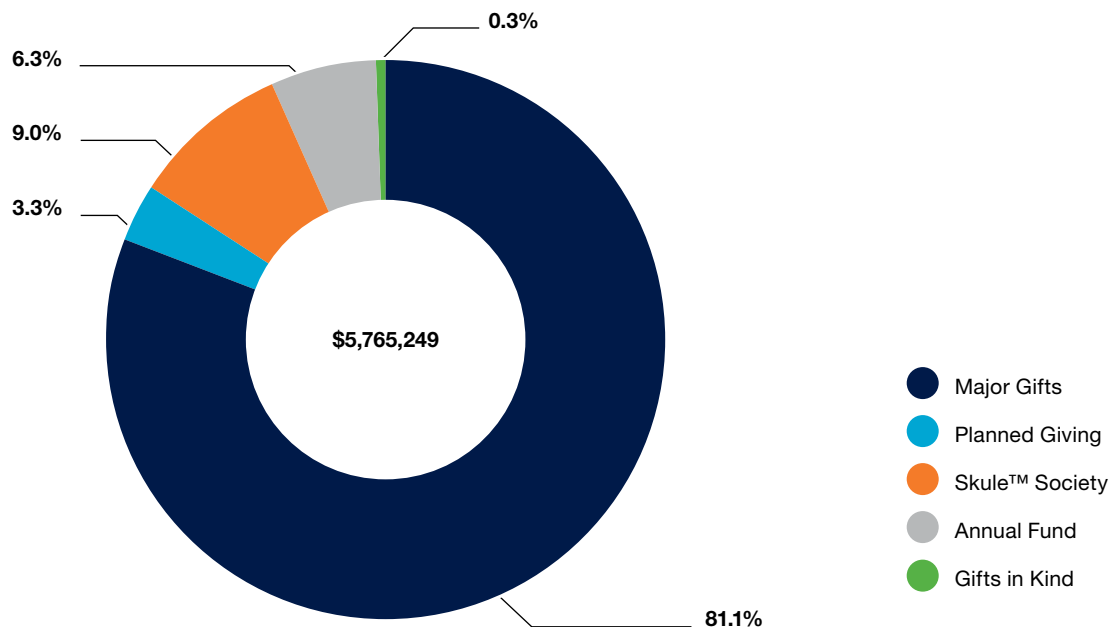
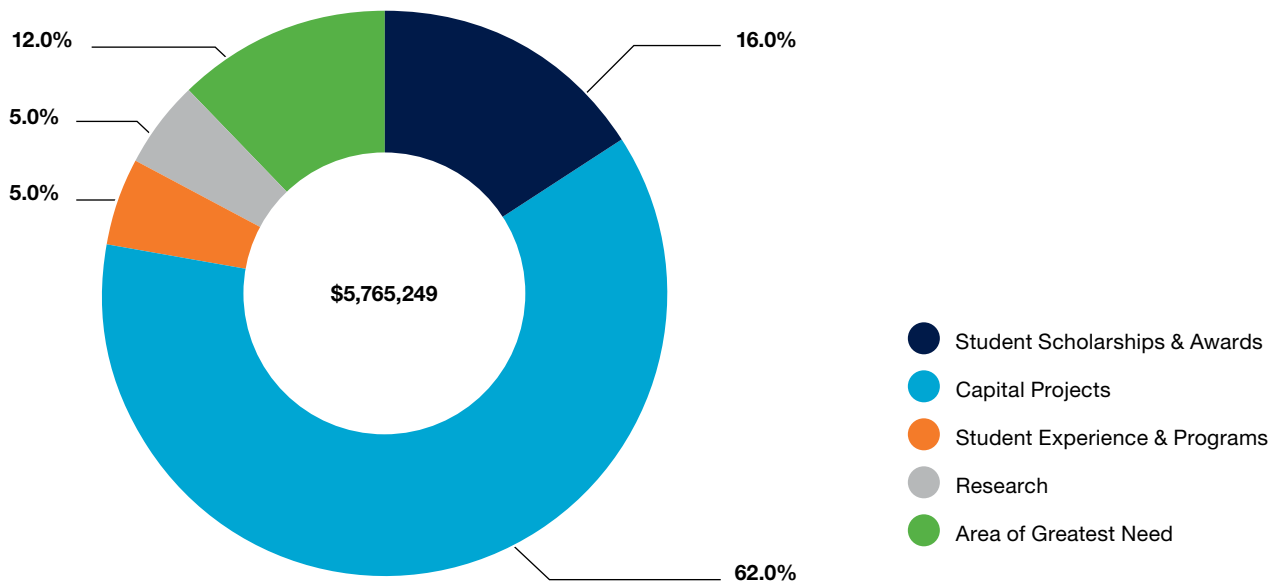


Figure 7.1b Gift Designation, 2011



Through alumni donations to the Skule™ Fund for Education, the Faculty provides financial support to numerous student clubs, teams and organizations. During the 2010–2011 academic year, the Faculty received a total of 102 applications, of which 65 were granted. The total amount requested by student clubs was \$269,183, of which \$102,670 was funded. Clubs receiving grants ranged from special interest groups like the Engineering Photography Club to teams that compete internationally, like Blue Sky Solar Racing.

# Initiatives and Projects for 2010–2011

## Graduate Gratitude

The Class of 1T1 and PEY+1To launched the Gratitude Campaign as a way to show gratitude to the Faculty while giving back to the next generation of students. Thanks to the efforts of the Gratitude Committee, the 2011 Campaign raised more than \$6,000 and achieved 16% participation from among the fourth-year class. These funds were matched by alumni donations and will be used to support Iron Ring celebrations for next year's class and the Student Experience Fund.

## Skule™ Society and Skule™ Society Committee

Annual donors to the Faculty who give between \$1,200 and \$24,999 are recognized as members of the Skule™ Society. This year, Skule™ Society donations exceeded \$522,000. Collectively, these contributions serve to enhance the quality of student experience in our Faculty and provide much-needed funds for a variety of student activities, including scholarships, student club funding and program support. A Skule™ Society Committee, composed of alumni leadership donors, have come together to encourage alumni to support their alma mater with annual gifts at the Skule™ Society level.

## Volunteer Recognition Event

On May 26, 2010, the Engineering Alumni Association and the Faculty celebrated its inaugural Volunteer Recognition Event. This event is an occasion to thank alumni volunteers for their outstanding service to the Faculty and University. The event also announced Donald King (ChemE 5To) as the recipient of the 2010 Malcolm F. McGrath Alumni Achievement Award.

## GOLD (Graduates of the Last Decade) Program

Alumni of all ages have an opportunity to make a meaningful gift to Skule™. With the launch of the GOLD Program, young alumni donors can be recognized for their leadership gift to their alma mater. With a minimum gift of \$250 for alumni of five years or less and \$500 for alumni of six to ten years, young alumni can enjoy the benefits of membership to the Faculty's Skule™ Society. They receive invitations to special events and opportunities to participate in intimate gatherings with Faculty leaders and students. They also enjoy regular communication on the latest Faculty developments.

## Alumni Outreach

The Dean held alumni receptions in several cities across Canada and the world in 2010 in an effort to reach out to a wider range of alumni. The Faculty and departments hosted events for the first time in Shanghai, Singapore, Hong Kong and San Francisco. In addition, academic leaders met with alumni in Ottawa, Montreal, Calgary, Vancouver, Washington, New York and Boston. We look forward to strengthening our ties with alumni in these cities and around the world.

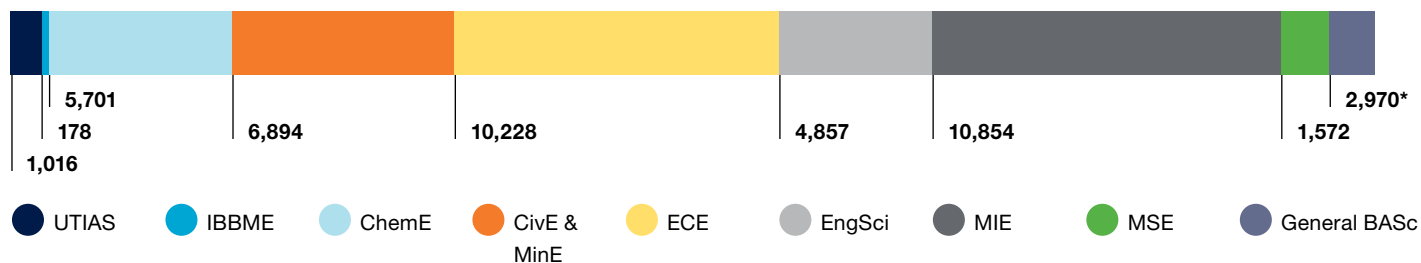
## Advancement Workshop for Senior Volunteers

In April 2011, Board of Advisors from the Departments of Chemical Engineering & Applied Chemistry and Mechanical & Industrial Engineering, along with members of the Skule™ Society Committee, took part in the first Advancement Workshop for Senior Volunteers. John Glier, world-renowned philanthropic consultant and President and CEO of Grenzebach Glier and Associates, led the workshop.

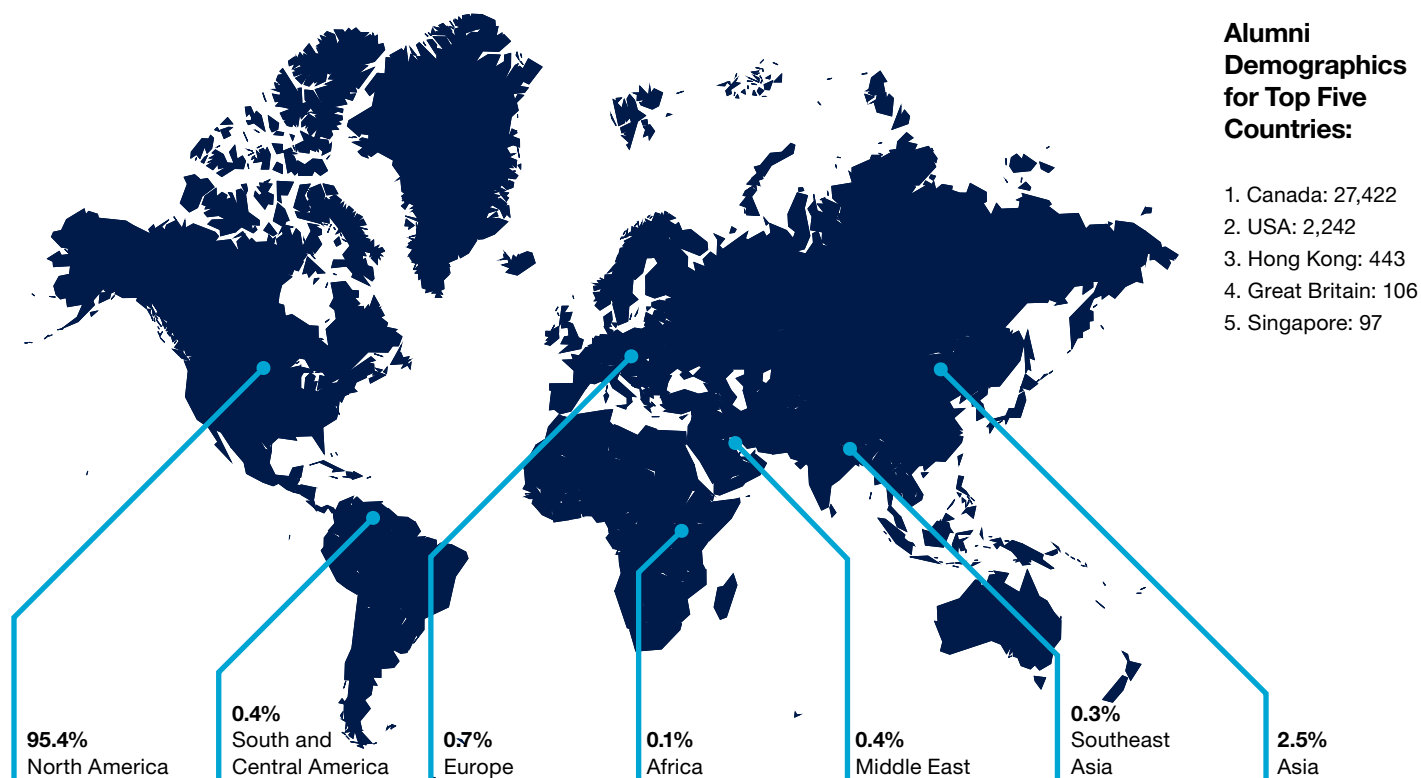
# Alumni Relations Activities

**Figure 7.2** Active Alumni by Academic Area, 2010–2011

Total Alumni: 42,614



**Figures 7.3** Geographic Location of Contactable Alumni, 2010–2011



**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.

**Note 7.3:** This figure plots the current location of alumni of our graduate and undergraduate programs for which we have contact information. While many of our alumni originate from other parts of the world, most reside in North America. Not shown on map: 0.2% living in Oceania (includes Australia and other countries in the Pacific Ocean).

**Figure 7.4 Events Attended by Alumni, 2010–2011**

Event Name	Event Date	Attendance
MIE Shanghai Alumni Event	May 15, 2010	11
Engineering Volunteer Recognition	May 26, 2010	45
Engineering Spring Reunion	May 27, 2010	240
ECE Spring Reunion Lunch	May 29, 2010	17
CivE Spring Reunion Alumni Lunch	May 29, 2010	36
ChemE Spring Reunion Alumni Lunch	May 29, 2010	30
EngSci Spring Reunion Lunch	May 29, 2010	48
MMS/MSE Department Reunion Lunch	May 29, 2010	23
MIE Spring Reunion Open House	May 29, 2010	40
Engineering 20-Year Reunion	June 10, 2010	44
UTIAS Industry-Alumni-Student Event	June 15, 2010	19
Calgary Student Send-Off	July 21, 2010	16
CivE Survey Camp Reunion	September 18, 2010	15
ChemE Leaders of Tomorrow Alumni Breakfast	September 21, 2010	19
BizSkule™ Fall Lecture	September 21, 2010	48
Engineering Class of 9T5 Reunion	September 26, 2010	23
MIE Networking Lecture	October 6, 2010	17
ChemE Scholars and Leaders Reception	October 6, 2010	14
Skule™ Mentorship Program Kick-Off Event	October 14, 2010	15
MSE Industry Day	October 14, 2010	10
Skule™ Alumni Reception in Singapore	October 19, 2010	22
IBBME Alumni and Awards Dinner	October 20, 2010	25
Skule™ Alumni Reception in Hong Kong	October 21, 2010	52
MMS/MSE Winegard Visiting Lectureship	November 4, 2010	37
Engineering Alumni Association Annual Awards Dinner	November 4, 2010	100
EngSci Ottawa Event	November 9, 2010	24
Calgary Skule™ Alumni Chapter Event	November 15, 2010	37
ECE Alumni Networking and Lecture Event	November 18, 2010	38
University of Toronto Engineering Competition	January 8, 2011	22
Leaders of Tomorrow: Graduate Seminar	January 27, 2011	9
CivE and MinE Alumni Dinner	February 11, 2011	80
IndE 50th Anniversary Seminar Series	February 16, 2011	16
Skule™ Alumni Reception in San Francisco	February 22, 2011	68
IndE 50th Anniversary Seminar Series	March 9, 2011	12
Skule™ Kids' March Break Event	March 15, 2011	20
Skule™ Mentorship Program Closing Reception	March 16, 2011	16
ChemE Annual Alumni Dinner	March 18, 2011	56
EngSci Alumni Dinner	April 1, 2011	50
IndE 50th Anniversary Seminar Series	April 6, 2011	38
MIE Women & Leadership: Lessons from White House	April 7, 2011	15
MIE Alumni Dinner	April 8, 2011	70
American Concrete Institute Convention Alumni Event	April 11, 2011	13
Biz Skule™ Networking Event	April 14, 2011	50
IndE 50th Anniversary Seminar Series	April 26, 2011	10
<b>Total Alumni Attendance</b>		<b>1,610</b>

Events form an important part of cultivating strong relationships with our alumni. They also provide a means for alumni to network with former classmates and create new connections with other U of T Engineering graduates. As seen in Figure 7.4, between May 2010 and April 2011, we held 44 events across the world attended by more than 1,600 alumni.

In addition to the events we coordinate, the Faculty communicates regularly with alumni throughout the year using several modes. Whether we are informing alumni of the Faculty's latest initiatives in a brochure or thanking them for their donation over the phone, our communications reach an incredibly diverse range of alumni worldwide. In 2010–2011, we sent a total of 238,108 emails (e.g., Alumni eNewsletter), mailed 20,955 individual pieces (e.g., event invitations) and placed 2,633 phone calls (e.g., Thank-a-Thon).

## Gift Highlights for the 2011 Fiscal Year

Through the generosity of our donors during the 2011 fiscal year, the Faculty received gifts that support a variety of important projects, including the Lassonde Institute for Mining, Engineering Leaders of Tomorrow, Civil and Mineral Practicals (CAMP) and numerous undergraduate and graduate scholarships. Some gift highlights include:

### Class of 5T6

In celebration of their days at Skule™ and in honour of their 25th reunion, the Class of 5T6 established the Award of Merit in 1981 to recognize outstanding students who successfully complete first year of any undergraduate Engineering program. On the occasion of their 55th reunion, the Class of 5T6 renewed their efforts this year to raise funds. Thanks to their collective generosity, the Award of Merit Fund has reached more than \$300,000 in donations and will support and reward generations of emerging engineering leaders.

### ERCO Worldwide

ERCO Worldwide, a division of Superior Plus LP, is a global leader in the supply of chemical products, solutions and technologies with offices in North America, Chile, China and Japan. ERCO appreciates the power of outstanding leadership training, education, research and teaching, and wanted to further extend its support of our Faculty's leadership education for engineers. The company has supported our Faculty since 1995 with several gifts to scholarships. In 2010, ERCO pledged \$125,000 to establish the ERCO Worldwide Leaders of Tomorrow Award in the Department of Chemical Engineering & Applied Chemistry. With this gift, the company takes to new heights the level of corporate support for leadership education within the department.

### Ian Hollingsworth

Ian Hollingsworth (CivE 5T3) is retired from a dynamic and highly successful business career which took him across Canada and around the world. Mr. Hollingsworth recognized the strong foundation that he secured through his engineering education at U of T and wanted to support our next generation of students. With his wife, Helen, Mr. Hollingsworth made a gift of \$200,000 in 2010 to the 5T3 Engineering Award, which recognizes third-year students within any Engineering department. It is awarded on the basis of high academic achievement, financial need and qualities of character and leadership as demonstrated through extra-curricular activities both within the University and the community at large.

### Stephen Georgas

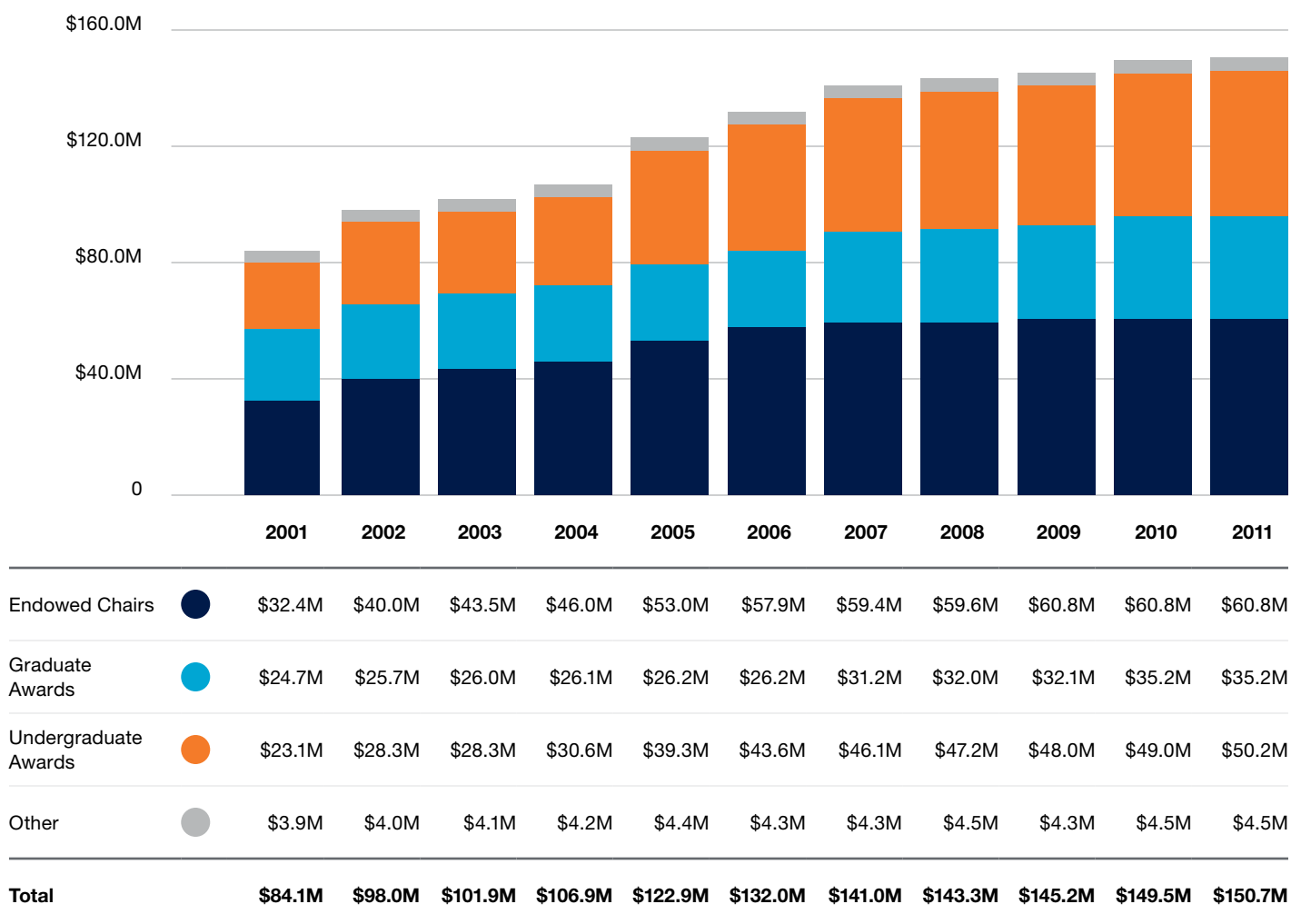
For the last four years, Stephen Georgas (EngSci 7T1) has set aside an annual gift to support U of T Engineering. As a Partner at one of Canada's most respected business law firms, Mr. Georgas counsels his clients on the protection and enforcement of their intellectual property and technology. Attributing his successful practice to his degree in Engineering Science, Mr. Georgas is a loyal Skule™ Society donor, contributing each year to the Faculty and to the Division of Engineering Science. His support helps sustain a foundation of excellence — enhancing the student experience through scholarships, club activities and research opportunities.

### Sally & Paul Wang

A world-renowned expert in diabetes research and a faculty member at the Institute of Biomaterials and Biomedical Engineering (IBBME) for 35 years, Professor Paul Wang and his wife, Sally, established the Sally and Paul Wang Distinguished Graduate Scholarship in 2006 to support IBBME students. Since establishing the first scholarship, Professor and Mrs. Wang had regular opportunities to meet some of IBBME's most promising students and have been impressed by each and every one of them. When they completed their first pledge of \$50,000 (matched by the Graduate Studies Endowment Fund), they decided to create the Sally and Paul Wang Graduate Scholarship in Biomedical Engineering. This scholarship will help students reach their full potential as biomedical engineers.



**Figure 7.5** Endowments, 2001 to 2011



**Note 7.5:** Data is shown by fiscal year (May to April). Graduate awards (non-government matched) were held at the School of Graduate Studies until October 2006. The transfer value of \$20,326,113 was added to the graduate awards total for the 2000 to 2006 fiscal years.

# 8 Communications

Engineering Strategic Communications captures and shares the stories of Faculty innovation, collaboration and accomplishment — finding the stories in the statistics. To best reflect our evolving communication needs, both internally and externally, the department is undergoing a transformation.

In a world that is increasingly digital, we are taking advantage of multimedia, interactive potential of online tools. A growing number of videos are being added to the website and to sites like Vimeo. More than 1.6 million viewers have watched our 59 videos on Vimeo, while more than 900,000 people have viewed the ornithopter video of the world's first sustained human-powered flight found on various online sites. Applicants to our Faculty also had an opportunity to view a series of videos, including undergraduate video blogs by three first-year Engineering students.

Ongoing communication through e-newsletters, the revitalized website and *Skulematters* continues to evolve. Our media relations activity has more than doubled the Faculty's presence on the web, in the press, and in the electronic media over the past year. In particular, the ornithopter story garnered wide coverage in traditional media like CBC, CTV and CNN, as well as newspapers across Canada, Europe, Asia and Australia.

We produced a wide variety of materials in 2010–2011 to support the Faculty's recruitment, admissions, outreach and advancement efforts. In a marketplace cluttered with messages, we strive to find ways to rise above the noise. Engineering Strategic Communications is building a team of multimedia communicators charged with letting people know how U of T engineers contribute to making the world a better place.

