6

World Recognition by Rankings

Through a comprehensive suite of metrics, we evaluate our performance in engineering research and education, including the quality of applicants to our programs and the awards and honours earned by our faculty members. International rankings are complementary measures of excellence, capturing factors such as our research influence, reputation, learning environment and knowledge transfer.

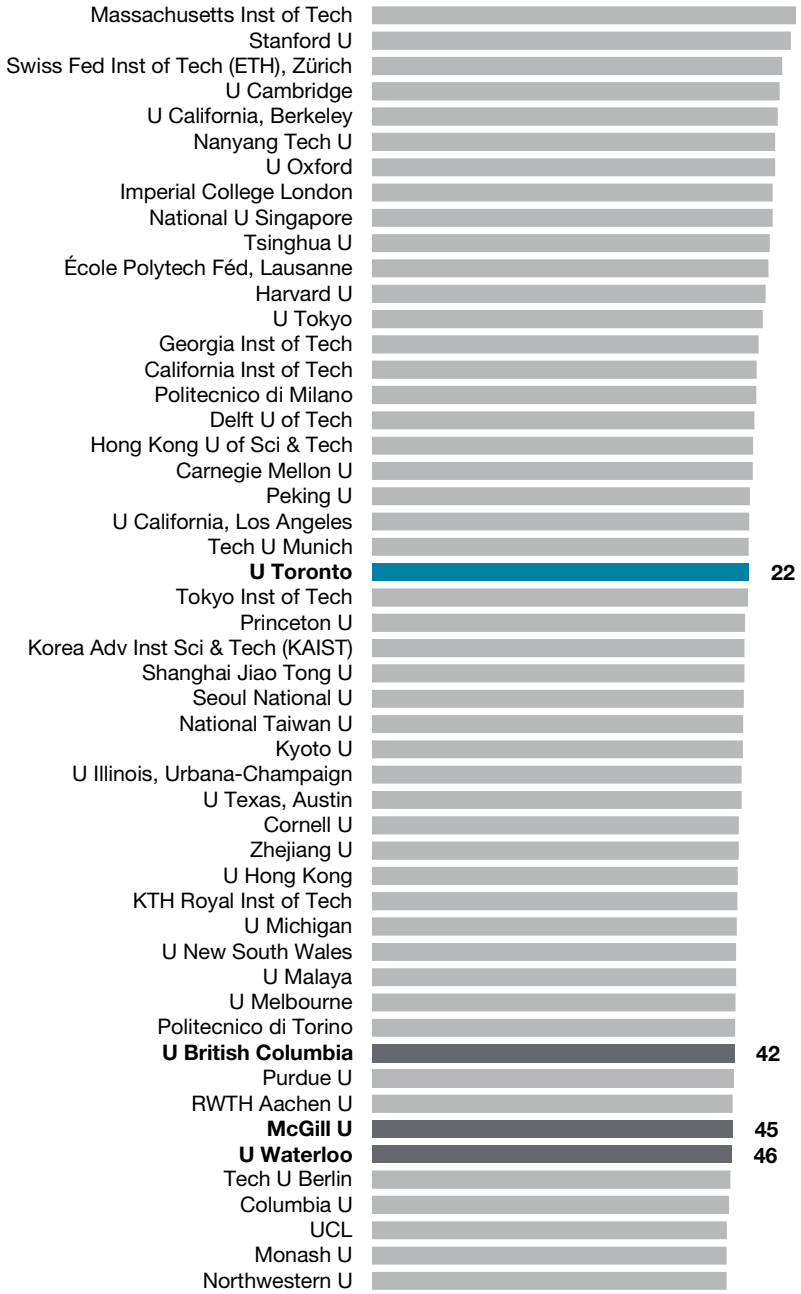
Over the past decade, we have continued to strengthen our position as the highest-ranked engineering school in Canada. This rank is consistent across four organizations that produce world university rankings specific to engineering: the Quacquarelli Symonds World University Rankings (QS), the Times Higher Education World University Rankings (THE), Academic Ranking of World Universities (ARWU) published by ShanghaiRanking Consultancy and the National Taiwan University Performance Ranking of Engineering Papers (NTU; formerly HEEACT). Our Faculty also ranks in the top 10 of North American public universities. We are also the highest-ranked Canadian university across many subject-level rankings, from Chemical Engineering to Electrical Engineering.

While each organization's assessments and methodologies are unique, our high standing across all major rankings is one of the factors that enables us to attract top students, faculty, staff and industry partners. We will continue to focus on maintaining and enhancing our global reputation in the years to come.

Comprehensive University Rankings

QS World University Rankings for Engineering and Technology

Figure 6.1a **QS Top 50 World Universities, 2019**



U of T Engineering ranked 22nd in the most recent QS World University Rankings for Engineering and Information Technology. This was a significant rise from last year's ranking of 43rd and remains well ahead of our Canadian peer universities. Our standing among North American public universities remained in fourth place.

We rank as the top Canadian engineering school in three of the seven engineering and information technology subjects (Chemical Engineering, Computer Science & Information Systems, Electrical & Electronic Engineering) and second in three of the others (Civil & Structural Engineering, Materials Sciences, Mechanical, Aeronautical & Manufacturing Engineering) demonstrating our strength across a range of disciplines.

