10

Our engineering profession must reflect the diversity of the society we serve. A wide range of voices enhances creativity and ensures innovations are designed with inclusion in mind. Our Faculty is committed to fostering an environment in which each member of our community can excel, contribute and benefit from different perspectives. We also take pride in championing diversity across all domains of science, technology, engineering and mathematics.

For the last three consecutive years, our incoming undergraduate cohort has included approximately 40% women, and a similar proportion will join us in September 2019. Across all years of study, in 2018–2019 women represented 35.4% of our undergraduate population, well above the national average of 21.8% reported in the most recent (2017) data from Engineers Canada. We continue to drive Engineers Canada's efforts to raise the percentage of newly licensed women engineers to 30% by the year 2030.

The proportion of women faculty members is more than 21%, and the number of women professors has nearly tripled from 21 in 2005–2006 to 57 today. Women engineers lead many of our multidisciplinary research centres and institutes, and hold positions of senior leadership at the University level. More than one third of our Canada Research Chairs are women.

Our Engineering Equity, Diversity, and Inclusion Action Group (EEDIAG) strives to foster a community at U of T Engineering where students, staff and faculty are genuinely acknowledged, respected and represented. The efforts of EEDIAG are complemented by our newly appointed Assistant Dean and Director of Diversity, Inclusion and Professionalism.

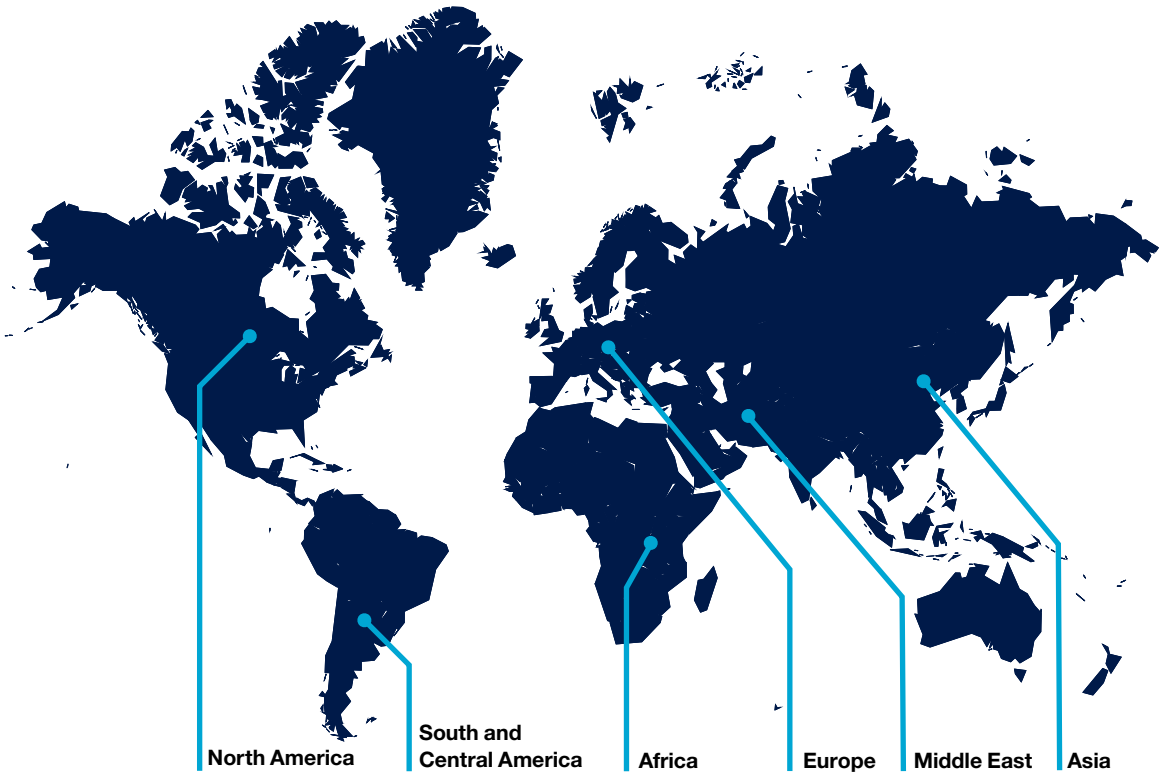
Through our Dean's Advisor on Indigenous Initiatives, our Eagles' Longhouse Indigenous Initiatives Steering Committee, our Dean's Advisor on Black Inclusivity Initiatives and Student Inclusion & Transition Mentor, and our Anti-Black Racism Committee, we work to recognize and challenge power dynamics that may lead to exclusion and discrimination, and to increase the representation of Black students, Indigenous students and other historically underrepresented groups within our community.