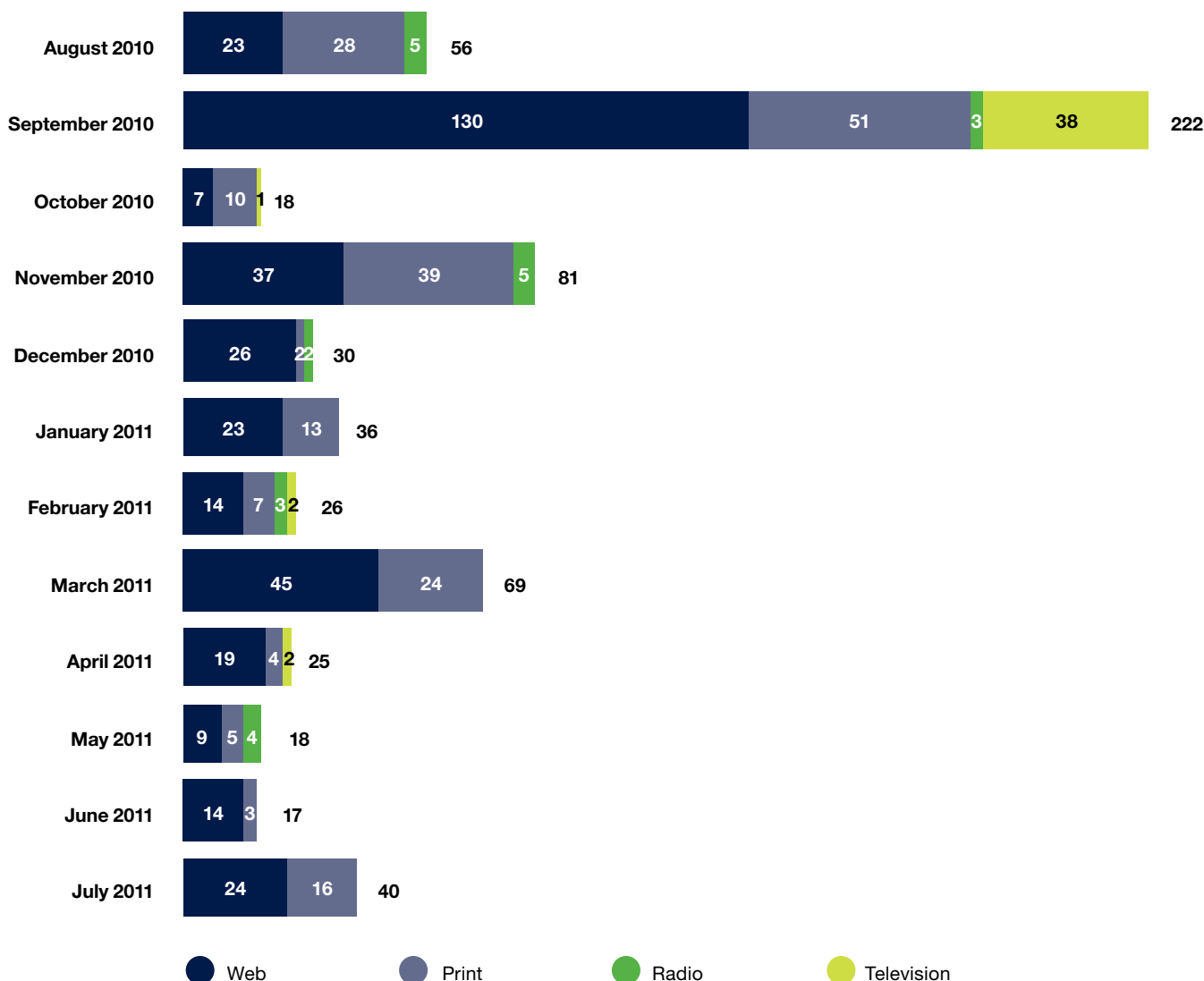
## Media Coverage

The Faculty's presence online, in print, on television and radio more than doubled in 2010–2011 over the previous year. Impressions in newspapers and magazines increased by 16%, but the most impressive gains were in digital and electronic media. The increase on the web was 195%, television was up 390% and radio clips rose from three in 2009–2010 to three dozen in 2010–2011.

Contributing most significantly to that was the welcome coverage we received for the successful ornithopter flight in the fall of 2010. See Social Media Case Study: The Flight of the Ornithopter on the following page for more about the increasing interest in Engineering stories shared through emerging media.

Engineering Strategic Communications is increasing our ability to produce, distribute and track online video, which will see the Faculty's media presence increase even more in the next few years.

**Figure 8.1** Media Coverage of U of T Engineering News, 2010–2011



**Note 8.1:** Media coverage reflects data as recorded by University of Toronto Strategic Communications between August 2010 and July 2011.

## Social Media Case Study: The Flight of the Ornithopter

On August 2, 2010, a University of Toronto human-powered aircraft became the first ornithopter to successfully fly. The feat, ratified by the Fédération Aéronautique Internationale, represented the first time human physical endurance, together with technology (developed at UTIAS), was able to create sustained flight. The story also illustrates how powerful a single shared video can be.

A video clip that captured the 145-metre flight was uploaded to Vimeo and YouTube, video-sharing social media websites, and eventually incorporated into a *Toronto Star* story in September. More than 20 Engineering students participated in the project, as did exchange students from France and the Netherlands. What started as a unique story in a Toronto-based newspaper quickly turned into an online supernova, becoming an international social media sensation. For a few days, it was a phenomenon on Twitter, the popular microblogging platform, with hundreds of ‘tweets’ linking to the video, stories, and the Faculty’s website pages about the historic human-powered flight.

By late spring 2011, the video had been viewed more than 900,000 times through Vimeo (around 300,000) and YouTube (around 600,000), and continues to increase every day. It generated several comments on both video-sharing websites, with viewers not only linking to stories about the project, but also praising the engineers involved with the event.

Mainstream media outlets like the *Toronto Star*, *Der Stern*, *CNN* and the *Christian Science Monitor* that had embedded the video into their online stories often sparked the sharing. In November 2010, blogTO.com declared the clip to be one of the top ten Toronto viral videos of the year.

The impressive reach of the video makes a convincing case for more sharing of information through social media. Engineering Strategic Communications will continue to develop its capacity as a team of multimedia storytellers.

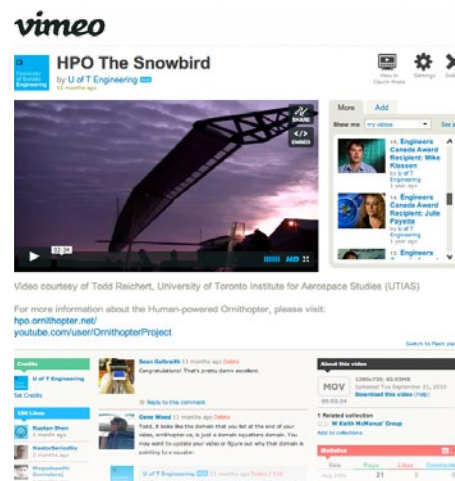
## U of T Engineering’s Vimeo Statistics

In the past year, the we uploaded 59 videos to our channel on Vimeo ([vimeo.com/uoftengineering](http://vimeo.com/uoftengineering)), a video-sharing site; videos that have been played a total of 1,657,724 times as of May 31, 2011. They feature Faculty news, undergraduate recruitment initiatives and other activities by members and friends of the U of T Engineering community.

People watching the Engineering-produced videos come from all over the world. Interestingly, the most activity came from U.S. users with 1,119,177 plays. Next were Canadian users with just under 80,000 plays, followed by viewers from the Philippines, United Kingdom, Australia, Germany, Russia, Romania and Spain. While it is important to note where the most users came from, it is equally important to recognize that our videos have been watched in countries like Burundi, Uzbekistan and Laos, where Canadian universities are not as well-known. Some countries, like China, block Vimeo.

Nearly 1,400 online news sources in North America (e.g., [cbc.ca](http://cbc.ca)), Europe (e.g., [dailymail.co.uk](http://dailymail.co.uk)), Australia (e.g., [news.com.au](http://news.com.au)) and elsewhere have embedded our videos, adding to our incredible international reach.

**Note:** To read about the ornithopter and watch the video clip mentioned above, please visit [uoft.me/ornithopter](http://uoft.me/ornithopter)



### Top countries viewing the ornithopter video on our Vimeo channel as of May 31, 2011

Rank	Country	Plays
1	United States	144,550
2	Canada	28,007
3	United Kingdom	11,699
4	Russia	9,336
5	Spain	8,307
6	Germany	7,545
7	Denmark	5,329
8	Brazil	5,288
9	Romania	4,927
10	Netherlands	3,804

### Top countries viewing U of T Engineering videos on our Vimeo channel as of May 31, 2011

Rank	Country	Plays
1	United States	1,119,177
2	Canada	79,460
3	Philippines	33,742
4	United Kingdom	23,143
5	Australia	15,740
6	Germany	15,639
7	Russia	11,679
8	Romania	11,359
9	Spain	10,257

## U of T Engineering Website Statistics

From July 2010 to June 2011, our website had over 325,000 visits from nearly 194,000 unique visitors. This translates to roughly 2,415 pages viewed per day with an average dwell time of nearly 2.5 minutes. The views per day are four times greater on average than during the three-month period following the launch of the site in April 2010.

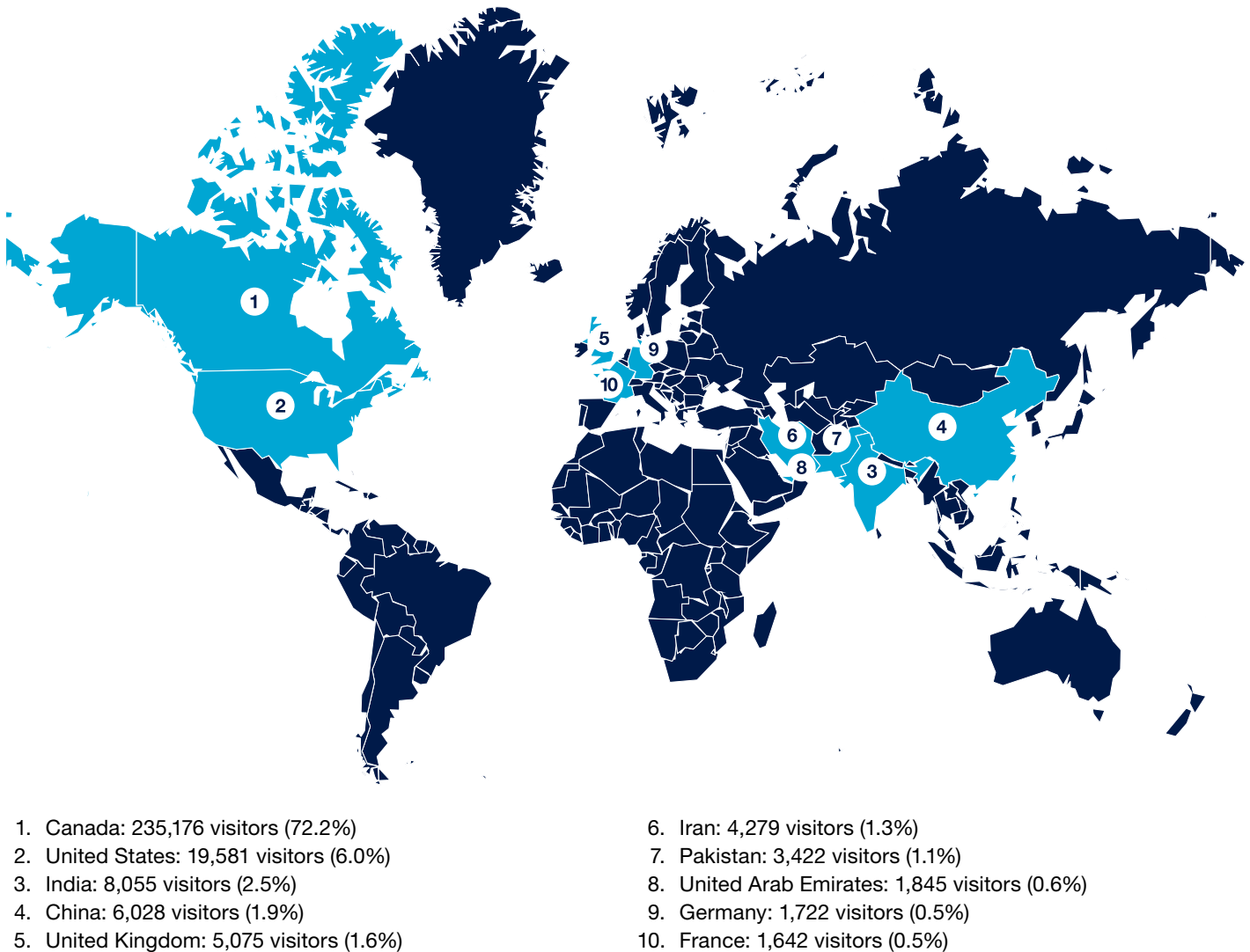
After the home page, the top three most-visited pages on the site are:

1. Undergraduate Studies (for prospective students)
2. Graduate Studies (for prospective students)
3. Current Undergraduate Students

### Summary of Analytics for [www.engineering.utoronto.ca](http://www.engineering.utoronto.ca)

- 325,693 visits
- 193,820 unique visitors
- Average of 2.71 pageviews per visit
- 2 minutes and 26 seconds average time on site
- 2,414 average pageviews per day
- 4,570 pages were viewed a total of 814,643 times
- Visitors came from 6,673 cities in 193 countries
- Outside of Toronto, visitors came from Vancouver, Ottawa, Calgary, Montreal and Edmonton
- U.S. visitors came primarily from California, New York, Massachusetts, Texas and Florida

**Figure 8.2** Visitors to U of T Engineering Website: Top 10 Countries, 2010–2011



**Note 8.2:** Website statistics (from Google Analytics) represent data collected between July 2010 and June 2011.

# 9 International Initiatives

Our array of partnerships, exchanges and internships with universities and organizations around the world facilitates our impact on an international stage.

Our growing global focus is particularly rewarding for students. The Centre for Global Engineering (CGEN) launched our graduate certificate in Engineering & Globalization in the fall of 2010, while a new undergraduate certificate in Global Engineering will begin in fall 2011. Taking courses at universities abroad has become easier because of Structured Exchange Pathways, an initiative that helps students make selections that best meet their U of T and engineering accreditation requirements.

Exchange programs, like the graduate student exchange with the University of Tokyo, now in its 10th year, and the new Cross-Cultural Capstone Design Program between MIE and Peking University, are helping to provide our students with international experience. In 2010–2011, 4% of the U of T Engineering students taking part in a Professional Experience Year (PEY) internship did so outside of Canada. Students who are passionate about global change and leadership development can also join the U of T chapter of Engineers Without Borders (EWB), a group that was named EWB Canada's Chapter of the Year in January 2010.

Initiatives for international students coming to U of T include the International Foundation Program (IFP), a transitional opportunity to build English language skills. In the fall of 2011, 17 students from Kazakhstan, China, Taiwan and Qatar started their Engineering studies after completing the IFP. A similar program for graduate students is also being developed.

The MITACS Globalink Program makes it possible for undergraduate students from India to carry out research internships with U of T Engineering professors, while the Faculty's DEEP (Da Vinci Engineering Enrichment Program) Summer Academy attracts many high school students from around the world to explore our world of innovation. Our professors are also reaching out internationally to teach courses in Ethiopia and India.

## Centre for Global Engineering

Since its launch in 2009, the Centre for Global Engineering (CGEN) has been active in developing opportunities to enhance the global experience of our students:

- In the fall of 2010, we introduced a graduate certificate in Engineering & Globalization. This certificate is mainly aimed at MEng students who want to increase their expertise in global knowledge. Students must complete the equivalent of four courses, one of which is offered by U of T's Munk School of Global Affairs.
- To provide undergraduates with the ability to explore global themes and issues, the Faculty will launch the Global Engineering Certificate in the fall of 2011.
- CGEN will launch a new course in the spring of 2012 tentatively called Appropriate Technologies. CGEN currently offers two courses: 1) Innovative Technologies & Organizations in Global Energy Systems; and 2) Technology, Engineering & Global Development.

The Centre has also engaged in research with a global engineering focus. Among its ongoing projects, CGEN is researching supply and delivery of oxygen technologies for resource-constrained areas in The Gambia. As well, it is analyzing global mortality data to determine what technologies and policies have the greatest impact on global health.

In the summer of 2011, U of T Engineering was one of eight schools worldwide — and the only Canadian school — selected to tackle a pressing global issue: create a sustainable, safe and affordable toilet for the developing world. As part of the Bill & Melinda Gates Foundation's *Reinvent the Toilet Challenge*, U of T Engineering was awarded a phase-one grant to develop a toilet that is self-contained, operable on five cents per day, and does not need running water, a sewerage system or electricity. Professor Yu-Ling Cheng (ChemE), Director of CGEN, will lead our team to a sustainable sanitation solution.

## Selected Teaching and Learning Partnerships with Universities Abroad

### Addis Ababa University in Ethiopia

In the spring of 2011, Professor Jonathan Rose (ECE) served as the first U of T Engineering professor to teach at Addis Ababa University in Ethiopia. He was part of a mission by Mount Sinai psychiatrist and U of T Assistant Professor of Psychiatry, Dr. Clare Pain. Dr. Pain and her colleagues have been in Ethiopia for nine years, helping to train local psychiatrists. The initiative has since expanded to other areas of the University, including Engineering.

Fourteen full- and part-time students participated in Professor Rose's course on digital hardware design using Field-Programmable Gate Arrays. As he prepares to teach his second course on mobile device programming, more of our faculty are slated to join Professor Rose in the fall of 2011.

### Peking University in China

In March 2011, MIE hosted academics from the College of Engineering at Peking University to launch the Cross-Cultural Capstone Design Program. In 2011, 12 Beijing students will spend a week in Toronto, and 12 U of T Engineering students will travel to Beijing. The proposed collaborative design projects for the next academic year will focus on providing international companies with solutions that apply cross-culturally.

Peking University's College of Engineering has already established collaborative courses with Stanford University and the National University of Singapore. The University of Toronto will be their sole Canadian collaborator.

### Indian Institute of Technology–Bombay in India

In the spring of 2011, Professors Murray Metcalfe (MIE, Globalization) and Sanjeev Chandra (MIE) co-taught a course entitled Defining Energy Futures at the Indian Institute of Technology–Bombay through Woodsworth College's Study Abroad program. The course sent 14 U of T Engineering undergraduates to explore the use of energy and its broader social aspects in India and Canada.

### University of Tokyo in Japan

Since 2001, MSE and the University of Tokyo have been sending graduate students to and from the two institutions on research exchanges through the UT<sup>2</sup> program. The collaborative effort has grown to a Faculty-wide initiative, with MIE and ChemE partnering in the last two years. UT<sup>2</sup>'s annual graduate student conference was hosted by U of T in the summer of 2011.



## Structured Exchange Pathways

Exchange programs allow students to take courses at a university in another part of the world. Exchanges give students a new cultural and learning context for their discipline. In the past, Engineering undergraduates wishing to study abroad sought their own opportunities. To make it easier for our students to take courses outside of Canada, we created a program called Structured Exchange Pathways. This program enables our students to identify courses at other universities, making the process of selecting courses at universities abroad more similar to course selection at U of T. International exchange programs are growing in popularity, and many of our students are now submitting their applications to the Structured Exchange Pathways program for the upcoming academic year.

## NARETI (North American Consortium on Rehabilitation Engineering and Healthcare Technology for the Individual)

We are one of six universities across Canada, the United States and Mexico to participate in NARETI. The goal of the program is to increase awareness among biomedical engineering undergraduates of the different rehabilitative needs across North America through educational exchanges. Each of the six participating universities has a strong biomedical engineering program with a wide selection of technical and language/cultural courses. In addition to taking courses, students also engage in local industrial, clinical and/or research experiences in rehabilitation engineering. Through this program, students can expand their horizons in a field where comprehensive initiatives are much needed to develop low-cost, high-impact solutions for widespread applications.

## Selected Opportunities for Students to Gain Experience Abroad

### International Professional Experience Year (PEY) Placements

The Engineering Career Centre continues to build relationships with industry partners around the world. These partnerships result in more international PEY placements for our undergraduates. Of the 554 PEY placements from 2010–2011, 24 opportunities took place outside of Canada. The Faculty aims to expand the number of international placements available to our students. To read more about PEY, please see the Undergraduate Studies chapter.

### Summer Research Opportunities

In the summer of 2011, 202 undergraduates worked alongside faculty members in our departments, divisions and institutes to gain engineering research experience. While the majority of these opportunities took place locally, 18 of our students contributed to ongoing research projects outside of Canada. International research positions give our students the opportunity to put their skills and education to practice while making invaluable ties to the global engineering research community.

### Engineers Without Borders

The U of T Chapter of Engineers Without Borders (EWB) is one the Faculty's many student groups (for a full listing, please see Appendix A). EWB is comprised of dedicated students who have a passion for global change, community building and realizing leadership potential. Their diligence was recognized in January 2010 when they were named EWB Chapter of the Year. With more than 50 members, EWB offers several opportunities both abroad and on-campus, including: overseas placements, public outreach, youth engagement and numerous year-round events.



# Selected Opportunities for International Students at U of T Engineering

## International Foundation Program

Each year, U of T receives applications from international students who excel academically, but whose English facility scores fall below the University's admissions threshold. U of T created the International Foundation Program (IFP) for these students.

Engineering IFP students are conditionally accepted to undergraduate studies within the Faculty while completing intensive English instruction and a first-year credit in Engineering Strategies & Practice. Upon successful completion of both program components, students proceed to their chosen Engineering program and begin first year with one full credit. In 2010–2011, 20 international students from Kazakhstan, China, Taiwan and Qatar enrolled in the program, of which 17 will proceed into first-year Engineering studies in the fall of 2011.

The Graduate International Foundation Program (G-IFP) is now being developed for MEng students. Like the undergraduate IFP, students accepted to the G-IFP are given conditional acceptance as they complete comprehensive English instruction and one graduate-level Engineering course. When they have successfully completed this four-month program, G-IFP students will begin their MEng degree with one full credit. The first offering of the G-IFP will take place in September 2012. A focus group was held in spring 2011 to learn more from current international MEng students. Promotional material is currently under development.

## MITACS Globalink Program

U of T Engineering is one of eight Canadian universities participating in the MITACS Globalink program. The initiative welcomes Indian undergraduates to Canada for summer research internships. Participants undertake research projects with professors while building connections with graduate students, researchers and companies. In 2010, 19 students spent three months doing research within the Faculty, working with professors in ECE, MIE, IBBME and UTIAS. Given the academic calibre of Globalink students, we developed the Dean's Graduate Fellowship as a means to attract these excellent students to graduate studies in our Faculty.

## DEEP (Da Vinci Engineering Enrichment Program) Summer Academy

The DEEP Summer Academy brings gifted high school students from across Canada and around the world to our Faculty to take part in innovative courses inspired by our current research. Over the years, DEEP Summer Academy has seen a heightened interest internationally. For instance, of the 370 high school students that attended DEEP Summer Academy in 2010, 22% were international students who came from South Korea, the United States, Turkey, Hong Kong and Venezuela. Our program also became the official Canadian provider of summer programming to students at the Korean Science Academy (KSA) of the Korea Advanced Institute of Science and Technology (KAIST) in 2010. As a result, we welcomed 12 excellent students and their teacher from KSA to DEEP Summer Academy in July 2011.

In addition to providing a Canadian engineering context to international high school students, these individuals experience our Faculty first-hand while building relationships with our students (who serve as their instructors). Our graduate and undergraduate students enjoy the opportunity to share their research interests and learn how to communicate their subject effectively. DEEP Summer Academy continues to serve as an excellent means of attracting top international students to apply for undergraduate studies in U of T Engineering while providing a superb summer experience for our current students.

# 10 Diversity

Our Faculty represents a fusion of cultural and geographic backgrounds that enhances the innovation, discovery and learning that take place on campus. Our students come from over 100 different countries, representing more than half of the world's nations. We not only welcome the world into our classrooms, but also prepare graduates to apply engineering solutions to the world's challenges in the global market.

We are engaged in several initiatives to help increase cultural diversity within our Faculty. For instance, the MITACS Globalink program brings top Indian undergraduates to the Faculty for summer research internships. At the same time, our students also have the opportunity to gain a new cultural perspective while studying abroad through initiatives like our new Structured Exchange Pathways program, or working abroad through an international PEY internship. This exchange of ideas and perspectives further enriches the experience of our students.