Data in this chapter include rankings published between August 2018 and July 2019

Figure 6.1b **QS Top North American Public Universities, 2019**

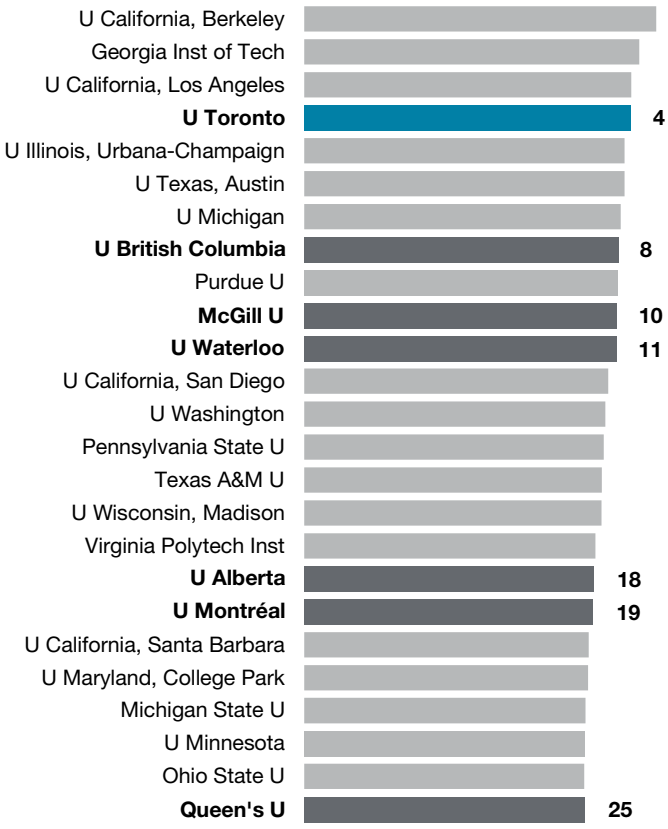


Figure 6.1c **Canadian U15 Universities in QS Top 200, 2019**

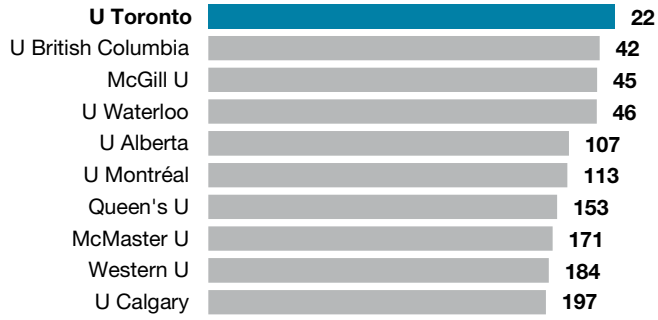
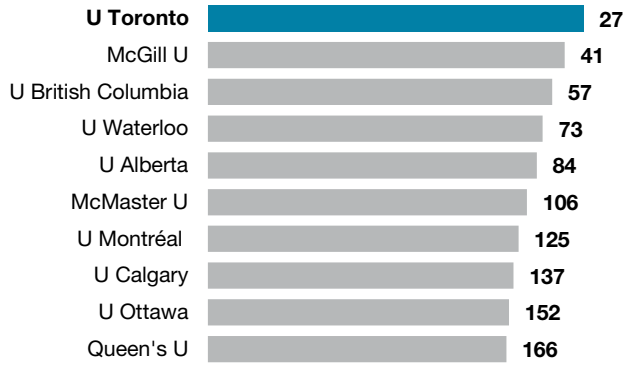
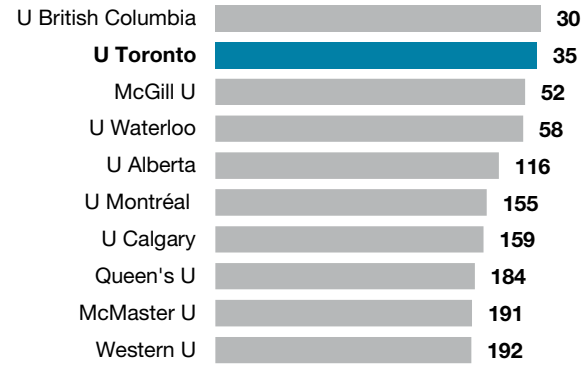


