



UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING

Academic Plan 2011-2016

Year Two: Progress and Achievements

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1. Executive Summary

We have now completed the second year of operations under the guidance of our Academic Plan 2011–2016, and in keeping with our commitment to measure our progress towards our stated goals and objectives, we are pleased to present our Year Two progress report.

Our Plan is a vibrant, living document that interconnects the diverse activities and accomplishments of our collective community to our objectives and goals, guiding us through our active processes and helping us to visualize and bring these objectives to fruition.

As with our Year One progress report, we sequentially address the seven key themes that form the central goals of the Academic Plan:

1. Culture of Excellence
2. Positioning
3. Educating Future Engineers
4. Student Experience
5. Research Foci
6. Outreach, Collaboration and Influence
7. Resource Allocation

The following provides a brief overview of our activities, progress and achievements in each of these thematic areas during Year Two of the Academic Plan.

Culture of Excellence

Our objectives to maintain and strengthen our high quality of education, research and administrative processes through continuous review and refinement helps us to identify and build upon our strengths, and ensures that we proactively strive to accelerate our standard of excellence.

U of T Engineering's international reputation influences our ability to attract diverse and talented students, scholars and educators and we continue to hold our strong standing in all major rankings. In 2012–2013, we are again placed as the preeminent engineering school in Canada by all international rankings, and in 2013 placed at number 12 on the Shanghai Jiao Tong Academic Ranking of World Universities (ARWU).

Our Governance portfolio has been quite active this year. We completed the Canadian Engineering Accreditation Board (CEAB) accreditation review of all nine of our undergraduate programs in October 2012, which resulted in five programs receiving maximum accreditation until 2019 and four receiving accreditation to 2016 with possible three-year extensions. Three divisions underwent external reviews, and the Department of Mechanical & Industrial

Engineering and the Faculty's Engineering Communication Program will both be externally reviewed in November 2013.

We continue to progress toward our objectives for diversity. Our International enrolments have increased in both undergraduate and graduate programs to 21.2 per cent and 22.5 per cent, respectively; and our female undergraduate population now comprises over 25 per cent of our first-year class. The ratio is similar among our graduate population, with women comprising 26.2 per cent of the graduate student body.

Our first-year retention rate reached a 10-year high this year, currently resting at 0.937, and we experienced a 23-per-cent increase in participation in summer research in 2013, with an overall increase of approximately 9 per cent in PEY internships over last year.

To increase awareness and encourage greater participation in the wide range of enriching international exchange opportunities available to U of T Engineering students, we mounted several special initiatives throughout the academic year, including an online video entitled *An Exchange Would Do You Good*. Another event featured a panel discussion comprised of experts on international student exchanges and past exchange participants. These efforts garnered significant results, which translated into a 68-per-cent increase in applications for international summer exchange programs.

The Faculty expanded our awards nominations to ensure that our pre-tenure professors receive appropriate recognition for their achievements, which resulted in several of our professors receiving a significant number of the major awards available to early-career engineers. Many of these were won by our women faculty, who represent 17 per cent of the total number of award recipients. We presented our two new faculty awards, the Sustained Excellence in Teaching Award and the Research Leader Award, to the inaugural recipients in April 2013, and continue to receive recognition from within the University for the high calibre of our faculty and staff, with two of our professors being conferred with Distinguished Professorships and another receiving renewal for a second term.

We created formal Engineering Alumni Association Chapters in San Francisco, Hong Kong and South Korea, and established fundraising committees in Hong Kong, Indonesia, Singapore, South Korea and Taiwan.

The Faculty launched our component of "Boundless: The Campaign for the University of Toronto" in September 2012 and we are close to celebrating the \$100-million mark towards our goal of \$200 million. The planned Centre for Engineering Innovation & Entrepreneurship has become a core goal of the campaign and to date, over \$50 million has been dedicated towards the development of this important and much-needed facility.

Positioning

Through our increased collaboration and efforts to expand our outreach to the wider, global community, our Faculty is collectively defining itself as the educators, researchers and thought

leaders the world needs now, and over the past year we have made great strides to position U of T Engineering among the top ranked research and education institutions in the world.

We have created a strategic communications framework which lays out the themes, messages, audiences and tactics we will undertake as a Faculty to set ourselves in a distinctive position, developed a series of strong external publications, and are positioning ourselves to make the best use of the emerging technologies our audiences are embracing. We reimagined the *Discover Engineering* viewbook to create a hybrid online-print piece, and are proactively communicating with current students using our digital display system to broadcast timely messages on a variety of topics.

U of T Engineering has impressive stories to tell, stories about innovations that foster prosperity and global change, education that will reshape our economy, and research that opens new possibilities for industry and all Canadians. We will continue to use innovative methods to put our stories forward, and to further position our Faculty within the top tier ranks of research and education on domestic and international scales.

Educating Future Engineers & Student Experience

Our ongoing pursuit of engineering education excellence and commitment to support our students' active engagement in the Faculty and the University all serve to enhance their development as future global engineering leaders.

A significant activity of this past year has been the interpretation and implementation of the CEAB Graduate Attribute requirements. As a starting point to addressing this objective, we expanded our efforts to assess the development of our students in our first-year programs by specifically measuring many of the attributes within the common core courses. To enhance our ability to properly assess these attributes, we created a software tool that automatically extracts the relevant data from marked assignment rubrics in the Engineering Strategies & Practice courses APS111 and APS112. This is the first element of a suite of automated assessment tools that will be developed to assist our analysis of the graduate attributes over the next few years.

We also developed new tools to aid our analysis of students' course workloads, starting with the core eight first-year program streams. Through the development of a meaningful set of data tables, instructors are able to identify periods within the term where the combined course work becomes unevenly balanced, thus placing disproportionate pressure on our students. As a result of this exercise, course work schedules are adjusted to avoid these overly stressful times in advance of the term start.

We organized an *Exam Jam* event to provide students with an opportunity to review their course material with their instructors, as well as have time to interact with their peers and relax. The event was extremely well received by students, and *Exam Jam* will now be instituted as a regular event before each examination period.

Much work has been done throughout 2012–2013 to further our objectives for curriculum renewal, inject innovative new directions into our curriculum, and enhance our student

experience. We have expanded our online course offerings to include two first-year courses, have developed inverted classroom courses, and are in production of our first massive open online course (MOOC), we have improved access to Arts & Science CS/HSS elective courses for 2013–2014 through securing priority access to over 700 seats in the most popular Arts & Science courses that our students take, and in December 2012 we instituted the Engineering Instructional Innovation Program (EIIP) to generate innovation in undergraduate course development, with five projects addressing a wide range of pedagogical objectives selected for funding.

In 2011–2012, we established the Institute for Multidisciplinary Design & Innovation (UT-IMDI), and this year we followed through with assembling the Engineering Design Education Group (EDEG) to enhance engineering design education across the engineering disciplines. We also rolled out the new cross-Faculty Multidisciplinary Capstone Design course, and completed renovations to the NSERC Design Chair Fabrication Studio, which students can access to build their capstone design project prototypes.

In addition, in order to help our graduates prepare for the emerging new economy, and to inspire and foster an environment of innovation and entrepreneurial spirit within our undergraduate community, we formally established The Entrepreneurship Hatchery. Through a mentorship partnering program, the Hatchery is helping students link their technical knowledge and engineering skills with meaningful test-bed opportunities, enabling them to apply their learning in real-time engineering settings. Now in its second year, the Hatchery summer 2013 mentorship program provided tools, resources and support to 18 teams of students (involving 44 students), and the Hatchery Advisory Committee helped to raise a total of 17 fellowships, providing support to 48 per cent of the students who applied for funding.

More than 14 per cent of our undergraduates are pursuing our interdisciplinary minor and certificate programs, while exciting new directions are being explored and cultivated through our Cross-Disciplinary Programs Offices. In particular, participation in the Engineering Business minor has grown by 40 per cent in the last year. And, this September, we rolled out two new certificate programs in Mineral Resources and Nuclear Engineering. We also launched the Combined Program in Environmental Science (BSc) and Master of Engineering (MEng) in partnership with UTSC, and are close to finalizing the parameters for a new undergraduate engineering pathway with UTM.

Our graduate enrolment continues to increase, resting at 1,933 in 2012–2013, and applications to all three graduate programs (PhD, MAsc, MEng/MHSc) within the 2013–2014 admissions cycle increased by more than 9 per cent over last year.

We have taken action to provide greater flexibility in graduate registration options by introducing the Flexible-time PhD option within the Mechanical & Industrial Engineering doctoral stream, and the Extended Full-Time registration option for all MEng students.

The Faculty enhanced its graduate programs through the introduction of the certificate program in Financial Engineering, the program emphasis in Advanced Water Technologies and Process Design, and the introduction of an entirely new MEng program, the Master of Engineering in

Cities Engineering and Management (MEngCEM). In September 2013, we also launched a program emphasis in Sustainable Aviation, and over this year have substantially expanded courses offerings associated with the ELITE certificate program.

In the coming year, we will continue our work to strengthen the initiatives and strategies that have been established during these first two years of our Academic Strategy, in order to achieve the highest level of academic excellence and experiential enrichment for our students.

Research Foci

U of T researchers in the Faculty of Applied Science & Engineering are at the leading edge of their fields internationally, and we have made significant progress in our goals to leverage our strengths, build a strong financial base to accommodate our research activities, develop multidisciplinary research programs, and enable our researchers to make significant impact through advancing engineering knowledge and innovation.

In 2013 the Faculty received four additional Tier-II equivalent CRCs as a direct result of growth in our Tri-Council share, and the Canada Foundation for Innovation (CFI) awarded three projects to our researchers, totalling over \$10-million, in 2012–2013. These CFI awards were matched by the Ontario Research Fund, and together with additional support from our industry partners, raised more than \$20-million in new infrastructure support for the Faculty. In addition, NSERC partnerships funding grew by 17 per cent, largely driven by a more than doubling in the Strategic Networks category, and in early 2013 the Faculty received two newly funded NSERC CREATE projects.

To expand and strengthen our external ties, and build upon our relationship with our industry partners, we created the position of Director of Government and Corporate Partnerships and, together with the Division of University Advancement, created the partner position of Director of Foundation and Corporate Partnerships.

The Faculty's Research Committee has continued working to raise awareness and identify leaders for opportunities to build NCEs, CECRs, Strategic Research Networks, and CREATEs, hosting campus events in support of interdisciplinary research, such as the Engineering Global Health symposium held in April. Also through the work of the Faculty Research Committee, we ensured that each unit implemented a peer review/mentorship program to support faculty striving to write compelling applications. This was complemented by a series of Discovery Grant, Discovery Accelerator and RTI panel sessions.

We sought to expand our outreach by communicating captivating stories about our research and its implications for society and the economy. In a new series titled *Research Impact Narratives*, we celebrate Engineering advances and their impact, and to further our goals to raise awareness and support our emerging research leaders, the Faculty established a new lunchtime panel series entitled *Best Practices in Research*.

Collaborative educational and research programs are a fundamental part of U of T Engineering, and we continue to expand our offerings. One key activity was to collaborate with the Faculty's

Working Group for Multidisciplinary Centres and Institutes to feature speakers who have led successful CREATE grants, Strategic Research Networks and Ontario Research Fund grants. We also worked to harmonize the administration of two key undergraduate research support programs, the NSERC USRA and the UTEA, and are now working with The Edward S. Rogers Sr. Department of Electrical & Computer Engineering to leverage its online graduate application system to facilitate the undergraduate summer research recruitment and application process.

Outreach, Collaboration & Influence

Throughout 2012–2013, we worked diligently on multiple fronts to extend our outreach, engage and grow our collaborative initiatives, and impart our contributions both to the profession and the global community.

In November 2012, we created the new position of Communications Coordinator, Alumni and Development, and since then we have devised a dynamic alumni e-communications strategy that is shaping the direction of our interactions with alumni, including our use of mobile-friendly platforms. We now publish our alumni e-newsletter on a regular quarterly basis, and are supplementing this with a new publication, *This (Season) at Skule*, an e-bulletin highlighting upcoming Faculty events. We established metrics for measuring alumni engagement, helping us to develop greater clarity in our understanding of their investment in our Faculty, and have adjusted our goals accordingly.

To further complement our undergraduate educational experience, over this past year we solidified a new exchange agreement with Peking University under the Global Educational Exchange (Globex) initiative, in which our students can earn a full course credit during a summer term at the host institution. We also welcomed 212 students through the Science Without Borders scholarship program in Summer 2013.

At the graduate level, in November 2012, we formalized an agreement with L'Istituto Universitario di Studi Superiori di Pavia (IUSS) to enhance and strengthen the academic and research collaborations between our two institutions by promoting joint placement PhDs and developing joint international research programs.

Resource Allocation

Our resource allocation and academic goals are inextricably linked, and ensuring that adequate resources are available allows us to focus on other key areas of our Academic Plan. To this end, over the summer, we carried through on our initiative to implement a Human Resources office specifically dedicated to providing the strategic and operational support required by our Faculty. We also ensured that a workload policy committee was established in each academic unit, and policies developed to formulate guidelines that will ensure balance and integration between teaching, research and service.

The Faculty remained in a strong financial position in 2012–2013, realizing a 7-per-cent increase to our revenue base. This is largely due to rising enrolments, along with increases in research funding to support graduate students, but also as a result of the new budget allocation

model we introduced in 2011. In April, the Faculty struck a task force to review our budget model, with a view to identifying areas that may benefit from adjustment or refinement, and we will consider recommendations for implementation within the 2014–2015 fiscal period.

We embarked on a three-phase review of our facilities and space utilization, with the goal of identifying opportunities for maximization and sharing of our physical resources. The three phases of this review included student space, meeting and conference rooms, and teaching laboratory facilities. We completed the second stage in 2012 and began the third stage of reviewing our laboratory facilities in September 2013.