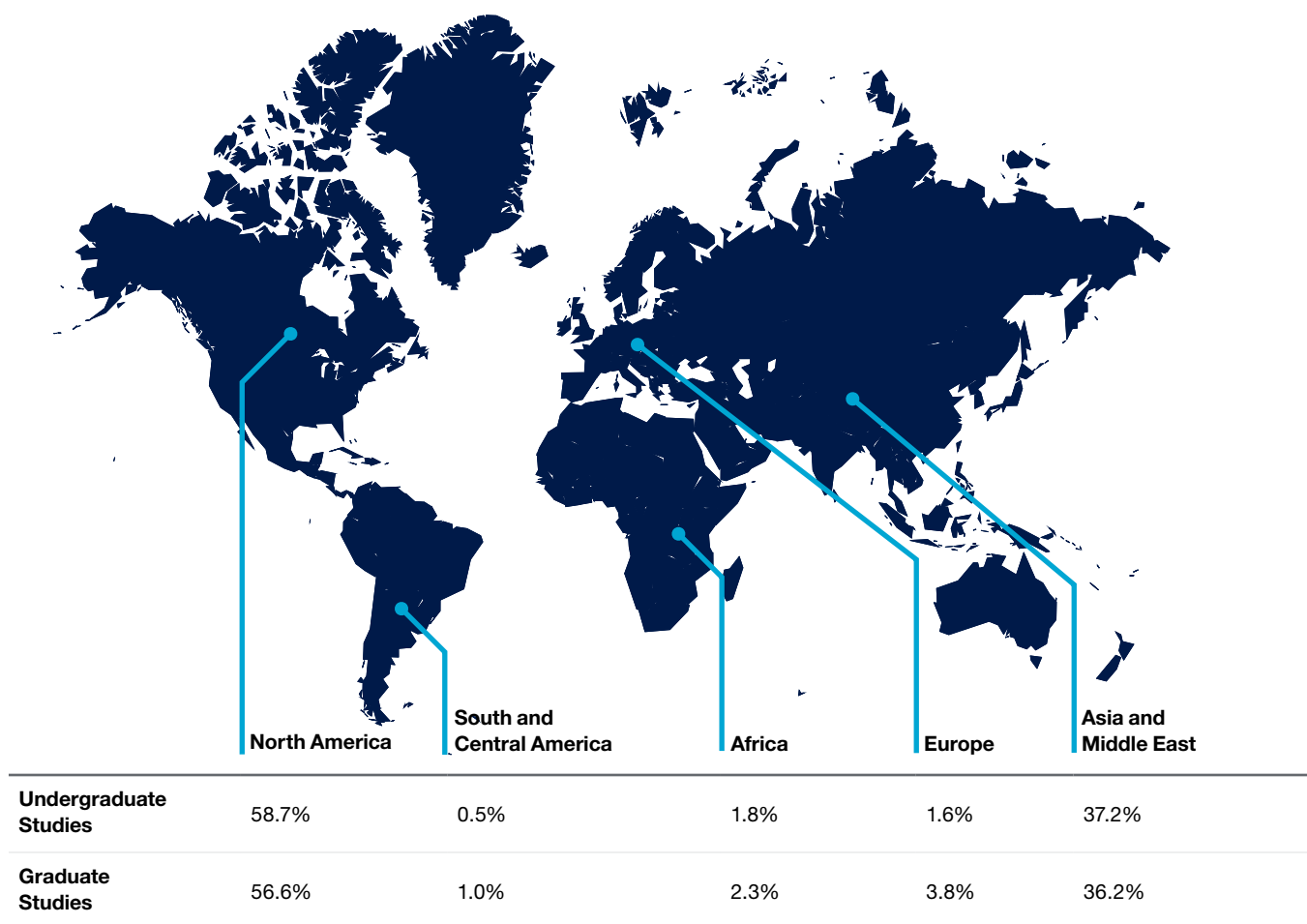
Equally important to our Faculty's diversity is the number of women undergraduates, graduate students and faculty members. Following a dip in the percentage of women undergraduates in the middle of the past decade, the numbers have been increasing since 2008. More than a fifth of our undergraduates are women, while the number in graduate studies is nearly a quarter. We continue our commitment to encouraging women to consider studies in engineering through outreach programs like Go ENG Girl and Girls' Jr. DEEP. An increasing number of women faculty are receiving tenure, boosting the number of women associate professors in 2010–2011. Recruiting women students and faculty members continues to be a priority for all of our departments and institutes.

## Cultural Diversity

Our students come from 108 countries, representing every continent except Antarctica. The result is a cultural diversity that broadens the rich intellectual conversation that takes place among undergraduate and graduate students in our Faculty. The global perspective is reflected in curriculum (MEng/Global certificate; Global Engineering certificate; international PEY internships), research (Centre for Global Engineering) and clubs (more than a half-dozen with a cultural or international focus). Over half of the Faculty's students come from Canada, while more than a third come from Asia and the Middle East. The country with the second largest number of undergraduate students is China, followed by India, South Korea and Pakistan. The second largest graduate student number is Iran, followed by China, India and South Korea.

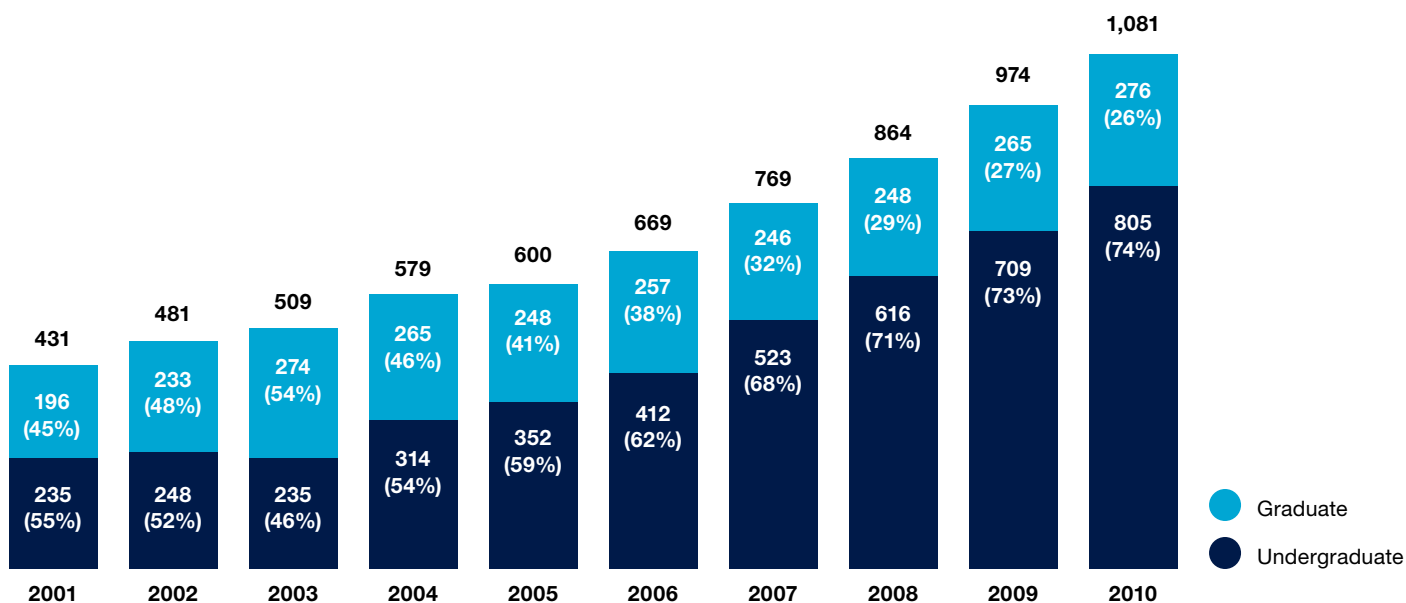
As shown in Figure 10.1b on the following page, the number of international students in the Faculty has more than doubled in the past ten years. Historically, about half of our international students were in undergraduate studies, and, in the past few years, that percentage has increased to represent about three-quarters.

**Figure 10.1a** Continent of Origin: Undergraduate and Graduate Students, Fall 2010



**Note 10.1a:** Not shown: 0.2% of undergraduates and 0.1% of graduate students from Oceania, which includes Australia, New Zealand and other countries in the Pacific Ocean. Continent of origin as reported in the U of T enrolment reporting cube is derived from a combination of citizenship, location(s) of previous studies and permanent address. The information does not indicate current Canadian immigration status, which is used to determine domestic/international student status for tuition and funding purposes.

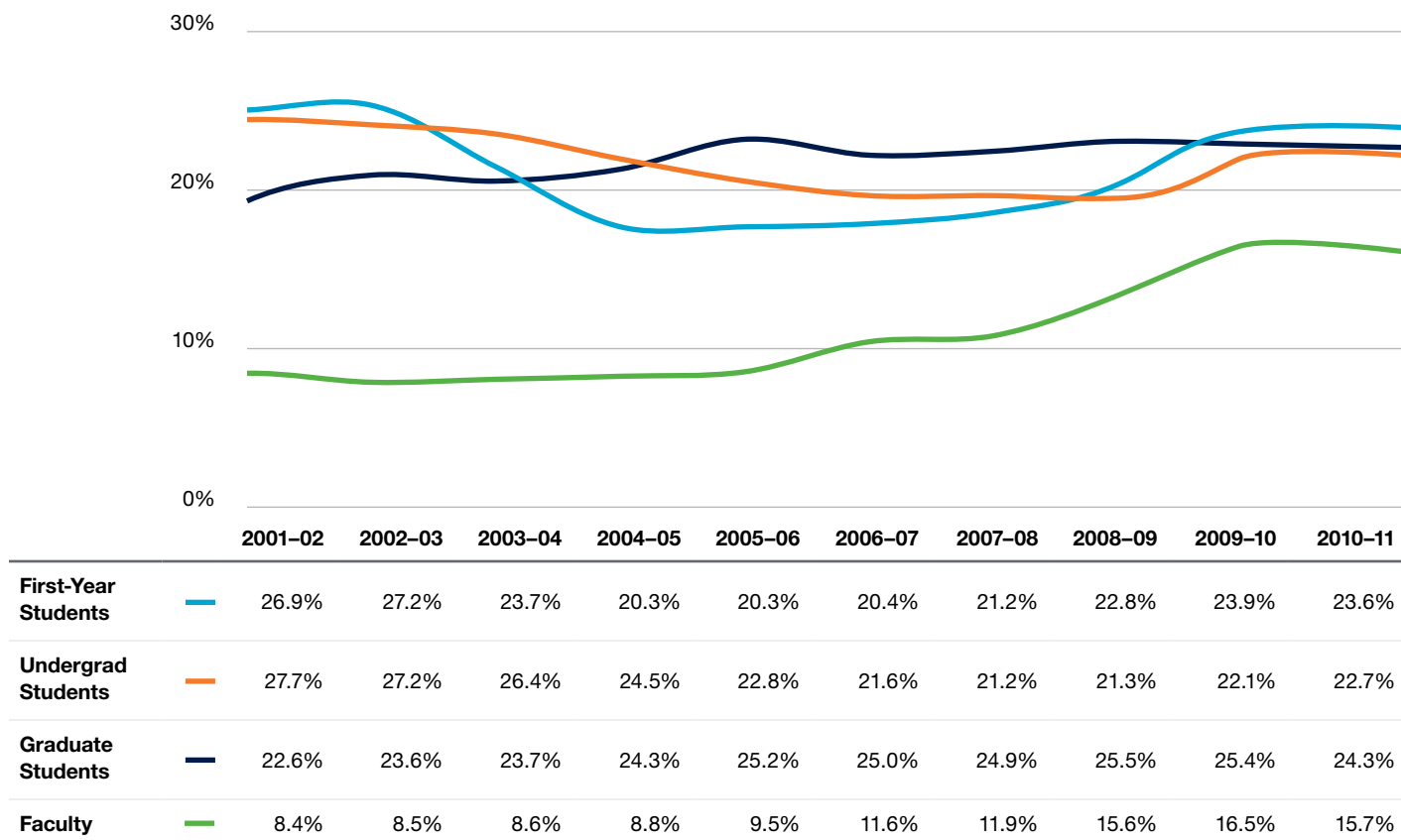
**Figure 10.1b** Graduate and Undergraduate Proportion of International Students, 2001 to 2010



## Gender Diversity

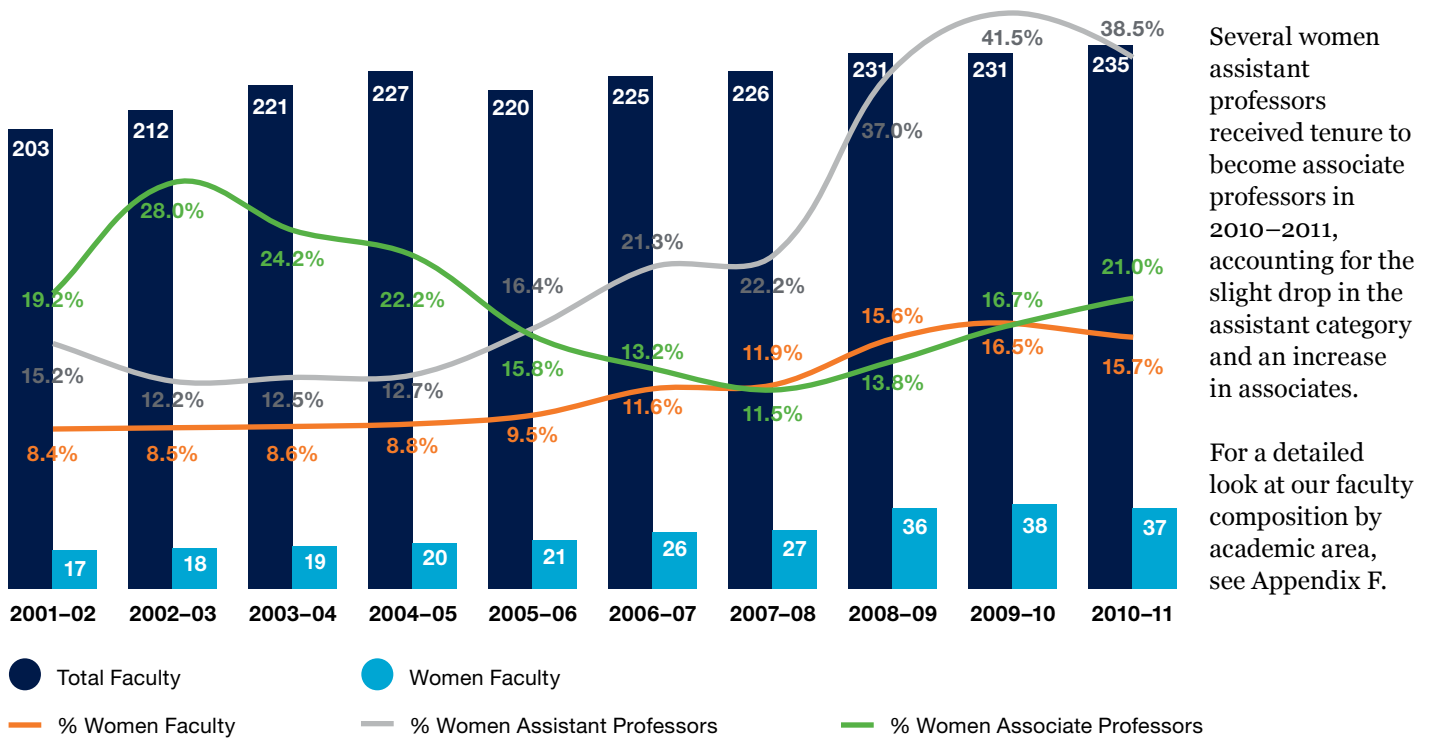
Despite a slight decline in the percentage of women among first-year undergraduates in 2010–2011, the percentage of women in the total undergraduate population continued to climb, rising to 22.7%. About a quarter of all graduate students are women — a statistic that has not deviated more than three percent in the past decade.

**Figure 10.2** Percentage of Women First-Year Students, Undergraduate Students, Graduate Students and Faculty in Engineering, 2001–2002 to 2010–2011

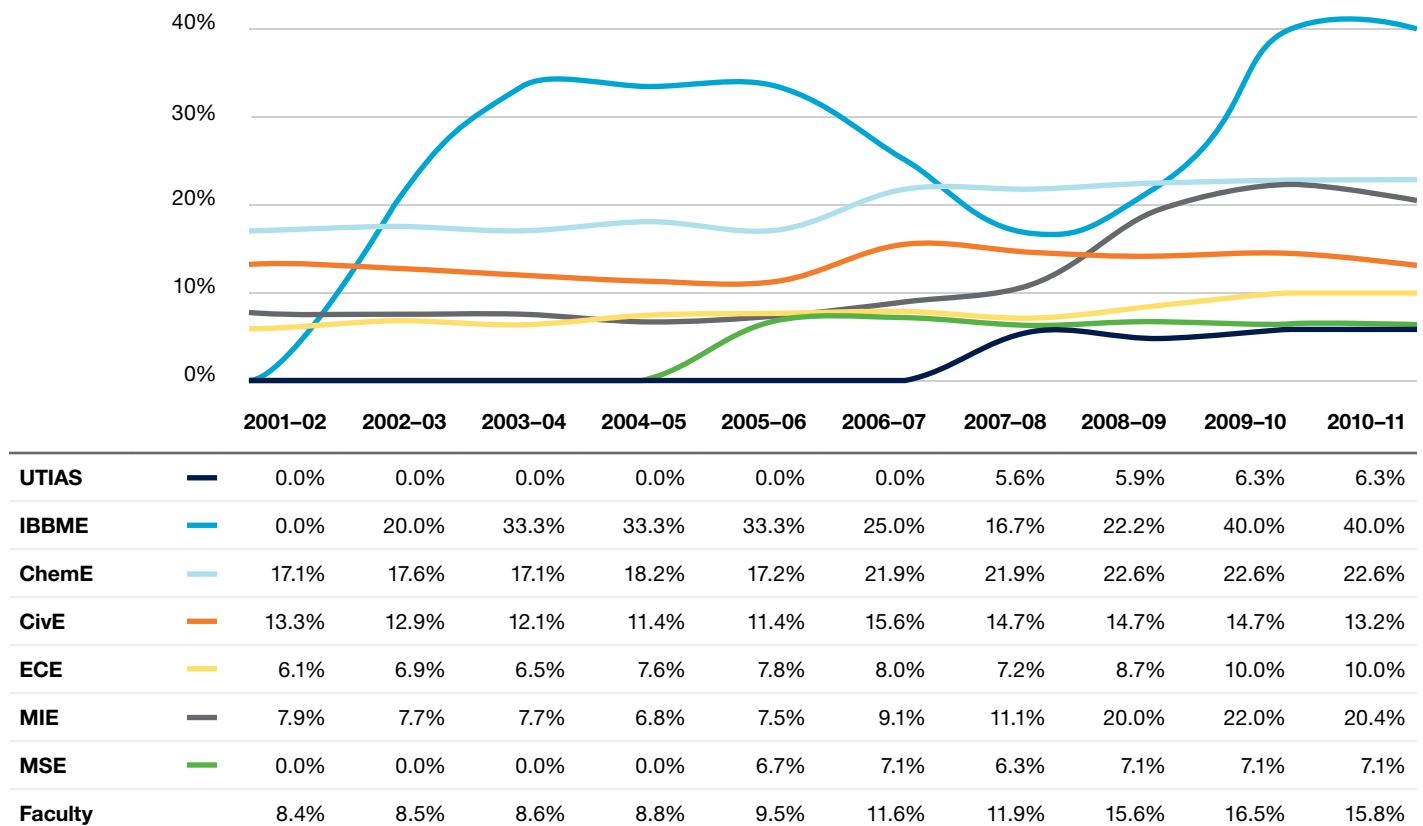


**Note 10.1b and 10.2:** Student counts are shown as of November 1.

**Figure 10.3** Total Number of Faculty with Percentage of Women, 2001–2002 to 2010–2011

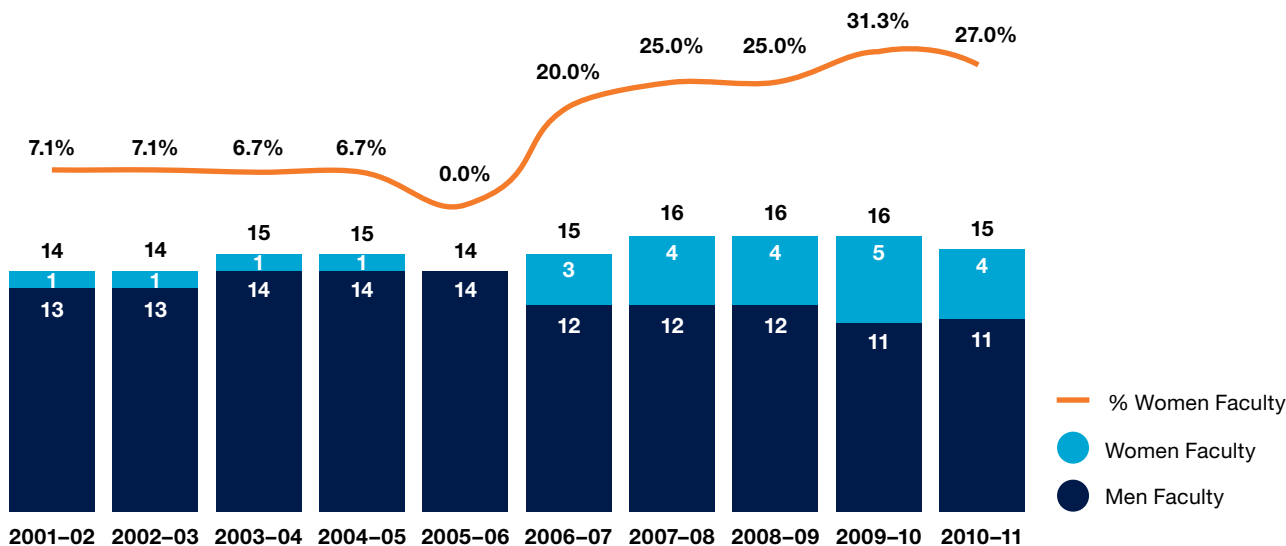


**Figure 10.4** Percentage of Women Faculty by Academic Area, 2001–2002 to 2010–2011

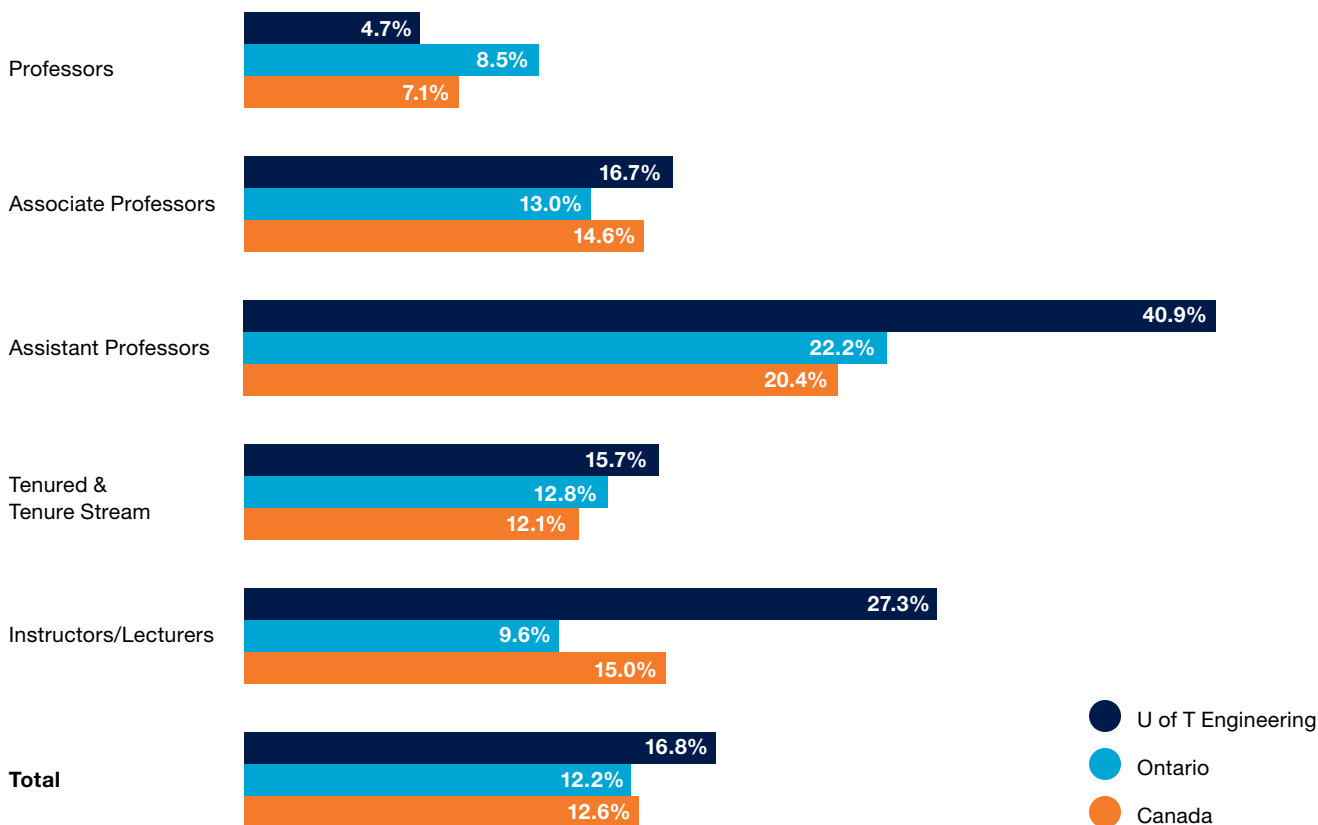


The percentage of women in Faculty leadership tracks higher than the total proportion of female faculty members. Women faculty members are assuming leadership roles in academic administration, creating positive role models for female undergraduate and graduate students.

**Figure 10.5 Academic Administrative Faculty Roles and Percentage of Women, 2001–2002 to 2010–2011**



**Figure 10.6 Percentage of Women Faculty at U of T Engineering Compared with Women Faculty in Ontario and Canadian Engineering Faculties, 2010**



**Note 10.5:** 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.

**Note 10.6:** Based on November 15, 2010 data analysed by Engineers Canada.

# 11 Financial and Physical Resources

The past fiscal year, 2010–2011, marked the first time we operated under our new budget allocation process. The departments responded well to the new model which increases fiscal transparency and attributes budgetary decisions to academic goals. Familiarity will grow as we move into our second year and the methodology gains prolonged use. After a three-year period, the Faculty's model will be reviewed and adjustments made as required.