Figure 6.1d **Canadian Universities in QS Top 200 by Subject, 2019**

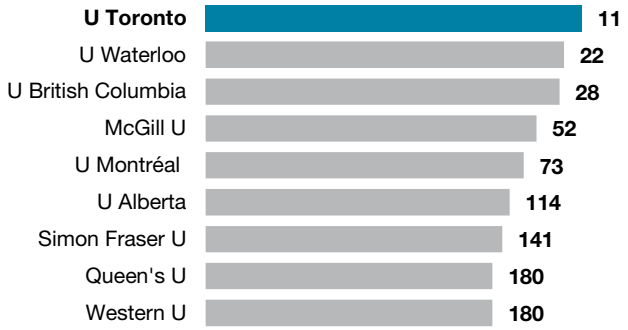
Chemical Engineering



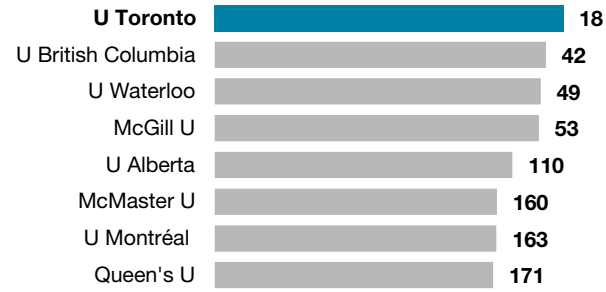
Civil & Structural Engineering



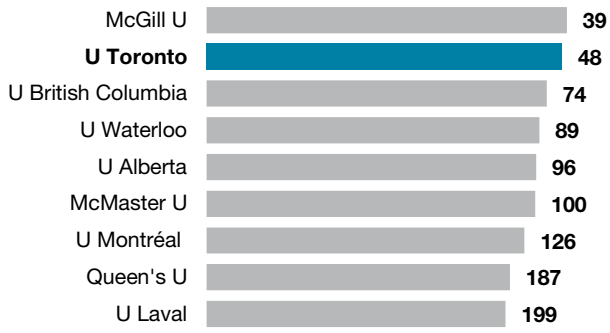
Computer Science & Information Systems



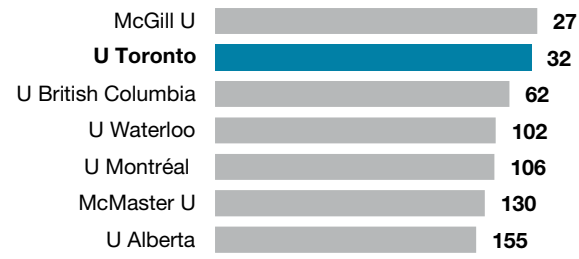
Electrical & Electronic Engineering



Materials Sciences



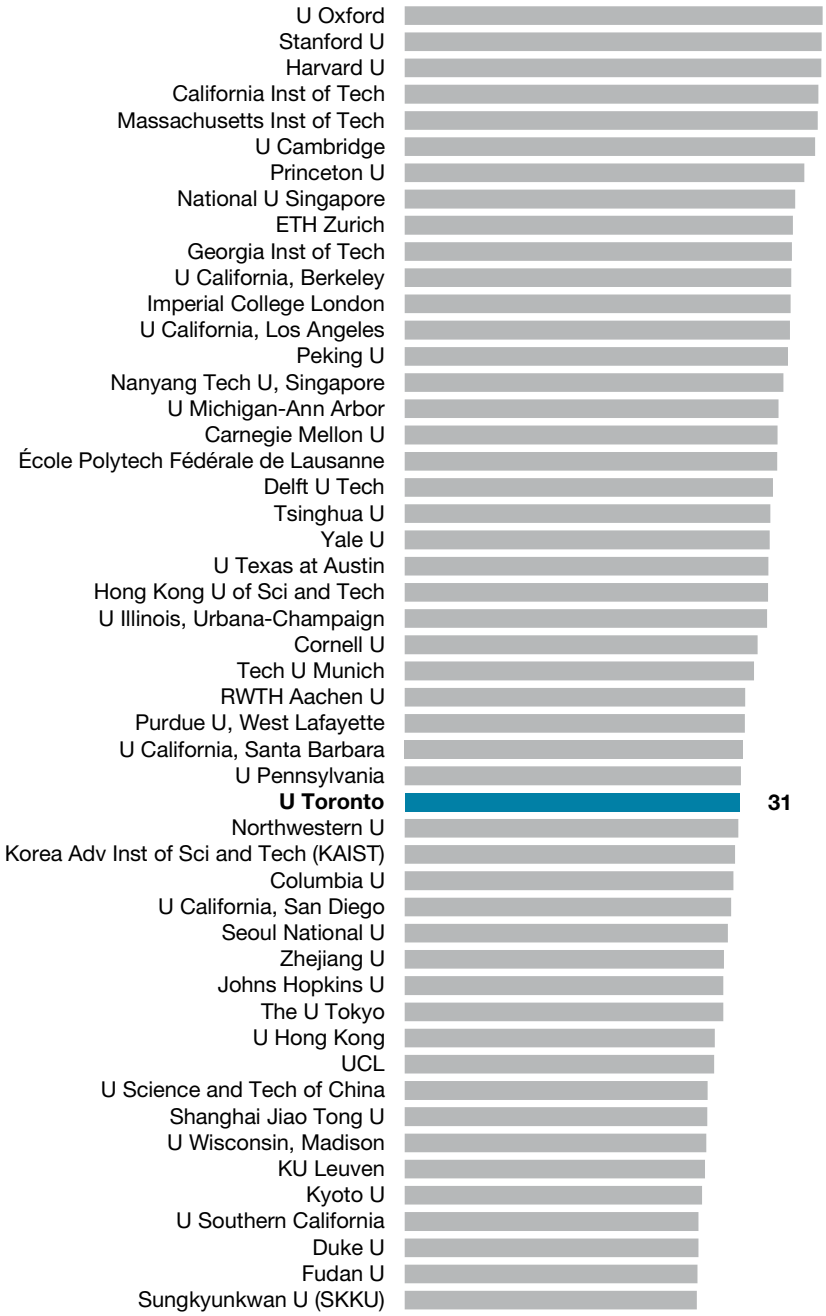
Mechanical, Aeronautical & Manufacturing Engineering



Mineral & Mining Engineering

Times Higher Education (THE)–Elsevier World University Ranking for Engineering and Technology

Figure 6.2a **THE Top 50 World Universities, 2019**



In the 13 years that Times Higher Education (THE) has published rankings in Engineering and Information Technology, our Faculty has consistently been ranked the top Canadian school and among the top 10 North American public universities, this year placing ninth. THE is characterized by the breadth of its evaluation, which uses 13 performance indicators in five weighted categories:

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

Figure 6.2b **THE Top North American Public Universities, 2019**

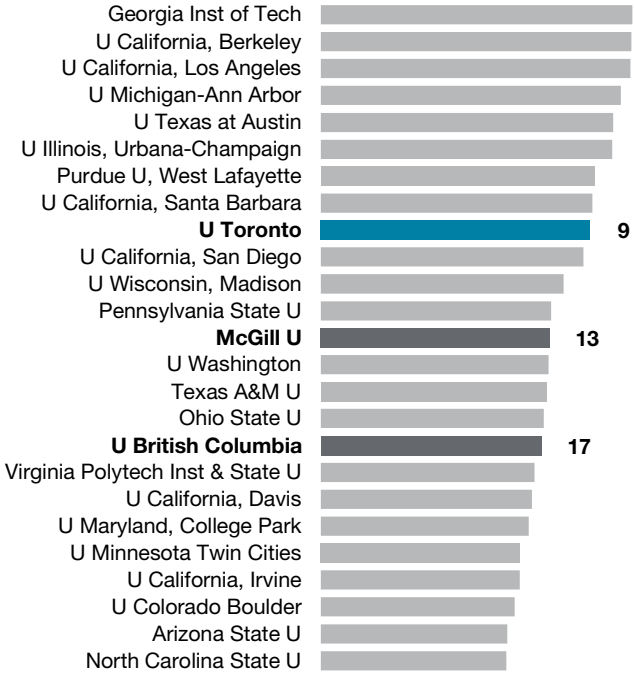


Figure 6.2c **Canadian U15 Universities in THE Top 200, 2019**

Academic Ranking of World Universities (ARWU) for Engineering Subjects

U of T Engineering is Canada's top school across four of the engineering subject-level rankings provided by ARWU: Aerospace Engineering, Biomedical Engineering, Computer Science & Engineering and Materials Science & Engineering. We rank second or third in Canada in four more: Mechanical Engineering, Civil & Structural Engineering, Electrical & Electronic Engineering and Mineral Engineering.

ARWU is produced by ShanghaiRanking Consultancy, and has provided university-level rankings since 2003. The company also provided field-level rankings (e.g., Engineering, Science, Medicine) from 2007 to 2016. In 2016, ARWU first introduced subject-level rankings for engineering disciplines (e.g., Mechanical Engineering, Aerospace Engineering). These subject-level rankings have now replaced the field-level rankings that have formed the basis of our previous reporting. Of the 22 engineering-related fields, which we have chosen to report the nine most relevant to our programs.

The ARWU's methodology has changed in recent years, and is currently based on five scoring measures:

- PUB – The number of papers authored by an institution in an academic subject during 2011-2015, as indexed in Clarivate's InCites report.
- CNCI – Category Normalized Citation Impact: The ratio of citation of papers published by an institution in an academic subject during the period of 2011–2015 to the average citation of papers in the same category, of the same year and same type.
- IC – The extent of international co-authorship.
- TOP – The number of papers published in top journals.
- AWARD – The number of faculty members winning a significant award.

Below is the complete list of ARWU Subject Rankings in Engineering, with those relevant to our programs in bold:

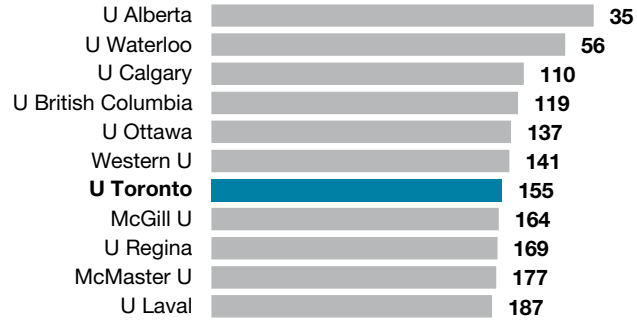
Aerospace Engineering
Automation & Control
Biomedical Engineering
Biotechnology
Chemical Engineering
Civil Engineering
Computer Science & Engineering
Electrical & Electronic Engineering
Energy Science & Engineering
Environmental Science & Engineering
Food Science & Technology
Instruments Science & Technology
Marine/Ocean Engineering
Materials Science & Engineering
Mechanical Engineering
Metallurgical Engineering
Mining & Mineral Engineering
Nanoscience & Nanotechnology
Telecommunication Engineering
Transportation Science & Technology
Remote Sensing
Water Resources

Figure 6.3 **Canadian Universities in ARWU Top 200 World Universities by Subject, 2018**