Through the Dean's Strategic Fund (DSF), eight projects received financial support that will either seed the start-up of new interdisciplinary-based entities, support our objectives to enhance the student experience through innovations in undergraduate programs and student services, or bring improvement to administrative systems. To date, the Faculty has committed total potential funding of nearly \$8 million in support of our DSF initiatives.

This Executive Summary provides only a few highlights of our work and resulting accomplishments of Year Two of our Academic Plan for 2011 to 2016. The following report provides greater detail on these, and many other, achievements. We can take great pride in these achievements, and use what we have learned to catalyze us with renewed energy to continue on our collective mission to provide the highest quality and most innovative educational and university experience to our students. Through our research we will continue to uncover, discover and create global impacting solutions to world problems, and we will further our objective to advance the Faculty of Applied Science & Engineering at the University of Toronto as a leader among the world's very best Schools of Engineering in its discovery, creation and transfer of knowledge and technology through our teaching and research.

2. Culture of Excellence

Excellence is defined as being outstanding in its class and of the highest quality. It is our commitment to this standard that propels us in our unwavering pursuit to achieve excellence in all that we do. Through innovation, the continual review and refinement of our approach to teaching, research, administration and governance, engaging our alumni and industry partners, and in providing service to society-at-large, we also strengthen ourselves, both as a community and as individuals ascending towards our own best potential.

Our reputation of excellence influences our ability to attract diverse and talented students, scholars and educators, and we are encouraged by the progress that is being made in our objectives to increase diversity. We hired 14 excellent new faculty members, including four women, in 2012–2013, raising our percentage of tenured and tenure-stream women from 15.1 per cent to 16.4 per cent. Although this is the highest we have had in the history of the Faculty, we need to continue to strategically recruit, and strive to improve our progress toward our objectives for faculty diversity.

Our engagement efforts in this area continue to bear fruit with our female undergraduates who comprise over 25 per cent of our first-year class. Our annual Girls' Leadership in Engineering Experience (GLEE) event, held in May 2013, was highly successful once again this year, with 71 of the 74 attendees accepting our offer to join U of T Engineering.

Concurrently, we continued to increase our profile internationally with overall international student applications up by 11 per cent, and our international enrolments increasing in both undergraduate and graduate programs to 21.2 per cent and 22.5 per cent, respectively.

The Science Without Borders (SWB) Program, which began in February 2012, has substantially enriched our environment, and will be offered once again in the 2013–2014 academic year with the new cohort of students having arrived in July. The objective of this program is to send talented Brazilian undergraduates in the Science/Engineering disciplines to top-ranked universities around the world for one year during their undergraduate studies. There were 192 SWB undergraduates at the University of Toronto in 2012–2013, of which 123 were enrolled in the Faculty of Applied Science & Engineering. In 2013–2014, the number of SWB students confirmed to participate in our Faculty has nearly doubled, reaching 212 new participants as of September 2013. This program allows us to continue to explore educational synergies and mutual research interests while expanding our recruitment in South America. We expect that some of these students will return to U of T Engineering for graduate studies.

Despite intense and increased competition at the international level, we continue to hold our strong standing in all major rankings. In 2012–2013, we again placed as the preeminent engineering school in Canada by all major rankings.

In the 2013 Shanghai Jiao Tong Academic Ranking of World Universities (ARWU), we moved up nine positions in two years to 12th worldwide. Further, the 2012 Times Higher Education

(THE)-Thomson Reuters World University Rankings placed our Faculty at 22nd globally, 15th in North America and first in Canada in the Engineering and Information Technology category. We are the only Canadian institution among the top 25 institutions worldwide, and one of two Canadian institutions in the top 25 within North America.

We take pride in knowing that our students are both acknowledging, and responding to, the many ways in which we have sought to enhance and improve their educational experience. This year, our first-year retention rate reached a 10-year high, currently resting at 0.937, and student participation in international exchanges, summer research opportunities and PEY placements have all escalated. We experienced a 23-per-cent increase in participation in summer research in 2013 (up from 291 in 2012 to 359 in 2013), an overall increase of approximately 9 per cent in PEY internships, and a 38-per-cent increase in availability of international PEY placements over the 2011–2012 numbers.

Our track record with respect to recognizing excellence within our community is also improving. In recent years we expanded our awards nominations to ensure that our pre-tenure professors receive appropriate recognition for their achievements. The result of this effort was especially apparent this past year with several of our professors garnering many of the major awards available to early-career engineers. These include the Engineers Canada Young Engineer Achievement Award, Steacie Prize and U of T's McLean Award. Additionally, one of our young professors was named one of the "Top 35 Innovators Under 35" by *MIT's Technology Review*. We are especially proud that many of these awards were won by women faculty, who represent 17 per cent of our total award recipients. We view this as an emerging trend.

Our senior faculty members also continued to receive national and international engineering honours. Three professors were inducted into the Royal Society of Canada, three were elected Fellows of the American Association for the Advancement of Science, six professors became Fellows of the Canadian Academy of Engineering, and three were elected as Engineering Institute of Canada Fellows. Other notable awards received by faculty over the past academic year include the Ontario Professional Engineers Gold Medal and induction into the Canadian Science and Engineering Hall of Fame.

We continue to receive recognition within the University for the calibre of our faculty and staff. Alberto Leon-Garcia was named Distinguished Professor in Application Platforms and Smart Infrastructure, Yu-Ling Cheng was named Distinguished Professor in Global Engineering and Javad Mostaghimi's Distinguished Professorship in Plasma Engineering was renewed for a second term. Fourteen staff members were also recognized for their achievements and contributions with Excellence Through Innovation Awards.

In April 2013, we held our sixth annual Celebrating Engineering Excellence event, where we presented two new faculty awards — the Sustained Excellence in Teaching Award and the Research Leader Award — as well as our staff and teaching awards and the triennial McCharles Prize.

Engaging our alumni in student activities and added-value program enhancements is not only beneficial to the intellectual and emotional health of our community, but is also crucial to the

ongoing professional development of our students. As such, it is incumbent upon us to build a robust outreach program and draw our alumni into Faculty activities to the greatest extent possible.

Since the inception of our Academic Plan, we have created formal Engineering Alumni Association Chapters in San Francisco, Hong Kong and South Korea, and have established fundraising committees in Hong Kong, Indonesia, Singapore, South Korea and Taiwan.

We launched the Faculty's component of "Boundless: The Campaign for the University of Toronto" in September 2012 and, as of the writing of this report, are close to celebrating the \$100-million mark towards our goal of raising \$200 million. The planned Centre for Engineering Innovation & Entrepreneurship is one of our main campaign themes, and fundraising for this project is proceeding well with proactive efforts now taking place across six countries.

The Faculty continued to strengthen our internal governance processes through reviewing our Faculty Constitution to bring our processes in line with the U of T Quality Assurance Process, and to better reflect our delegated authority to approve modifications to existing degree programs.

We completed the Canadian Engineering Accreditation Board (CEAB) review in October 2012. All nine undergraduate programs were evaluated in tandem, resulting in five programs receiving maximum accreditation until 2019 and four receiving accreditation to 2016 with possible three-year extensions. These extensions will be subject to submission of a report addressing the Faculty's efforts to respond to CEAB's specific recommendations.

Three divisions underwent external reviews since our last progress report. The Institute of Biomaterials & Biomedical Engineering (IBBME) was reviewed in November 2012, and The Edward S. Rogers Sr. Department of Electrical & Computer Engineering (ECE) and Department of Materials Science & Engineering (MSE) were reviewed in May 2013.

The Department of Mechanical & Industrial Engineering and the Faculty's Engineering Communication Program will both be externally reviewed in November 2013.

Continual review and refinement of our programs helps us to identify and build upon our strengths, and ensures that we proactively strive to accelerate our standard of excellence. In January 2013, we struck a Task Force to Review the First-Year Curriculum and we will receive their report in fall 2013.

Other governance matters accomplished this year include the introduction of a new Master of Engineering in Cities Engineering and Management (MEngCEM), a new graduate emphasis in Advanced Water Technology and Process Design, and the establishment of the Institute for Sustainable Energy as an EDU-C.

In the list below, we provide a recap of the goals set out in the Academic Plan 2011–2016 within the context of our objectives to foster a culture of excellence, with highlights of actions that have been taken to address them.

2. CULTURE OF EXCELLENCE: YEAR 2 PROGRESS HIGHLIGHTS

2.1 Maintain a strong Faculty vision for excellence in engineering education and research.

- Moved up 9 positions in 2 years on the ARWU international scale to 12th worldwide in 2013
- Placed 22nd globally, 15th in North America, and 1st in Canada on THE-Thomson Reuters World University Rankings

2.2 Measure our progress in achieving our mission and vision.

- Published 5th Annual Report of Performance Indicators, August 2013
- Published Academic Plan Year 2 progress report, October 2013
- Successfully completed CEAB review of all 9 undergraduate programs and conducted 3 departmental external reviews

2.3 Increase diversity, focusing on gender diversity among students and faculty.

- Attracted 14 new faculty, including 4 women faculty, in 2012–2013
- Percentage of tenured and tenure-stream women faculty increased to 16.4%
- Number of first-year women undergraduates increased by 18% from 279 to 330
- Women now account for 26.2% of the graduate student body

2.4 Support the development of faculty members as outstanding engineering educators and researchers.

- Held workshops for newer faculty on grant applications such as NSERC Discovery Grants
- Established lunchtime panel series entitled *Best Practices in Research*
- Established new Sustained Excellence in Teaching Award and Research Leader Award
- Expanded awards nominations to ensure that pre-tenure faculty receive appropriate recognition for their achievements

2.5 Support our students by strategic efforts to build upon educational, extracurricular and co-curricular experiences.

- Experienced 23% increase in participation in summer research in 2013
- Overall increase of 9% in PEY internships over last year
- Over the past 4 years, PEY internships have increased almost 50%, and now represents almost two-thirds (64%) of all third-year students
- International PEY placements went up by 38%
- Reached a historic high with 690 students being placed in PEY positions in 2013 including 54 international placements (up from 39 in 2012–2013)

- 7 MIE students participated in the Global Educational Exchange (Globex) initiative with Peking University

2.6 Maximize the skills of our staff members and create opportunities to strengthen their performance and develop them as integral contributors to the Faculty's mission.

- Established new Human Resources Office dedicated to our Faculty
- Recognized 14 staff through the Excellence Through Innovation Awards
- Secured funding and related support from the Office of Student Life for a professional development day for all registrarial staff at U of T; held in November 2012 with over 300 staff attending from the 3 campuses
- Established a series of workshops through the Organizational Development and Learning Centre (ODLC) for staff advisors and student life professionals; ODLC now has a number of courses to assist staff working closely with students

2.7 Increase staff retention and enhance succession planning within the Faculty.

- To be addressed in conjunction with the establishment of the Faculty's HR Office

2.8 Build upon alumni involvement with the Faculty to share their world-based expertise and perspectives, to strengthen our reputation and to inspire the next generation of U of T engineers towards innovation and excellence.

- Created formal Engineering Alumni Association (EAA) chapters in San Francisco, Hong Kong and South Korea
- EAA proactively participated in Faculty events such as Convocation Plaza, Spring Reunion and the U of T Arbor Awards
- Established bridging student mentorships with alumni and industry entrepreneurs through The Entrepreneurship Hatchery; invited alumni to participate in ongoing Hatchery events
- Expanding the Hatchery Advisory Committee to include representation from external alumni entrepreneurs

2.9 Enhance governance processes, cyclical reviews and quality assurance processes.

- Reviewed the Faculty Constitution and ensured alignment with University terms of reference and policies, and with editorial updates to modernize and standardize the language
- Strengthened Faculty governance and external review processes through the development of guidelines, templates and standardized communications (e.g., itineraries, timelines, report outlines)
- Captured CEAB processes to facilitate mapping and designating authority for future review cycles
- Developing internal procedures and guidelines to help steer the creation and approval of new programs
- Completed 3 departmental external reviews throughout 2012–2013 (CivE, ECE and MSE) and will undergo 2 additional external reviews in fall 2013 (ECP and MIE)

- Completed CEAB accreditation review of Faculty's 9 undergraduate programs
- Annual progress reports on external review recommendations are shared at regularly scheduled Chairs & Directors meetings

3. Positioning

Through the increased collaboration that we have established over the past six years, and our efforts to expand our outreach to the wider, global community, our Faculty is collectively defining itself as the educators and thought leaders who are helping solve complex global problems, and contributing to the intellectual, social and economic status of Canada. This is the message that we are focused on articulating, clearly and precisely, as we continue to pursue our objective to propel U of T Engineering towards our greatest heights of achievement, and in so doing securing our standing within the international engineering community.

We have made great strides in our progress to position our Faculty among the top-ranked research and education institutions in the world, while also advancing the goals set out in our Academic Plan for strategic positioning. Specific strategic communications objectives set out for 2012–2013 included:

- developing a strategic communications framework, including a crisis communications plan and blogger relations strategy;
- developing a variety of print materials to illustrate the excellence of our research;
- enhancing the web presence of units such as the Engineering Career Centre and The Entrepreneurship Hatchery; and,
- strengthening relations with media partners.

Formulation of a strategic communications framework has been a priority throughout 2013. This is now developed and under review with Faculty leadership, with a view to having an adopted framework fully in place by December 2013. The framework lays out the themes, messages, audiences and tactics we will undertake as a Faculty to set ourselves in a distinctive position, astutely recognized for our innovation and standard of excellence within the education, research, and development sectors.

Our objective to develop a crisis communications plan has been met, as well as a focused communications plan for the Professional Experience Year (PEY) office, and a multimedia strategy for our Faculty's component of the Boundless campaign.

We are developing strong external publications, including a corporate brochure that speaks directly to a vital audience. This flexible, dynamic piece powerfully tells our story, while allowing for interchangeable material. A series of department and research-specific inserts, and an annual report will keep the document fresh and timely.