We are well along in negotiations with the Faculty of Arts & Science to codify our interdivisional teaching arrangements, including our historical teaching agreements, in the context of the University's new budget model. We have approached this with the aim of providing Engineering students with better access to Arts & Science elective courses, and providing a fair revenue sharing methodology as enrolments and teaching requirements increase or decrease.

Over the past few years, space has emerged as our most pressing need. We submitted plans for two new buildings for government funding. The Centre for Enabling Technologies would serve to consolidate research in micro and nanotech fabrication, optics and advanced materials technologies, and the Centre for Innovation and Sustainability would address the Faculty's shortage of high-quality research space, supporting infrastructure and other space needs identified in the Faculty Space Review. The sites for these buildings have not been settled, and we are poised to purchase property should the opportunity arise. We have identified funding for new buildings as a critical fundraising priority.

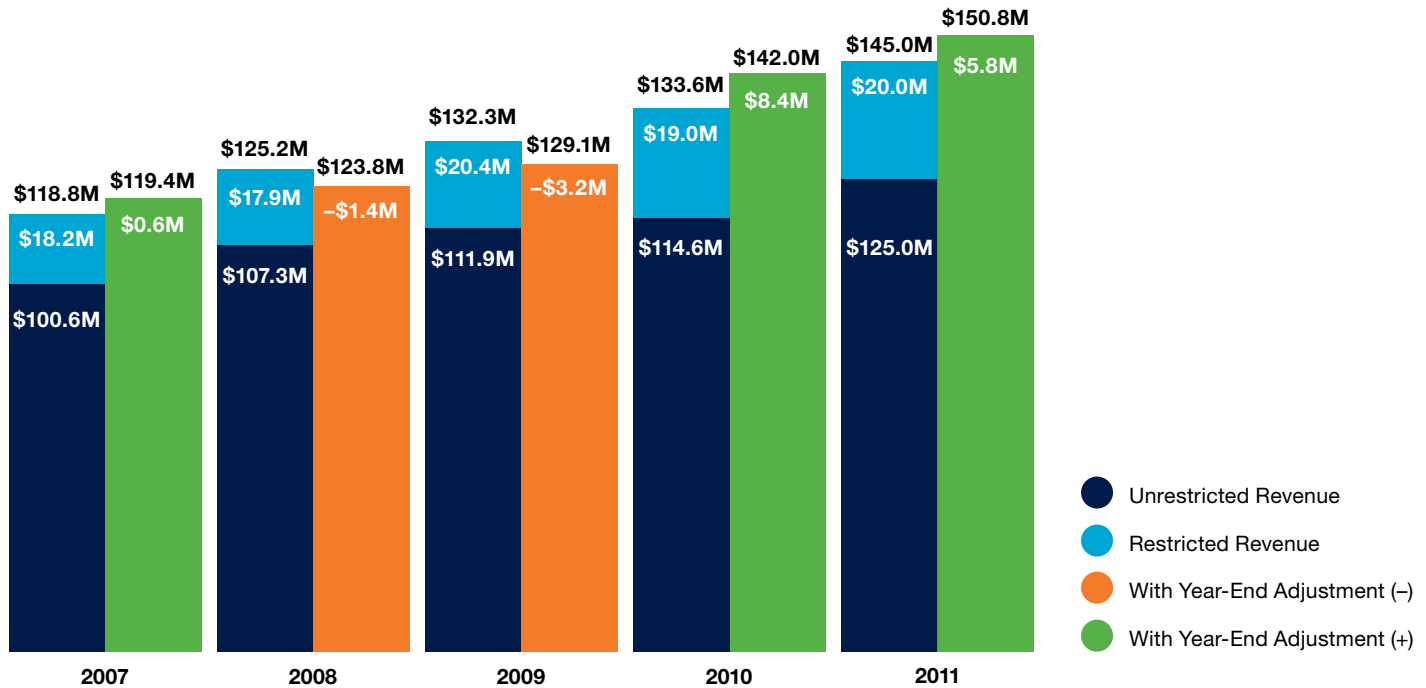
We continue to work to improve our existing space. We currently have six Canada Foundation for Innovation projects nearing completion, and while this helps to renew our research infrastructure, much more work needs to be done. The Mining Attic project is also scheduled for occupancy summer 2011 and will be an innovative showcase of learning space. In addition to improving research and learning spaces, we continue to seek opportunities to develop space for undergraduate club activities.

## Total Revenue and Central Costs

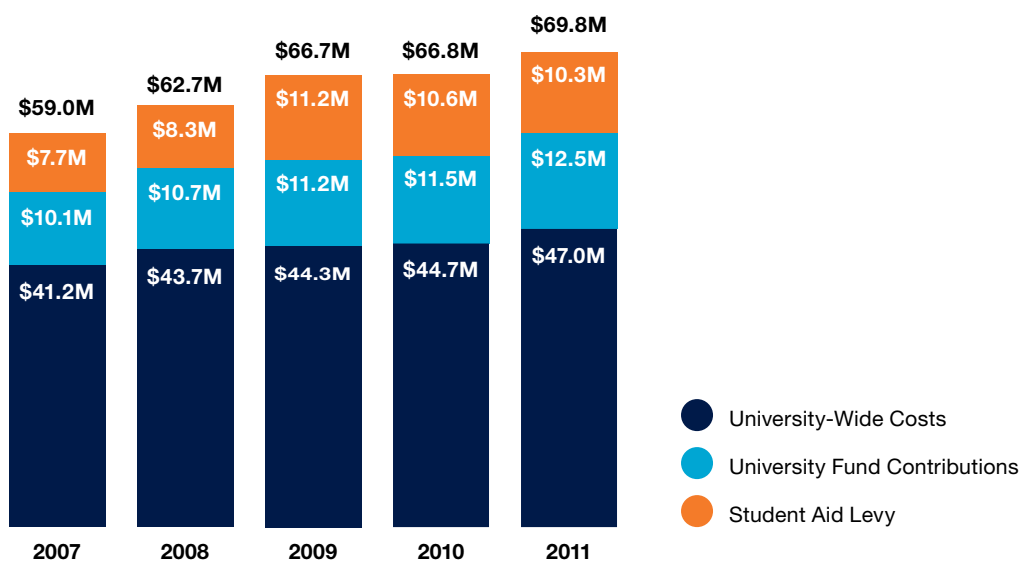
Figures 11.1, 11.2 and 11.3 show our total revenue and the associated central costs attributed to the Faculty since the inception of the University's new budget model in the 2007 fiscal year. Each year, an estimated budget amount is provided to our Faculty based on target enrolments. After year-end, an adjustment to the budget is made that reflects our actual enrolments for the year.

Our total operating budget of \$91.9 million for the 2011 fiscal year (Figure 11.6) is made up of three components: 1) net revenue (Figure 11.3); 2) allocation from the University Fund; and 3) divisional income.

**Figure 11.1 Total Revenue, 2007 to 2011**



**Figure 11.2 Total Central Costs, 2007 to 2011**



**Note 11.1 and 11.2:** Data is shown by fiscal year (May to April). For example, the 2011 fiscal year runs from May 2010 to April 2011.



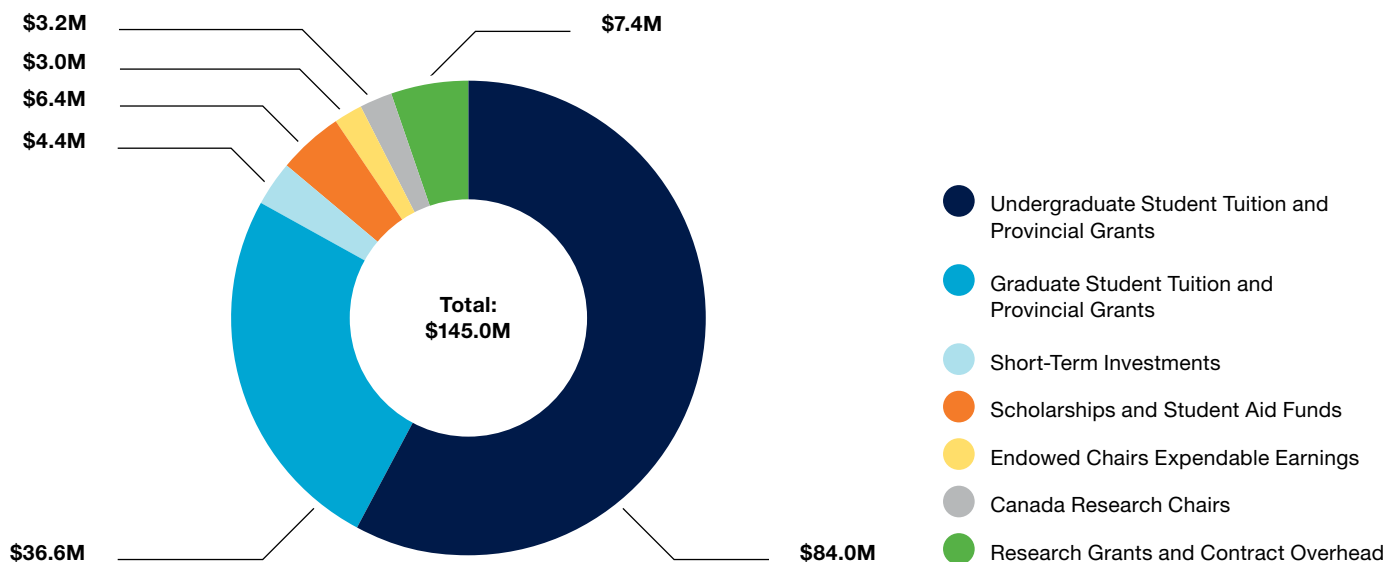
**Figure 11.3 Budget Data, 2007 to 2011**

	2007	2008	2009	2010	2011
<b>Total Revenue</b>	<b>\$118,826,327</b>	<b>\$125,233,418</b>	<b>\$132,333,400</b>	<b>\$133,571,789</b>	<b>\$144,976,282</b>
Unrestricted Revenue	\$100,663,690	\$107,347,671	\$111,937,605	\$114,602,697	\$124,966,518
Restricted Revenue	\$18,162,637	\$17,885,747	\$20,395,795	\$18,969,092	\$20,009,764
<b>Total Central Costs</b>	<b>\$58,976,711</b>	<b>\$62,755,042</b>	<b>\$66,667,514</b>	<b>\$66,768,403</b>	<b>\$69,837,572</b>
University-Wide Costs	\$41,180,986	\$43,698,011	\$44,307,203	\$44,693,620	\$47,027,056
University Fund Contribution	\$10,066,369	\$10,734,767	\$11,193,761	\$11,460,270	\$12,496,652
Student Aid Levy	\$7,729,356	\$8,322,264	\$11,166,550	\$10,614,513	\$10,313,864
<b>Net Revenue</b>	<b>\$59,849,616</b>	<b>\$62,478,376</b>	<b>\$65,665,886</b>	<b>\$66,803,386</b>	<b>\$75,138,710</b>
<b>Year-End Adjustment</b>	<b>\$553,886</b>	<b>-\$1,380,831</b>	<b>-\$3,233,099</b>	<b>\$8,373,388</b>	<b>\$5,756,848</b>

## Budget Overview for the 2011 Fiscal Year

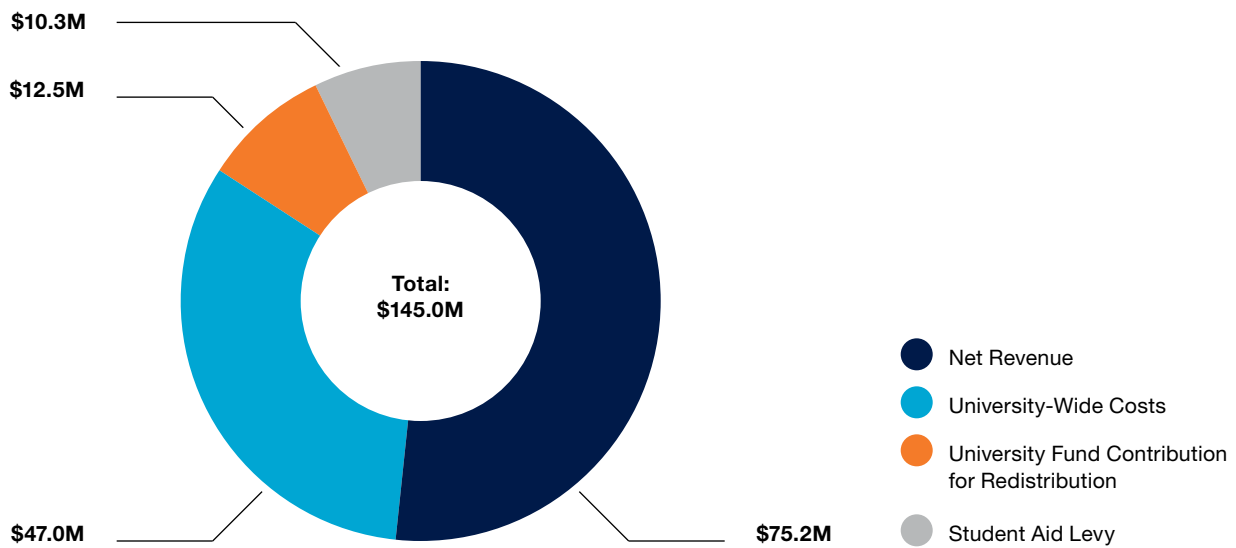
Sound fiscal management and robust enrolments in 2010 helped our Faculty recover from the lack of an endowment payout in 2009. The proposed 2011 budget is based on continued solid enrolment and an increase in research funding, which will allow us to rebuild our reserves.

**Figure 11.4 Revenue Sources, 2011**

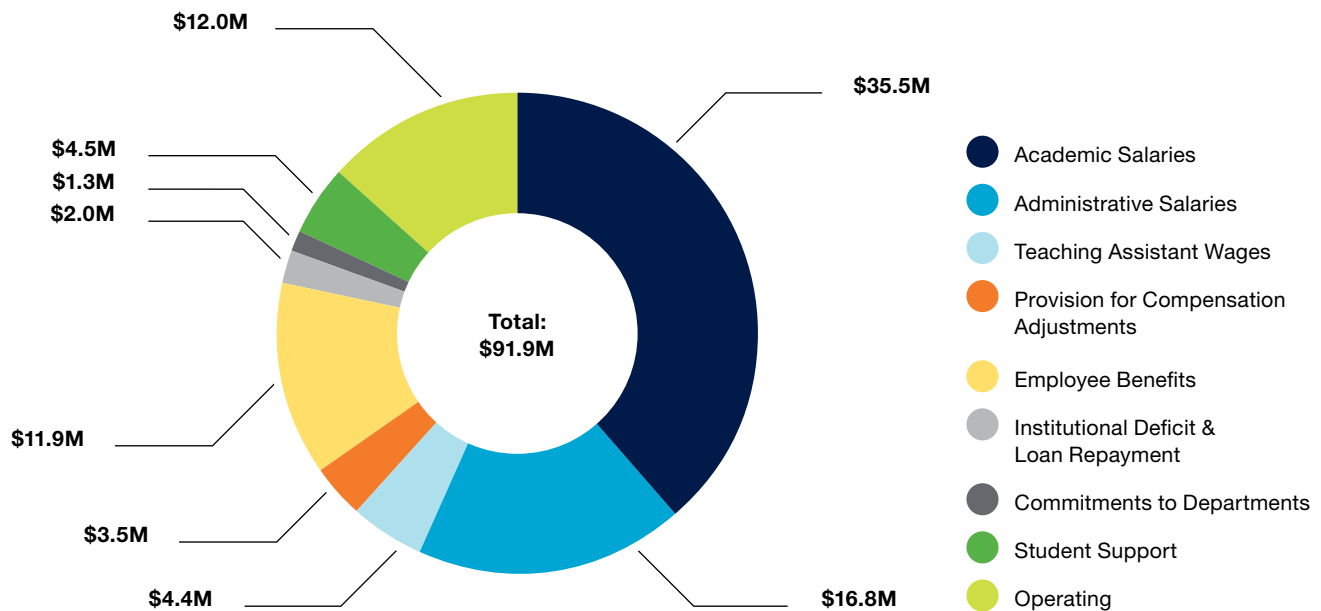


**Note 11.3 and 11.4:** Data is shown by fiscal year (May to April).

**Figure 11.5 Revenue Distribution, 2011**



**Figure 11.6 Total Operating Budget: Breakdown by Expense, 2011**



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

## Dean's Strategic Fund

Our Faculty budget model includes a Strategic Fund that is generated each year at a level of 5% of net Faculty revenues, and is used by the Dean to support strategic initiatives. In 2010–2011, we ran a first competition for projects to be funded by the Strategic Fund and received 25 excellent submissions. This fund competition will be an annual process.

The projects listed in Figure 11.7 were successful in gaining an allocation for implementation in 2011–2012 and spanning up to three years.

**Figure 11.7 Dean's Strategic Fund Competition Results, 2010–2011**

Name of Proposal	Lead Unit	Project Allocation
Advanced Education and Communication Facilities for Engineering	CivE	\$354,000
Centre for Research in Advanced Neural Implant Applications	IBBME	\$285,000
Centre for Resilience of Critical Infrastructure	CivE	\$300,000
Centre for Water Innovation	ChemE, CivE, MSE	TBD
Computer Infrastructure in ECE	ECE	\$500,000
Faculty-Wide Digital Signage	Vice-Dean, Undergraduate	\$75,000
Faculty-Wide Energy Initiatives		
– Centre for Sustainable Energy (CSE)	MIE	TBD
– Cross-Discipline Energy Fundamentals Laboratory	MIE	TBD
– Energy and Sustainability Institute	ECE	TBD
– Low Energy Buildings	CivE	TBD
Faculty-Wide MEng Initiatives		
– MEng Program in Global Engineering	CGEN	TBD
– Coordinated MEng Effort	ECE	TBD
Faculty-Wide Support Model for ECTI	ECE	\$415,500
Infrastructure in MIE	MIE	\$250,000
Investing in Communication Excellence — A YouTube Channel for Civil Engineering	CivE	\$36,000
Leadership by Engineers in Business Enterprise	ChemE	\$100,000
Portable Tabletop Labs	MSE	\$510,500
Space Robotics Control	UTIAS, ECE	\$61,000
Student Project Space	MIE	\$200,000

## Physical Infrastructure

In 2008–2009, we embarked on a comprehensive Space Review to assess our research and learning spaces. The review found that our current physical infrastructure, which has not been updated in decades, no longer meets our needs. We are now working toward upgrading our facilities across the Faculty. This remains a critical focus for our philanthropic fundraising goals.

The table below indicates our presence within buildings as measured in NASMs (Net Assignable Square Metres). Most academic areas have developed a shared presence in several buildings, notably the Bahen Centre and Sandford Fleming, which is shared with the Faculty of Arts & Science. All University divisions, as well as the public, have access to classrooms in our buildings; these are operated by the Office of Space Management.

**Figure 11.8** Location Summary: 16 Buildings Occupied by Engineering, 2010–2011

Code	Building	Office of the Dean	EngSci	UTIAS	ChemE	CivE & MinE	ECE	IBBME	MIE	MSE	Total NASMs
AS	Aerospace			4,350							4,350
EA	Annex	310					947				1,257
BA	Bahen Centre	1,052	456				5,672		1,431		8,611
EL	Electrometal									149	149
GB	Galbraith	1,603				5,002	4,215				10,820
HA	Haultain	12			181	98			638	720	1,649
MC	Mechanical	63							5,483		5,546
MB	Mining					530		1,386	1,926	832	4,674
RM	256 McCaul	128							246		374
PT	Pratt						1,341			1,525	2,866
RS	Rosebrugh							810	2,084		2,894
SF	Sandford Fleming	878		698		1,548	3,580				6,704
WB	Wallberg	357			8,033		129			1,298	9,817
DC	CCBR				457	174		935			1,566
	Other	513			50						563
Total Area		4,916	456	5,048	8,721	7,352	15,884	3,131	11,808	4,524	61,840
61,840 NASMs											

**Note 11.8:** A map of the buildings within the Engineering Precinct is available in Appendix G.

# Infrastructure Upgrades

During 2010–2011, we engaged in the following projects:

## Projects Initiated

- Relocation and upgrade of ECE server room (Sandford Fleming Building)
- Electronic building directories (all major Engineering buildings)
- Visualization Laboratory (Lassonde Mining Building)

## Projects Under Construction

- BioZone Phase II (Wallberg Building)
- Centre for Industrial Application of Microcellular Plastics (Off-Campus Rental Space)
- Microsatellite Science and Technology Centre (University of Toronto Institute for Aerospace Studies, Downsview)
- Electrical re-feed (Galbraith and Sandford Fleming Buildings)
- Relocation of Strategic Communications Group (third floor of Bahen Centre for Information Technology)
- Air-conditioning upgrades (basement and first floor of Galbraith Building; all floors of north and west sections of Mechanical Engineering Building)

## Projects Completed

- Attic Project (Lassonde Mining Building)
- Canadian Aerosol Research Network (various buildings)
- Centre for Advanced Coatings Technologies Research Lab Upgrades (Bahen Centre for Information Technology)
- Student Services Centre (Mechanical Engineering Building)
- Centre for Microfluidic Systems (various buildings)
- Upgrading ECF undergraduate computer lab (Wallberg Building)
- Construction of a Plasma Enhanced Chemical Vapour Deposition Facility (Galbraith Building)
- Upgrading capacity of electrical service (Mechanical Engineering Building)
- Two roof solar arrays for ECE research (Galbraith Building)
- Renovation of lecture theatre (Sandford Fleming Building)
- Lobby study seating (Galbraith Building)
- Upgrades to the experimental dome (University of Toronto Institute for Aerospace Studies, Downsview)

## Planning Reports

- Centre for Sustainable Energy and Advanced Technologies
- Centre for Engineering Innovation and Partnerships
- UTIAS Space Utilization Review
- Student Space Audit
- Undergraduate Teaching Laboratories Audit
- Meeting Rooms Audit

# Glossary

## Faculty of Applied Science & Engineering Academic Area Terms

<b>Academic Area</b>	For the purpose of the 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 or an academic program, it is also included as an academic area in specific contexts in Chapter 1.
<b>AeroE</b>	Graduates who studied the discipline of Aerospace Engineering from the University of Toronto Institute of Aerospace Studies (UTIAS).
<b>BioMedE</b>	Graduates who studied the discipline of Biomedical Engineering at the Division of Engineering Science and the Institute of Biomaterials & Biomedical Engineering.
<b>ChemE</b>	Department of Chemical Engineering & Applied Chemistry: <a href="http://www.chem-eng.utoronto.ca">www.chem-eng.utoronto.ca</a> Graduates who studied the discipline of Chemical Engineering are also designated as ChemE.
<b>CivE</b>	Department of Civil Engineering: <a href="http://www.civil.engineering.utoronto.ca">www.civil.engineering.utoronto.ca</a> Graduates who studied the discipline of Civil Engineering are also designated as CivE.
<b>CompE</b>	Graduates of The Edward S. Rogers Sr. Department of Electrical & Computer Engineering (ECE) who studied the discipline of Computer Engineering.
<b>ElecE</b>	Graduates of The Edward S. Rogers Sr. Department of Electrical & Computer Engineering (ECE) who studied the discipline of Electrical Engineering.
<b>ECE</b>	The Edward S. Rogers Sr. Department of Electrical & Computer Engineering: <a href="http://www.ece.utoronto.ca">www.ece.utoronto.ca</a> Graduates of Electrical Engineering are designated as ElecE; graduates of Computer Engineering are designated as CompE.
<b>EngSci</b>	Division of Engineering Science: <a href="http://www.engsci.utoronto.ca">www.engsci.utoronto.ca</a> Graduates of this Division are also designated as EngSci.
<b>IBBME</b>	Institute of Biomaterials & Biomedical Engineering: <a href="http://www.ibbme.utoronto.ca">www.ibbme.utoronto.ca</a> Graduates who studied the discipline of Biomedical Engineering within this Institute are referred to as BioMedE.
<b>IndE</b>	Graduates from the Department of Mechanical & Industrial Engineering (MIE) who studied the discipline of Industrial Engineering.
<b>MechE</b>	Graduates from the Department of Mechanical & Industrial Engineering (MIE) who studied the discipline of Mechanical Engineering.
<b>MIE</b>	Department of Mechanical & Industrial Engineering: <a href="http://www.mie.utoronto.ca">www.mie.utoronto.ca</a> Graduates of Mechanical Engineering are designated as MechE; graduates of Industrial Engineering are designated as IndE.
<b>MinE</b>	Graduates from the Department of Civil Engineering (CivE) who studied the discipline of Mineral Engineering.
<b>MSE</b>	Department of Materials Science & Engineering: <a href="http://www.mse.utoronto.ca">www.mse.utoronto.ca</a> Graduates who studied the discipline of Materials Engineering are also designated as MSE.
<b>TrackOne</b>	General first-year undergraduate studies in Engineering. Upon successful completion of TrackOne, students choose from one of the other undergraduate programs, excluding Engineering Science.
<b>UTIAS</b>	University of Toronto Institute for Aerospace Studies: <a href="http://www.utias.utoronto.ca">www.utias.utoronto.ca</a> Graduates who studied the discipline of Aerospace Engineering within this Institute are designated as AeroE.