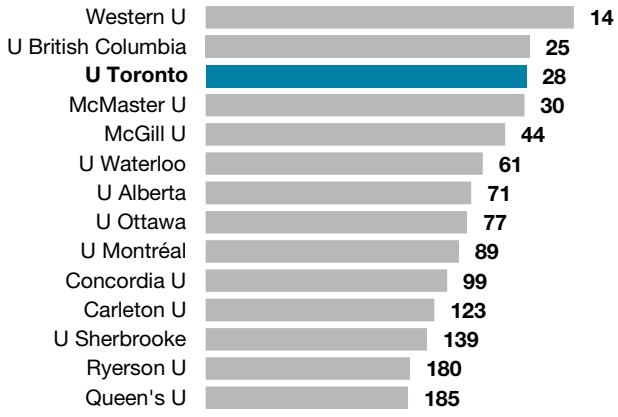
Aerospace Engineering

Biomedical Engineering

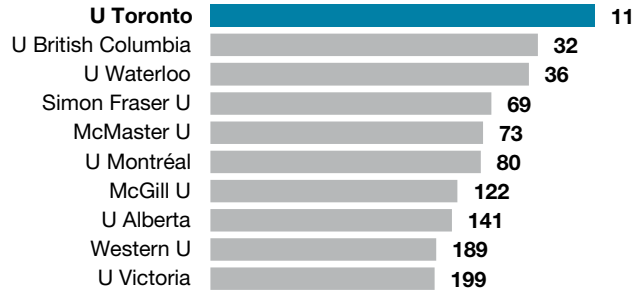
Chemical Engineering



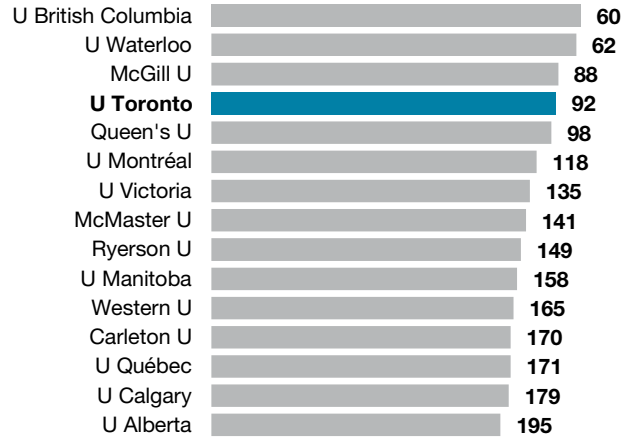
Civil & Structural Engineering



Computer Science & Engineering

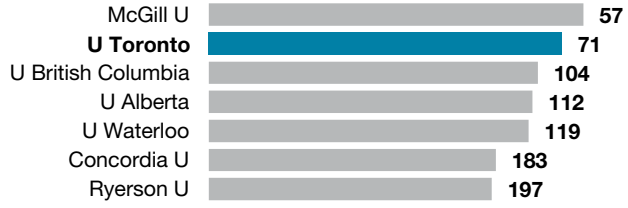


Electrical Engineering



Materials Science & Engineering

Mechanical Engineering



Mineral Engineering

National Taiwan University (NTU) Performance Ranking of Engineering Papers

U of T Engineering ranked first in Canada, eighth among top-tier North American public universities, and 55th in the National Taiwan University (NTU) Performance Ranking of Engineering Papers.

Unlike the other rankings in this section, the NTU rankings are based entirely on bibliometrics. It compares the top 200 universities in the world by subject, using eight weighted criteria grouped into three broad categories:

Research Productivity

- Total number of articles published in the past 11 years (2007–17) [10%]
- Total number of articles published in the most recent year reported (2017) [15%]

Research Impact

- Total number of citations in the past 11 years (2007–17) [15%]
- Total number of citations in the past two years (2016–17) [10%]
- Average annual number of citations over the past 11 years (2007–17) [10%]

Research Excellence

- H-index (measures productivity and impact of published work) of the past two years (2016–17) [10%]
- Number of highly cited papers in the past 11 years (2007–17) [15%]
- Number of papers published in high-impact journals in the current year (2016) [15%]

Figure 6.4a **NTU Top 60 World Universities, 2018**

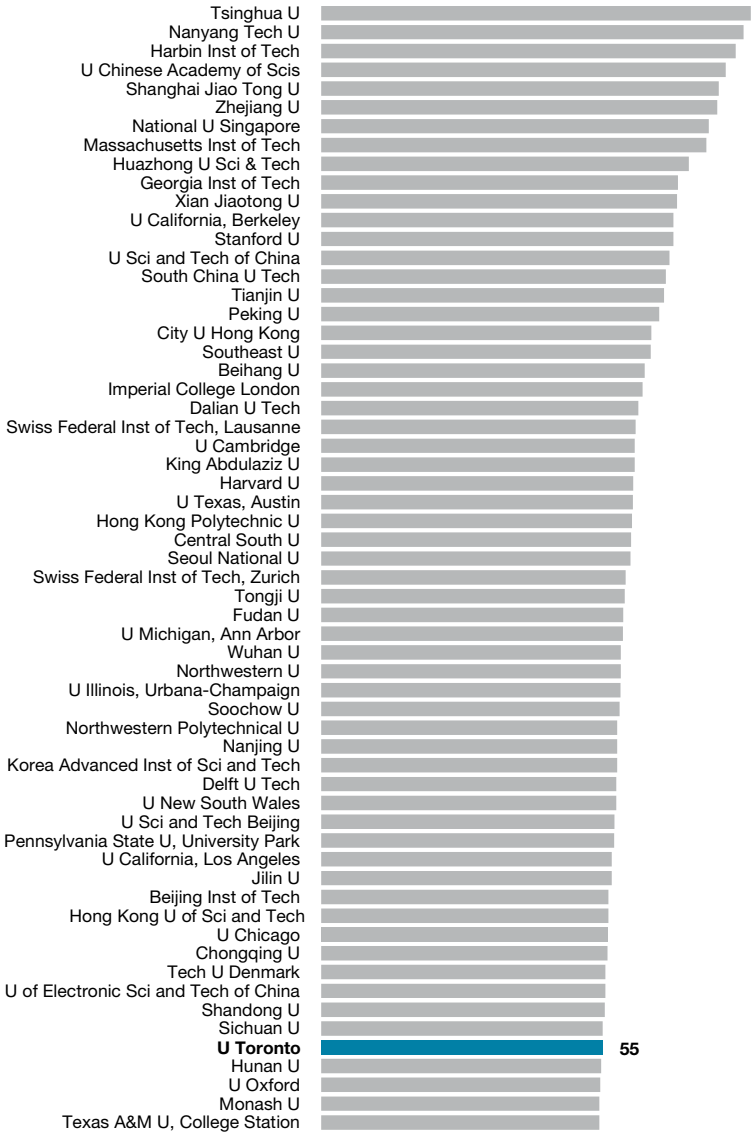
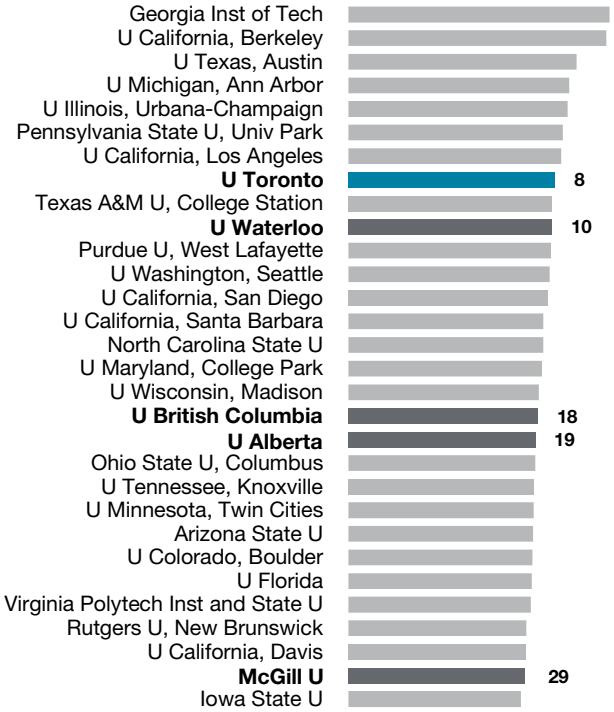