We are positioning ourselves to make effective use of the emerging technologies our audiences are embracing. We strive to show our innovation, not only in our research and education, but also in the ways we choose to reach audiences, which increasingly discover us via social media

and mobile devices. This year, we published an appointments brochure and video-enhanced microsite to which many of our faculty contributed. We reimagined the *Discover Engineering* viewbook to create a hybrid online-print experience for prospective undergraduates. We are also proactively communicating with current students by broadcasting timely messages on a variety of topics such as Faculty events, important dates, sessional activities, public announcements and Faculty news highlights, via a series of digital display screens (13 to date) installed in strategic locations throughout our 16 Engineering buildings. We also created an animated whiteboard video to encourage international exchanges, produced several unique news-centric videos, and redeveloped future-focused websites for several divisions, including The Entrepreneurship Hatchery, Engineering Graduate Studies and the Institute for Sustainable Energy.

The Faculty has impressive stories to tell; stories about innovations that foster prosperity and global change, education that will reshape our economy, and research that opens new possibilities for industry and all Canadians. We will continue to use creative methods to put our stories forward, and to employ new communications advancements as opportunities present. Some of the projects slated for development include a research podcast series, a resource for Faculty communicators entitled *A Field Guide to Engineering Communications*, a multimedia campus tour, and a mobile-first website redesign.

Our strategic communications efforts were recognized in 2012 with MarCom Awards by the Association of Marketing and Communication Professionals. We received two Gold Awards — one for a video entitled *An Exchange Would Do You Good*, and another for our *Discover Engineering* viewbook — as well as a Platinum Award for a campaign called *Your Feedback Matters*, which encouraged students to complete their course evaluations.

The Academic Plan outlines the goals that guide our Faculty's strategic communications activities for 2011 to 2016. Below, we list these goals and provide some highlights to demonstrate our progress toward meeting them this past year.

3. POSITIONING: YEAR 2 PROGRESS HIGHLIGHTS

3.1 Deliver a plan that articulates our communication goals, maintains consistency of our branding and products, keeps on top of markets, and clearly outlines methods so that we can remain competitive and set the Faculty apart.

- Developed a Strategic Communications Framework to guide our activities for the next 3 years; currently under review by Faculty leadership

3.2 Strengthen the Faculty's key messages and customize them for target audiences.

- Established key messages, communications strategies and tactics for target audiences through the Strategic Communications Framework
- Published our 5th internal Annual Report of Performance Indicators and created an abridged companion piece targeting our external audiences and other stakeholders
- Developed a communications plan to enhance the profile of PEY

- Executed a multimedia messaging and communications plan in conjunction with the launch of the Faculty's component of "Boundless: the Campaign for the University of Toronto"
- Delivered a special issue of *Skulematters* alumni magazine, e-newsletters, print and digital collateral as well as a media-relations strategy in support of our Faculty's campaign launch
- Currently developing a corporate brochure that speaks directly to various external audiences with an integrated series of department-centric and research inserts

3.3 Establish the Faculty as the go-to resource for media looking for comments and engineering expertise on breaking news issues.

- Furthered working relationships with key national and international STEM media through personalized outreach
- Developed a research communications plan to effectively tell the stories of our research impact; the plan includes a podcast series and media training for faculty
- Created the *Research Impact Narratives* series to celebrate and raise awareness of Engineering advances and their impact, both within and beyond the Faculty
- Continue to build a growing library of stories of tangible research impacts, for broad internal and external distribution
- Made news headlines throughout 2012–2013 on a number of innovations and breakthroughs, such as:
 - U of T Engineering Grads Make Aeronautical History (Sikorsky Prize)
 - U of T Engineers Win Third Place at Gates Foundation's Reinvent the Toilet Challenge
 - U of T Engineering Grads Invent World's Most Energy-efficient Light Bulb
 - Breakthrough by U of T-led Research Team Leads to Record Efficiency for Next-Generation Solar Cells
 - A 3-D Machine that Prints Skin? How U of T Engineers Are Revolutionizing Burn Care

3.4 Continue to increase the quality of our storytelling, journalism and communications processes and tools to make our practices best-in-class and in pace with emerging technologies and their uses by our target audiences.

- Increased the Faculty's visibility through use of technological tools, including video coverage and live-tweeting of key research initiatives and events; examples include the openings of BioZone's expanded facilities, the Institute for Robotics & Mechatronics (IRM) and the Centre for Industrial Application of Microcellular Plastics (CIAMP)
- Showcased our newest researchers and educators with a new appointments brochure, coupled with a dynamic microsite that provides brief biographies and videos featuring each new member; as of September 2013, the video profiles received more than 3,000 views
- Instituted *Just ASK Engineering!*, a student-inspired online resource that answers questions on a wide range of topics (e.g., University services, facilities and finances)
- Reimagined a key undergraduate recruitment vehicle, the *Discover Engineering* viewbook, as a hybrid print and online communications tool; the Faculty's entire suite of recruitment publications were also refreshed to complement this shift

- Rolled out a cross-Faculty digital signage initiative, strategically placing 13 screens in various locations throughout the Engineering precinct to proactively inform our students and visitors of the many events and activities taking place throughout the year
- Created an animated whiteboard video and promotional campaign to encourage international exchange opportunities among our undergraduates
- Enhanced graduate student recruitment efforts with new promotional materials, including a graduate student brochure and website
- Developed effective new websites for The Entrepreneurship Hatchery, Engineering Graduate Studies and the Centre for Global Engineering; renewed sites for the Office of Advancement and Alumni Relations, Engineering Career Centre and the Institute for Robotics and Mechatronics
- Instituted regular meetings of the Engineering Communications Network (ECN) and created a central online resource (ECN Hub) to better share resources, tools and best practices with communicators across the Faculty

3.5 Remain flexible to changing media and technologies, nurture blogger and social media relationships, and build relationships and communications with traditional media.

- Established the role of Communications Coordinator, Alumni & Development to facilitate engagement with our alumni and donors through broadcast of informative and timely mobile-friendly communications
- Participated in ENGINE, a New York-based networking event for communications professionals representing top U.S. schools and other leading universities
- Increased coverage of teaching initiatives and research accomplishments through direct contact with key media reporters, social media broadcasts and posting press releases across research and mainstream newswires

3.6 Increase the Faculty's presence, visibility and reputation on modern social media platforms.

- Provided one-on-one media training to engineering spokespeople
- Placed new emphasis on multimedia and social media channels, such as video coverage and live-tweeting of key research initiatives and events, for example:
 - Spring Convocation;
 - Proceedings of the inaugural U of T Women in Science & Engineering (WISE) conference;
 - Engineering Science Praxis student project presentations; and,
 - NSERC Robotic Field Trials.

All 4 broadcasts received wide attention through a range of social media channels including Twitter, Vimeo and Facebook

- Working toward the development of a research podcast series, *A Field Guide to Engineering Communications* to help us tell our best stories, a multimedia campus tour that will enhance recruitment and first-year information services, and a mobile-first website redesign

4. Educating Future Engineers & Student Experience

Our ongoing pursuit of engineering education excellence, and commitment to support our students' active engagement in the Faculty and the University all serve to enhance their development as future global engineering leaders. We made substantial progress in addressing our Academic Plan objectives in both of these key areas throughout 2012–2013.

We are encouraged by the progress being made in our objectives to increase diversity. Our international student population increased by 22 per cent, which represents 27 per cent of our incoming first-year class, and we have continued to increase our profile internationally with overall international student applications up by 11 per cent. We have also broadened our student diversity with over 200 exchange students from Brazil, Australia, Korea, India, China, France and Mexico, to name a few. Our female student population now comprises over 25 per cent of our first-year class and our annual Girls' Leadership in Engineering Experience (GLEE) event, held in May 2013, was highly successful once again this year, with 71 of the 74 attendees accepting their offer to U of T Engineering. To further our efforts to attract outstanding students, the Faculty embraced the new University-wide President's Scholars of Excellence Program through creation of a set of unique components. This includes a \$5,000 scholarship (awarded in second year), participation in a summer Faculty mentorship research experience, regular contact with a research mentor throughout the academic year, and an invitation to an Innovation Camp that will take place at the end of the winter term. Ten exceptional students were awarded the scholarship and began their research mentorship programs in summer 2013.

A significant activity impacting this portfolio this past year has been in preparing for and hosting the Canadian Engineering Accreditation Board (CEAB) review team visit of fall 2012, and the interpretation and implementation of the CEAB Graduate Attribute requirements.

We completed the accreditation review in October 2012. All nine undergraduate programs were evaluated simultaneously, resulting in five programs receiving maximum accreditation until 2019 and four receiving accreditation to 2016 with possible three-year extensions. These extensions will be subject to submission of a report addressing the Faculty's response to CEAB's specific recommendations.

A primary concern expressed by the CEAB is licensure levels of instructors. We have made tremendous progress in this area over the past six years, with 94 per cent of our teaching instructors now holding a P.Eng. designation. This ensures our position to guarantee that future graduating classes will meet CEAB requirements for licensed instructors.

In March, our Faculty attracted a Higher Education Quality Council of Ontario (HEQCO) grant to develop high-quality assessment instruments to evaluate learning outcomes. The grant supports the development of valid analytic rubrics in the areas of application of knowledge, communication skills, and teamwork. Research investigations to date have identified existing assessment instruments that will be very useful for our faculty, and the process of developing draft rubrics for testing has begun.

As a starting point, we have expanded our efforts to assess the development of our first-year students by specifically measuring many of the graduate attributes within the common core courses. To enhance our ability to properly assess these attributes, we created a software tool that automatically extracts the relevant data from marked assignment rubrics in the Engineering Strategies & Practice courses, APS111 and APS112. This is the first element of a suite of automated assessment tools that will be developed over the next few years.

This has motivated a further assessment of learning outcomes in the programs and a growing body of data that will be used to inform curriculum change. In particular, this year the curriculum maps developed by each academic unit within the Faculty showed areas of overlap and gaps in curriculum needs. Programs are now moving to modify courses and course sequences to respond to this information.

To further our objective to encourage and support innovative, diverse learning experiences, and set qualitative learning objectives and assessment plans, this year we piloted a Facilitated Study Group (FSG) program in our T-Program Linear Algebra course (MAT188H1S) in which two upper-year undergraduates ran weekly study group sessions to assist students in working through relevant problems. The nature of the facilitation followed the Supplemental Instruction Model, which enables the facilitators to focus on supporting the students' study and learning skills as opposed to correcting the students' technical work. This program will be expanded this coming year to support six additional foundational core courses, as well as multiple courses within the Engineering Science curriculum. Appropriate assessment techniques will be put in place to ensure that such FSGs are effective.

Much work has been done throughout 2012–2013 to further our objectives for curriculum renewal, and we have made significant progress toward achieving our goals to refine our programs, inject innovative directions into our curriculum, and enhance our student experience.

The Faculty is committed to exploring ways of using technology to enhance learning, including lecture capture, online courses and inverted classrooms. In 2011–2012, we began offering two online courses at the graduate and fourth-year levels, and this year we are expanding our online offerings to include two first-year courses: *Calculus for Engineers I* and *II*. These pilot courses are offered as alternatives to the traditional in-person class model, and 38 students are registered in fall 2013. Course content includes internet-platform videos, interactive tutorials, and use of online tools that allow interaction between students, the instructor and TAs. The pedagogy used in this format is a problem-based learning approach, with examples drawn from a range of engineering disciplines.

In winter 2013, we offered the first inverted classroom core course: ECE221, *Electricity and Magnetism*. Students were able to watch lectures online before class, freeing up time to work on problem sets and conceptual elements that have previously left learners struggling. We are assessing its effectiveness and developing guidelines and best practices for inverted classroom courses in Engineering.

In addition, we are in production of our first massive open online course (MOOC), entitled *The Energetic Earth*, a shortened version of our very popular *Terrestrial Energy Systems* course, taught by Bryan Karney of the Department of Civil Engineering. The videos and other materials being developed for the MOOC will also be used in subsequent sessions of the *Terrestrial Energy Systems* course to supplement direct in-class teaching. The course will be ready for broadcast on the edX platform in late October 2013 (www.edx.org).

In December 2012, we instituted the Engineering Instructional Innovation Program (EIIP) to generate novel approaches in our undergraduate course development. Through this program, funding is awarded to develop projects that are specifically geared toward the creation or substantial reworking of large, Faculty-wide courses and learning experiences.

Five innovative projects were selected for EIIP funding in 2013. The range of investment includes the installation of an interactive digital broadcast system that will provide station-to-station visual connections between the student, the instructor, and the experiment protocol demonstrators in one of our undergraduate teaching labs; the development of reusable learning objects (RLOs) to facilitate teaching in a number of areas such as engineering economics, materials science, and chemistry courses, and the development of digital learning objects (DLOs) to improve the student experience both in the areas of engineering design, and planning and development of the fourth year thesis.

The 2012–2013 academic year was also a record year for the number of instructors requesting lecture capture for their courses. We continue to work with instructors to either capture or enable the capture of lectures, and where the situation warrants, develop reusable online content. We have made the lecture recordings available to all first-year CIV100 students regardless of what section they belong to and have shared content created for APS162, an online calculus course, with the entire first-year cohort.

During the 2013 winter term, our First Year Office created course workload tables for each of the eight core program streams. First-year instructors were then able to identify periods within the term where the combined coursework became unevenly balanced, thus placing disproportionate pressure on our students. As a result of this exercise, coursework schedules were adjusted to avoid these overly stressful times in advance of the term start. The tables also enabled instructors to be better informed of other course activities with respect to course work and course coverage, and allowed students to view their entire term work at a glance, thus aiding their assessment of time management. This well-received project will continue over 2013–2014 to create these tables as a collaborative effort amongst the team of course coordinators.