Measures of Progress

International Diversity

We have grown our proportion of international undergraduate students from 14.6% in 2009–2010 to 27.5% in 2018–2019. Among graduate students, 36.5% are from outside of Canada, up from 16.6% in 2009–2010. Our strategic recruitment efforts in key regions have attracted talented students from a wider range of countries than ever before, including Brazil, Colombia, Dubai (UAE), Ecuador, Indonesia, Panama, Singapore, Trinidad and Tobago, Turkey and the U.S. *(For more information about our international recruitment initiatives, please see Chapter 9: International Initiatives.)*

Figure 10.1 **Continent of Origin: Undergraduate and Graduate Students, Fall 2018**



	North America	South and Central America	Africa	Europe	Middle East	Asia
Undergraduate Students	59.0%	1.1%	0.9%	1.2%	3.6%	34.1%
Graduate Students	46.8%	1.5%	1.6%	2.4%	11.4%	36.2%
Overall	55.0%	1.2%	1.1%	1.6%	6.1%	34.8%

Data and highlights in this chapter are from September 2018 to August 2019.

Note 10.1: Not shown — 0.1% of undergraduate students from Oceania, which includes Australia, New Zealand and other countries in the Pacific Ocean. Country of origin is derived from a combination of citizenship, location of previous studies (e.g. elementary school, high school and university) and permanent address. This information does not indicate current Canadian immigration status, which is used to determine domestic/international student status for tuition and funding purposes.

Outreach and Inclusivity

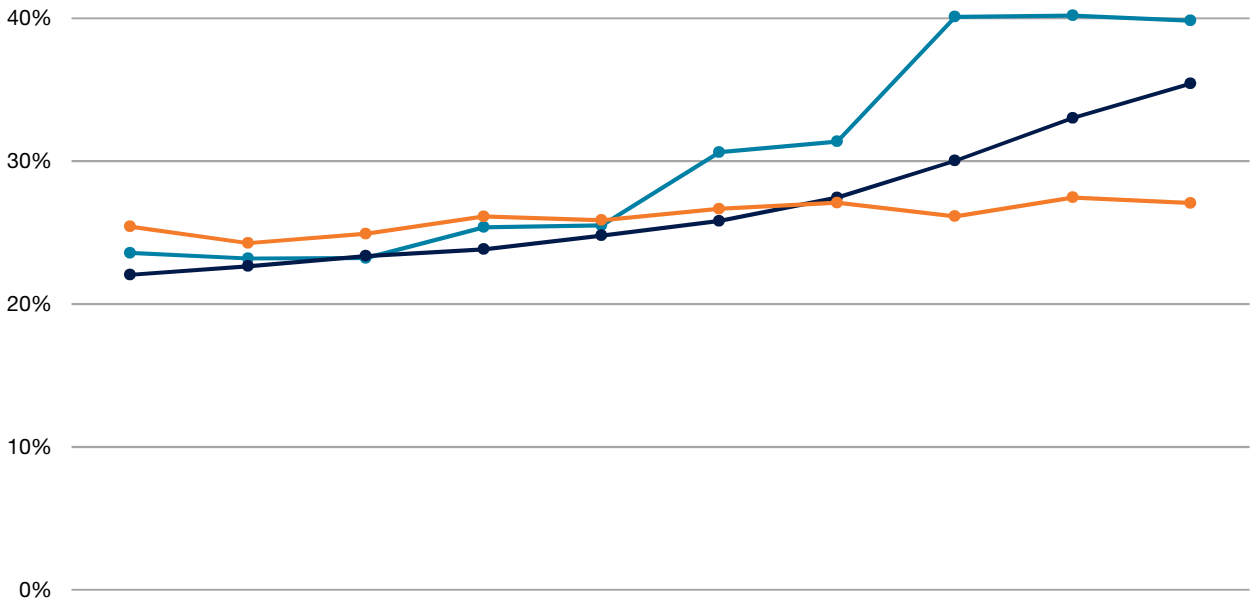
We continue to grow the proportion of women in our undergraduate and graduate programs and to provide a rich environment that supports diversity and inclusion in all forms.

In the 2018–2019 undergraduate cohort, women accounted for 39.8% of incoming students, up from 23.6% a decade ago. Across all years of study, the undergraduate population is now 35.4% women, and 27.1% of graduate students are women. We play a leading role in advancing Engineers Canada's 30-by-30 campaign to raise the percentage of newly licensed women engineers to 30% by the year 2030.

Through strategic outreach and recruitment, we strive to inspire talented women to choose engineering. Our programs increase awareness of the engineering profession and the positive impact of our graduates across a wide range of fields, from medicine to sustainable development. These programs include:

- **Girls' Leadership in Engineering Experience (GLEE):** This program brings together talented young women from across Canada who have been offered admission to our programs for a weekend to meet students, faculty members and alumni and learn more about engineering. In 2018, 91 of GLEE's 117 participants accepted our offer of admission, a yield of 78%. In 2019, GLEE was split into two events, one for students from Ontario and one for students from elsewhere, including other Canadian provinces, the U.S. and Latin America. In April, 24 out-of-province students participated in GLEE, with a further 86 Ontario students attending in May.
- **Young Women in Engineering Symposium (YWIES):** Now in its sixth year, YWIES invites top Grade 11 high school students from the Greater Toronto Area to learn about engineering and our undergraduate programs early in their decision-making process. We attracted 84 students to our fifth annual symposium in May 2018, and an additional 54 in May 2019.