Figure 6.4b **NTU Top North American Public Universities, 2018**



In NTU's rankings of engineering and information technology subject areas, U of T Engineering placed first among Canadian institutions in two out of six subject rankings and second in two more, as shown in Figure 6.4d. We are among the top 50 globally in Computer Science and Electrical Engineering.

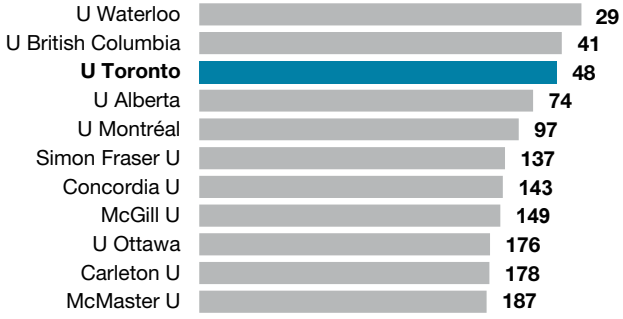
Figure 6.4c **Canadian U15 Universities in NTU Top 200, 2018**

Figure 6.4d **Canadian Universities in NTU Top 200 By Subject, 2018**

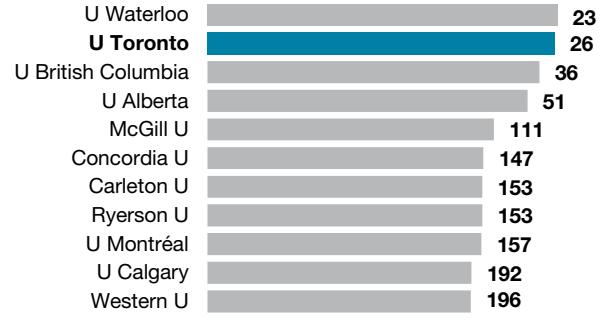
Chemical Engineering

Civil Engineering

Computer Science



Electrical Engineering



Materials Science

Mechanical Engineering

Rankings Based on Publications and Citations

The Association of American Universities (AAU) index measures research output, productivity and intensity based on publication counts. Once again, U of T Engineering ranked 10th in North America and second in Canada, based on a total publication count of 3,169 papers between 2013 and 2017. The metric utilized by this ranking, shown in Figure 6.5a, is influenced by the size of the faculty complement, and tends to favour large faculties.

Figure 6.5a **Number of Engineering Publications Indexed by Thomson Reuters for Association of American Universities (AAU) Public and Canadian Peer Institutions, 2013 to 2017**