We continue to seek new directions and opportunities to engage and energize our community outside of the classroom, both to enhance the educational experience of all of our constituents as well as to build upon their investment in the Faculty. In August, we sponsored a First-Year Instructors' Day to generate greater collaboration among our instructors and to improve the integration between courses. More than 20 first-year instructors attended the event, which provided opportunity for a number of useful discussions relating to student support programming, general program administration, and program curriculum. This past winter, our

First Year Office organized an *Exam Jam* event for students. Held just before the winter term examination period, the event provided students with opportunity to review their course material with their instructors, as well as have time to interact with their peers and relax. Student reaction to the event was extremely positive and *Exam Jam* will now be instituted as a regular event before each examination period as a pathway to engaging students both academically and socially.

Our core summer transitional program, First-Year Foundations, continues to grow in attendance with over 300 students participating this year. This represents a 70-per-cent increase in attendance since the program was first introduced two years ago. The fact that 95 per cent of students who participated in this program progressed into second year clear of any probationary constraints is a measure of success of this program.

Our conversations with the Faculty of Arts & Science regarding a mutual interdivisional teaching agreement are making modest progress. To date, we have improved access to Arts & Science CS/HSS elective courses for 2013–2014 through securing priority access to over 700 seats in the most popular Arts & Science courses among our students. The full complement of seats was filled within minutes of registration opening. Engineering students continue to have access to other Arts & Science courses as space allows.

Last year, the Teaching Methods and Resources Committee (TMRC) worked with the Centre for Teaching Support and Innovation (CTSI) to develop a set of divisional questions for the new course evaluation system. Multiple information sessions were held with students and faculty to obtain feedback on the questions, which were then refined in response to the feedback. The full set of questions was approved at Faculty Council in April and the validation process continued throughout the summer with results tabulated in September. An important aspect still to develop is a methodology for including TA evaluations in this process. This issue will be addressed by the TMRC throughout fall 2013.

The University's Co-Curricular Record (CCR) enables students to conduct electronic searches for clubs and activities of interest, both as an information resource but also to help them assess the value of the extracurricular experience relative to their personal goals. The student's degree of participation in any assessed co-curricular activity is evaluated and, if merited, can be recognized on an official U of T record. The record also describes the learning outcomes the student has achieved through their out-of-class experiences, thus aiding them to identify and better articulate their strengths and university experience at the professional level. We created the position of Assistant Director, Student Experience & Teaching Development in 2012 with an initial focus to implement the undergraduate CCR project. The system became active in fall 2013, and over the next few years, we will collect data to analyze the effectiveness of the project.

Our Professional Experience Year (PEY) internship program continues to grow, with participation increasing by 9 per cent over last year. This year we reached a historic high with 690 students being placed in PEY positions, including 54 international placements.

To facilitate the recruitment of candidates for our undergraduate summer research programs (USRA, UTEA), the Vice-Dean, Undergraduate and Vice-Dean, Research have been working

with The Edward S. Rogers Sr. Department of Electrical & Computer Engineering to develop an online system that will help faculty more easily identify and match undergraduates seeking summer research positions to their research programs. Targeted pilots were tested this year, and we will continue to work with the programmers throughout 2013–2014 toward implementing an expanded system in conjunction with the next recruitment cycle.

The number of students conducting summer research at international institutions continues to increase. In summer 2013, a total of 359 students completed summer research internships, representing an increase of 23 per cent over 2012. This successful growth is in part attributable to new global exchange agreements the Faculty solidified over the past year, which includes an agreement with Peking University and Science Without Borders from Brazil.

Other elements contributing to this success can be credited to the efforts we have taken within the Faculty to increase student awareness of the many international opportunities available to them, such as the creation of an informational web page highlighting the benefits of participating in an exchange program, holding Town Halls dedicated to discussion on these program enhancements, as well as our ongoing development of an extended and more engaged international network of alumni. Departments continue to work on establishing structured pathways and streamlined course approvals to make it easier for students to receive credit for courses taken at other institutions.

International placements and exchanges are often a challenge for students due to the relative costs and reduced income opportunities. Through our advancement and industrial partnership initiatives, we are continually seeking new avenues to provide support to help make these exchanges and placements more feasible options for our students.

We are vigilant in our commitment to maintain and strengthen our high quality of education through review and assessment of our programs, and to enrich the quality of the academic experience of our students through the provision of reliable, accessible and effective services. It is in this spirit that the Faculty initiated reviews of the Engineering Communication Program (ECP), our undergraduate computing services (including the Engineering Computing Facility (ECF) and Administrative computing services), and a review of the Engineering Career Centre (ECC), especially with respect to the structure for delivery of expanded services and new programs that have recently emerged. Through this process we will also seek to improve the alignment between funding opportunities and resources with the mission of the ECC. The ECP review team will visit in November 2013, with ECF's review taking place shortly thereafter.

Significant progress has been made towards addressing our objectives to promote and advance multidisciplinary engineering design education within the Faculty since establishing the Institute for Multidisciplinary Design & Innovation (UT-IMDI) in 2011–2012, and appointing Kamran Behdinan to serve as inaugural director.

The aim of UT-IMDI is to create a unique, problem-based learning environment that provides students with meaningful practical training opportunities by involving them in industry-based

projects, sponsored by industry partners. In summer 2012, UT-IMDI engaged 10 undergraduates to work on projects from three major aerospace companies, and this past summer, that number grew to 25 projects, involving 10 aerospace/automotive companies.

We established a number of groups to enhance engineering design education across the engineering disciplines. They are the Engineering Design Education Group (EDEG), the Faculty's NSERC Design Chair Structure, and the Multidisciplinary Capstone Project (MCP) Lead Committee. This committee is comprised of the capstone course coordinators from all Engineering departments and 12 industry representatives.

Throughout 2012–2013, EDEG focused on the development of the cross-Faculty Multidisciplinary Capstone Design course. Through this course, students work together on client-driven projects that are sponsored by a variety of industries and industry partners, and also required them to communicate with their client throughout the project. Nineteen sponsored multidisciplinary capstone projects (MCPs) have been secured for 2013–2014.

In conjunction with the roll-out of the Multidisciplinary Capstone Design course, through the Department of Mechanical & Industrial Engineering, we developed the NSERC Design Chair Fabrication Studio, a fully equipped workshop facility that students can access to build their capstone design project prototypes. The studio is located in the Mechanical Engineering Building.

Consultations with departmental design instructors are currently underway to identify opportunities to enhance and strengthen the engineering design components of undergraduate courses at earlier stages within the program curriculum. And, we are strengthening our collaborations with OISE and the Toronto District School Board with respect to curriculum development and teacher training. OISE pre-service teachers take a module on design/STEM through our Faculty, and OISE interns are currently helping to investigate design enhancement opportunities within the DEEP Summer Academy and first-year engineering design courses (i.e., ESP, Praxis).

Our work to enrich our students' learning experiences through the integration of new areas of exploration, such as the design initiatives engendered through UT-IMDI, is flourishing on other fronts as well. To help our future graduates prepare for the emerging economy that rewards initiative, creativity and passion, our Faculty is also investing intellectual capital, energy and resources to incorporate professional competencies in entrepreneurship into the undergraduate learning experience.

To aid our vision and inspire and foster an environment of innovation and entrepreneurial spirit within our undergraduate community, we formally established The Entrepreneurship Hatchery in 2013. The Hatchery's roots began to develop in 2011. With start-up funding from the Dean's Strategic Fund, an advisory committee chaired by Jonathan Rose and the appointment of Joseph Orozco as Executive Director, the Hatchery is now moving forward on firm footing. The Hatchery Advisory Committee includes representatives from undergraduate departments, Faculty leadership, and members of the Alumni & Advancement team, and future plans are to expand the team of advisors to include alumni entrepreneurs.

Now in its second year, the Hatchery summer 2013 mentorship program provided tools, resources and support to 18 teams of students (involving 44 students) who worked on prototyping their innovative ideas with guidance from experienced entrepreneurs. Student involvement in the summer program is optional and full-time, which can preclude the student's ability to compete for summer jobs or research internships. To help ease this impediment, one of the goals of the Hatchery is to secure a strong base of fellowships in aid of summer program students. We are extremely encouraged that, for the summer 2013 cohort, we raised a total of 17 fellowships, providing support to 48 per cent of the students who applied for funding.

Interdisciplinary undergraduate minor and certificate programs continue to be well received by our students. More than 14 per cent of our undergraduate population is now participating, and we continue to explore and cultivate exciting new directions through our Cross-Disciplinary Programs Office.

Enrolment in all cross-disciplinary program offerings remain strong across the board, with 95 students enrolled in the Bioengineering minor, 49 enrolled in Environmental Engineering, 139 enrolled in the Sustainable Energy Minor, and the Robotics and Mechatronics minor showing growing interest and acceptance with 59 students registered.¹ However, the unprecedented growth of our Engineering Business minor merits a particular mention.

Launched in 2011, participation in the Engineering Business minor has grown by 40 per cent over last year, and enrolment in the three core courses that comprise the foundation of the minor has more than doubled. The waitlists for these courses have consistently been as long as the class registration lists. As such, in addition to now offering the courses in all three academic terms, we also plan to double the sections for each course at least once each year for a total of at least five sections of each course per year. As we move forward, we will continue to monitor the demand for these courses closely, with a view toward identifying additional ways to make the subject material more widely available to our students.

This September, we rolled out two new undergraduate certificates in Mineral Resources and Nuclear Engineering, and we are currently exploring development of two new certificate programs, one in the area of technical communication in partnership with the Engineering Communication Program, and another in engineering leadership in conjunction with the Institute for Leadership in Engineering Education (ILeAD).

Another key objective outlined within our Academic Plan is to further the development of meaningful collaborations across U of T. To this end, this year we launched the Combined Program in Environmental Science (BSc) and Master of Engineering (MEng) in partnership with UTSC, and are close to finalizing the parameters for a new undergraduate engineering pathway with UTM. Predicated on a 2 + 3 program model, participants will be offered greater diversification in structuring their programs, allowing them to work towards their BSc degree while fulfilling the requirements for a UTM minor or major. Students will be able to concentrate

¹ Course registrations based on 2012–2013 completion counts

on fulfilling their engineering foundation courses, CS/HSS electives, and/or program minors or majors at UTM during the first two years of their program, and then transition to second year of Engineering at the St. George campus to complete their degree requirements.

Graduate enrolment continues to increase, reaching 1,933 in 2012–2013, a 5-per-cent increase over last year, so we are most assuredly on track to achieve our Academic Plan goal of 2,000 graduate students by 2015. International students now account for 22.5 per cent of total graduate enrolment, and women students comprise 26.2 per cent. These figures represent historic highs within the Faculty in both areas.

Overall, graduate students currently represent approximately 30 per cent of our total student population, which reflects even and steady growth within our graduate population since the Academic Plan was adopted in 2011. This is a positive step forward for our Faculty in terms of ensuring a robust research program, and we remain committed to our longer-term goal of bringing our undergraduate-graduate student ratio closer to 60:40.

Our ongoing graduate recruitment efforts continue to show very positive results. Applications to all three graduate programs (PhD, MAsC, MEng/MHSc) increased by more than 9 per cent over last year. This figure represents another all-time high for our Faculty, and clearly indicates that interest and demand for all of our graduate programs is accelerating and growing stronger.

In the spring of 2013, we entered into an informal recruitment partnership with four other top Canadian engineering schools, in which each institution hosted an engineering graduate fair during the fall 2013 term attended by each of the five partner institutions. Through this consortium, we aim to increase the overall number of engineering graduate applicants from top Canadian schools. We will also continue to host and participate in other relevant local graduate recruitment activities and events throughout the coming year.

We provided greater flexibility in terms of program registration options for our graduate students over this past year. In September 2012, the Department of Mechanical & Industrial Engineering (MIE) introduced the Flexible-time PhD option, which allows select highly qualified engineers who are already working in a research and development setting to pursue their PhD while continuing to work. The program in MIE is showing good promise for demand, and several other graduate units Faculty-wide are preparing to make a similar registration option available within their programs over the 2013–2014 academic year.

We anticipate that our MEng enrolment will continue to increase as we move forward, especially with the introduction of the Extended Full-Time registration option in the 2013–2014 admissions cycle. This new option allows students to complete their degree over a two-year period as opposed to undertaking the more traditional one-year, full-time program or three-year part-time option. The Extended Full-Time option does not adversely affect the student insofar as tuition and fees are concerned, but rather provides them with more time and opportunity to focus and complete their programs.

Our objectives to develop vibrant MEng programs and offer a larger variety of courses suitable to MEng students is ongoing, and in 2012–2013, we introduced the certificate program in

Financial Engineering, a program emphasis in Advanced Water Technologies and Process Design, and the Master of Engineering in Cities Engineering and Management (MEngCEM). In addition, we launched a program emphasis in Sustainable Aviation in September 2013, and the course offerings associated with the Entrepreneurship, Leadership, Innovation and Technology in Engineering (ELITE) certificate program were substantially expanded to now provide a roster of 24 courses, with some courses offered in each term.

MEng student enrolment, both domestic and international, continues to grow, with MEng students now representing 38.2 per cent of total masters enrolment. We still have some work to do to achieve our goal of having MEng enrolment increase to 50 per cent of Eligible Full-Time Equivalent (EFTE) masters students by 2015–2016. However, with the addition of the Extended Full-Time registration option, along with the many dynamic new MEng emphases we have established over the past three years, interest in our MEng programs will grow, and through our ongoing and proactive efforts in promotion and recruitment we will continue to pursue this goal.

In September 2012, we introduced the Graduate International Foundation Program (GIFP), a partnership with New College that provides international MEng applicants, whose English proficiency test scores fall below the minimum requirement for admission, with an opportunity to undertake intensive English language instruction prior to commencing their MEng program. Acceptance in the MEng is conditional upon successful completion of the GIFP program, and although enrolment in this program has been modest, it has already doubled within the short time that it has been offered.