Figure 10.2 **Percentage of Women Students, 2009–2010 to 2018–2019**



	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19
First Year Undergrad	23.6%	23.2%	23.2%	25.4%	25.5%	30.6%	31.4%	40.1%	40.2%	39.8%
All Undergrad	22.1%	22.6%	23.4%	23.8%	24.8%	25.8%	27.4%	30.0%	33.0%	35.4%
Graduate Students	25.4%	24.3%	24.9%	26.1%	25.9%	26.7%	27.1%	26.1%	27.5%	27.1%

Engineering Outreach also offers a range of programs aimed at cultivating an interest in science, technology, engineering and math among girls in elementary and high school, such as:

- **Girls Jr. DEEP:** These one-week courses inspire students to tackle fun and fascinating STEM activities and challenges. Participants conduct experiments, work on engineering design projects and collaborate in an all-girls environment, taught by women undergraduates from U of T Engineering.
- **Launch! Girls Saturday Program:** Hosted at GTA public schools, this program welcomes female students currently in Grades 3–5. Through immersive science and engineering activities, Launch! Girls Saturday inspires confidence in problem-solving strategies, teamwork, and a range of STEM topics.

Since 2010, we have partnered with the U of T chapter of the National Society of Black Engineers (NSBE) to deliver ENGage, a week-long day camp for students in Grades 3 – 8 that provides participants with on-campus activities that demonstrate engineering principles and practices. We reached more than 60 students through ENGage camps held in July of 2018, and anticipate increased participation in summer 2019.

LAUNCH: Science & Engineering Community Camps, are one-week camps in schools and community centres located in neighbourhoods that have been identified as under-served. Like all ENGage programs, LAUNCH operates on a barrier-breaking model and is open to all participants. LAUNCH reached more than 220 students this year through our offerings at Dundas Jr. Public School and John Polanyi Collegiate Institute.

In addition to ENGage programs offered through our Engineering Outreach Office, the Faculty delivers the Urban In-School Workshop program (ISW). In operation for more than 20 years, the program provides more than 100 STEM-related workshops led by U of T Engineering students each May and June in schools within under-served communities.

We also visit schools throughout the province each year through programs such as the Engineering Society's Hi-Skule outreach group and Women in Science and Engineering (WISE).

- **Hi-Skule:** In 2018-2019, Hi-Skule hosted five major outreach events for more than 600 high school students, including a Welcome to Engineering event on campus, a Mentorship Coffee House, and the University of Toronto High School Design Competition. Hi-Skule also sent mentors back to 10 high schools across the GTA to speak to students, and collaborated with the National Society of Black Engineers U of T Chapter on Designapalooza, an event which hosted over 100 students in Grades 5–8.
- **Women in Science and Engineering (WISE):** Our U of T Engineering chapter of WISE recruited 27 student ambassadors and delivered a total of 26 presentations in high schools and through public-facing initiatives such as Science Rendezvous. Elementary school students also had the opportunity to attend Girls in STEM workshops run by WISE in collaboration with U of T's Department of Mathematics. WISE also led a successful high school mentorship program with 20 mentors and 40 mentees, and organized events such as the on-campus event "STEM Student for a Day," a high school conference "Step up with STEM," and a design challenge bringing 200 high school students to campus. In total, WISE reached more than 1,500 students in 2018-2019.