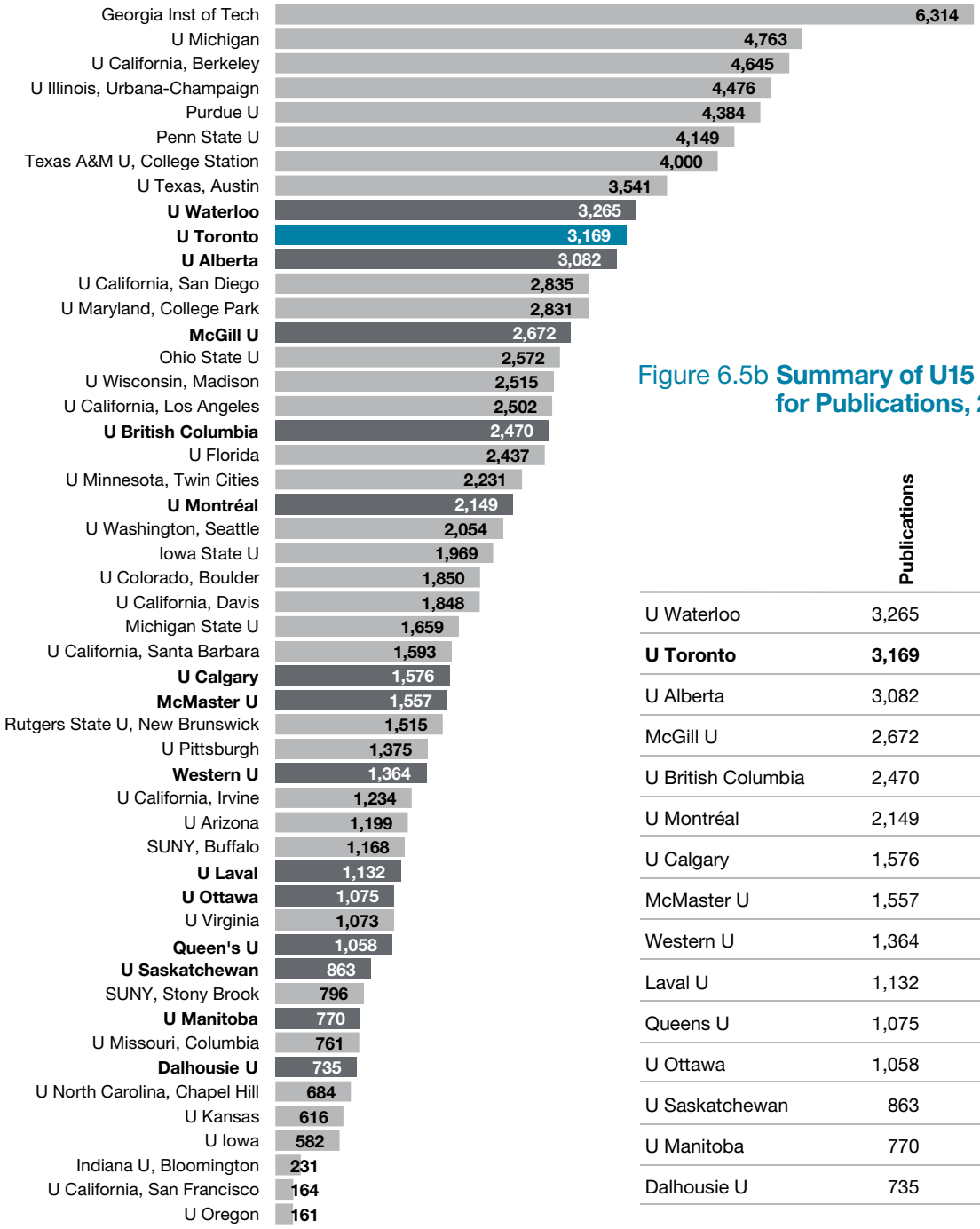


Figure 6.5b **Summary of U15 Bibliometrics for Publications, 2013 to 2017**

	Publications	Faculty Count	Publications per Faculty	Rank on Pub per Faculty
U Waterloo	3,265	296	11.0	6
U Toronto	**3,169**	**261**	**12.2**	**5**
U Alberta	3,082	227	13.6	2
McGill U	2,672	143	18.8	1
U British Columbia	2,470	195	12.7	3
U Montréal	2,149	254	8.5	12
U Calgary	1,576	159	9.9	8
McMaster U	1,557	156	10.0	7
Western U	1,364	108	12.6	4
Laval U	1,132	162	7.0	15
Queens U	1,075	127	8.5	13
U Ottawa	1,058	125	8.5	11
U Saskatchewan	863	87	9.9	9
U Manitoba	770	85	9.1	10
Dalhousie U	735	104	7.1	14

Note 6.5 and 6.6: Faculty counts are based on data from the Engineers Canada Resources Report (2017) Publication and citation data from Thomson Reuters InCites™, updated April 30, 2019.

The AAU index citation counts are based on the total number of papers cited over a five-year period, as well as the frequency of citations per faculty member and article. U of T Engineering placed first in Canada and ninth among North American public institutions in the total number of citations.

We ranked second in Canada for citations per faculty after McGill University, and retained the lead among Canadian universities in the number of citations per publication, which is the metric representing the relevance of our publications as cited by other researchers.

Figure 6.6a **Number of Engineering Citations Indexed by Thomson Reuters for Association of American Universities (AAU) Public and Canadian Peer Institutions, 2013 to 2017**