## Additional Terms

<b>AAAS</b>	American Association for the Advancement of Science: <a href="http://www.aaas.org">www.aaas.org</a>
<b>Academic Year</b>	The University of Toronto academic year runs from September to August. For example, the 2010–2011 academic year begins in September 2010 and ends in August 2011.
<b>BASc</b>	Bachelor of Applied Science
<b>CAE</b>	Canadian Academy of Engineering
<b>CCBR</b>	Donnelly Centre for Cellular and Biomolecular Research: <a href="http://www.tdccbr.med.utoronto.ca">www.tdccbr.med.utoronto.ca</a>
<b>CIHR</b>	Canadian Institutes of Health Research: <a href="http://www.cihr-irsc.gc.ca">www.cihr-irsc.gc.ca</a>
<b>CRC</b>	Canada Research Chair
<b>DEEP Summer Academy</b>	An advanced summer program for high school students from around the world: <a href="http://www.deepsummeracademy.com">www.deepsummeracademy.com</a>
<b>Domestic</b>	Students who are citizens, landed immigrants or permanent residents of Canada
<b>ECF</b>	Engineering Computing Facility
<b>EDU</b>	Extra-Departmental Unit: <a href="http://www.provost.utoronto.ca/policy/interdisciplinary">www.provost.utoronto.ca/policy/interdisciplinary</a>
<b>EDU:C</b>	Typically a multidisciplinary multidepartmental research and/or academic unit with a defined research domain in a particular area of academic work. It exists to foster research and scholarly interest in the area. For more information: <a href="http://www.provost.utoronto.ca/policy/interdisciplinary">www.provost.utoronto.ca/policy/interdisciplinary</a>
<b>EDU:D</b>	A group of researchers who come together for the purpose of pursuing specific research objectives. For more information: <a href="http://www.provost.utoronto.ca/policy/interdisciplinary">www.provost.utoronto.ca/policy/interdisciplinary</a>
<b>EIC</b>	Engineering Institute of Canada: <a href="http://www.eic-ici.ca">www.eic-ici.ca</a>
<b>EFTE</b>	Eligible Full-Time Equivalent
<b>ELITE</b>	Entrepreneurship, Leadership, Innovation and Technology in Engineering: <a href="http://www.engineering.utoronto.ca/Future_Students/Graduate_Studies/Certificates/ELITE.htm">www.engineering.utoronto.ca/Future_Students/Graduate_Studies/Certificates/ELITE.htm</a>
<b>Engineering Society</b>	Student government for Engineering students at the University of Toronto: <a href="http://www.skule.ca">www.skule.ca</a>
<b>Engineering Strategies &amp; Practice</b>	An award-winning first-year course in engineering design and communications. All first-year Engineering students (except Engineering Science students) take Engineering Strategies & Practice: <a href="http://www.esp.engineering.utoronto.ca">www.esp.engineering.utoronto.ca</a>
<b>EPP</b>	Engineering and Public Policy
<b>Fiscal Year</b>	The University of Toronto fiscal year runs from May to April. For example, the 2011 fiscal year begins in May 2010 and ends in April 2011.
<b>FTE</b>	Full-Time Equivalent
<b>Go ENG Girl</b>	An interactive, one-day event for girls in grades 7 to 10. Go ENG Girl takes place across the province of Ontario.
<b>Grant Year</b>	The grant year runs from April to March. For example, the 2011 grant year runs from April 2010 to March 2011.

<b>G13</b>	Group of 13 leading, research-intensive universities in Canada, including: University of Alberta, University of British Columbia, University of Calgary, Dalhousie University, Université Laval, McGill University, McMaster University, Université de Montréal, University of Ottawa, Queen's University, University of Toronto, University of Waterloo, University of Western Ontario
<b>Headcount</b>	Number of degree-seeking students
<b>IEEE</b>	Institute of Electrical and Electronics Engineers: <a href="http://www.ieee.org">www.ieee.org</a>
<b>Jr. DEEP</b>	Summer program for students in grades 7 and 8: <a href="http://www.outreach.engineering.utoronto.ca">www.outreach.engineering.utoronto.ca</a>
<b>MASc</b>	Master of Applied Science: <a href="http://www.engineering.utoronto.ca/Future_Students/Graduate_Studies.htm">www.engineering.utoronto.ca/Future_Students/Graduate_Studies.htm</a>
<b>MEng</b>	Master of Engineering: <a href="http://www.engineering.utoronto.ca/Future_Students/Graduate_Studies.htm">www.engineering.utoronto.ca/Future_Students/Graduate_Studies.htm</a>
<b>MHSc</b>	Master of Health Science in Clinical Engineering: <a href="http://www.engineering.utoronto.ca/Future_Students/Graduate_Studies.htm">www.engineering.utoronto.ca/Future_Students/Graduate_Studies.htm</a>
<b>NAE</b>	National Academy of Engineering: <a href="http://www.nae.edu">www.nae.edu</a>
<b>NSERC</b>	Natural Sciences and Engineering Research Council of Canada: <a href="http://www.nserc-crsng.gc.ca">www.nserc-crsng.gc.ca</a>
<b>NSERC CREATE</b>	Collaborative Research and Training Experience program funded by NSERC: <a href="http://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/CREATE-FONCER-eng.asp">www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/CREATE-FONCER-eng.asp</a>
<b>OCUFA</b>	Ontario Confederation of University Faculty Associations: <a href="http://www.ocufa.on.ca">www.ocufa.on.ca</a>
<b>Ornithopter</b>	An aircraft that flies by flapping its wings. To learn about U of T Engineering's ornithopter, visit: <a href="http://uoft.me/ornithopter">uoft.me/ornithopter</a>
<b>PEO</b>	Professional Engineers Ontario: <a href="http://www.peo.on.ca">www.peo.on.ca</a>
<b>PhD</b>	Doctor of Philosophy (doctoral program)
<b>Retention Rate</b>	The proportion of first-year students who move into second year.
<b>ROSI</b>	Repository of Student Information: <a href="http://www.rosi.utoronto.ca">www.rosi.utoronto.ca</a>
<b>Saturday Science &amp; Engineering Academy</b>	A hands-on Saturday program for students in grades 7 to 12 in the fall and spring: <a href="http://www.outreach.engineering.utoronto.ca">www.outreach.engineering.utoronto.ca</a>
<b>SCFI</b>	Stronach Centre for Innovation
<b>Special Student Status</b>	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).
<b>SSHRC</b>	Social Sciences and Humanities Research Council: <a href="http://www.sshrc.ca">www.sshrc.ca</a>
<b>Teaching-Stream Faculty</b>	Academic staff including lecturers, instructors and other teaching faculty with continuing appointments
<b>Tenure-Stream Faculty</b>	Academic staff including Assistant Professors, Associate Professors and Professors; excludes lecturers
<b>Tri-Council</b>	Typically refers to NSERC, CIHR, SSHRC
<b>UTAPS</b>	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. Visit <a href="http://www.adm.utoronto.ca/fa/UTAPS/default.htm">www.adm.utoronto.ca/fa/UTAPS/default.htm</a> for more information.
<b>UTSU</b>	University of Toronto Students' Union: <a href="http://www.utsu.ca">www.utsu.ca</a>
<b>YWCA</b>	A women's multi-service organization: <a href="http://www.ywcanada.ca/en">www.ywcanada.ca/en</a>



## Appendix A: Student Clubs and Teams

Below is a listing of Engineering student clubs and teams. Beyond the groups listed here, our students also have access to clubs and teams across the University of Toronto. To read about the achievements of select Engineering student groups for 2010–2011, please see page 19 of the Undergraduate Studies chapter.

### Academic Clubs

- Biomedical Engineering Student Association
- Chemical Engineering Club
- Civil Engineering Club
- Computer Engineering Club
- Electrical Engineering Club
- Engineering Science Club
- Industrial Engineering Club
- Materials Science & Engineering Club
- Mechanical Engineering Club
- Mineral Engineering Club
- TrackOne Committee

### Athletic

- Engineering Athletic Association
- Iron Dragons Dragon Boat Team
- Parkour Club
- U of T Yoga Club

### Cultural

- Chinese Engineering Students' Association
- Engineering Chinese Culture Club
- Iranian Engineering Students' Association
- Jewish Engineering Students' Association
- Korean Engineering Students' Association
- National Society of Black Engineers
- U of T Gujarati Council
- U of T Indian Students' Society

### Design

- BlueGenes
- Destination Imagination
- U of T Aeronautics Team
- U of T Blue Sky Solar Racing
- U of T Concrete Canoe Team
- U of T Concrete Toboggan Team
- U of T Eco-Marathon Club
- U of T Engineering Acceleration
- U of T Formula SAE Racing Team
- U of T Human-Powered Vehicle Design Team
- U of T Mechatronics Design Association
- U of T Mining Games Team
- U of T Robotic Sailboat Club
- U of T Snowboard Design Team

### Performance

- Brass Ring
- Rise and Improvise Dance Club
- Skule™ Arts Festival
- Skule™ Choir
- Skule™ Improv Society
- Skule™ Jazz Combo
- Skule™ Nite
- Skule™ Orchestra
- Skule™ Stage Band
- Skule™ Stage Band Blue

### Professional

- American Society of Mechanical Engineers, U of T Chapter
- Astronomy and Space Exploration Society
- Canadian Society of Chemical Engineers, U of T Chapter
- Canadian Society of Industrial Engineers / Institute of Industrial Engineers, U of T Chapter
- Citizen Engineer
- Club for Undergraduate Biomedical Engineering
- Engineering Conservatives
- Engineering World Health, U of T Chapter
- Engineers in Borders
- Engineers Without Borders, U of T Chapter
- Environmental Management Committee
- Friends of Interdisciplinary Research in Medicine
- Hacker Academy
- Hi-Skule™ Committee
- IEEE University of Toronto Student Branch
- International Society of Pharmaceutical Engineering, U of T Chapter
- Material Advantage, U of T Chapter
- National Business and Technology Conference
- NSciential
- NSight
- Nspire
- Ontario Water Works Association
- Professional Engineers of Ontario Student Club, U of T Chapter

- Project Management Association of Canada, U of T Chapter
- Student Issues Committee
- Surface Mount Technology Association
- Sustainable Engineers Association
- Take Action! Organization
- Tetra Society at the U of T
- TrackOne Alumni Committee
- TrackOne Mentorship Program
- U of T Consulting Association
- U of T Engineering First Responders
- U of T Engineering Competitions
- U of T Engineering Toastmasters
- U of T Nano Club
- U of T Society of Manufacturing Engineers
- U of T Space Design Contest
- U of T Sustainable Energy Fair
- U of T Student Chapter of the Water Environment Association of Ontario
- Web Startup Society
- Women in Science and Engineering

### Publications

- *Crumpled Paper Arts and Creative Writing Magazine*
- Skulebook
- *The Cannon Newspaper*
- *The Toike Oike Newspaper*

### Social

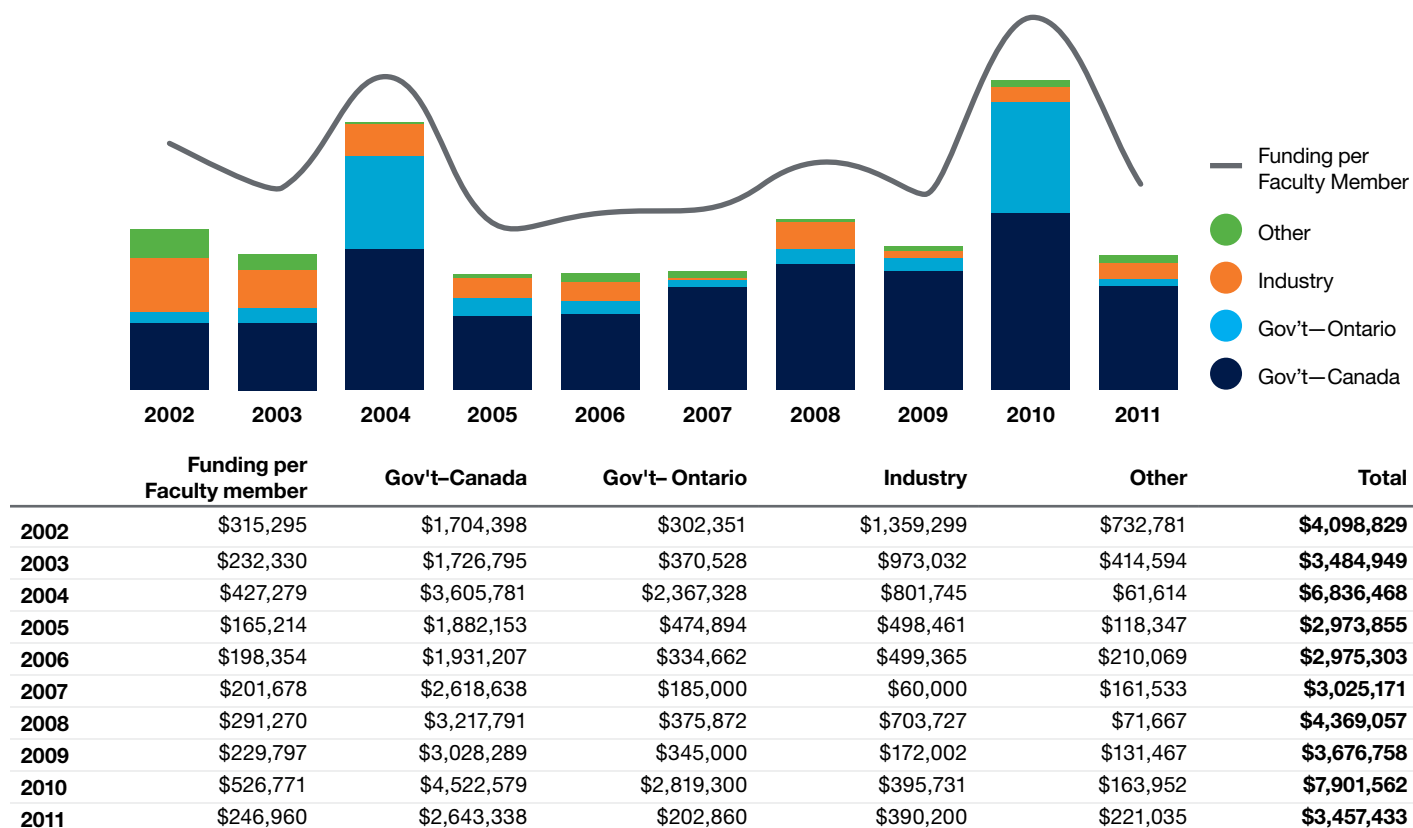
- 1T1 Committee
- 1T2 Committee
- 1T3 Committee
- 1T4 Committee
- Blue and Gold Committee
- Engineering Friday All-Night Gaming
- Engineering Lego Group
- Engineers for Christ
- Eyes of Hope
- Lady Godiva Memorial Bnad [sic]
- Skule™ Juggling Club
- U of T Engineering Photography Club
- U of T Mandarin Chinese Christian Fellowship

**Note:** Referenced in Chapter 1, Undergraduate Studies.

## Appendix B: Research Funding by Academic Area

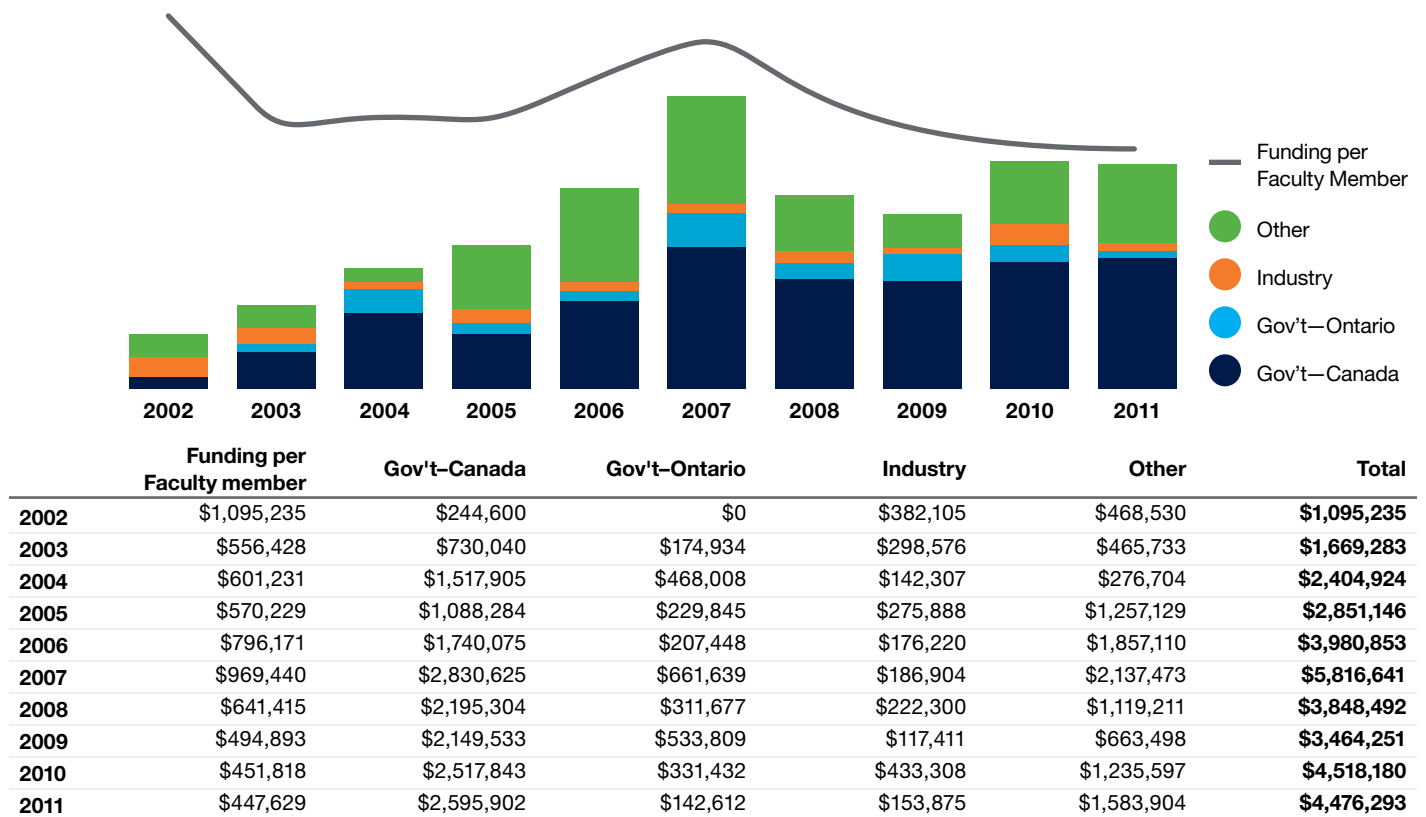
Appendix B shows the research funding each of our departments, divisions and institutes received over the last 10 years. For an overview of the Faculty's research funding by source, please see Figure 3.1a (page 31) in the Research chapter.