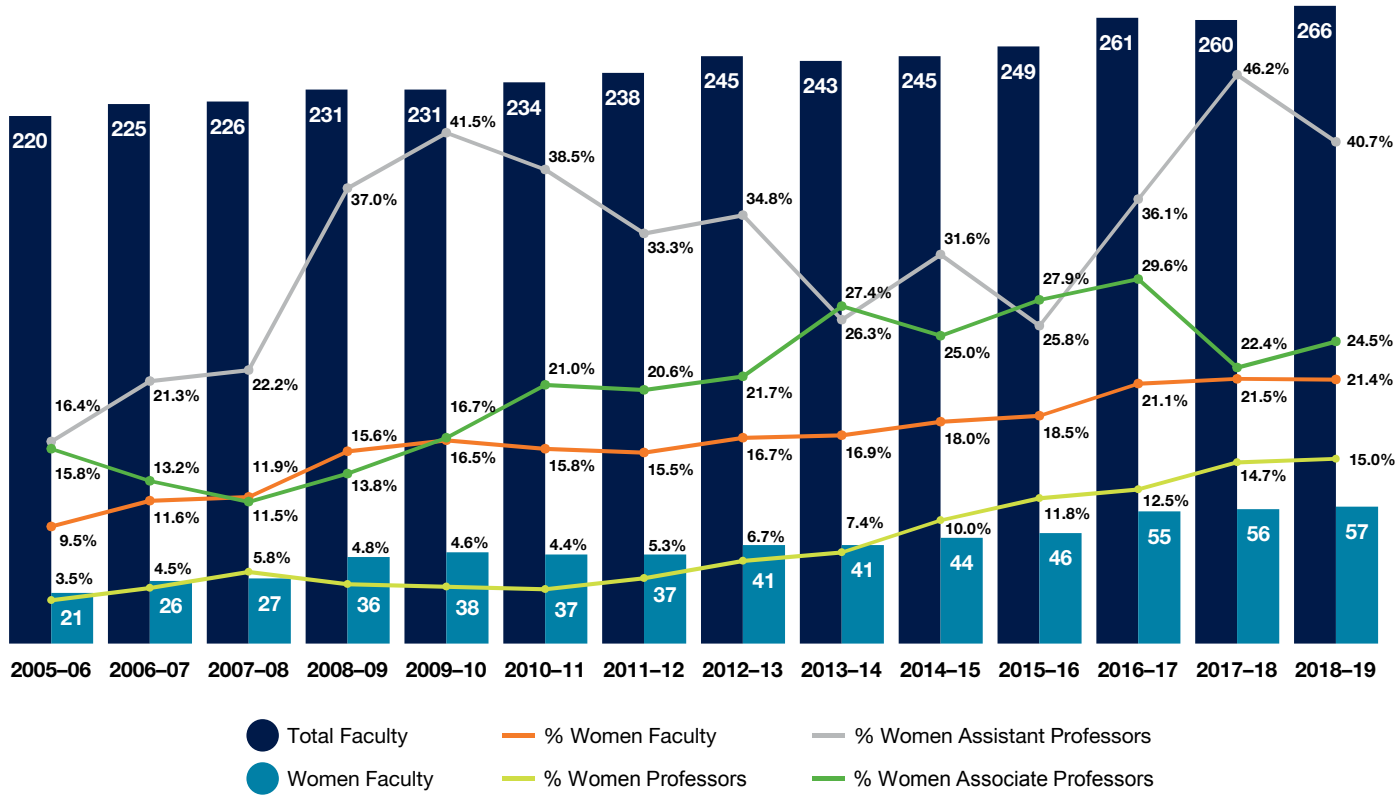
Since 2017, the U of T Engineering Society has appointed an Equity and Inclusivity Director who coordinates with clubs and university services to facilitate discussion and support around these issues. They also work with the Ombudsperson to respond to the needs of students and promote awareness of equity and inclusivity within the Skule™ community.

Outreach and Inclusivity

As part of our ongoing commitment to fostering an inclusive environment, we have significantly increased the proportion of women among our faculty members over the last 10 years. This proportion now stands at 21.4%. While the latest comparison data from Engineers Canada is not yet available, our proportion is higher than any other Canadian engineering school in the U15 group of research-intensive institutions as reported in 2017.