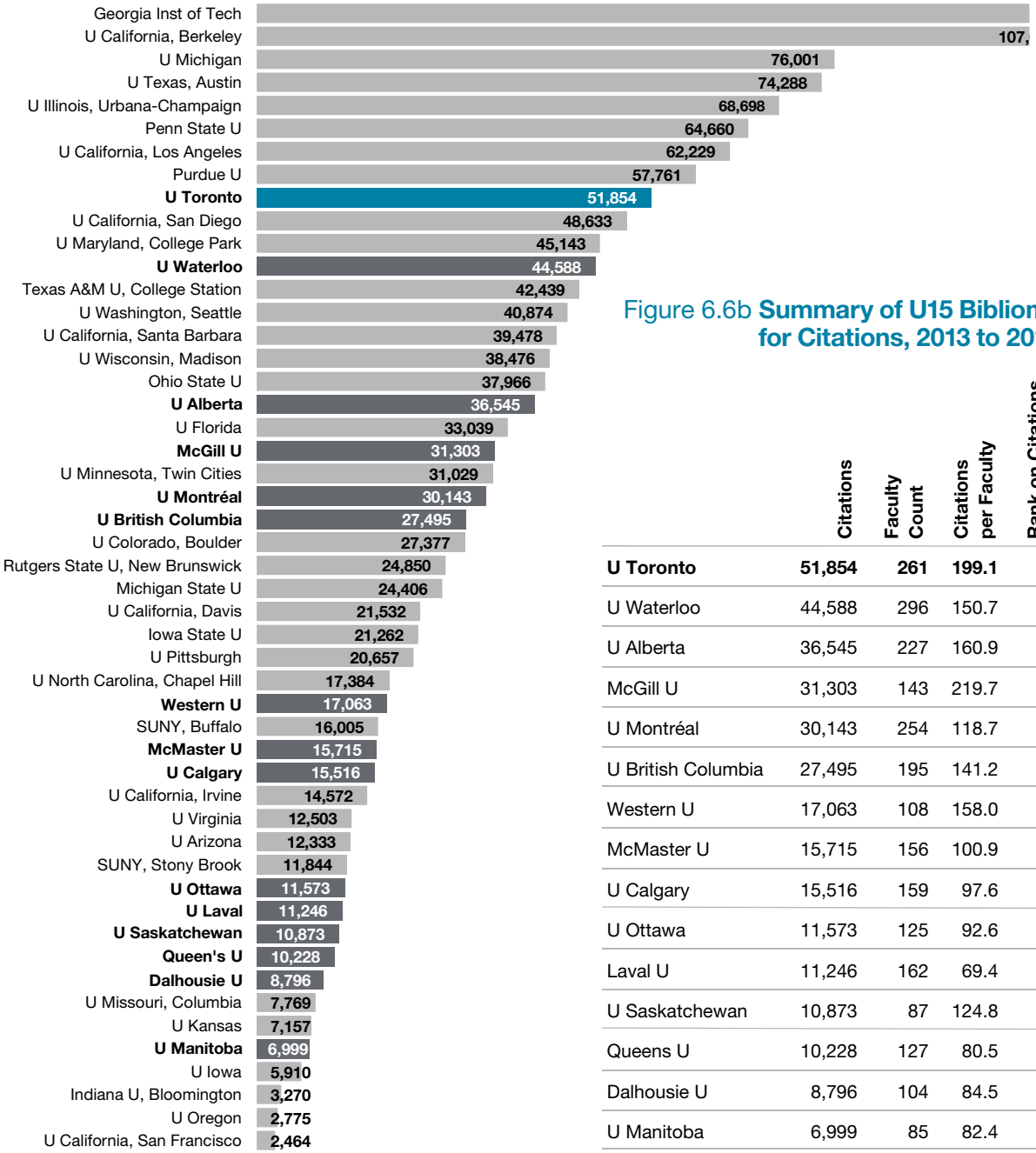


Figure 6.6b **Summary of U15 Bibliometrics for Citations, 2013 to 2017**

	Citations	Faculty Count	Citations per Faculty	Rank on Citations per Faculty	Citations per Publication	Rank on Citations per Publication
U Toronto	**51,854**	**261**	**199.1**	**2**	**16.4**	**1**
U Waterloo	44,588	296	150.7	5	13.7	3
U Alberta	36,545	227	160.9	3	11.9	7
McGill U	31,303	143	219.7	1	11.7	8
U Montréal	30,143	254	118.7	8	14.0	2
U British Columbia	27,495	195	141.2	6	11.1	9
Western U	17,063	108	158.0	4	12.5	5
McMaster U	15,715	156	100.9	9	10.1	11
U Calgary	15,516	159	97.6	10	9.8	13
U Ottawa	11,573	125	92.6	11	10.9	10
Laval U	11,246	162	69.4	15	9.9	12
U Saskatchewan	10,873	87	124.8	7	12.6	4
Queens U	10,228	127	80.5	14	9.5	14
Dalhousie U	8,796	104	84.5	12	12.0	6
U Manitoba	6,999	85	82.4	13	9.1	15

Summary of Ranking Results

In the most recent results available, we strengthened our position as the top Canadian engineering school across all rankings. We placed in the top 10 among North American public universities, our closest peers. Although no ranking can decisively illustrate a school's performance, our high rankings enhance our ability to attract top students, faculty and collaborators from around the world.

Figure 6.7 **Summary of University of Toronto Engineering Performance in World Rankings**

Ranking Organization	Release Date	Canada	North American Public	World
QS World University Rankings for Engineering and Information Technology	**February 2019**	1	4	22
QS World University Rankings by Subject	February 2019			
• Chemical Engineering		1	7	27
• Civil & Structural Engineering		2	7	35
• Electrical & Electronic Engineering		1	4	18
• Materials Science		2	10	48
• Mechanical, Aeronautical & Manufacturing Engineering		2	7	32
• Mineral & Mining Engineering		5	8	22
• Computer Science & Information Systems		1	2	11
Times Higher Education (THE) – Elsevier World University Ranking for Engineering & Technology	**November 2018**	1	9	31
Academic Ranking of World Universities (ARWU) for Engineering Subjects	**July 2018**			
• Aerospace Engineering		1	6	15
• Biomedical Engineering		1	7	27
• Chemical Engineering		7	27	155
• Civil Engineering		3	13	28
• Computer Science and Engineering		1	3	11
• Electrical & Electronic Engineering		4	25	92
• Mechanical Engineering		2	18	71
• Materials Science & Engineering		1	14	69
• Mining & Mineral Engineering		3	6	25
National Taiwan University (NTU) Performance Ranking of Scientific Papers for World Universities by Subject	**August 2018**	1	8	55
NTU Performance Ranking by Subject	August 2018			
• Chemical Engineering		4	20	140
• Civil Engineering		2	12	58
• Electrical Engineering		2	6	26
• Materials Science		1	11	73
• Mechanical Engineering		1	11	73
• Computer Science		3	8	48