We are also one full year into the Licensing International Engineers into the Profession (LIEP) program, a partnership between our Faculty, the School of Continuing Studies, and the Ministry of Citizenship and Immigration. This program serves to provide a course-based pathway for immigrant engineers to earn their P.Eng. license, enabling them to practice in Canada.

The two lists below highlight our progress and achievements toward meeting our educational and student experience objectives of the Academic Plan 2011–2016 over the past year. In the coming year, we will continue our work on the many initiatives and special projects that have been established during these first two years of our academic strategy, to refine content, improve methodologies, and incorporate the new ideas to come as we continue our work to achieve the highest level of academic excellence and experiential enrichment for our students.

4.1 EDUCATING FUTURE ENGINEERS: YEAR 2 PROGRESS HIGHLIGHTS

4.1.1 Maintain and strengthen our high-quality education through continued review and assessment of our programs and curricula for currency, vision and relevance. Establish desired learning outcomes for graduates and undergraduate students to ensure they are well prepared as future engineers. Evolve our cyclic reviews and plan for continuous quality assessment within the new UTQAP and CEAB Graduate Attribute systems.

- Completed CEAB accreditation review in October 2012; 5 programs received maximum accreditation to 2019, 4 received accreditation to 2016 with possible 3-year extensions
- Addressed compliance with Ontario's Quality Assurance Framework (QAF) through articulation of the Faculty's Undergraduate and Graduate Degree Level Expectations (UDLEs and GDLEs, or Graduate Attributes) during Year 1 of our Academic Plan, and proceeded with preliminary stages of implementation, testing and analysis via the common core courses of the first-year program during Year 2
- Developed assignment rubrics and created a software tool that automatically extracts relevant data to enhance ability to properly assess attributes in APS111 and APS112; first element of a suite of automated assessment tools; data extracted from UDLE attributes to be used to inform curriculum change
- Struck the Task Force to Review First-Year Curriculum; report expected in fall 2013

4.1.2 Further integrate professional competencies, such as global engineering, entrepreneurship, leadership and communication into undergraduate and graduate curricula. Define, assess and measure our programs and curricula successes through the UTQAP UDLEs, GDLEs and cyclic reviews and through the CEAB Graduate Attributes.

- As above, completed CEAB review of all 9 undergraduate programs; began process for testing and analysis of Graduate Attributes
- Completed external reviews of 3 divisions during 2012–2013 (CivE, ECE and MSE), 2 additional divisions scheduled for review in November 2013 (ECP and MIE)
- Provided multi-year start-up funding via the Dean's Strategic Fund in support of initiatives that will integrate professional competencies in the areas of global engineering, entrepreneurship, leadership and communication through the Institute for Leadership Education in Engineering (ILead), the Institute for Robotics and Mechatronics (IRM), the Institute for Sustainable Energy (ISE) and the Centre for Global Engineering (CGEN)

4.1.3 Enrich the quality of undergraduate academic experience by increasing flexibility in the undergraduate curriculum, continuing to develop progressive opportunities for students to pursue their professional interests, and integrating professional competencies throughout the curriculum.

- Implemented the undergraduate Co-Curricular Record project; system can be used as an information and assessment resource for students, and student participation in any assessed co-curricular activity can be recognized on an official U of T record
- Participation in PEY increased by 9% in the past year (and by 49% over 4 years); reached historic high in 2013–2014 with 690 participating students

- Solidified a new exchange agreement with Peking University under the Global Educational Exchange (Globex) initiative
- Established the U of T Institute for Multidisciplinary Design & Innovation (UT-IMDI) and hired its inaugural director in 2011–2012; secured 8 summer projects in first year and number of projects grew to 25 in summer 2013
- Developed a cross-Faculty Multidisciplinary Capstone Design course; 19 sponsored projects secured for 2013–2014
- Invested resources to incorporate professional competencies in entrepreneurship into the undergraduate learning experience through The Entrepreneurship Hatchery
- Interdisciplinary minors and certificate programs maintain strong interest with 14% of undergraduates participating (total of 716 students)
- Registration in the Engineering Business minor has grown in its second year by 71.3% to 439 students; now offering courses in all 3 academic terms with plans to double sections for each course at least once each year (for a total of 5 sections of each course per year)
- Developed new undergraduate certificates in Mineral Resources and Nuclear Engineering
- Currently exploring development of new certificate programs in technical communication and engineering leadership
- Released first version of degree explorer to students in Civil, Mineral, Mechanical, Industrial, and Materials Engineering
- Launched the Combined Program in Environmental Science (BSc) and Master of Engineering (MEng) in partnership with UTSC

4.1.4 Continue to support and enhance undergraduate students' opportunities for self-directed learning and study time, and participation in the enriching extracurricular activities within our Faculty, across the University, and beyond.

- Expanded online offerings to include 2 first-year undergraduate calculus courses; content includes internet-platform videos, interactive tutorials and use of online tools that allow interaction between students, instructors and TAs
- In production of first massive open online course (MOOC); will be ready for broadcast on edX platform in late October 2013
- Lecture recordings for CIV100 were made available to all sections
- Shared content created for APS162, an online calculus course, with the entire first-year cohort

4.1.5 Enhance our instructional space to facilitate innovative teaching methods and create efficiencies on how we share space. This includes flexible interactive teaching space for substantial numbers of students, design and group project space and lecture/lab combination space.

- Completed second phase and embarking on final stage of a 3-phase facilities review; addressed student space, meeting and conference spaces during first two stages, and reviewing teaching laboratory facilities in the third phase; exercise so far has led to new opportunities for physical improvement, consolidation and/or sharing
- Developed the NSERC Design Chair Fabrication Studio, which students can access to build their capstone design project prototypes (located in Mechanical Engineering Building)
- Secured site for the new Centre for Engineering Innovation & Entrepreneurship (CEIE) in 2011–2012

- Hired architects and developed schematic design for CEIE in 2012–2013; now finalizing design and targeting to start construction in early fall 2014 with project completion slated for summer 2016
- Secured more than \$50 million towards CEIE development costs to date with \$20 million from philanthropic donations and a \$1-million commitment from the Engineering Society

4.1.6 Provide reliable, accessible, effective computing services and study spaces within and outside computer laboratories, library and classrooms to enhance efficient interactive learning and socialization where today's student 'lives'.

- Upgraded and extended wireless internet access in 3 buildings for complete building coverage (Galbraith, Sandford Fleming and Bahen Centre)
- Initiated assessment reviews of the undergraduate computing services (ECF) and administrative computing services

4.1.7 Link the quality of student learning, the quality of their education and their improved future performance with teaching effectiveness. Continue to inspire and support the Faculty's culture of teaching excellence and encourage Faculty members and teaching assistants to reflect upon their teaching effectiveness through enhanced feedback mechanisms. Support teaching initiatives and opportunities that will improve their professional development as educators.

- 94% of teaching and research staff hold either the P.Eng. or LEL designation
- Developed set of divisional questions for transition to the University's new online course evaluation system
- Strengthened collaboration with OISE regarding curriculum development and teacher training (focus on STEM and design)
- Conferred inaugural Sustained Excellence in Teaching Award
- Sponsored First-Year Instructors' Day to generate greater collaboration among instructors and improve integration between courses
- Launched the Engineering Instructional Innovation Program to generate innovation in large undergraduate course development
- Offered a day-long Instructor Training Conference to assist TAs involved in our DEEP Summer Academy; 68 people attended in June 2013, a 21% increase over last year

4.1.8 Continue to attract and retain diverse, outstanding students from a wide range of backgrounds in order to provide an exceptional education for future global engineers and leaders. In particular, we must strive to attract more female students into our programs.

- International students now account for 21.2% of undergraduates (1,110 students) and 22.5% of graduate students (434 students)
- Women represent 26.2% of our graduate student population (507 students)
- Women comprise 25.4% of our first-year undergraduate class (330 students), up from 23.4% in the previous year (279 students)

4.1.9 Strategically award admission scholarships to meet our student recruitment goals.

- Joined with University-wide President's Scholars of Excellence Program to offer an innovative new entrance scholarship while adding elements unique to Engineering such as a faculty mentor, an online summer research experience and an invitation to innovation camp at the end of first year; 10 students were awarded scholarships and began programs in 2013

4.1.10 Reduce the dwell time for MAsc and PhD students and address time-to-graduation issues.

- Median time to graduation for doctoral students is 5.3 years; among the lowest at U of T

4.1.11 Continue to develop vibrant MEng programs and offer a larger variety of courses suitable to MEng students.

- Introduced program emphases in Financial Engineering, Advanced Water Technologies and Process Design and Sustainable Aviation; also launched a new program: Master of Engineering in Cities Engineering and Management (MEngCEM)
- Expanded course offerings in ELITE certificate; students can now select from 24 courses
- Developed several new MEng-specific courses and engaged 4 additional practitioners to teach (commenced in 2012–2013)
- Enhanced MEng course offerings with evening, weekend and compressed summer options

4.1.12 Increase graduate student enrolment to reach 2,000 graduate students by 2015, with particular focus on increasing PhD and MEng students and aiming to reach an average of one PhD graduated annually per faculty member. At the same time, we will endeavour to reduce our undergraduate student enrolment to 4,000 by 2015, with 25% of undergraduates consisting of international students. In fall 2010, the November 1 Full-Time Equivalents (FTEs) were 4,599 undergraduate and 1,527 graduate students, a percentage of 75.1% to 24.9%.

- Graduate enrolment reached 1,933 in 2012–2013; representing a 5% increase over 2011–2012
- Applications to graduate programs increased by more than 9% within the 2012–2013 admissions cycle
- Graduate students currently represent approximately 30% of our total student population
- International students account for 21.2% of total undergraduate enrolment and 26.8% of first-year enrolment

4.2 STUDENT EXPERIENCE: YEAR 2 PROGRESS HIGHLIGHTS

4.2.1 Ensure that all our undergraduate curricula provide students with sufficient self-directed time to fully reflect on and understand the material in their program, the vision and relevance to 'learn how to learn,' and the advantage of taking opportunities to experience and engage in University life outside the classroom through extracurricular and co-curricular activities.

- Over 300 students participated in First-Year Foundations summer transitional program in 2013; represents 70% increase in participation since program was introduced in 2008; 95% of participating students progressed to second year clear of probationary constraints

- First-year retention rate reached a 10-year high in 2013; currently rests at 93.7%
- Experienced 23% increase in summer research participation in 2013 (359 students)
- Participation in PEY increased by 9% over last year (and 49% in the last 4 years); historic high with 690 students participating in 2013–2014, including 54 international placements
- The Hatchery mentorship summer program provided tools, resources and support to 18 teams of students (44 students in total) to enable development of their business ideas and technical innovations in summer 2013
- Student teams participating in UT-IMDI industry-sponsored projects grew from 8 projects in summer 2012 to 25 projects in summer 2013
- Held Town Halls dedicated to open discussion on Faculty program enhancements, offered panel discussion on exchange opportunities and produced a video (*An Exchange Would Do You Good*) with corresponding informational web page; efforts translated to a 68% increase in applications for international summer exchange programs
- Working with other first-entry faculties and OSM at St. George campus, introduced a new comprehensive exam scheduling tool allowing all exams for these groups to be scheduled at the same time (previously Arts & Science exams were scheduled first, causing exam conflicts and late release of schedules to Engineering students)

4.2.2 Engage more undergraduates in faculty research activities. Enhance summer opportunities for our undergraduates by expanding the Engineering Summer Internship Program (eSIP) and by increasing summer research opportunities both within the Faculty and through agreements with international institutions.

- Working with ECE to develop online system to identify and match undergraduates seeking summer research positions to research programs; pilot tested in 2013 and working toward implementing expanded system in time for next recruitment cycle
- Experienced a 23% increase in participation in summer research in 2013 to 359 students
- Solidified new global exchange agreement with Peking University under the Global Educational Exchange (Globex) initiative in which 7 MIE students have already participated

4.2.3 Enhance our students' access to electives outside technical courses.

- Improved access to most popular Arts & Science elective courses among our undergraduates through reserved registration in 2013–2014 cycle (total of 700 seats made available, distributed throughout a number of courses); seats filled within minutes of online registration opening
- Discussions continue with the Faculty of Arts & Science regarding mutual interdivisional teaching agreement
- Establishing the parameters for a new undergraduate engineering pathway with UTM that will give students the opportunity to enter a 2+3 program, allowing them to graduate with a BAsC as well as a minor or major from UTM

4.2.4 Enhance our undergraduate and graduate students' non-traditional educational opportunities, including international academic exchanges and internships, courses offered abroad, field courses, and credit for work in extracurricular activities such as design teams.

- UT-IMDI secured 8 industry-sponsored projects in summer 2012; grew to 25 sponsored projects in summer 2013
- The Hatchery secured a total of 17 fellowships, providing support to 48% of students requesting funding; Hatchery Advisory Committee seeking to grow strong base of fellowships in aid of future summer program students
- PEY facilitated 54 international placements in 2013–2014
- Our students can now earn a full-course credit during a summer term at Peking University through under the Global Educational Exchange (Globex) initiative; 7 MIE students participated this year
- Formalized agreement with L'Istituto Universitario di Studi Superiori (IUSS) di Pavia to enhance and strengthen academic and research collaborations through joint placement PhDs and joint international research programs
- Students participating in the Master of Engineering in Cities Engineering and Management (MEngCEM) have the opportunity to intern at the NYU-based Center for Urban Science & Progress (CUSP)

4.2.5 Continue to inspire the Faculty's culture of teaching excellence and support teaching initiatives that improve student experience, support their connections with course content, increase in-class engagement and strengthen students' understanding of course relevance.