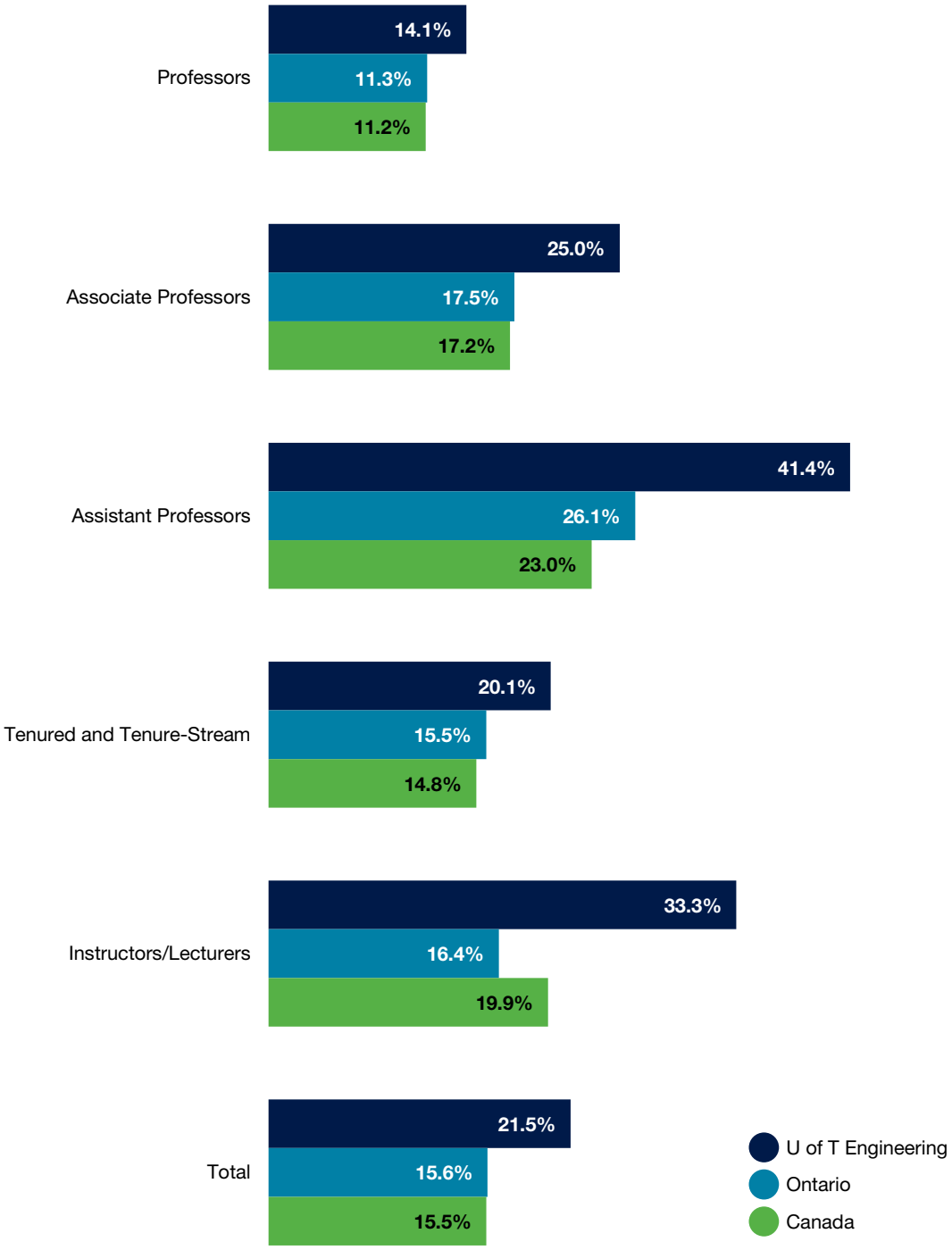
Women hold senior leadership roles across many of the departments and divisions of our Faculty. These include the Chair of our Edward S. Rogers Sr. Department of Electrical & Computer Engineering and the Directors of several of our multidisciplinary research centres and institutes, such as BioZone, the Centre for Global Engineering and Troost ILead.

Figure 10.3 **Total Number of Faculty with Percentage of Women Overall and by Academic Rank, 2005–2006 to 2018–2019**



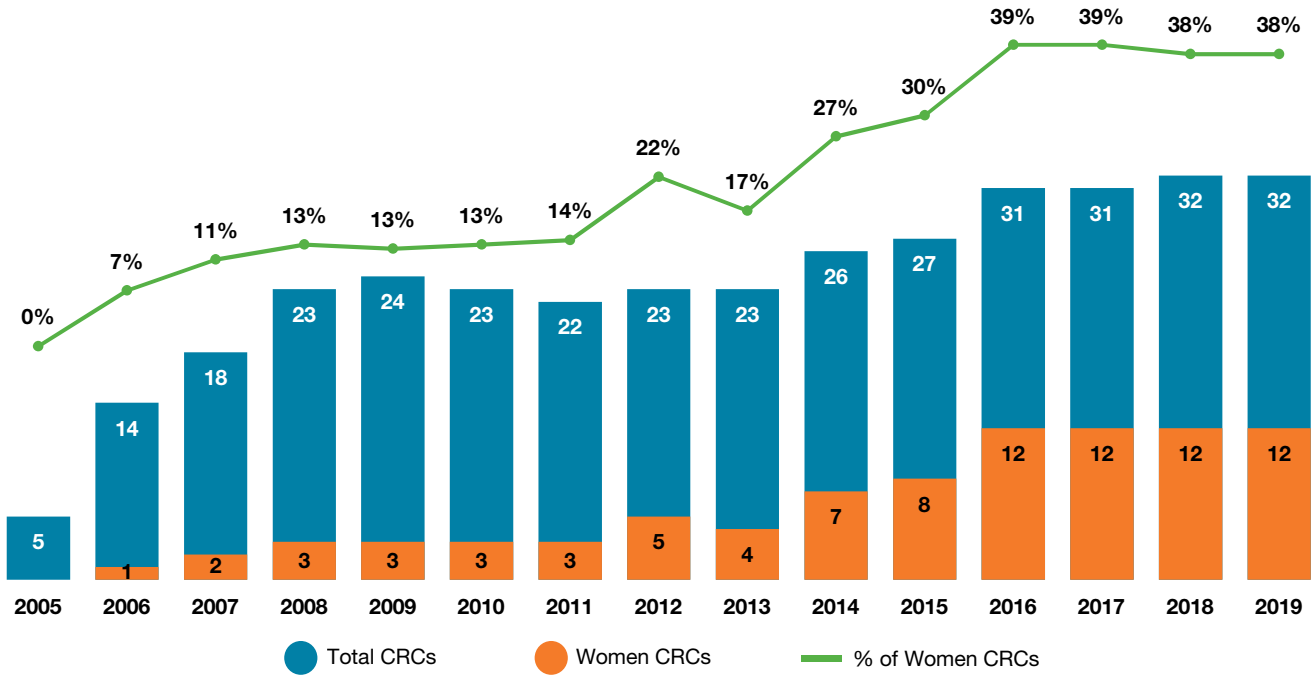
Note 10.3: Data for this figure are based on headcount.