**Figure B.1** University of Toronto Institute for Aerospace Studies Research Funding by Source, 2002 to 2011

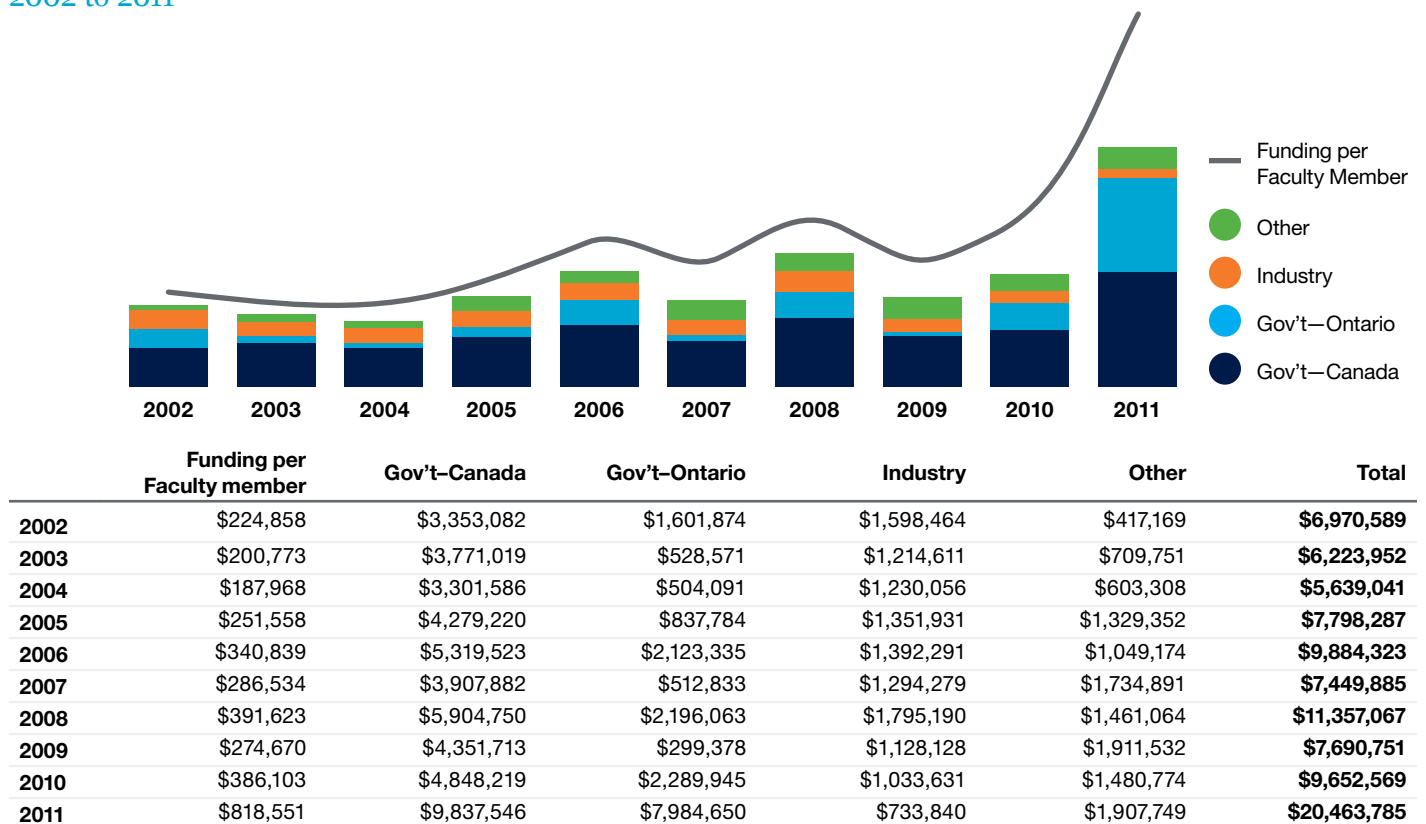


**Note B.1:** Referenced in Chapter 3, Research. Data is presented by grant year (April to March).

**Figure B.2** Institute of Biomaterials & Biomedical Engineering Research Funding by Source, 2002 to 2011

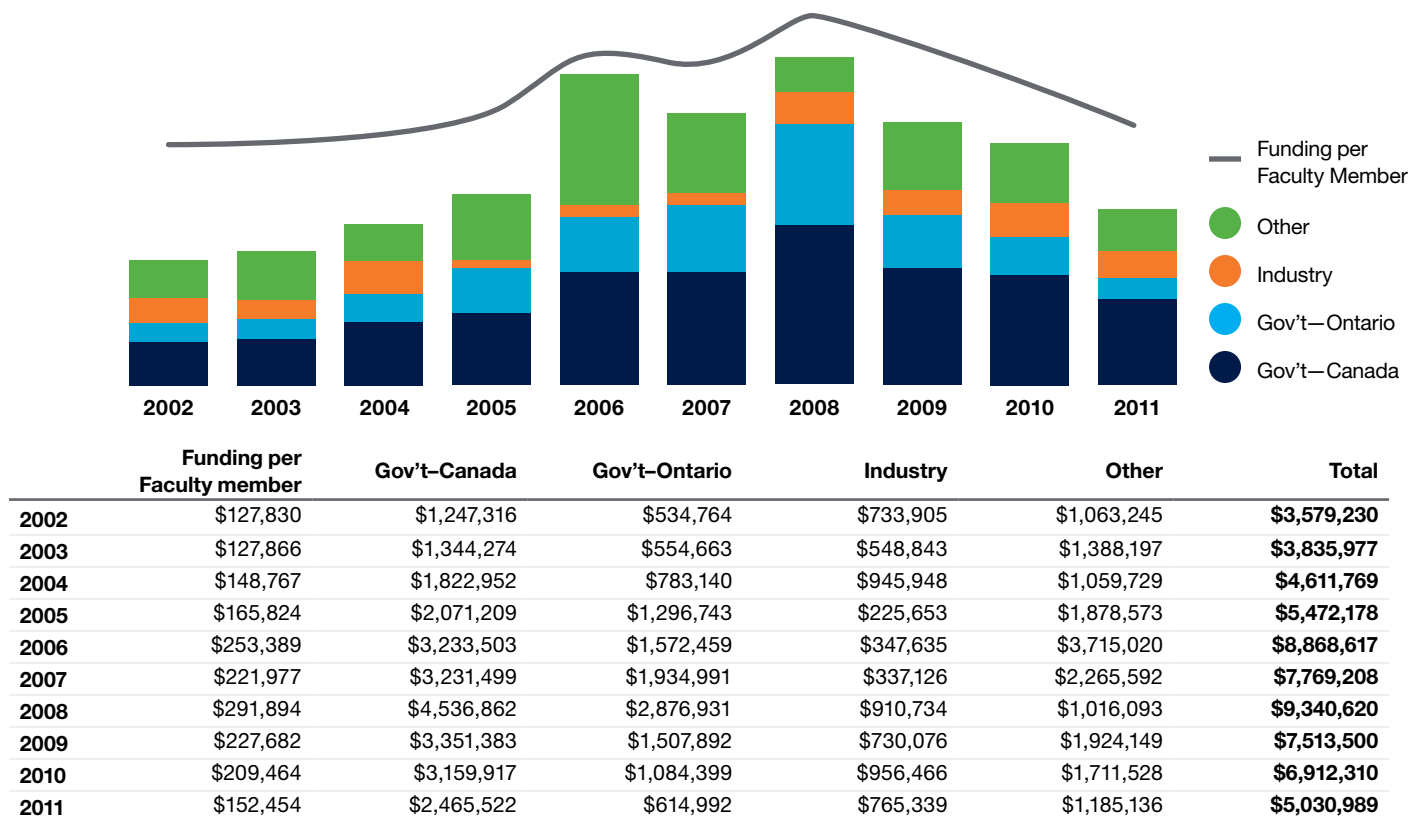


**Figure B.3** Department of Chemical Engineering & Applied Chemistry Research Funding by Source, 2002 to 2011

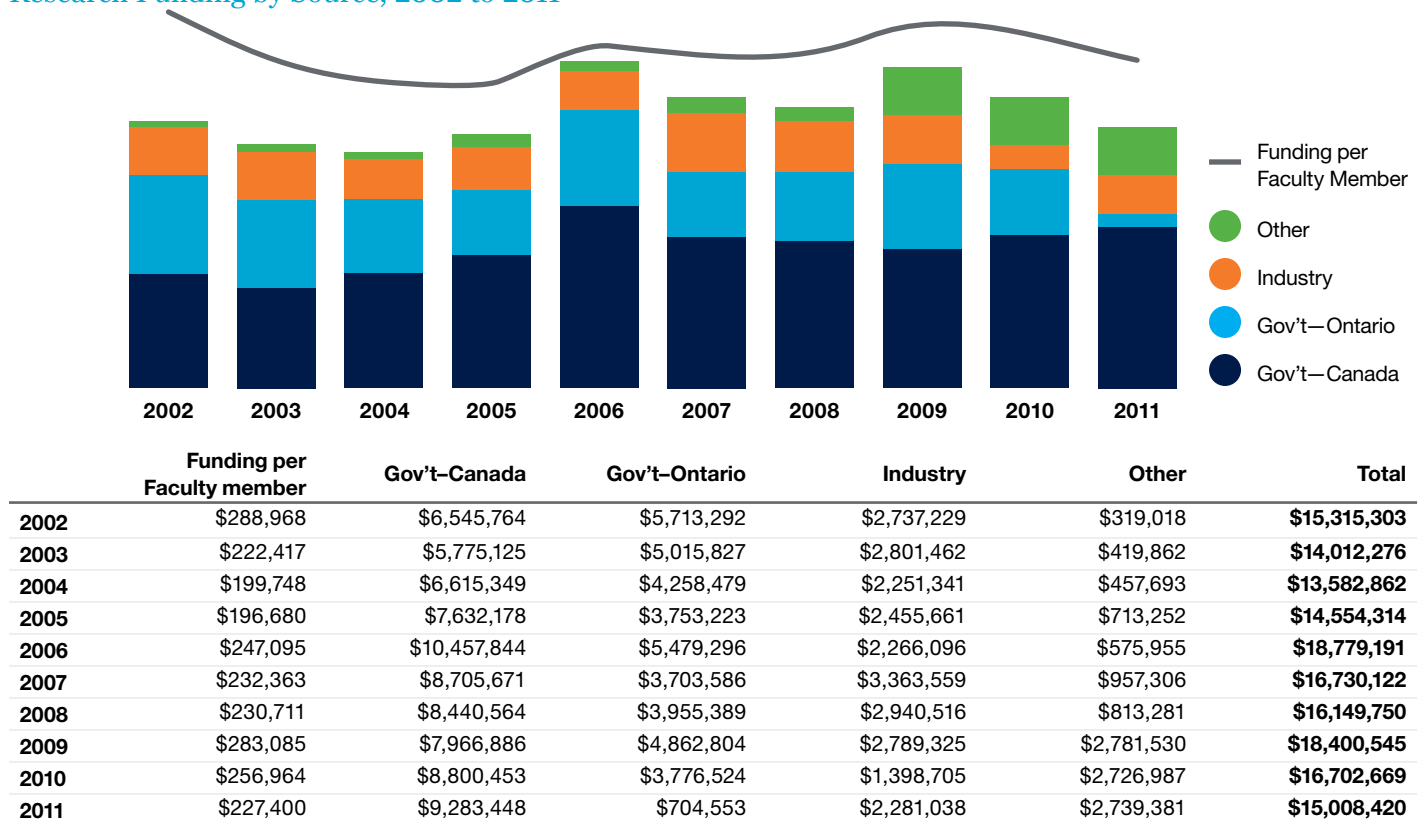


**Note B.2 and B.3:** Referenced in Chapter 3, Research. Data is presented by grant year (April to March).

**Figure B.4** Department of Civil Engineering Research Funding by Source, 2002 to 2011

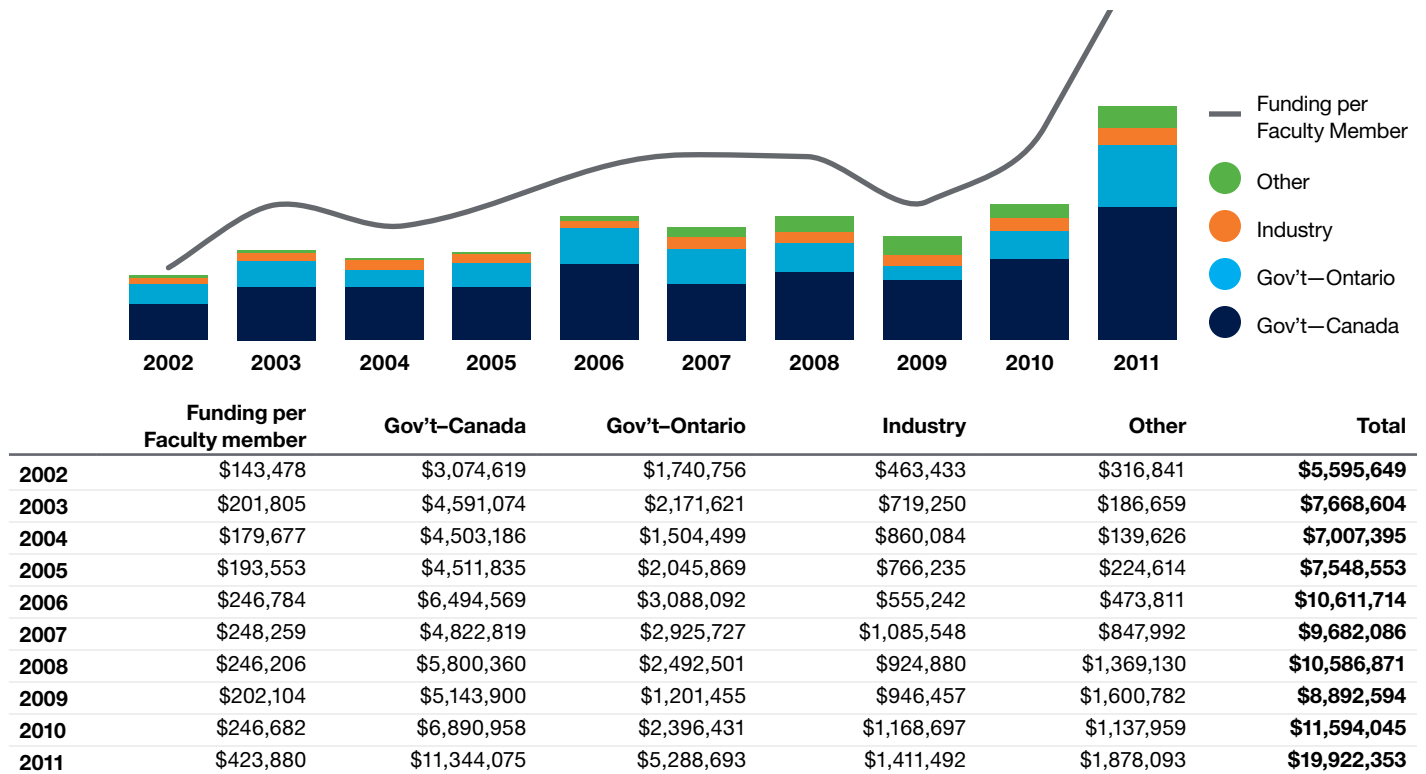


**Figure B.5** The Edward S. Rogers Sr. Department of Electrical & Computer Engineering Research Funding by Source, 2002 to 2011

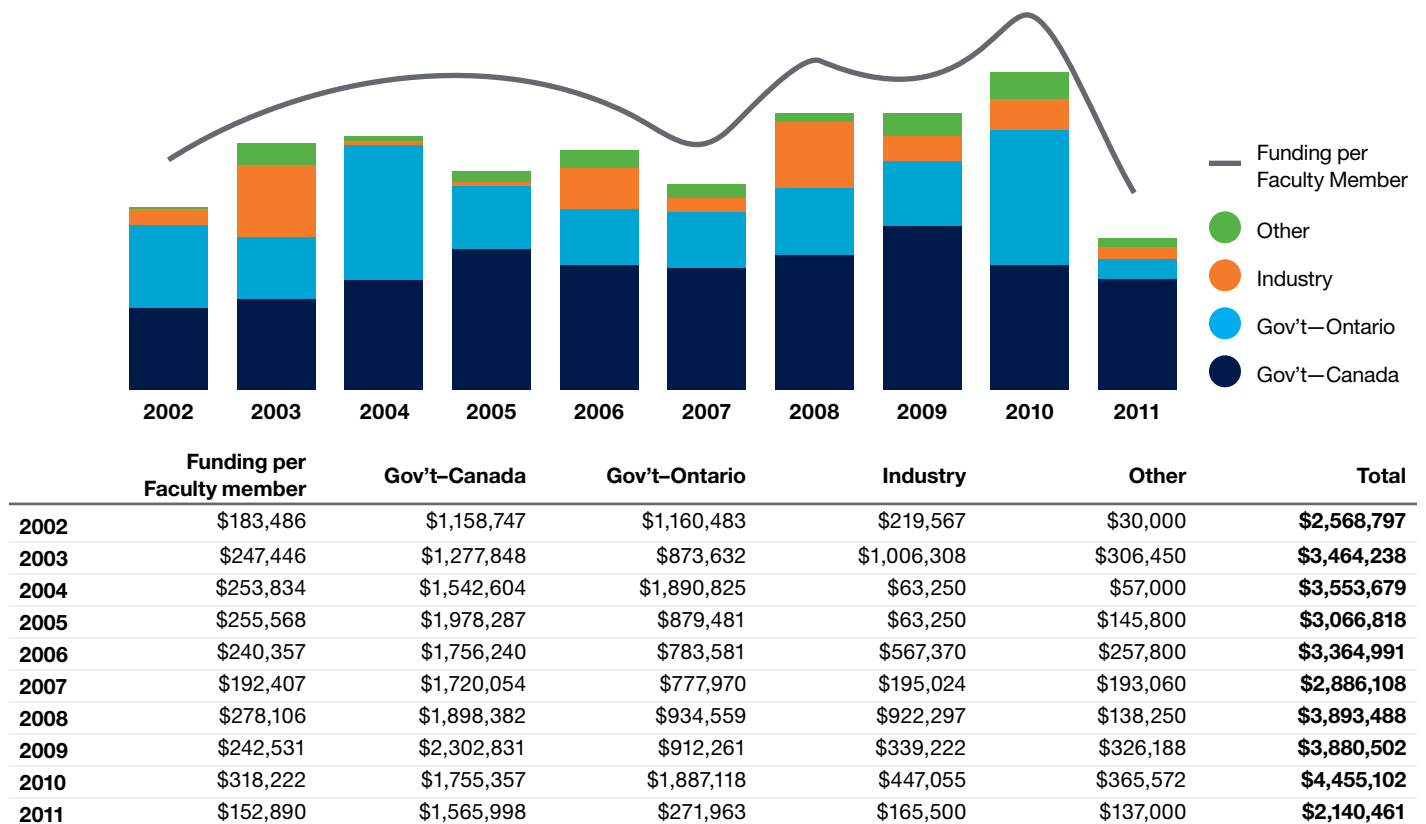


**Note B.4 and B.5:** Referenced in Chapter 3, Research. Data is presented by grant year (April to March).

**Figure B.6** Department of Mechanical & Industrial Engineering Research Funding by Source, 2002 to 2011



**Figure B.7** Department of Materials Science & Engineering Research Funding by Source, 2002 to 2011



**Note B.6 and B.7:** Referenced in Chapter 3, Research. Data is presented by grant year (April to March).

## Appendix C: Research Chairs

In 2010–2011, more than 50 faculty members held the title of Chair. 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 in Canadian degree-granting institutions. The program invests a total of \$300 million per year across the country. There are 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 only 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 who display promise. This Chair is limited to no more than 3% of tenured professors within a Faculty.

**Figure C.1 Research Chairs, 2010–2011**

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 Autonomic Service Architecture	Alberto Leon-Garcia	NSERC	Tier 1	ECE
Canada Research Chair in Autonomous Space Robotics	Tim Barfoot	NSERC	Tier 2	UTIAS
Canada Research Chair of Biotechnology	Warren Chan	NSERC	Tier 2	IBBME
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 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 Digital Communications	Wei Yu	NSERC	Tier 2	ECE
Canada Research Chair in Fuel Cell Materials and Manufacturing	Olivera Kesler	NSERC	Tier 2	MIE
Canada Research Chair in Information Processing and Machine Learning	Brendan Frey	NSERC	Tier 2	ECE
Canada Research Chair in Internet Video, Audio and Image Search	Parham Aarabi	NSERC	Tier 2	ECE
Canada Research Chair in Mechanobiology	Craig Simmons	CIHR	Tier 2	MIE
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
Canada Research Chair in Nano- and Micro-Structured Electromagnetic Materials and Applications	George Eleftheriades	NSERC	Tier 1	ECE

<b>Title</b>	<b>Chairholder</b>	<b>Sponsor</b>	<b>Tier</b>	<b>Dep't</b>
Canada Research Chair in Nanotechnology	Ted Sargent	NSERC	Tier 2	ECE
Canada Research Chair in Organic Optoelectronics	Zheng-Hong Lu	NSERC	Tier 1	MSE
Canada Research Chair in Photonic Technologies and Applications	Li Qian	NSERC	Tier 2	ECE
Canada Research Chair in Quantum Information	Hoi-Kwong Lo	NSERC	Tier 2	ECE
Canada Research Chair in Signal Processing Systems	Glenn Gulak	NSERC	Tier 1	ECE
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
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	Tarek Abdelrahman	Endowed		ECE
Clarice Chalmers Chair of Engineering Design	William Cleghorn	Endowed		MIE
Claudette MacKay-Lassonde Chair in Mineral Engineering	John Hadjigeorgiou	Endowed		CivE
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
Gerald R. Heffernan Chair in Materials Processing	Torstein Utigard	Endowed		MSE
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
Nortel Institute Chair in Emerging Technology	J. Stewart Aitchison	Endowed		ECE
Nortel Institute Chair in Network Architecture and Services	Jörg Liebeherr	Endowed		ECE
NSERC Industrial Research Chair in Design Engineering for the Urban Environment	Paul Gauvreau	NSERC		CivE
NSERC Industrial Research Chair in Drinking Water Research	Robert Andrews	NSERC		CivE
NSERC/Cement Association of Canada Industrial Research Chair in Concrete Durability and Sustainability	Doug Hooton	NSERC		CivE
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	William Bawden	Endowed		CivE
Stanley Ho Professorship in Microelectronics	Sorin Voinigescu	Endowed		ECE
The Stanley L. Meek Chair in Advanced Nanotechnology	Harry Ruda	Endowed		MSE
Velma M. Rogers Graham Chair in Engineering	George Eleftheriades	Endowed		ECE
Wallace G. Chalmers Chair of Engineering Design	Lily Shu	Endowed		MIE
W. M. Keck Chair of Seismology and Rock Mechanics	John Harrison	Endowed		CivE

**Note:** Referenced in Chapter 3, Research. In addition to the list above, the following roles are in the process of being filled: John Patrick Sheridan Chair in Mineral Processing and Robert M. Smith Chair in Geotechnical Mine Design and Analysis.



## Appendix D: Spin-Off Companies

Over the last 40 years, more than 100 spin-off companies have been launched from within our Faculty. For a detailed breakdown of invention disclosures by academic area since 2007, please see Figure 3.4 (page 35) in the Research chapter.

**Figure D.1 Engineering Spin-Off Companies, 1970 to 2011**

Est.	Company Name	Engineering Affiliation	Department
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	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	Hydratek and Associates Inc.	Bryan Karney and (since 2006) Fabian Papa	CivE
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
2001	Fox-Tek	Rod Tennyson	UTIAS
2001	Inspection Biosciences	Peter Zandstra	IBBME
2001	Interface Biologics	Paul Santerre	IBBME
2000	Biox Corporation	David Boock	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
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.	Ilan 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

**Note D.1:** Referenced in Chapter 3, Research. Includes spin-offs on file with the U of T Innovations Group, and as added by faculty.

## Appendix E: Descriptions of Major Awards

Figure 5.1 (page 44) in the Awards and Honours chapter summarizes the international, national and provincial awards received by our faculty since 2001. 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 Fellowship

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 teaching excellence and educational leadership

#### Alan Blizzard Award

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

#### Canada's Top 40 Under 40

Honours the top 40 Canadians who have reached a significant level of success prior to age 40

#### CAE Fellowship

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

#### EIC Fellowship

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

#### 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

#### 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

#### 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

#### Synergy Award for Innovation

Recognition for university-industry collaboration that stand as a model of effective partnership

### Provincial

#### PEO Medal

Awarded to a PEO member who has contributed substantially to the advancement of the engineering profession in any of its branches

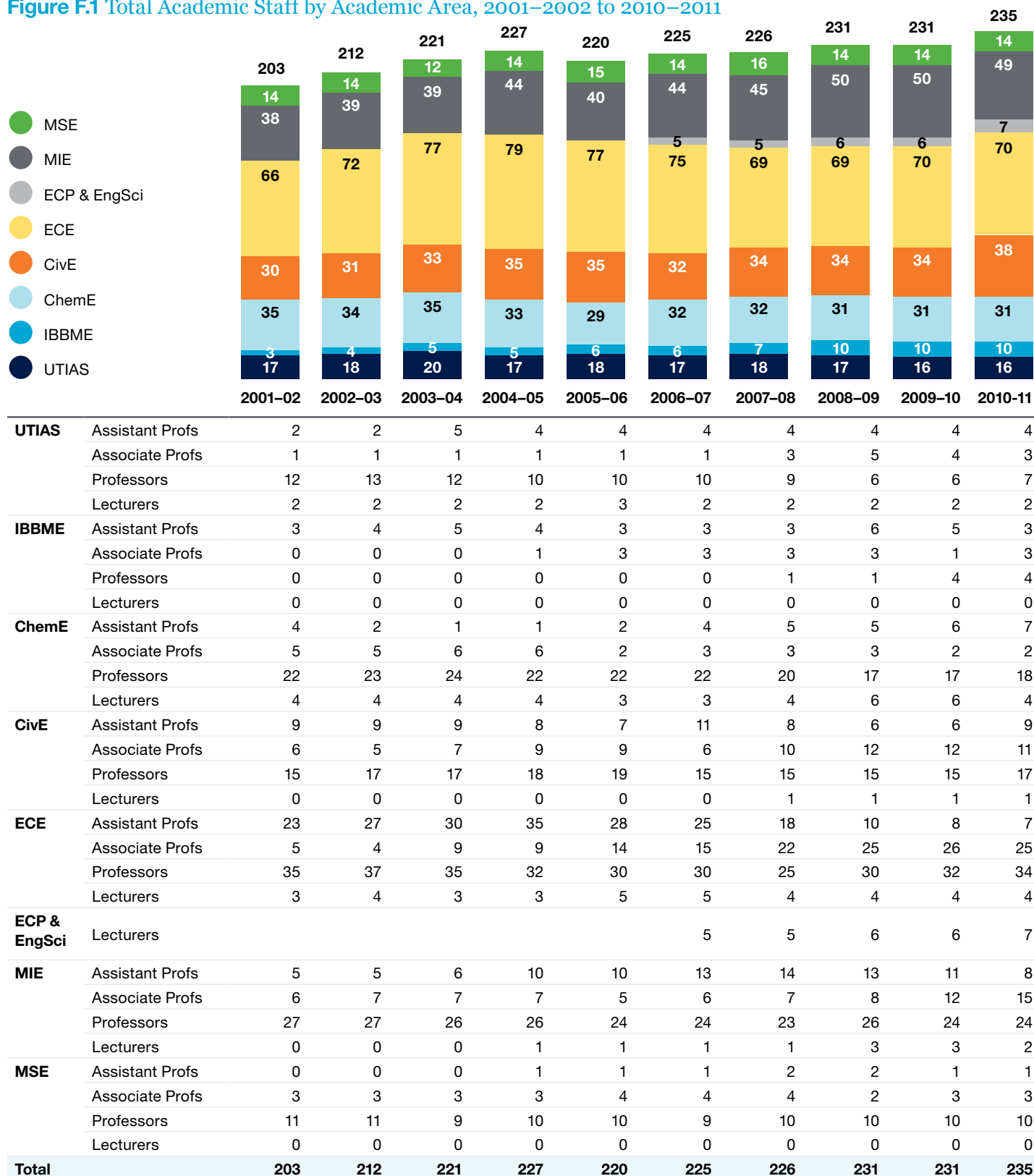
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**Note:** Referenced in Chapter 5, Awards and Honours.

## Appendix F: Academic Staff by Academic Area

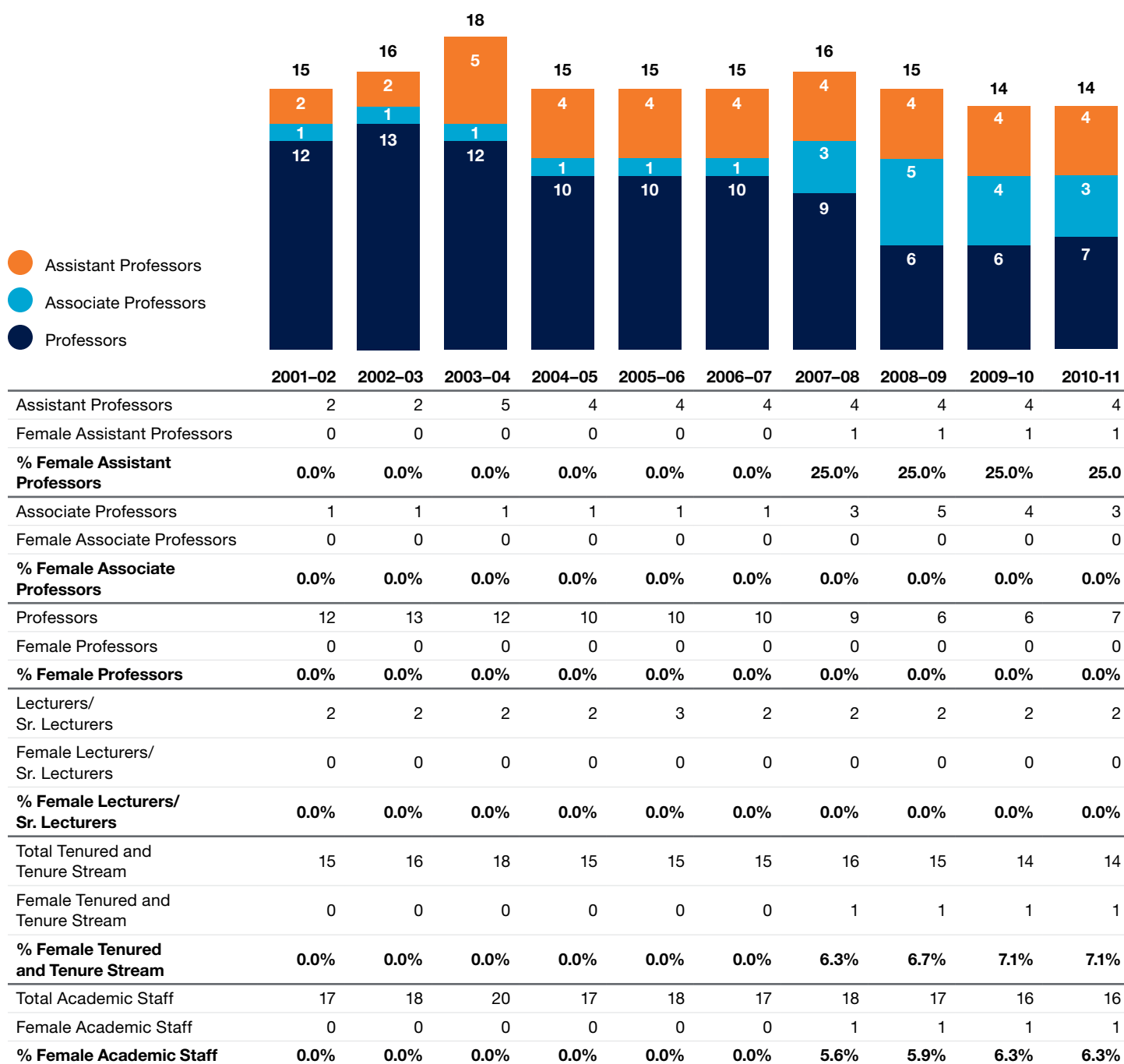
The figures in Appendix F show the composition of our Faculty's academic staff over the past 10 years. Figure F.1 provides an overview, while F.2 to F.8 present a detailed analysis by academic area.