- Instituted Engineering Instructional Innovation Program to generate innovation in undergraduate course development; funded 5 projects in 2013
- Offered first inverted classroom course in winter 2013 (ECE221: *Electricity and Magnetism*)
- Lecture recordings for CIV100 were made available to all sections
- Shared content created for APS162, an online calculus course, with the entire first-year cohort In production of first massive open online course (MOOC), planned to be ready for broadcast on the edX platform in late October 2013

4.2.6 Promote extracurricular activities through communications, faculty mentoring and suitable space and facilities.

- Completed renovations to create Student Woodworking Shop (in MC10B)
- Created NSERC Design Chair Fabrication Studio to enable development of student design projects
- Installed digital display system in 13 locations to broadcast Faculty messages, news and events
- Created animated whiteboard video to encourage international exchanges, redeveloped websites for The Entrepreneurship Hatchery, Engineering Graduate Studies and the Institute for Sustainable Energy
- See #4 above for additional actions

4.2.7 Actively engage and support students in their unique academic and non-academic experiences as soon as they enter our Faculty, so they can thrive throughout their studies.

- Organized *Exam Jam* event for students before the winter 2013 examination period with positive student reaction; event will become a regular activity before each examination period as a pathway to engage students both academically and socially
- Created course workload tables for each of the 8 core program streams which enabled first-year students to view their entire term work at a glance, thus aiding their assessment of time management; over the course of 2013–2014, we will work to create other similar tables as a collaborative effort among course coordinators
- Implemented embedded counselling for students with minor or low levels of anxiety as well as a learning strategist to work with first-year students
- Provided additional support to international students on matters such as student visas, work permits, and cultural issues through our International Advisor from CIE
- See #1 above for additional actions

4.2.8 Engage Master of Engineering (MEng) students to improve the quality of their experience.

- MEng-specific graduate courses now offered through several programs
- Select MEng courses offered on evenings, weekends, in compressed summer courses and online
- Engaged practitioners to teach 4 new MEng courses, commenced fall 2012
- Implemented Extended Full-Time registration option to complement existing full- and part-time MEng options
- New Master of Engineering in Cities Engineering and Management (MEngCEM) program offers internship opportunities working in collaboration with industry, government agencies and researchers; internships can also be undertaken through the NYU-based Center for Urban Science & Progress (CUSP)
- Expanded MEng offerings with new program emphases in Advanced Water Technologies and Process Design, Financial Engineering and Sustainable Aviation; received first registrations September 2013
- Substantially expanded Entrepreneurship, Leadership, Innovation & Technology in Engineering (ELITE) certificate; now provides a roster of 24 courses

4.2.9 Enrich graduate students' academic life and build a stronger sense of community among graduate students across the Faculty.

- Offered Instructors Training Conference to assist TAs involved with DEEP Summer Academy, 68 people attended, representing a 21% increase over the previous year
- Mandatory TA training now offered twice each year
- Standardized stipend rates for graduate students throughout the Faculty

5. Research Foci

U of T researchers in the Faculty of Applied Science & Engineering are at the top of their fields internationally. We take enormous pride in our research, researchers and global impact. This impact ranges from deepening basic understanding of our world to influencing thinking and practices in industry. It includes economic impact through our many successful entrepreneurial activities. Engineers reach beyond technology and commercial activity to influence global society through our innovations.

With these goals in mind, the crucial importance of strong funding for research remains a key priority. We strive to ensure that our faculty are fully aware of, and equipped to take advantage of, provincial, national and international funding opportunities. This approach has increased our participation over time in Tri-Council funding, including Canadian Institutes of Health Research (CIHR) and Natural Sciences and Engineering Research Council (NSERC). Overall, NSERC funding has continued to grow and CIHR revenue nearly doubled over the past year. NSERC partnerships funding grew by 17 per cent, largely driven by a more than doubling in the Strategic Networks category. Tri-Council funding reached \$22.8 million in 2011–2012. Growth in Tri-Council funding was in significant part attributable to growth in Industrial Research Partnerships Programs, where funding reached \$10 million in 2011–2012. U of T Engineering is increasing its participation in these important partnership opportunities.

This funding also enhances our Faculty's ability to attract and retain world-class faculty members, particularly through the federally funded Canada Research Chairs (CRCs) program. In 2013, U of T Engineering received four additional Tier-II equivalent CRCs as a direct result of growth in our Tri-Council share. Key activities over the past year towards growing our research support included a series of roundtable discussions in which researchers shared strategies for writing successful Discovery Grants, DARPA and AFOSR proposals, and Strategic Project Grants. The sessions provided opportunity for investigators to confer in an informal setting, discussing issues and sharing experiences as they relate to specific sponsor programs.

Research infrastructure is also critical to our international competitiveness. The Canada Foundation for Innovation (CFI) awarded three projects, totalling over \$10 million, to our Faculty in 2012–2013. Recipients included Omer Gulder (UTIAS) to develop a high-pressure blow-down facility for gas turbine combustion research, Charles Mims (ChemE) for development of the "Ontario Centre for Characterization of Advanced Materials" (co-led by Doug Perovic, MSE), and Ted Sargent (ECE) for research into nanomaterials for energy. These grants were matched by the Ontario Research Fund. Together, with additional support from our industry partners, this raised new infrastructure support for the Faculty to over \$20 million.

Many research advances come about through collaborations with partners in industry, non-profits and governments. The relationship between U of T Engineers and external partners is an important one, and is one that resonates in Canada and the world. To expand and strengthen our external ties and build upon our relationship with our industry partners, we created the

positions of Director of Government and Corporate Partnerships and, together with the Division of University Advancement, Director of Foundation and Corporate Partnerships.

An example of one such important partnership is the Centre for Industrial Application of Microcellular Plastics (CIAMP) led by Chul Park, which officially opened in May 2013. CIAMP works toward developing stronger and more cost-effective plastic materials for the automotive and construction industries. Another is the Pulp & Paper Centre led by Honghi Tran which, in November 2012, celebrated 25 successful years at its annual research colloquium. This Centre has a consortium of 22 companies from seven countries. NSERC recently invested an added \$1.88 million in the form of a Collaborative Research and Development grant for research into drying, combustion and ash properties of biomass and impacts of pulp and paper mill operations. Further, our faculty members are deeply engaged with the Southern Ontario Smart Computing Innovation Platform (SOSCIP), a major partnership with IBM and Ontario-based small- and medium-sized enterprises.

In early 2013, the Faculty received two newly funded NSERC CREATE projects. Molly Shoichet's "Manufacturing, Materials and Mimetics" (M3) and Murray Thomson's "Program in Clean Combustion Engines" were each awarded over \$1.6 million.

In February, Faculty Council approved the advancement of the (then) Centre for Sustainable Energy. Founded in 2010 as an Extra-Departmental Unit–D (EDU-D) within the Department of Mechanical & Industrial Engineering, the division is now classified as an EDU-C and has been renamed the Institute for Sustainable Energy (ISE).

In 2013, we awarded the first Faculty Research Leader Award, which was established in 2012 to recognize a faculty member or team who made significant contributions to enhancing the research profile of the Faculty through: leadership in interdisciplinary and multiple investigator initiatives, significant research leadership contributions that have made an impact on their department or institute; coordination of major research projects involving multiple disciplines and/or multiple investigators which benefit the Faculty as a whole; development of major new industrial partnerships involving multiple faculty members; and, academic leadership. The inaugural recipients were Elizabeth Edwards, Radhakrishnan Mahadevan and Emma Master, for their group leadership in the creation of BioZone, a unique multidisciplinary centre conducting leading-edge research at the intersection of biology and engineering. The recipients were celebrated at the Faculty's Celebrating Engineering Excellence event in the spring.

The Faculty's Research Committee has continued working to raise awareness and identify leaders for opportunities to build NCEs, CECRs, Strategic Research Networks, and CREATEs, hosting campus events in support of interdisciplinary research, such as the Engineering Global Health symposium held in April. The Committee also ensured that each unit implemented a peer review/mentorship program to support faculty striving to write compelling applications to NSERC Discovery Grant, Discovery Accelerator, and RTI (Equipment) programs. This was complemented by a series of Discovery Grant, Discovery Accelerator and RTI panel sessions.

As stated earlier, in 2013, the number of Canada Research Chair Tier-II equivalents held by the Faculty increased to 28 from 24 as a result of sustained growth in our Tri-Council share. In July,

Faculty Chairs, Associate Chairs, and advancement professionals met with a number of existing Industrial Research Chair (IRC) holders to learn about their experiences and processes for building additional IRCs. The Faculty also formulated a strategy for faculty-initiated IRC development by spurring conversations among Associate Research Chairs. This included a roundtable discussion on best practices, and lessons learned from past and current IRC holders. In conjunction with this, representatives from across the Faculty worked together to identify and pursue companies with capacity to further partnership engagements with our faculty members. Moving forward, we will continue our work to identify new opportunities for increased support for industry partnerships (such as the Industrial Research Chairs program), and creating new opportunities for endowed chairs.

We also worked closely with the University's Office of the Vice-President for University Relations to further our international outreach, with a goal to cultivate partnerships with peer institutions internationally, as well as raising awareness of U of T Engineering among prospective partners, students and other leading research-intensive universities. Over the past year, the Faculty was represented in U of T delegations to India, China and Korea. In addition, we led several targeted visits to research and educational international institutions in Brazil, China, Hong Kong, Malaysia and Singapore.

The Faculty sought to expand our outreach by communicating captivating stories about our research and its implications for society and the economy. In a new series, titled *Research Impact Narratives*, our researchers shared stories and discussed the impact of their work with an audience that included colleagues from within the Faculty, as well as the University at large. The series had four sessions in its first year, in which 12 inspiring stories of research discovery, innovation and impact were told. Twelve two-page write-ups are now available at: <http://uotresearch.pbworks.com> for use by any Faculty unit, as is or with customization.

We continue to work closely with U of T's Innovations and Partnerships Office (IPO), providing feedback on how our Faculty and the IPO can most effectively work together. Throughout 2012–2013, we held a series of sessions in which faculty offered peer-to-peer insights on how best to take advantage of funding opportunities from NSERC (e.g., Discovery, Strategic), U.S. agencies (e.g., National Institutes of Health and Department of Energy), as well as international funding opportunities.

To further our goals to raise awareness and to support emerging research leaders, the Faculty established a new lunchtime panel series entitled *Best Practices in Research*. This series, aimed primarily at pre-tenure faculty but open to all, launched in April 2013. We will continue to identify topics and panellists for the new series to be offered in 2013–2014.

The Faculty participated in NSERC's consultation on the future of its Discovery Grants and Discovery Accelerators programs. We worked with the Ontario Centres of Excellence (OCE) towards harmonizing the applications process for OCE partnerships grants and allied NSERC Collaborative Research and Development submissions. At the provincial level, together with the Office of Government, Institutional and Community Relations, the Faculty participated in a

2013 announcement by the Ontario Minister of Research and Innovation of a \$35-million grant from the Ontario Government in support of U of T research infrastructure.

Our programs, centres and institutes provide an extraordinary range of opportunities for multidisciplinary research and teaching. Collaborative educational and research programs are a fundamental part of U of T Engineering, and the Faculty continues to expand offerings. One key activity was the creation of the Faculty's Working Group for Multidisciplinary Centres and Institutes which featured discussions among those who have led successful CREATE grants, Strategic Research Networks and Ontario Research Fund grants.

The Faculty worked to harmonize the administration of two key undergraduate research support programs, the NSERC USRA and the UTEA, with the goal of releasing a more efficient process for undergraduate research support funding in 2014, and is also working with The Edward S. Rogers Sr. Department of Electrical & Computer Engineering to leverage its online graduate application system towards undergraduate summer research recruitment.

At the graduate level, through 2012–2013, the Research and Graduate portfolios within the Faculty have been working together to raise awareness and promote the Faculty's excellence in research at leading international universities, particularly within those nations offering financial support for students to carry out graduate research abroad.

The Faculty of Applied Science & Engineering takes great pride in the achievements of our researchers. The list of Research Foci Year Two progress highlights below provides further examples of the many advances we have made towards achieving the goals stated within our Academic Plan over the past year.

5. RESEARCH FOCI: YEAR 2 PROGRESS HIGHLIGHTS

5.1 Create new and support current research centres around strategic research themes that make significant, relevant impacts on society.

- Supported PIs as they prepared proposals (letter of intent) for 2015 Networks of Centres of Excellence (NCE) competition
- Supported industry partnership outreach for iCity: Urban Informatics for Sustainable Cities and SFIGC: Scaling Frugal Innovations for Global Cities
- Initiated conversations with prospective industry partners for grants and donations in support of new and growing research hubs (in conjunction with CEIE capital campaign):
 - Institute for Sustainable Energy
 - Centre for Water Innovation
 - Centre for Resilience of Critical Infrastructure
 - Centre for Global Engineering
 - Institute for Multidisciplinary Design and Innovation
 - Institute for Robotics and Mechatronics
- Catalyzed activity to incorporate institute/centre planning into the Faculty's Boundless campaign goals, specifically for the Centre for Water Innovation (CWI) and U of T Transportation Research Institute (UTTRI) proposals

5.2 Increase our Tri-council funding level to \$25-million per annum by 2015.

- NSERC funding continued to grow and CIHR revenue almost doubled in the past year
- Total Tri-Council funding now at \$22.8 million in 2011–2012, up from \$20.5 million in 2009–2010
- NSERC Industrial Partnership funding increased by 17% in 2011–2012

5.3 By 2015, increase the number of Canada Research Chairs by eight (to a total of 30), increase Industrial Research Chairs by six (to a total of 10) and increase Endowed Chairs and Limited Term Chairs by 13 (to a total of 40).