Figure 10.4 **Percentage of Women Faculty at U of T Engineering Compared with Women Faculty in Ontario and Canadian Engineering Faculties, 2017–2018**



Note 10.4: Data for this figure comes from Canadian Engineers for Tomorrow: Trends in Engineering Enrolment and Degrees Awarded, Engineers Canada, 2017. Counts are based on full-time equivalent faculty.

Figure 10.5 **Canada Research Chairs with Number and Percentage of Women Chairholders, 2005 to 2019**



Programs and Initiatives

Equity, Diversity and Inclusion Action Group

The Engineering Equity, Diversity and Inclusion Action Group (EEDIAG) was established in 2018 to advance our Faculty's commitment to fostering an environment in which each member of our community can excel, contribute and benefit from different perspectives. With representation from students, staff and faculty, the group works to identify barriers to access and inclusion of underrepresented groups in engineering, as well as to build more inclusive spaces within our Faculty.

In 2018–2019, EEDIAG has led several initiatives and events, including:

- **Addressing Root Causes: Power, Privilege and Injustice in Engineering Education & Practice**: An invited talk from Professor Donna Riley of Purdue University, this workshop was co-hosted by Troost ILead as part of the Engineering Leadership Seminar series.
- **Monthly Open Conversations:** This event series invites all U of T Engineering community members to discuss issues in equity, diversity and inclusion (EDI). Topics have included: understanding bias, barriers to equity and inclusion, imposter syndrome and making our faculty more inclusive.
- **Towards Inclusive Practices Series (TIPS):** Workshops and seminars on EDI issues in engineering education. Topics have included Foundations for an Inclusive Community, and Understanding & Supporting Students Who Experience Imposter Syndrome. In April 2019 we hosted a session on Accessibility & Accommodations with a particular focus on team work.

The EEDIAG also worked with Engineering Strategic Communications to develop an EDI webpage and implemented a new EDI online suggestion box for receiving community feedback. These resources can be found at uoft.me/EngEDI.

Enhancing Black Inclusivity

Dean's Advisor on Black Inclusivity Initiatives and Student Inclusion & Transition Mentor

In March 2018, we appointed Mikhail Burke (MSE 1T2, IBBME PhD 1T8) to the new role of Dean's Advisor on Black Inclusivity Initiatives and Student Inclusion & Transition Mentor at U of T Engineering. In 2018–2019, Burke formed the Black Inclusion Steering Committee (BISC), which consists of staff, student and faculty members both within

U of T Engineering and from other divisions of the University. BISC has produced an interim report, providing an initial set of recommendations to the Faculty. It notes that the Faculty has shown progress towards the execution of its recommendations, including:

- Formalization of Faculty presence at events such as the NSBE National Convention and the Collaborative Network for Engineering and Computing Diversity (CoNECD) conference hosted by the American Society for Engineering Education;
- Creation and launch of its first anti-Black racism campaign and acknowledgement of Black History Month *(see "Anti-Black Racism Committee" later in this section)*;
- Establishment of a new EDI role/office *(see "Equity, Diversity and Inclusion Action Group" earlier in this section)*;
- Collection of more disaggregated data, feedback and communication pathways.

BISC continues its consultation and the committee's final report is expected by end of summer 2019.

Addressing Anti-Black Racism

In Fall 2018, we established the Anti-Black Racism Committee (ABRC) to take meaningful action in raising awareness of anti-Black biases in our Faculty, and improve the experience of students, staff, faculty and alumni who identify as Black in our community. We launched our first campaign during Black History Month in February, capitalizing on the enhanced attention to achieve two goals: creating a sense of empowerment, community and support among Black students, and highlighting unconscious bias as a barrier to advancing anti-racism. The campaign featured two primary pillars: a news story sharing the personal experiences of students and alumni who identify as Black, and a poster series designed to enhance inclusivity of Black community members, and call attention to pervasive unconscious bias. The news story generated a total reach of 10.4K and 331 engagements on Facebook, and 8.7K reach and 332 engagements on Twitter.

Indigenous Partnerships and STEM Outreach

We are working with U of T's First Nations House and with Indigenous communities to increase the number of Indigenous students who apply to and enrol in U of T Engineering programs, and to ensure a welcoming, supportive and inclusive environment for all students, faculty and staff.