**Figure F.1 Total Academic Staff by Academic Area, 2001–2002 to 2010–2011**



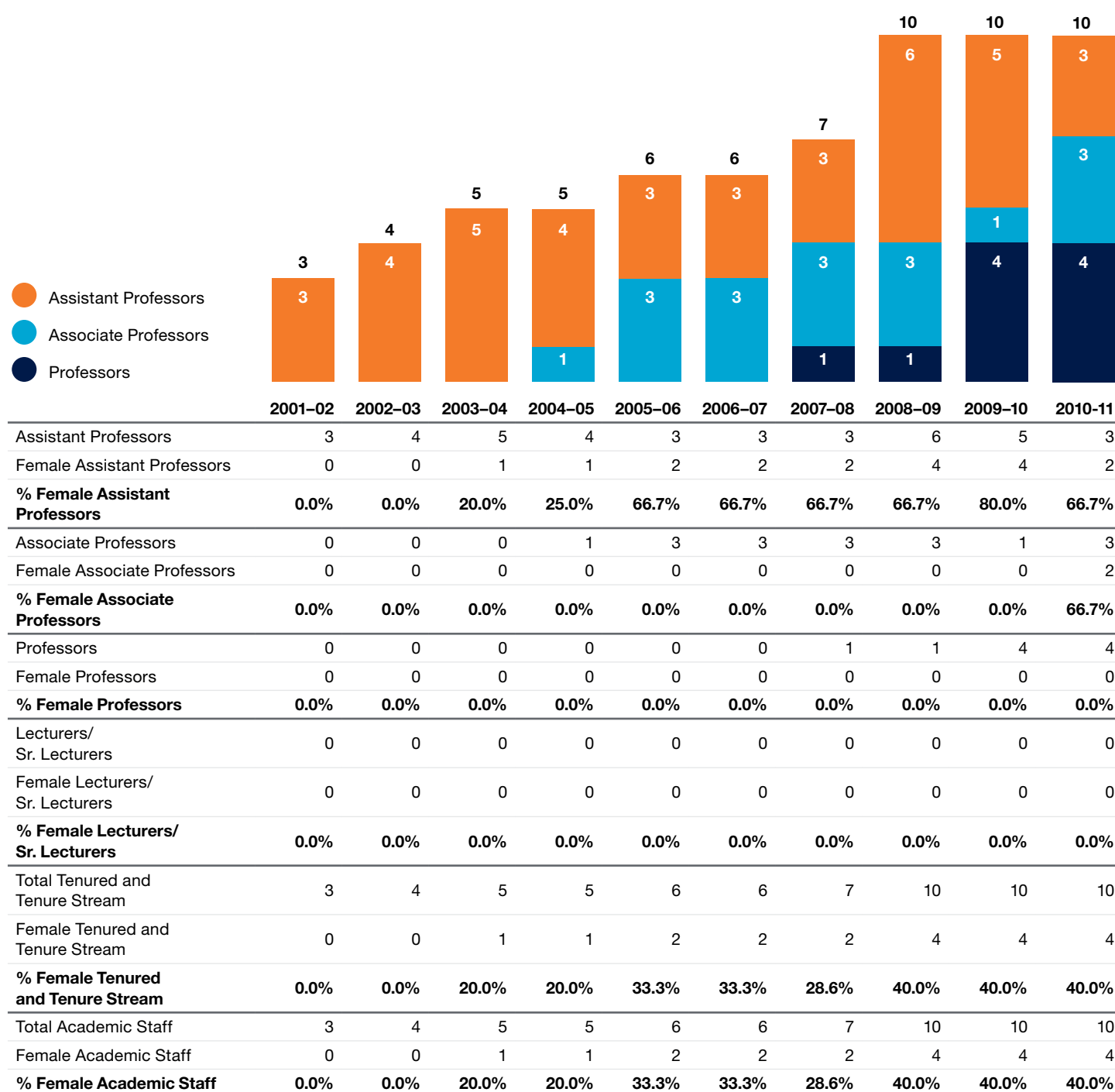
**Note F.1:** Referenced in Chapter 10, Diversity. Number of lecturers from Engineering Communications Program (ECP) and EngSci is unavailable prior to 2006–2007.

**Figure F.2** University of Toronto Institute for Aerospace Studies:  
Academic Staff by Position with Percentage of Women, 2001–2002 to 2010–2011



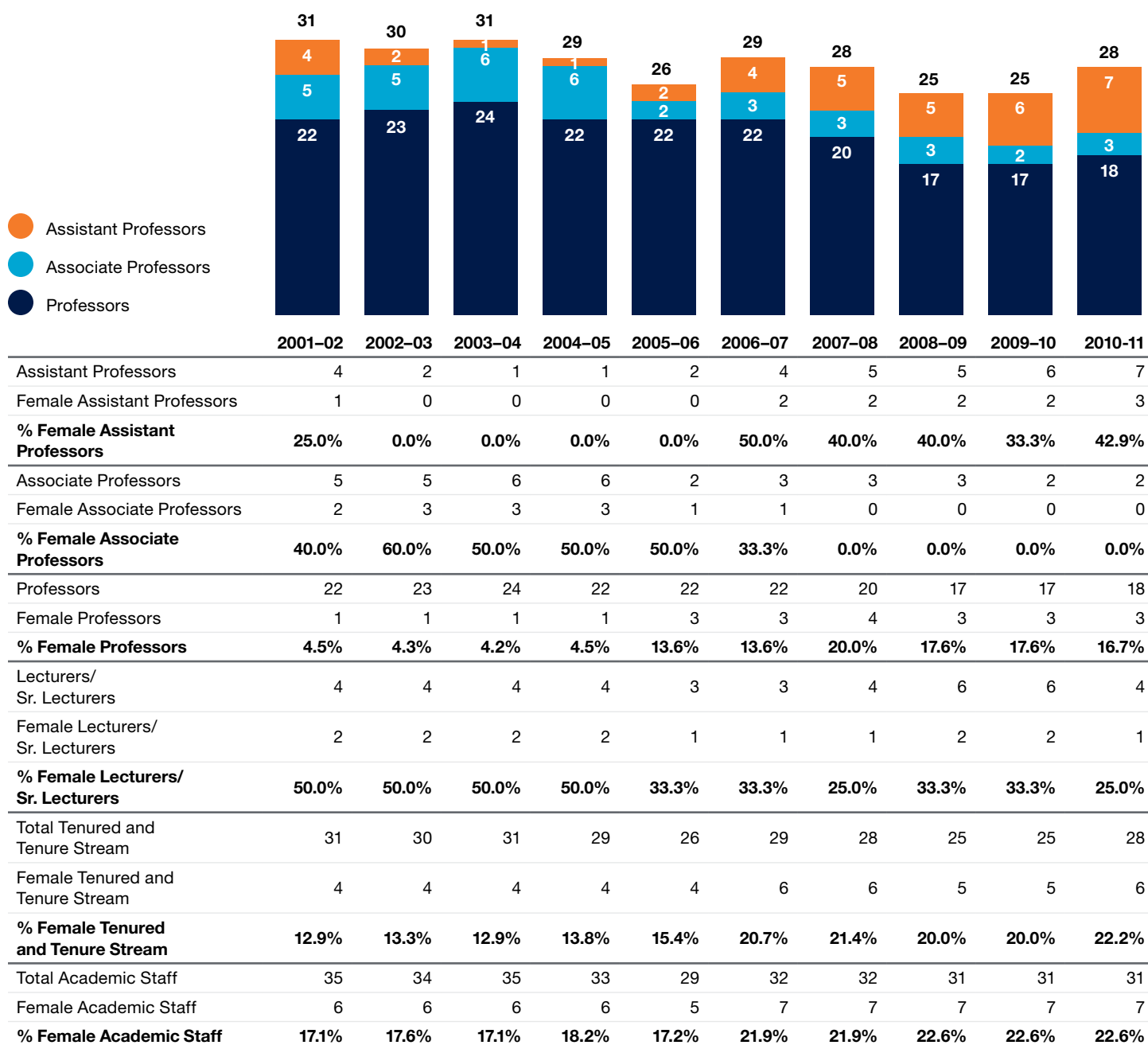
**Note F.2:** Referenced in Chapter 10, Diversity.

**Figure F.3** Institute of Biomaterials & Biomedical Engineering:  
Academic Staff by Position with Percentage of Women, 2001–2002 to 2010–2011



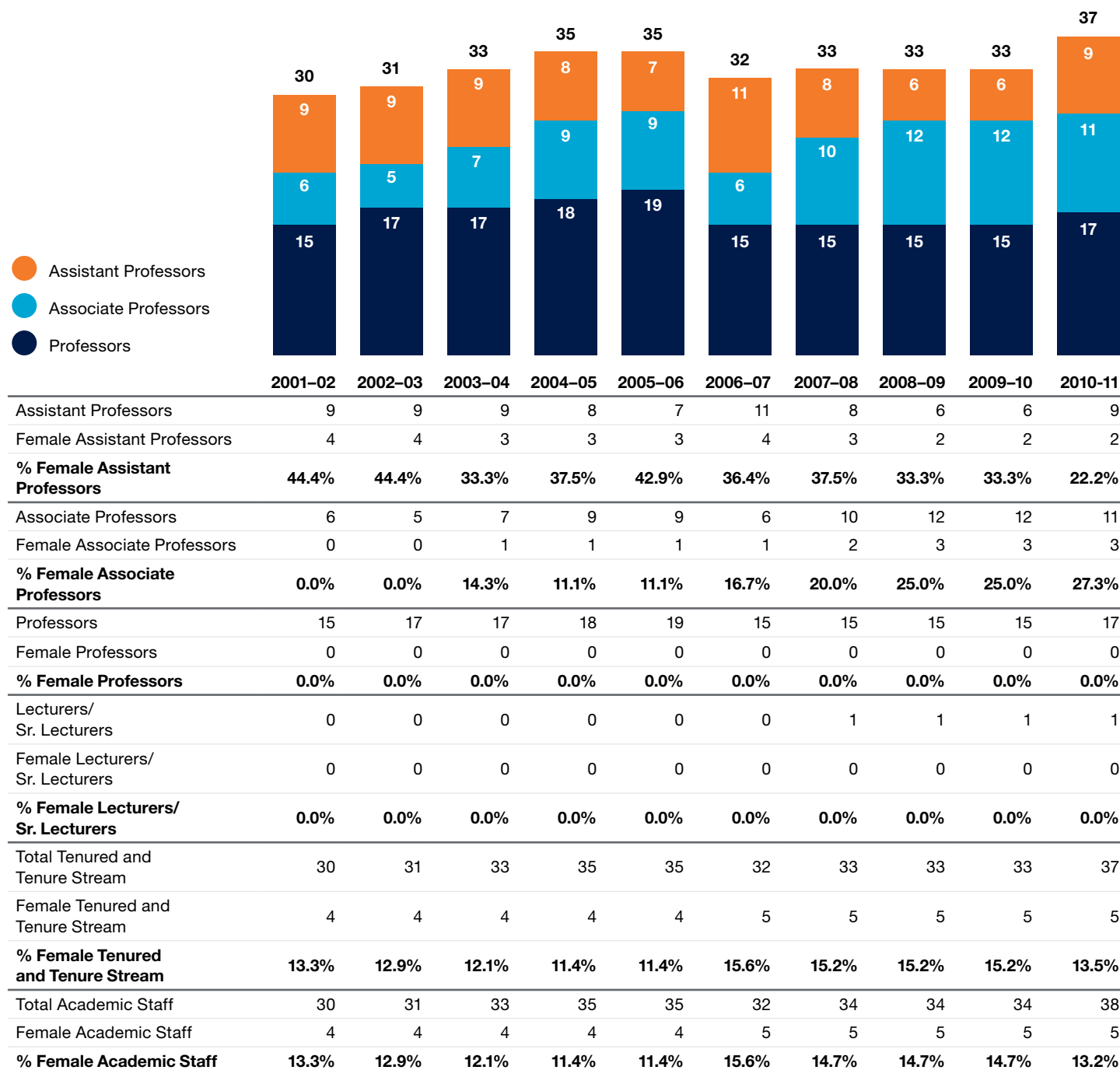
**Note F.3:** Referenced in Chapter 10, Diversity.

**Figure F.4** Department of Chemical Engineering & Applied Chemistry:  
Academic Staff by Position with Percentage of Women, 2001–2002 to 2010–2011



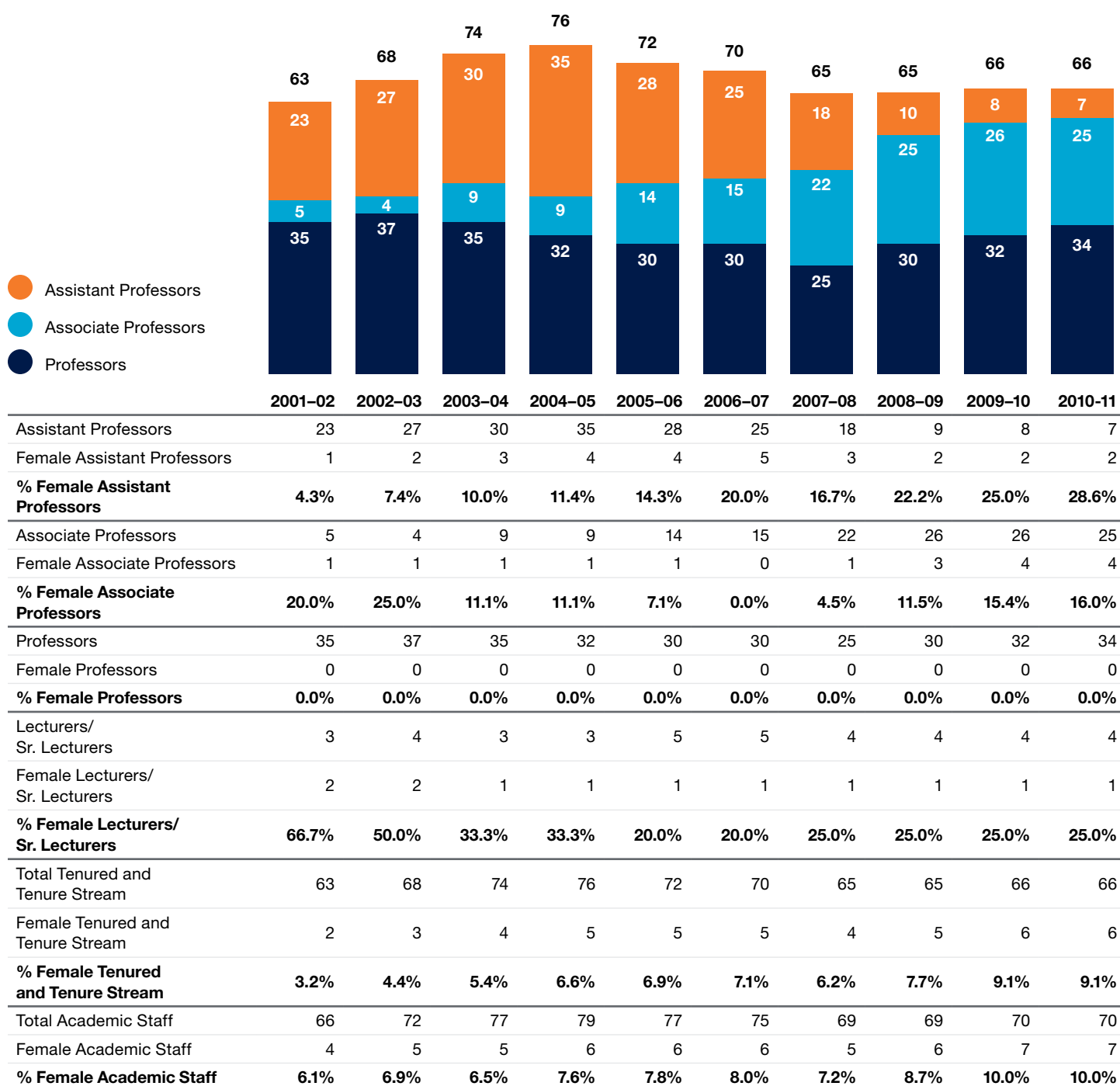
**Note F.4:** Referenced in Chapter 10, Diversity.

**Figure F.5** Department of Civil Engineering:  
Academic Staff by Position with Percentage of Women, 2001–2002 to 2010–2011



**Note F.5:** Referenced in Chapter 10, Diversity.

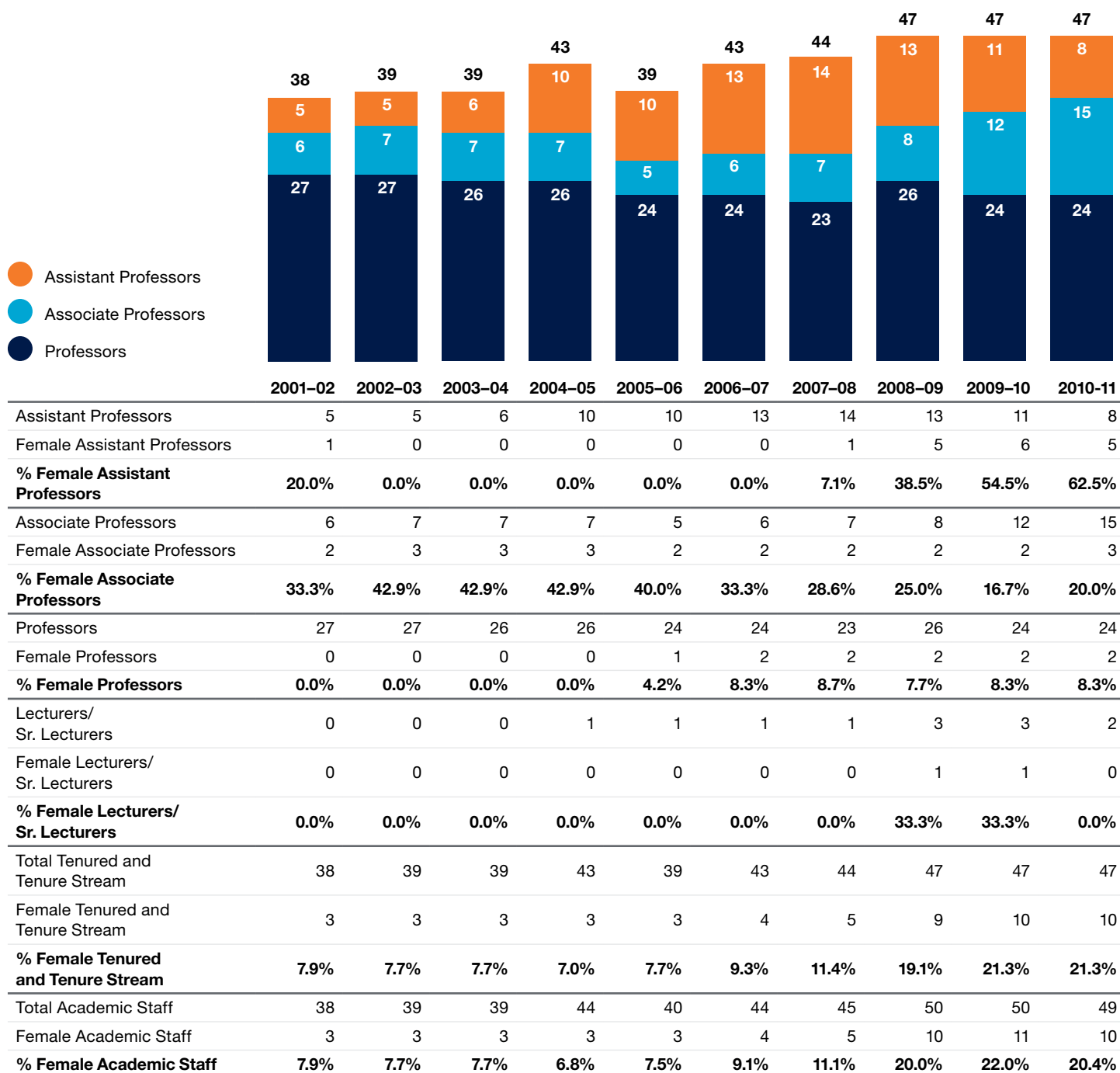
**Figure F.6** The Edward S. Rogers Sr. Department of Electrical & Computer Engineering: Academic Staff by Position with Percentage of Women, 2001–2002 to 2010–2011



**Note F.6:** Referenced in Chapter 10, Diversity.

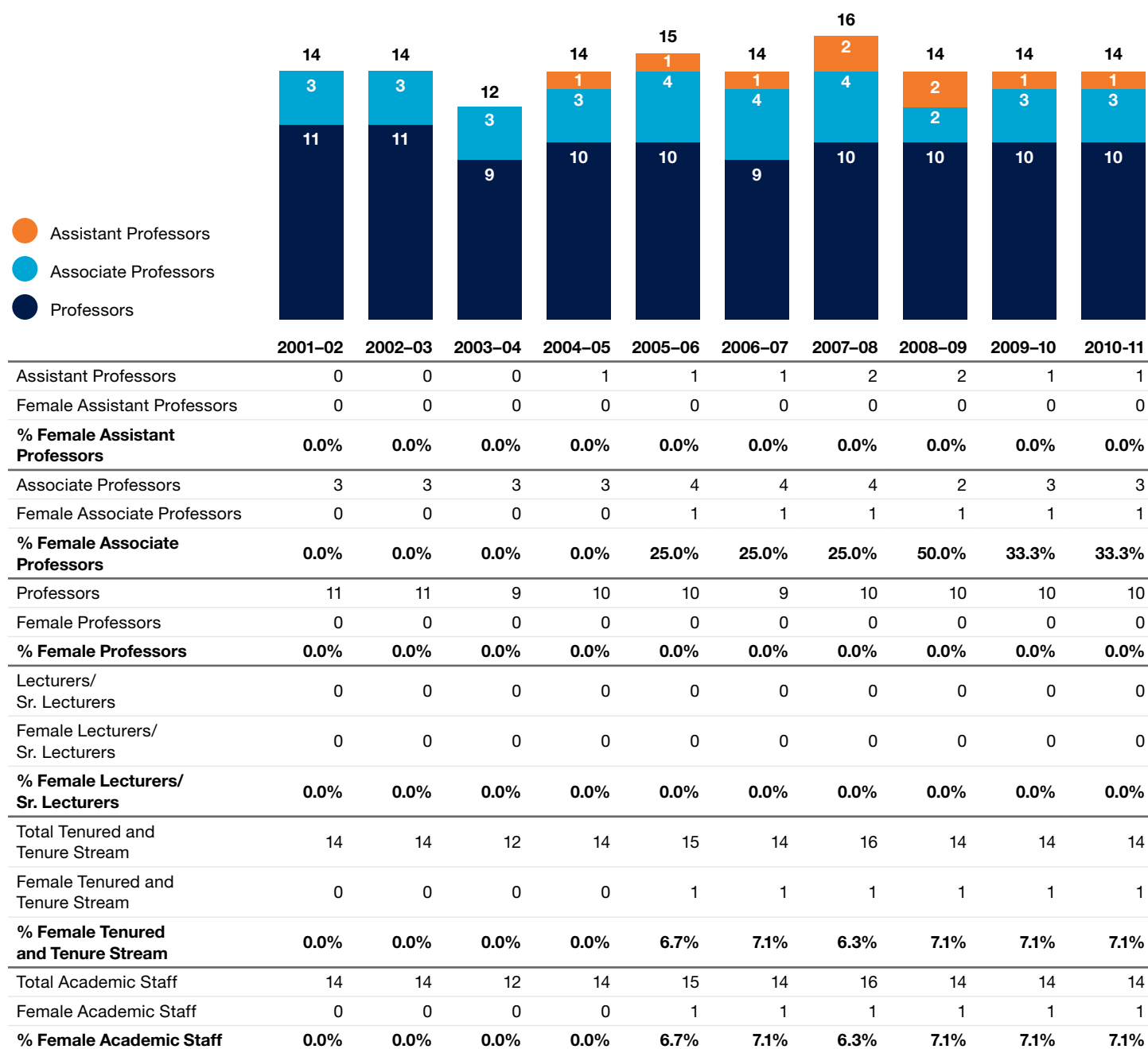


**Figure F.7** Department of Mechanical & Industrial Engineering:  
Academic Staff by Position with Percentage of Women, 2001–2002 to 2010–2011