- Number of CRC Tier-II equivalents was increased by 4 to 28 from 24
- Awarded NSERC Design Chair in Multidisciplinary Engineering Design
- Created 2 Junior Chalmers' Endowed Chairs in Engineering Design
- Research Committee spurred conversations among associate chairs/directors of research on NSERC IRCs
- Held roundtable on best practices, tips and lessons from past and current IRC holders
- Ongoing promotion of the benefits of endowed research chairs, limited-term research chairs and NSERC IRC among prospective industry partners

5.4 Develop additional funding sources through the Social Sciences and Humanities Research Council (SSHRC), the Canadian Institutes of Health Research (CIHR), corporations, industries and international granting agencies.

- Focused on industry-sponsored research and matching Tri-council and Ontario partnerships funding
- Created and filled 2 business development positions: Director of Government and Corporate Partnerships, and Director of Foundation and Corporate Partnerships

5.5 Support junior faculty members and emerging research leaders to ensure that they successfully secure external research funding from industry, federal and provincial sources.

- Research Committee and Directors of Corporate Partnerships worked with new faculty to identify and pursue industry partners
- Held workshops on NSERC Discovery Grants held in September 2012
- Established a new lunchtime panel series entitled *Best Practices in Research* to raise awareness and support emerging research leaders

5.6 Raise awareness and promote our research contributions and breakthroughs with peers, funding agencies, industry and the public.

- Mapped and linked Advancement and Research resources via *Research Impact Narratives* lunchtime speaker series
- Supported industry and entrepreneurship-themed events at Spring Reunion 2013
- Worked with Advancement to expand portfolio of industry prospects

5.7 Generate synergistic research partnerships with peer institutions within Canada, and strategic international partners, while taking on leadership roles at the national and international levels.

- Developed connections between Advancement, Vice-Dean Research and PEY offices to track industry partners interested in Highly Qualified Personnel (HQP) and student hiring, and to leverage existing PEY relationships for philanthropy and research
- Working with Directors of International Initiatives within Vice-President University Relations office to build relationships with international corporations and peer institutions
- Ensured Faculty participation on U of T delegations to India, China and Korea, and sponsored Faculty research and educational visits to Brazil, China, Hong Kong, Malaysia and Singapore

5.8 Increase participation and provide leadership on external review committees in granting agencies such as the Natural Sciences and Engineering Research Council (NSERC), Ontario Centres of Excellence (OCE), and the Ontario Ministry of Research and Innovation (MRI).

- Participated in NSERC consultation on the future of its Discovery Grants and Discovery Accelerators programs
- Worked with the Ontario Centres of Excellence (OCE) on harmonizing the application process of OCE partnerships and allied NSERC Collaborative Research and Development submissions
- In conjunction with the Office of Government, Institutional and Community Relations, participated in the 2013 announcement by the Ministry of Research and Innovation of \$35 million in matching funding in support of U of T researchers

5.9 Enhance multidisciplinary, collaborative research endeavours.

- Faculty PIs attracted 2 newly funded NSERC CREATE projects
- Research Committee co-hosted Engineering Global Health Symposium in May 2013
- Collaborated with several U of T departments on research-specific industry outreach
- Initiated new outreach to Tridel, Tower Labs, Tata Industries, ShawCor, Hitachi Canada, Siemens, ABB Canada, Samsung Electronics Canada, Canadian Tire and Schlumberger
- Contributed to establishment of new funded partnerships with Mercedes Benz Canada, Davis & Henderson, Abellon Clean Energy, Cisco Canada (iCity)

5.10 Engage more undergraduate and international graduate students in faculty research activities.

- Worked to harmonize the administration of 2 key undergraduate programs, the NSERC USRA and the UTEA
- Undergraduate participation in summer research increased by more than 20% over previous year; up from 291 students in 2011–2012 to 359 in 2012–2013
- International graduate student enrolment increased to 22.5% (434 students) from the previous year's 19.3% (355 students)

6. Outreach, Collaboration & Influence

Throughout 2012–2013, we have worked diligently on multiple fronts to extend our outreach, engage and grow our collaborative initiatives, and impart our contributions both to the profession and the global community.

In conjunction with the publication of our 2013 Annual Report of Performance Indicators, we created an abridged companion piece highlighting the facts and figures that position our Faculty among the leading Engineering schools in the world. Entitled *Where Innovation Thrives*, this condensed version of the report is targeted to speak directly to the interests of our external audience and other stakeholders.

To augment our external outreach, and in direct correlation with our Academic Plan, we are developing a new corporate prospectus that will allow all members of our Faculty to promote U of T Engineering in an engaging and consistent way. The content will provide focus on our diverse areas of strength, and in particular on research, global impact, education and collaboration. Designed as a customizable system, the prospectus consists of a main brochure and an integrated series of concise, department-centric and research inserts. A complementary PowerPoint is also being developed for international presentations.

The Faculty is continually seeking new opportunities to provide our students with enriching experiences that will contribute to their development as responsible global citizens and expand their global fluency. International exchanges benefit our community from both sides of the experience: our students are enriched through their encounters while visiting our partner institutions, and students from other countries equally gain through their interactions with members of our community. To this end, we have entered into new exchange agreements with two institutions in Asia: Peking University and The South China University of Technology.

To further complement our undergraduate educational experience, we solidified an agreement with Peking University under the Global Educational Exchange (Globex) initiative, in which our students can earn a full course credit during a summer term at the host institution. The School of Mechanical and Automotive Engineering at The South China University of Technology (SCUT) will see up to 20 third-year undergraduates joining our Faculty to complete their fourth-year, with conditional acceptance to the Master of Engineering program through MIE in their fifth year. The first cohort of students has begun to apply, and pending immigration considerations, will arrive to commence their studies in September 2014.

At the graduate level, in November, we formalized an agreement with L'Istituto Universitario di Studi Superiori di Pavia (IUSS) to enhance and strengthen the academic and research collaborations between our two institutions by promoting joint-placement PhDs and developing joint international research programs.

In addition, we partnered with The MasterCard Foundation Scholars Program at the University of Toronto, to help provide talented students from Sub-Saharan Africa with access to high-

quality post-secondary education and training. The aim of the program is to educate and enable students to contribute to the economic growth and social development of their countries of origin. While studying at U of T, students are also provided with the opportunity to participate in two internships to acquire in-depth practical experience.

Our industry partners continue to be supportive and engaged in our student activities, participating in many special events and extracurricular projects throughout 2012–2013, such as the OPSE Aerospace Industry Night, the highly successful You're Next! Career Fair, ILead, the BlueSky Solar Team, and the Capstone Design Projects. Industry partners and alumni are important contributors to two of our newest initiatives: the Multidisciplinary Design Course and The Entrepreneurship Hatchery. Both offerings seek to foster dynamic relationships between these essential supporters and our students. Further involvement from external partners will help our high-value extracurricular activities proliferate.

In November 2012, we created the new position of Communications Coordinator, Alumni and Development. Since then, we have devised a dynamic alumni e-communications strategy that is shaping the direction of our online interactions with alumni, especially with respect to mobile-friendly platforms. We have established a Skule Alumni Twitter account, and created several regional alumni sub-groups on LinkedIn spanning Canada, the USA, China and a number of countries along the Pacific Rim. Our alumni presence online was completely revamped in fall 2012, and this year we added a new "Alumni Spotlight" feature that provides profiles and stories to highlight the many contributions that our alumni make to our Faculty. We now publish our alumni e-newsletter on a regular quarterly basis, and are supplementing this with a new publication, *This (Season) at Skule*, an e-bulletin highlighting upcoming Faculty events.

Over the last year, the Alumni Office underwent a strategic planning review, identifying five key priority areas, which include recommendations for improving the brand awareness of the Engineering Alumni Association. The review also brought some changes to the administrative structure of the Alumni Office with two positions redefined and two new roles created: Volunteer Leadership and Recognition Officer and Alumni Engagement and Partnerships Officer. The primary focus of the Alumni Office throughout 2012–2013 has been dedicated to establishing metrics for alumni engagement, which has helped us develop greater clarity in our understanding of alumni investment in our Faculty, and our goals have been adjusted accordingly.

Engaging our alumni in student activities and co-curricular and extracurricular program enhancements is not only beneficial to the intellectual and emotional health of our community, but is also crucial to the ongoing professional development of our students. It is therefore incumbent upon us to build a robust outreach program and draw our alumni into Faculty activities to the greatest extent possible.

We are therefore initiating a new program to grow engagement between students and alumni through the development of the *Student-Alumni Ambassadors Program*. The concept for this program emerged out of a series of consultations with several student focus groups that began last November, and concluded in May 2013. The objective of the program is to establish a forum

in which students can interact with alumni, fostering opportunities to engage and access the exceptional expertise available to them through our talented alumni volunteers. Students participating in the program will take on recognized leadership positions, and so a further goal of the initiative is to transition these student alumni ambassadors to Class Leaders upon graduation.

We have reshaped our alumni awards calendar, with our Volunteer Recognition event now moving to a bi-annual schedule, and working in conjunction with the Division of University Advancement, have introduced a new annual mentorship appreciation event.

The Engineering Alumni Association (EAA) has been very active this year with four new members coming on board. Members have also been very proactive in providing encouragement to our students and fellow alumni through their presence at Faculty and University events such as Convocation Plaza, Spring Reunion and the U of T Arbor Awards. These proved to be excellent networking opportunities for students, graduands and fellow alumni.

To maintain an active dialogue with our alumni outside of Canada, we created formal Engineering Alumni Association Chapters in San Francisco, Hong Kong and South Korea, and established fundraising committees in Hong Kong, Indonesia, Singapore, South Korea and Taiwan.

Our philanthropic activities have also significantly accelerated over this past year. We launched the Faculty's component of "Boundless: The Campaign for the University of Toronto" in September 2012, and created a powerful multi-media communications package to support the campaign. Our efforts are garnering excellent results with close to \$100 million of our \$200-million goal being raised.

The planned Centre for Engineering Innovation & Entrepreneurship has become a core goal of the campaign, and fundraising for this project is proceeding very well, with proactive fundraising efforts taking place across six countries. A well-developed schematic design for the project has been formulated, and development of a comprehensive cost estimate is now underway. Detailed design development will begin in November, and our hope is to break ground by late summer or early fall 2014.

At our second Annual Dean's Dinner to recognize our top donors, scheduled for October 29, we will publicly acknowledge the generous gifts and support the Faculty has received from our many donors. We are especially grateful to the Engineering Society for their generous \$1-million donation in support of student club space.

The table below further demonstrates our current alignment with the goals stated in the Outreach, Collaboration and Influence chapter of the Academic Plan 2011–2016.

6. OUTREACH, COLLABORATION AND INFLUENCE: YEAR 2 PROGRESS HIGHLIGHTS

6.1 Better understand the breadth of the Faculty's current outreach, collaborative and influencing efforts, then efficiently manage, support, develop and communicate these activities.

- Developed a strategic communications framework
- New corporate prospectus currently in development that will allow all members of our Faculty to promote U of T Engineering in an engaging and consistent way
- Conducted strategic planning review of Alumni Office; identified key priority areas and set recommendations to improve awareness and outreach of the Engineering Alumni Association
- Established metrics for measuring alumni engagement; gained greater clarity in our understanding of alumni investment in our Faculty, and adjusted goals accordingly
- Redefined 2 administrative positions — Volunteer Leadership and Recognition Officer, and Alumni Engagement and Partnerships Officer — to better facilitate alumni relations
- Developed alumni and advancement communications plan

6.2 Continue building meaningful involvement and relations with Engineering alumni.

- Developed an alumni e-communications strategy to shape direction and transition of alumni communications to mobile-friendly platforms
- Established a Skule Alumni Twitter account and created several regional alumni sub-group chapters spanning Canada, USA, China and countries along the Pacific Rim via LinkedIn
- Revamped Alumni page of Faculty website in fall 2012 and added new “Alumni Spotlight” feature, publishing the alumni e-newsletter on a regular (quarterly) basis
- Launched new e-bulletin, *This (Season) at Skule*, to inform alumni of upcoming events
- Developing Student-Alumni Ambassadors Program to foster and grow engagement between students and alumni
- Engineering Alumni Association Chapters now active in Calgary, Toronto, San Francisco, Hong Kong and South Korea

6.3 Strengthen relationships with other University of Toronto Faculties.

- Strengthened collaborations with OISE in curriculum development and teacher training
- Launched the Combined Program in Environmental Science (BSc) and Master of Engineering (MEng) in partnership with UTSC
- Establishing the parameters for a new undergraduate engineering pathway with UTM
- Continuing discussions regarding a mutual interdivisional teaching agreement with the Faculty of Arts & Science; arranged improved access to Arts & Science CS/HSS elective courses for 2013–2014 Faculty course registration
- In June 2013, ESOO identified 3 undergraduate and graduate student instructors to participate in the Big Ideas Camp run by the Institute for Competitiveness and Prosperity, Rotman, and Actua; 100 campers came to U of T for an in-depth experience in applying engineering and technology insights into business challenges

6.4 Further develop sustainable collaborations with industry partners, and expand established partnerships with affiliated hospitals and research institutes.

- Created the positions of Director of Government and Corporate Partnerships and Director of Foundation and Corporate Partnerships to expand and strengthen external ties and build upon industry partnerships
- Established the NSERC Design Chair Multidisciplinary Capstone Project (MCP) Lead Committee, which includes 12 industry representatives
- Fostering relationships between students and industry partners and mentors through the Multidisciplinary Design Course and Entrepreneurship Hatchery
 - Developed the cross-Faculty Multidisciplinary Capstone Design course, which invites client-driven projects sponsored by a variety of industries and industry partners; 19 sponsored projects (MCPs) have been secured for 2013–2014
 - Through UT-IMDI, secured 25 industry-backed summer student projects in 2013, and the Hatchery secured 17 summer mentor fellowships, providing support to 48% of students who had applied for funding
- Planned expansion of the Hatchery Advisory Committee to include alumni entrepreneurs

6.5 Further develop connections with local communities, businesses and the City of Toronto.

- Developing corporate prospectus with focus on research, global impact, education and collaboration
- Continued growth of PEY; participation increased by 49% since 2009–2010 and reached a historic high in 2013–2014 with 690 student placements

6.6 Build upon high school outreach and continue to assess our pre-university activities with the goal of optimizing faculty and student involvement.