Following the Truth and Reconciliation Commission of Canada's call to eliminate educational gaps between Indigenous and non-Indigenous peoples, the University of Toronto published a report, *Answering the Call: Wecheehetowin,* which outlined proposed actions in six key areas:

- Indigenous spaces
- Indigenous faculty and staff
- Indigenous curricula
- Indigenous research ethics and community relationships
- Indigenous students and co-curricular education, and institutional leadership and implementation

In 2017, we established the Eagles' Longhouse, our Engineering Indigenous Initiatives Steering Committee, which includes members from across our Faculty and the Oneida Nation. The mandate of the Eagles' Longhouse is to engage Indigenous representatives and engineering educators to design a *Blueprint for Action* to ensure a welcoming and supportive environment and to intensify engineering outreach to these underrepresented communities. The committee is chaired by Professor Jason Bazylak (MIE), who was also appointed the Dean's Advisor on Indigenous Initiatives.

The *Blueprint for Action* was delivered in June 2018 and is available online (www.uoft.me/BlueprintforAction). Its recommendations are divided into four areas with immediate, short-term and long-term actions, including:

- **Indigenous Spaces:** Form an ongoing Indigenous Space Committee, involving Indigenous community members, to develop or redevelop existing spaces as Indigenous spaces, commission Indigenous artwork and create educational installations.
- **Indigenous Curriculum:** Integrate Indigenous content into existing curricula.
- **Indigenous Student Access:**
  - Tailor recruitment activities to Indigenous students, including scholarship opportunities and a website with specific content for Indigenous students.
  - Create a network of Indigenous engineers and educators to support mentorship and outreach programs.
  - Initiate an engineering outreach program for Indigenous high school students, and create a transition program for Indigenous students in Grade 10 math to enter U of T Engineering.
- **Indigenous Faculty and Staff Recruitment and Hiring:** Support a program focused on the recruitment and hiring of Indigenous faculty and staff.

We have also initiated three Indigenous community outreach projects, with support through the Dean's Strategic Fund (DSF):

Engineering outreach in Labrador

Led by Professors Erin Bobicki (MSE, ChemE) and Naomi Matsuura (IBBME, MSE), the Labrador Engineering Awareness Program (LEAP) aims to alleviate the geographic challenges faced by Indigenous high school students in accessing engineering education in Labrador, and to spark interest in engineering as a career path. The program was offered in October 2018 for students aged 13 to 18 in five communities across the region. Nearly 100 students engaged with the program, working on design projects that addressed engineering challenges relevant to their communities, in

areas such as mining, snowmobiling, sustainable housing and ice safety. Funding has been secured to continue the program for the next three years, with the number of communities expanding from five to 11.

Drone design at high schools
Partnering with the Dennis Franklin Cromarty High School in Thunder Bay, this project aims to teach science students to design and build drones, providing insight into the many applications that could benefit their communities. The project is led by UTIAS professors Craig Steeves and Jonathan Kelly.

Reconciliation Through Engineering Initiative (RTEI)
This multidisciplinary project, led by the Centre for Global Engineering (CGEN), takes a community-based collaborative approach to infrastructure-related challenges faced by Indigenous communities across Canada.

In June 2019, a CGEN team led by research associates Shakya Sur and Sonia Molodecky visited Sioux Lookout, Ontario to explore a collaboration with the town's proposed Innovation Station. They were joined by representatives from many other First Nations in Northern Ontario, including Slate Falls First Nation, Cat Lake First Nation, Lac Seul First Nation, and Kitchenuhmaykoosib Inninuwug First Nation. Together, they are looking to set priorities for future technology development projects.

The team is also working closely with the Tahltan First Nation in British Columbia, as well as the Nishnabe Aski Nation in Northern Ontario, where they plan to develop techniques in artificial intelligence and operations research to re-design and optimize the operations of the Nation's air transport network.

Selected Highlights

Assistant Dean and Director, Diversity, Inclusion and Professionalism

In May 2019, we created the new position of Assistant Dean and Director, Diversity, Inclusion and Professionalism. They work towards ensuring that every member of the U of T Engineering community can study and work in an environment free of biases based on race, ancestry, place of origin, colour, ethnic origin, citizenship or creed, sexual diversity, age, gender and ability. Working collaboratively with the senior academic and administrative leaders across the Faculty, and with equity officers at the University, the Director develops, leads and implements initiatives to promote diversity and inclusion within the learning and working environments for faculty, staff, and students in Engineering. The position includes extensive collaboration with the Vice-Dean, First Year, and liason with organizations such as Professional Engineers Ontario, and the Canadian Council of Professional Engineers, to lead and implement training and awareness initiatives to prepare students on critical aspects of ethics and professionalism in the field of engineering.

The inaugural Assistant Dean and Director, Diversity, Inclusion and Professionalism is Marisa Sterling, P.Eng., who brings more than 20 years of experience working and volunteering in the engineering field, in both the private and public sectors. She previously served as Assistant Dean, Inclusivity and Diversity, at York University's Lassonde School of Engineering, where her work with students, staff and faculty resulted in improved workplace culture and better inclusion of all people.