**Note F.7:** Referenced in Chapter 10, Diversity.

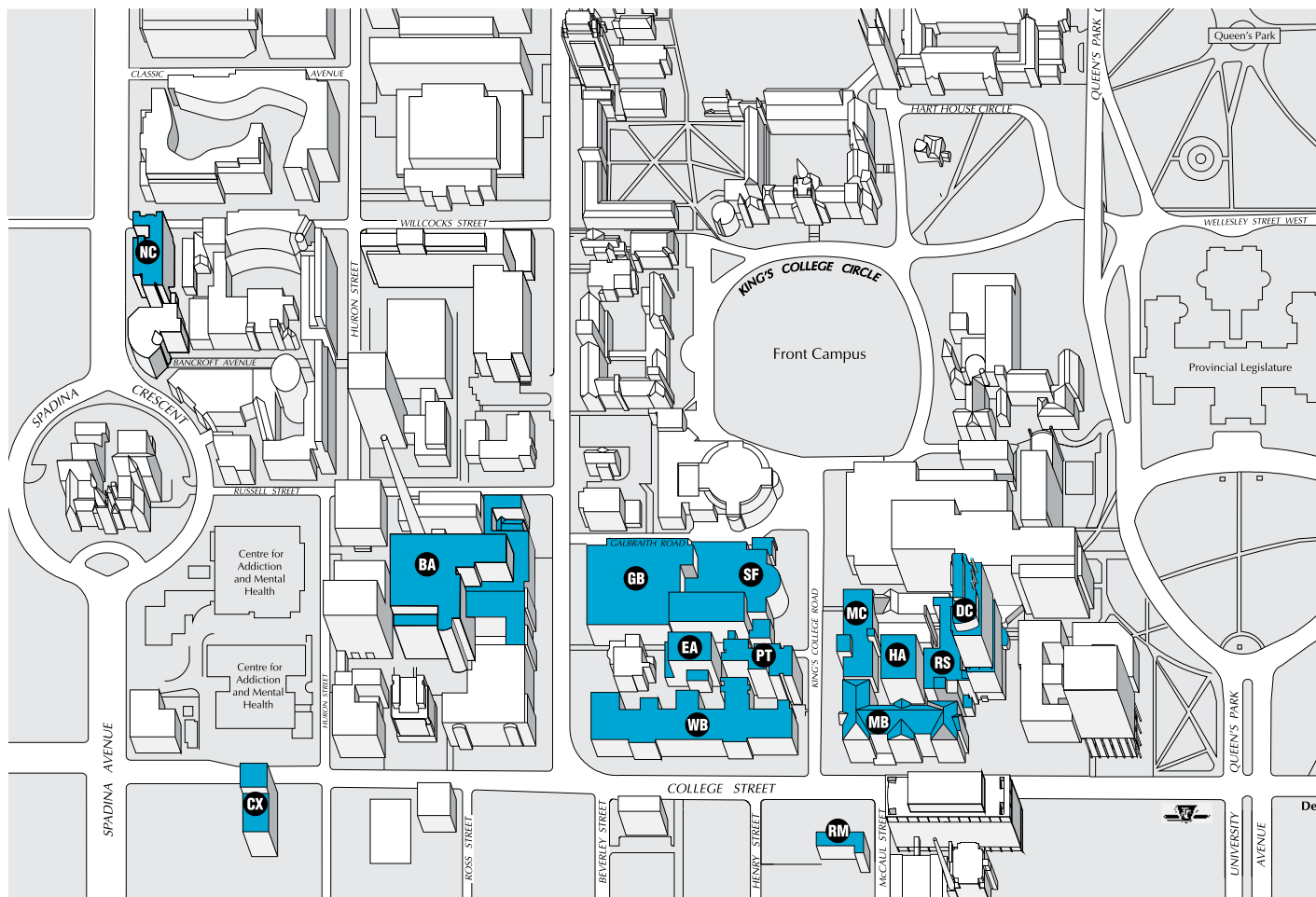
**Figure F.8** Department of Materials Science & Engineering:  
Academic Staff by Position with Percentage of Women, 2001–2002 to 2010–2011



**Note F.8:** Referenced in Chapter 10, Diversity.

## Appendix G: The Engineering Precinct

The map below highlights buildings on the St. George campus that form the Engineering Precinct. Most buildings within the Precinct 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 Figure 11.8 (page 84) in the Financial and Physical Resources chapter.



**BA** Bahen Centre for Information Technology

**GB** Galbraith Building

**WB** Wallberg Building

**EA** Engineering Annex / Electro-Metallurgy Lab Building (South Side)

**PT** D.L. Pratt Building

**SF** Sanford Fleming Building

**HA** Haultain Building

**DC** Donnelly Centre for Cellular and Biomolecular Research (CCBR)

**RS** Rosebrugh Building

**MB** Lassonde Mining Building

**MC** Mechanical Engineering Building

**NC** New College

**CX** 245 College Street

**RM** 256 McCaul Street

– UTIAS (Downsview)

**Note:** Referenced in Chapter 11, Financial and Physical Resources.

# Data Sources

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

Page	Figure	Data Source
3		<b>Faculty Leadership, 2010–2011</b> Information provided by Assistant Dean, Academic HR & Diversity, Faculty of Applied Science & Engineering. A current organizational chart is also available online at <a href="http://www.engineering.utoronto.ca/Assets/AppSci+Digital+Assets/pdf/2011+Faculty+Organizational+Chart.pdf">www.engineering.utoronto.ca/Assets/AppSci+Digital+Assets/pdf/2011+Faculty+Organizational+Chart.pdf</a>
4		<b>Comparison of U of T Engineering with Ontario and Canada, 2010–2011</b> Enrolment, degrees granted and faculty data comes from Engineers Canada for the National Council of Deans of Engineering and Applied Science (NCDEAS) 2010 Resources Report, based on the 2010 calendar year. 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 ( <a href="http://www.outil.ost.uqam.ca/CRSNG/Outil.aspx">www.outil.ost.uqam.ca/CRSNG/Outil.aspx</a> ) and includes grants only for the 2010–2011 NSERC fiscal year (April to March). 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 2010–2011 grant year (April to March).
5		<b>Comparison of U of T Engineering with St. George Campus and University of Toronto, 2010–2011</b> All student enrolment statistics are based on headcount for the fall of 2010 from the Undergraduate or Graduate U of T 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 2010 to June 2011 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 grant year and excludes partner hospitals; includes all program types; data current as of August 2011). 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 2010 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 2010. Engineering total revenue provided by Chief Administrative 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, November 2010. U of T and St. George space statistics from U of T Facts and Figures 2010, which is available online at: <a href="http://www.utoronto.ca/about-uoft/quickfacts/factsandfigures/Facts_Figures_2010.htm">www.utoronto.ca/about-uoft/quickfacts/factsandfigures/Facts_Figures_2010.htm</a>

## Chapter 1: Undergraduate Studies

8	1.1	<b>Applications, Offers, Registrations, Selectivity and Yield of First-Year Undergraduates, Fall 2001 to Fall 2010</b> 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 = APSC, New Students Only (based on candidacy session). Cube Parameters: All Fall Terms for 2001–2010, Year 1 (SESLEV), First Time Registered (LEVSTAT), Measure = Headcount.
8	1.2	<b>Ontario Secondary School Averages of Incoming First-Year Undergraduates and Retention Rate Between First and Second Year with Minimum Cut-Off, Fall 2001 to Fall 2010</b> Averages of incoming first-year students and minimum cut-offs calculated using data from Ontario Universities' Application Centre. Retention rates based on Undergraduate Enrolment Projections documents, published by the U of T Planning and Budget Office, October 2010 and January 2011.

9	1.3	<b>Incoming First-Year Undergraduates with Percentage of Women and International Students, Fall 2001 to Fall 2010</b> Headcount from U of T Undergraduate Enrolment Cube. Excludes students with special status. Cube Parameters: All Fall Terms for 2001–2010, First Time Registered (LEVSTAT), Measure = Headcount, [Gender] and [DOM_INTL] parameters used to calculate percentages of women and international students, respectively.
10	1.4	<b>Incoming First-Year Domestic and International Undergraduates, Fall 2005 to Fall 2010</b> 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 2005–2010, Degree Type = Undergraduate, Excludes students with special status.
10	1.5	<b>International and Domestic Undergraduates, Fall 2001 to Fall 2010</b> Headcount from University of Toronto Enrolment Master Files, the source of U of T Reporting Cube. Excludes students with special status. Cube Parameters: Fall Terms for 2001–2010, Degree Type = Undergraduate, Excludes students with special status.
11	1.6	<b>Undergraduates by Academic Area, Year of Study and PEY, Fall 2010</b> 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 2010, by Department, Degree Type = Undergraduate.
12	1.7	<b>Undergraduates by Academic Area, Fall 2001 to Fall 2010</b> 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 2001–2010, Years 1–4 (SESLEV), Degree Type = Undergraduate, Measure = Headcount, Departments based on [Programs] field.
13	1.8a	<b>Number of Awards Received by Cohort with Total Number of Undergraduate Award Recipients, 2001–2002 to 2010–2011</b> Data provided by Information Analyst, Admissions Information, Office of the Faculty Registrar, Faculty of Applied Science & Engineering
13	1.8b	<b>Total Value of Undergraduate Financial Assistance and Percentage Distributed by Year of Study, 2001–2002 to 2010–2011</b> Data provided by Information Analyst, Admissions Information, Office of the Faculty Registrar, Faculty of Applied Science & Engineering
14	1.9a	<b>Undergraduate Degrees Awarded by Academic Area, 2001–2002 to 2010–2011</b> Data for years up to 2008–2009 acquired from U of T Degrees Awarded Reporting Cube. Data for 2009–2010 and 2010–2011 (September to August) derived from ROSI. Cube Parameters: Undergraduate, Academic Years 2000–2009. ROSI Download: 5EA (Graduated Students), Faculty = APSC.
14	1.9b	<b>U of T Engineering Degrees Awarded by Academic Area Compared with Canadian and North American Degree Totals, 2009</b> U of T and Canadian statistics are from 2009 Engineers Canada Report of Enrolment & Degrees Granted (Canadian Engineers for Tomorrow, 2005–2009): <a href="http://www.engineerscanada.ca/files/w_report_enrolment_eng.pdf">www.engineerscanada.ca/files/w_report_enrolment_eng.pdf</a> . American statistics used to calculate North American percentages are from the 2009 American Society of Engineering Educators (ASEE) Report: <a href="http://www.asee.org/papers-and-publications/publications/college-profiles">www.asee.org/papers-and-publications/publications/college-profiles</a>
15	1.10a	<b>Undergraduate and Graduate Full-Time Equivalent Student-Faculty Ratios, 2001–2002 to 2010–2011</b> 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 2001–2010, Degree Type = Undergraduate, Measure = Headcount. To exclude PEY: for 2001–2004 = FT only; for 2005+ AssocOrg = blank. Number of FTE graduate students from U of T Graduate Enrolment Reporting Cube. Cube Parameters: Fall terms 2001–2010, 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).

15	1.10b	<b>Undergraduate Student-Faculty Ratios by Academic Area, 2010–2011</b> Number of undergraduates from U of T Undergraduate Enrolment Reporting Cube. Excludes students on PEY internship and students with special status. Cube Parameters: Fall 2010, Degree Type = Undergraduate, AssocOrg = blank (to exclude PEYs), Measure = Headcount. Faculty Total does not include teaching done for Engineering by extra-divisional units (esp. Arts & Science departments). Results are not adjusted for departmental contributions to shared first-year curriculum, Engineering Science or Cross-Faculty Minors. FTE faculty counts are derived from 2011–2012 (FY12) budget calculations, based on data from 2010–2011. Calculation includes tenured/tenure-stream and lecturers/teaching stream faculty.
16	1.11	<b>Undergraduate Course Teaching Evaluations by Academic Area, 2005–2006 to 2010–2011</b> Course evaluation average scores are based on data obtained from the Office of the Registrar, Faculty of Applied Science & Engineering, which administers the evaluations.
16	1.12	<b>Undergraduate Participation in Summer Research Opportunities, Summer 2011</b> 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.
17	1.13a	<b>PEY Internship Placements for Engineering Undergraduates with Percentage Participation from Previous Third-Year Class, 2004–2005 to 2010–2011</b> Statistics provided by Assistant Director, Engineering Career Centre, Faculty of Applied Science & Engineering.
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18	Text	<b>Pre-University Engineering Outreach</b> Information and statistics provided by Associate Director, Engineering Student Outreach Office, Faculty of Applied Science & Engineering.
19	Text	<b>Student Clubs and Teams</b> Information from the Engineering Society: <a href="http://www.skule.ca">www.skule.ca</a>

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24	2.2c	<b>Graduate Student Enrolment by Full-Time Equivalent (FTE) and Headcount (HC) by Academic Area, 2001–2002 to 2010–2011</b> 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 2001–2010, FTEs are counted by academic year as reported in the cube (May to April).

24	2.3	<b>Full-Time Equivalent (FTE) Graduate Student-Faculty Ratios by Academic Area and Degree Type, 2010–2011</b> Number of FTE graduate students from U of T Graduate Enrolment Reporting Cube. Cube Parameters: Fall 2010, 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).
25	2.4a	<b>External Graduate Student Scholarships by Source, 2001–2002 to 2009–2010</b> All data from U of T Graduate Student Income Reporting Cube, current as of September 2010 (includes complete 2009–2010 academic year). Faculty = APSC, Award Income only.
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26	2.5a	<b>Graduate Student Funding by Category, Fiscal Years 2002 to 2011</b> All data from U of T Graduate Student Income Reporting Cube, current as of May 2011. Reported by fiscal year (May to April). Faculty = APSC. Includes funding from all sources except work-study employment income.
26	2.5b	<b>Graduate Student Funding by Category and Academic Area, 2011 Fiscal Year</b> All data from U of T Graduate Student Income Reporting Cube, current as of May 2011. Reported by fiscal year (May to April). Faculty = APSC. Includes funding from all sources except work-study employment income.
27	2.6	<b>Number of Students Fast-Tracker from MASc to PhD, by Academic Area, 2006–2007 to 2009–2010</b> Information provided Vice-Dean Graduate Studies, Faculty of Applied Science & Engineering.
27	2.7	<b>Time-to-Graduation for PhD, MASc, MEng &amp; MHSc Graduate Students, 2001–2002 to 2010–2011</b> All data from ROSI 5EA downloads (Graduated Students). Faculty = SGS, Co- Secondary Org = APSC. Time-to-Graduation is defined as the time between a student's first enrolment (candidacy session) and the date of convocation.
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28	Text	<b>Certificates and Programs for Graduate Students</b> Information provided by Vice-Dean Graduate Studies, Faculty of Applied Science & Engineering.
29	2.9	<b>ELITE Certificates Awarded, 2008–2009 to 2010–2011</b> Information provided by Faculty Graduate Coordinator, Vice-Dean Graduate Studies Office, Faculty of Applied Science & Engineering.
29	2.10	<b>MEng/SCFI Program Enrolment, Fall 2008 to Winter 2011</b> Information provided by Graduate Program Administrator, Department of Mechanical & Industrial Engineering.

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31	3.1a	<b>Research Funding by Year and Source, and Funding Per Faculty Member, 2002 to 2011</b> Data from the U of T Research Cube. Current as of August 2011. Organized by grant year (e.g., Grant Year 2011 = April 2010 to March 2011). 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.
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32	3.1b	<b>Infrastructure Funding as a Proportion of Total Research Funding, 2002 to 2011</b> Data from the U of T Research Cube. Current as of August 2011. Organized by grant year. Faculty = Applied Science & Engineering. Infrastructure funding includes the Canada Foundation for Innovation (CFI), the Ontario Research Fund (ORF) and the NSERC Research Tools and Instruments (RTI) Program.
32	3.1c	<b>Canadian Institutes of Health Research (CIHR) and Natural Sciences and Engineering Research Council (NSERC) Funding by Year and Source, 2002 to 2011</b> Data from the U of T Research Cube. Current as of August 2011. Organized by grant year. Faculty = Applied Science & Engineering.
33	3.2a	<b>Natural Sciences and Engineering Research Council (NSERC) Funding, 2011</b> Data from the U of T Research Cube. Current as of August, 2011. Organized by grant year (e.g., Grant Year 2011 = April 2010 to March 2011). Faculty = Applied Science & Engineering.
34	3.2b	<b>Industrial Partners, 2010–2011</b> Information provided by Vice-Dean Research, Faculty of Applied Science & Engineering.
35	3.3a	<b>Canadian Peer Universities and University of Toronto Share of NSERC Funding for Engineering, Cumulative Five-Year Share, 2007 to 2011</b> All data from NSERC Award Search Engine: <a href="http://www.outil.ost.uqam.ca/CRSNG/Outil.aspx?Langue=Anglais">www.outil.ost.uqam.ca/CRSNG/Outil.aspx?Langue=Anglais</a> . Grants only (no scholarships). Organized by grant year. Does not include Canada Research Chairs, Networks of Excellence or Indirect Costs of Research.
35	3.3b	<b>U of T Annual Share of NSERC Funding in Engineering, 2002 to 2011</b> All data from NSERC Award Search Engine: <a href="http://www.outil.ost.uqam.ca/CRSNG/Outil.aspx?Langue=Anglais">www.outil.ost.uqam.ca/CRSNG/Outil.aspx?Langue=Anglais</a> . Grants only (no scholarships). Organized by grant year. Does not include Canada Research Chairs, Networks of Excellence or Indirect Costs of Research.
35	3.4	<b>Engineering Invention Disclosures by Academic Area, 2007 to 2011</b> Information provided by Data Management & Web Content Coordinator, Innovations & Partnerships Office.
36	3.5	<b>Distribution of Research Funding by Academic Area, 2002 to 2011</b> Data from the U of T Research Cube. Current as of August 2011. Organized by grant year. Faculty = Applied Science & Engineering.
37	Text	<b>Major Group Research Initiatives in 2010–2011</b> Information provided by Vice-Dean Research, Faculty of Applied Science & Engineering.

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40	Text	<b>New Engineering Science Major: Engineering Mathematics, Statistics &amp; Finance</b> Information provided by Chair, Engineering Science, Faculty of Applied Science & Engineering
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44	5.1	<b>Summary of Major International, National and Provincial Awards and Honours, 2001 to 2010</b> Information provided by Director, Awards and Honours, Faculty of Applied Science & Engineering.
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45	5.2b	<b>Percentages of Engineering Faculty and Total Major Awards Received in Canadian Engineering Faculties</b> Information provided by Director, Awards and Honours, Faculty of Applied Science & Engineering.
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47	Text	<b>University of Toronto Engineering Faculty Awards, 2001 to 2011</b> Information provided by Director, Awards and Honours, Faculty of Applied Science & Engineering.
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48	Text	<b>Engineering Alumni Association Awards, 2010</b> Information provided by the Office of Advancement and Alumni Relations, Faculty of Applied Science & Engineering.

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51	6.2a	<b>QS World University Rankings and U.S. News &amp; World Report World's Best Colleges and Universities, Top 50 Universities for Engineering and Information Technology, 2010</b> For more information, please visit: <a href="http://www.topuniversities.com/university-rankings/world-university-rankings/2010/subject-rankings/technology">www.topuniversities.com/university-rankings/world-university-rankings/2010/subject-rankings/technology</a> and <a href="http://www.usnews.com/education/worlds-best-universities/articles/2010/09/21/worlds-best-universities-engineering-and-it-">www.usnews.com/education/worlds-best-universities/articles/2010/09/21/worlds-best-universities-engineering-and-it-</a>
51	6.2b	<b>Canadian G13 in Top 100 from QS World University Rankings for Engineering and Information Technology</b> For more information, please visit: <a href="http://www.topuniversities.com/university-rankings/world-university-rankings/2010/subject-rankings/technology">www.topuniversities.com/university-rankings/world-university-rankings/2010/subject-rankings/technology</a> and <a href="http://www.usnews.com/education/worlds-best-universities/articles/2010/09/21/worlds-best-universities-engineering-and-it-">www.usnews.com/education/worlds-best-universities/articles/2010/09/21/worlds-best-universities-engineering-and-it-</a>
52	6.2c	<b>Canadian Universities in QS World Ranking by Discipline for Engineering and Information Technology, 2011</b> For more information, please visit: <a href="http://www.topuniversities.com/university-rankings/world-university-rankings/2011/subject-rankings/engineering">www.topuniversities.com/university-rankings/world-university-rankings/2011/subject-rankings/engineering</a>
53	6.3a	<b>Shanghai Jiao Tong Academic Ranking of World Universities (ARWU), Top 50 Universities for Engineering/Technology and Computer Sciences, 2010</b> For more information, please visit: <a href="http://www.arwu.org/FieldENG2010.jsp">www.arwu.org/FieldENG2010.jsp</a>

54	6.3b	<b>Canadian Universities in Top 100 from ARWU for Engineering/Technology and Computer Sciences, 2010</b> For more information, please visit: <a href="http://www.arwu.org/FieldENG2010.jsp">www.arwu.org/FieldENG2010.jsp</a>
54	6.3c	<b>Scoring Analysis of Canadian Universities in Top 100 from ARWU for Engineering/Technology and Computer Sciences, 2010</b> For more information, please visit: <a href="http://www.arwu.org/FieldENG2010.jsp">www.arwu.org/FieldENG2010.jsp</a>
55	6.4a	<b>Higher Education Evaluation &amp; Accreditation Council of Taiwan (HEEACT) Performance Ranking of Engineering Papers for World Universities, 2010</b> HEEACT 2010 by Field Performance Ranking of Scientific Papers for World Universities. Data compiled from Thomson Reuters' science citation indexes. For more information, please visit: <a href="http://ranking.heeact.edu.tw/en-us/2010%20by%20Field/Domain/ENG/TOP/100">ranking.heeact.edu.tw/en-us/2010 by Field/Domain/ENG/TOP/100</a>
55	6.4b	<b>Canadian Universities in HEEACT Performance Ranking by Discipline, 2010</b> HEEACT 2010 by Subject Performance Ranking of Scientific Papers for World Universities. Data compiled from Thomson Reuters' science citation indexes. For more information, please visit: <a href="http://ranking.heeact.edu.tw/en-us/2010%20by%20Subject/Page/Methodology">ranking.heeact.edu.tw/en-us/2010 by Subject/Page/Methodology</a>
56	6.5a	<b>Number of Engineering Publications Indexed by Thomson Reuters Association of American Universities (AAU) Public and Canadian Institutions, 2005 to 2009</b> Thomson Reuters U.S. and Canadian University Indicators 2009. Analysis limited to 2005 to 2009 and to public institutions only.
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57	6.6a	<b>Number of Engineering Citations Indexed by Thomson Reuters Association of American Universities (AAU) Public and Canadian Peer Institutions, 2005 to 2009</b> Thomson Reuters U.S. and Canadian University Indicators 2009. Analysis limited to 2005 to 2009 and to public institutions only.
57	6.6b	<b>Summary of G13 Bibliometrics for Citations</b> Analysis limited to 2005 to 2009 and to public institutions only. Faculty counts for analysis of G13 citations per faculty member are from the Engineers Canada 2009 Resources Report.
58	6.7a	<b>Summary of U of T Engineering Performance in World Rankings, 2007 to 2010</b> Summary compiled from websites noted above for the various international university rankings.
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60	7.1b	<b>Gift Designation, 2011</b> Statistics provided by Executive Director, Advancement, Faculty of Applied Science & Engineering.
61	Text	<b>Initiatives and Projects for 2010–2011</b> Information provided by Executive Director, Advancement, Faculty of Applied Science & Engineering.

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62	7.2	<b>Active Alumni by Academic Area, 2010–2011</b> Statistics provided by Executive Director, Advancement, Faculty of Applied Science & Engineering.
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64	Text	<b>Gift Highlights for the 2011 Fiscal Year</b> Information provided by Executive Director, Advancement, Faculty of Applied Science & Engineering.
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65	7.5	<b>Endowments, 2001 to 2011</b> Statistics provided by Executive Director, Advancement, Faculty of Applied Science & Engineering.
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67	8.1	<b>Media Coverage of U of T Engineering News, 2010–2011</b> Statistics provided by University of Toronto Strategic Communications. Data represents information collected between August 2010 and July 2011.
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69	8.2	<b>Visitors to U of T Engineering Website: Top 10 Countries, 2010–2011</b> Website statistics sourced from Google Analytics.
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71	Text	<b>Centre for Global Engineering</b> Information provided by Director, CGEN, Faculty of Applied Science & Engineering.
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75	10.1a	<b>Continent of Origin: Undergraduate and Graduate Students, Fall 2010</b> Cultural heritage based on headcount from University of Toronto Enrolment Reporting Cube. Field = Continent/Country of Citizenship (CUNCIT).
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76	10.1b	<b>Graduate and Undergraduate Proportion of International Students, 2001 to 2011</b> Headcount for 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 2001–2010, Measure = Headcount, DOM_INTL = International.
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76	10.2	<b>Percentage of Women First-Year Students, Undergraduate Students, Graduate Students and Faculty in Engineering, 2001–2002 to 2010–2011</b> Graduate, undergraduate and first-year headcount from U of T Enrolment Reporting Cube. Enrolment data exclude students with special status. Number of faculty provided by Assistant Dean, HR & Diversity, Faculty of Applied Science & Engineering.
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