- Held another successful Girls' Leadership in Engineering Experience (GLEE) event in May 2013; 71 of the 74 attendees accepted offers to U of T Engineering
- Joined the University-wide President's Scholars of Excellence Program to offer a unique entrance scholarship that contains several innovative components such as a faculty mentor, an online summer research experience and an invitation to innovation camp at the end of first year; 10 students were awarded the scholarship and began their programs in 2013
- Through the ESOO, offered 25 programs and provided over 32,000 hours of teaching related employment (primarily for our undergraduate and graduate student population)
- Implemented a full in-school workshop program for GTA schools; our student instructors visited close to 150 schools last summer
- Students in APS490 and APS112 are working with the Toronto District School Board to (re)design grade and high school science experiments and apparatus, with the goal of integrating engineering design into the science curriculum

6.7 Increase staff, faculty and student awareness of and involvement in professional societies and organizations and governing bodies.

- Sponsored First-Year Instructors' Day to generate greater collaboration among instructors and improve integration between courses

- Launched a *Research Impact Narratives* speaker series in which researchers shared their stories and discussed the impact of their work
- Hosted the Engineering Global Health symposium in May 2013
- Held a series of peer-to-peer faculty sessions to exchange insights on funding opportunities throughout 2012–2013
- Launched a new lunchtime panel series in April 2013 called *Best Practices in Research*
- Communicated current news and announcements proactively to students, staff and faculty via broadcast over new digital display system installed in 13 strategic locations throughout the Engineering buildings
- Engaged faculty and staff through the task force to review the Faculty’s Constitution on the their roles and responsibilities on Faculty Council

6.8 Develop strategic relationships with desirable peer, national and international Engineering schools.

- Solidified new exchange agreement with Peking University under the Global Educational Exchange (Globex) initiative; our students can earn a full course credit during a summer term at the host institution; 7 MIE students participated this year
- Entered a new (incoming) exchange agreement with the School of Mechanical and Automotive Engineering at The South China University of Technology (SCUT)
- Welcomed 212 Brazilian students through the Science Without Borders scholarship program in September 2013
- Formalized an agreement with L’Istituto Universitario di Studi Superiori di Pavia (IUSS) to enhance and strengthen academic and research collaborations between our institutions through joint placement PhDs and joint international research programs
- The Faculty was represented in U of T delegations to India, China and Korea, and led visits to research and educational institutions in Brazil, China, Hong Kong, Malaysia and Singapore

6.9 Increase influence in government and public policy decisions.

- Participated in NSERC’s consultation on the future of its Discovery Grants and Discovery Accelerators programs
- Worked with the Ontario Centres of Excellence (OCE) towards harmonizing the applications process for OCE partnerships grants and allied NSERC Collaborative Research and Development submissions
- Participated in a 2013 announcement by the Ontario Minister of Research and Innovation of a \$35-million grant from the Ontario Government in support of U of T research infrastructure

6.10 Develop a culture of stewardship and gratitude to the alumni and donors who provide philanthropic support to the Faculty.

- Transitioned our Volunteer Recognition event to a bi-annual schedule and introduced a new annual mentorship appreciation event
- Launched the Faculty’s component of “Boundless: The Campaign for the University of Toronto” in September 2012, attended by more than 600 members of the Engineering community

- Organized our second Annual Dean's Dinner in October 2013 to recognize donors and publicly acknowledged their generous gifts and support of the Faculty

6.11 Encourage the participation of administrative staff in professional associations related to their area of expertise, and in the mentoring programs offered by the University.

- Established a Human Resources Office in summer 2013 to support Faculty objectives
- Secured funding and related support from the Office of Student Life for a professional development day for all registrarial staff at U of T held in November 2012 with over 300 staff attending from the 3 campuses
- Established a series of workshops through the Organizational Development and Learning Centre (ODLC) for staff advisors and student life professionals; ODLC now has a number of courses to assist staff working closely with students

7. Resource Allocation

Our resource allocation and academic goals are inextricably linked, and ensuring that adequate resources are available allows us to focus on other key areas of our Academic Plan. In 2012, we proposed to establish a Human Resources office dedicated to serving the specific needs of our Faculty. Throughout the year, we worked closely with the Vice-President Human Resources & Equity Office to create a new structure for an Engineering Human Resources Office that was implemented in the summer of 2013. This newly established HR team is now better positioned to provide the strategic and operational support required by our Faculty.

To address our objective to maximize quality academic time and effectiveness, we ensured that a workload policy committee was established in each academic unit and developed guidelines to ensure balance between teaching, research and service. These guidelines are now being implemented throughout the departments and institutes, and we will review them on a regular basis to ensure that our talented academic staff are able to continue to take full advantage of all the opportunities available to them.

We continually seek new avenues for increasing our revenues and economizing on costs. In 2012–2013, the Faculty remained in a strong financial position, realizing a 7-per-cent increase to our revenue base. This increase is largely due to rising enrolments, particularly of MEng and international undergraduate and graduate students, along with research funding to support graduate students. The increase is also due in part to the new budget allocation model introduced in 2011.

The allocation process has proven to be an effective tool in improving transparency and providing incentives for academic units to increase revenues and contain costs. However, to follow through with our commitment to assess the process after three years, in April, the Faculty struck a task force to review the budget model. The objective of the task force is to identify areas that may benefit from adjustment or refinement, and we will consider recommendations for implementation within the 2014–2015 fiscal period.

The Faculty has now developed a strong, reliable and diversified revenue base with net revenues projected to compound annually at a growth rate of 5 to 6 per cent over the next few years. Through our continued efforts to maximize revenues and carefully manage costs, the Faculty will maintain sufficient operating reserves to fund future obligations and provide for contingencies, as well as fund an important capital reserve for the Centre for Engineering Innovation & Entrepreneurship building project.

Through the Dean's Strategic Fund, eight projects received financial support that will either seed the start-up of new interdisciplinary-based entities, support our objectives to enhance the student experience through innovations in student services, or bring improvement to infrastructure and administrative systems. The proposal evaluation process also presents opportunity to identify and redirect some initiatives toward more economic approaches to

starting up, such as sharing of resources, or building partnerships with the established interdisciplinary collaborative groups within the Faculty, or our partner Faculties.

In December 2012, we instituted the Engineering Instructional Innovation Program (EIIP), through a reserve from the Dean's Strategic Fund. This program is intended to spark the creation or substantial renovation of large undergraduate courses, particularly through effective use of IT. Five projects received funding through the EIIP in 2013.

At the outset of our Academic Plan 2011–2016, we embarked on a three-phase review of our facilities and space utilization, with the goal of identifying opportunities for maximization and sharing of our physical resources. In 2012, we completed the second stage of this review, which concentrated on meeting and conference rooms, and in early 2013, we began the review of our teaching laboratory facilities. The review of the conference and meeting spaces has successfully led to many new opportunities for sharing, and has relieved the need to secure and develop additional meeting facilities in the short term.

One of the core goals of our \$200-million campaign is to address our need to increase the quality and quantity of space through fundraising for new and revitalized buildings. We are pleased to announce that to date, over \$50 million has been dedicated towards the development of the Centre for Engineering Innovation & Entrepreneurship, which is destined to become the future hub of interdisciplinary collaboration within the post-secondary sector.

The following table provides a summary of the initiatives undertaken in 2012–2013 to advance the goals of our Academic Plan.

7. RESOURCE ALLOCATION: YEAR 2 PROGRESS HIGHLIGHTS

7.1 Maximize quality academic time and effectiveness by increasing engagement in high value activities that support students' academic experience, contribute to knowledge creation, and advance engineering research frontiers.

- Created workload policy in all departmental units
- Established dedicated Human Resources Office to serve the specific needs of the Faculty
- Supported ongoing engagement in a number of student activities, such as the OSPE Aerospace Industry Night, You're Next! Career Fair, Blue Sky Solar Team and the Capstone Design Projects

7.2 Place emphasis on Engineering's strategic research areas when considering faculty hires.

- Embarked on a Faculty-wide search to attract 3 new faculty in interdisciplinary areas
- Hired NSERC Design Chair in Multidisciplinary Design and commenced development of a suite of industry-supported multidisciplinary senior design projects to unite design initiatives across the Faculty and foster collaboration, design and innovation

- Welcomed 3 faculty in 2011–2012 and an additional 14 in 2012–2013 with at least one appointment in each of our departments and institutes; all are strengthening our strategic
- research foci or pursuing emerging research directions in support of the new directions in exploration being investigated through our existing and emerging collaborative initiatives

7.3 Provide a supportive environment for faculty members through mechanisms such as start-up funding, teaching skills workshops, and assistance via Associate Chairs, Research to create successful research proposals.

- Accelerated Faculty research awareness program through a new speaker series, workshops and panel discussions on a range of topics (e.g., *Research Impact Narratives* and *Best Practices in Research*)
- Assisted in the formation of NCE applications and securing letters of support and in-kind contributions from industry for 2 new interdisciplinary initiatives: Urban Informatics for Sustainable Cities (iCity) and Scaling Frugal Innovations for Global Cities (SFIGC)

7.4 Improve our chances of being awarded funding for capital projects by pre-planning for various opportunities consistent with our goals and suitable for external funding sources such as CFI, Ontario Ministry of Training, Colleges and Universities (MTCU) and other capital grants. Increase the quality and quantity of space particularly through fundraising for new and revitalized buildings.

- Attracted 3 CFI awards totalling over \$10 million, matched by ORF for a total of \$20 million
- Launched the Faculty's Boundless campaign with a goal to raise \$200-million
- Through our fundraising efforts, secured \$100 million as of fall 2013, of which over \$20 million has been secured toward the construction of the Centre for Engineering Innovation & Entrepreneurship (CEIE)

7.5 Enhance teaching and design facilities, upgrade undergraduate laboratory space, and make flexible space available for extra-curricular activities.

- Completed renovations to create a new workshop and fabrication space for student design projects within the Mechanical Engineering Building
- Renovated space to create the Walter Curlook Materials Characterization & Processing Laboratory in the Wallberg Building
- Completed lab renovations in Wallberg Building, the new teaching computer lab in the Lassonde Mining Building, energy fundamentals lab in the Mechanical Engineering Building, and the relocation of the MIE design shop within the Mechanical Engineering Building
- Committed more than \$1.3 million through the Dean's Strategic Fund in support of additional student laboratory upgrades
- Awarded architectural design contract and commenced design phase of the CEIE, targeting to begin construction in summer or fall 2014
- Commenced final phase of a 3-phase facilities audit focusing on undergraduate teaching laboratories

7.6 Provide reliable, accessible, effective computing services; create study spaces within and outside computer laboratories, library and classrooms so as to enhance interactive learning and socialization where today's student 'lives'.

- Completed Faculty-wide digital display project for wider broadcast of Faculty news, events and program information; installed 13 displays on a networked system at strategic building locations throughout the Engineering precinct
- In cooperation with the Office of Information and Technology Services, upgraded and extended wireless internet access in the Galbraith, Sandford Fleming and Bahen buildings to provide complete building coverage
- Additional highlights of the progress made towards achieving this goal in 2012–2013 can also be found in the Positioning and Educating Engineers sections of this report

7.7 Encourage timely degree completion among doctoral stream students; increase research funding and graduate fellowships to support graduate students.

- Median PhD time to completion currently 5.3 years
- Standardized the minimum graduate stipend across the Faculty
- Successfully transitioned the management of restricted awards (UTF and internal scholarships) from SGS to the Faculty
- Raised a total of \$14.3 million in philanthropic support of research activities and graduate fellowships since inception of our 2011–2016 Academic Plan

7.8 Establish a strong Case for Support that addresses the Faculty's resource requirements and aligns the Faculty's critical need for improved space in the context of addressing educational and research priorities.

- Secured site for CEIE in 2012, which will add the equivalent of 7,000 NASMs (net assignable square metres) of dynamic and interactive design and research incubation facilities to our space inventory
- Embarked on final phase of facilities audit which will serve to inform the development of future proposals, in readiness for application to calls for proposals, and infrastructure and incentive grant cycles

7.9 Increase long-term philanthropic support by strengthening the culture of advancement within the Faculty.

- Created the positions of Director of Development, Director Government & Corporate Partnerships, and Director Foundation & Corporate Partnerships to enhance the Faculty's philanthropic activities and outreach to corporate partners
- Increased outreach to alumni by creating formal Engineering Alumni Association chapters in San Francisco, Hong Kong and South Korea
- Established fundraising committees to support construction of the CEIE in Hong Kong, Indonesia, Singapore, South Korea and Taiwan

- Improved positioning of the Toronto chapter of the Engineering Alumni Association through encouraging proactive participation in strategic Faculty events such as Convocation Plaza, Spring Reunion and the U of T Arbor Awards
- Completed a strategic planning review of the Faculty's Alumni Office

8. Conclusion

This reflection and summation of the achievements and progress we have made during Year Two of our Academic Plan demonstrates that our Faculty is on course with its vision, and moving forward toward reaching our full potential.

As we propel into what, in cyclical terms, is the median year of our Academic Plan, we are poised to hit our stride and carry on in our work to strengthen the innovations we have generated so far, and to continue to develop new directions and initiatives. Through our collective determination and fortitude, we will continue to strengthen our research-intensive culture, ensure academic rigour, increase our global reputation and visibility, enhance student experience inside and outside of the classroom, and extend our outreach and influence on the global platform, bringing us closer toward realizing the abundant promise of our Academic Plan 2011–2016.