NSBE U of T Chapter hosts first student-run Black hackathon in GTA

On January 26, 2019, the U of T chapter of the National Society of Black Engineers (NSBE) hosted NSBEHacks, the first student-run Black hackathon in the Greater Toronto Area in the Myhal Centre for Engineering Innovation & Entrepreneurship. More than 100 attendees had 12 hours to design innovative solutions to challenges posed by the organizers and the event's sponsors, including Google, Shopify, Bloomberg and U of T Engineering.

NSBE conferences build new pathways for Black engineering students

In November 2018, U of T Engineering provided travel grants to three graduate students to attend the National Society of Black Engineers (NSBE) Fall Region 1 Conference (FRC) in Danvers, Mass. The project was initiated by the graduate office as well as Mikhail Burke, Dean's Advisor on Black Inclusivity Initiatives and Student Inclusion & Transition Mentor. Burke travelled alongside the three students: Shane Arnold (CivMin MEng candidate), Oluwasegun Modupe (ChemE PhD candidate) and Mohammad Shoaib (ChemE PhD candidate). The students had the opportunity to build their professional leadership skills, gather career advice, participate in case competitions and network with nearly 1,000 engineering students from across the east-coast regions of the U.S. and Canada.

We also provided support for 18 undergraduate students to attend the 45th NSBE National Convention, held March 27-31 in Detroit, Mich. In addition to this funding, our Faculty had a formal presence at the convention, with Vice-Dean, Undergraduate Tom Coyle attending strategic roundtable meetings and networking with the engineering education community. We also became the first Canadian institution to staff a recruitment booth at this conference. The learnings from this event will further inform our efforts to increase Black student, staff and faculty access, inclusion and success within our community.

The Voice of Engineering survey

The Voice of Engineering survey aims to take the pulse of the Faculty regarding the impressions and experiences of our students toward our institutional climate, diversity and wellness. It is designed for both undergraduate and graduate students from all departments and divisions. By providing baseline data, the survey serves as an important first step to identify underrepresented groups and issues of marginalization, discrimination, disparagement or alienation and to inform policies and initiatives as needed to support these groups.

The Voice of Engineering survey was developed by the Community Affairs and Gender Issues (CAGI) Standing Committee of Faculty Council in partnership with Dr. Glenys Babcock, a researcher and data scientist in the University of Toronto's Faculty of Medicine. The creation of the survey also included wide-ranging consultation across the Faculty on the scope of the questions asked.

The online survey was available to be completed in March and April 2019. Highlights from the report will be provided in Annual Report 2020.

U of T Engineering sends two students to the Arctic Youth Ambassador Caucus

In March 2019, U of T Engineering provided support that enabled two students to attend the Arctic Youth Ambassador Caucus, organized by Global Vision. Lia Codrington (Year 3 EngSci) and Natalie Enriquez-Birch (TrackOne) were among 22 youth leaders, including 11 from Canada's North, selected to visit Iqaluit as part of the program. Over the course of four days, they met with Inuit Elders to learn about the rich history of Nunavut and participate in round tables on Northern issues, such as food security, health care, environment and education. Codrington founded the Indigenous Allyship program within U of T's chapter of Engineering Without Borders, which Enriquez-Birch joined this year. Together with several other students, they have been engaged in self-driven learning about Indigenous culture and history in Canada, as well as working to bring more awareness of reconciliation to campus. In collaboration with the Eagles' Longhouse, they are discussing projects that could focus the efforts of their Indigenous Allyship program. The personal connections they made during the conference will further inform those future plans.

Catalysts for change: U of T Engineering hosts WISE National Conference 2019

The Women in Science and Engineering (WISE) National Conference took place on January 26–27, 2019 at Toronto's Westin Harbour Castle. The event empowered, inspired and connected more than 500 science, technology, engineering and math (STEM) students and professionals from across Canada. The annual two-day conference, founded seven years ago by the U of T chapter of WISE, enabled participants to learn from notable speakers, network with industry professionals and expand their skills in technical competitions and workshops. Featured speakers included physician-surgeon Shawna Pandya; physicist and fashion designer Kitty Yeung; and former CEO of the MaRS Discovery District Ilse Treurnicht.

QueerSphere's gingerbread bridge building competition

U of T Engineering is home to QueerSphere, the student chapter of EngiQueers Canada, which promotes and advocates for the inclusion of LGBTQ+ students and their allies in engineering schools across Canada. The group coordinates initiatives such as constructing a float for Toronto's internationally celebrated Pride Parade. This year, Queer Sphere started 2019 on a sweet note by hosting a student and faculty gingerbread bridge building competition. Teams were given 100 gingerbread cookies, icing and skewers and were tasked to build a bridge across two elevated platforms within 30 minutes. The bridges were then subjected to a stress test of increasing wooden weights. Ultimately, the CivMin's faculty team beat out four other teams with an arch design that withstood over 11 wooden weights before meeting its crumbly end.