



# Memorandum

**Office of the Vice-Principal (Research and Innovation)**

James Administration Building, room 419  
845 Sherbrooke Street W. Montreal (QC) H3A 2T5  
Tel: (514) 398-2995 | Fax: (514) 398-8257

**TO:** Senate

**FROM:** Professor Martha Crago, Vice-Principal (Research and Innovation)

**SUBJECT:** Annual Report on Research and Innovation 2018

**DATE:** March 27, 2019

**DOCUMENT #:** D18-52

**ACTION REQUIRED:**  INFORMATION     APPROVAL/DECISION

**ISSUE** Presentation and discussion on indicators of McGill’s recent research funding performance as well as performance in areas related to innovation and partnership-building between the University and external communities.

**BACKGROUND & RATIONALE** The Annual Report on Research and Innovation is a review of McGill’s performance in major funding programs and progress in areas related to innovation and partnerships in FY2017 and three-year averages from FY2015 to FY2017. It examines how McGill compares to comparable universities and U15 peers in terms of:

- Amount and sources of sponsored research funding
- Sponsored research funding per faculty member
- Tri-Agency funding
- Fonds de recherche du Québec funding
- Industry sponsored research funding including revenue from inventions, licences and options
- National competitions such as Canada Foundation for Innovation, Canada First Research Excellence Fund, and Canada Excellence Research Chairs
- Publications

**PRIOR CONSULTATION** Internal Review by the Office of the Vice-Principal (Research and Innovation) and members of the senior administration.

**SUSTAINABILITY CONSIDERATIONS** Sustainability was a core commitment of McGill’s Strategic Research Plan 2013 – 2017, which the Board of Governors extended until 2018. Sustainability is now inherent in all seven of the Research Excellence Themes outlined in the newly endorsed Strategic Research Plan 2019 - 2024 and has also explicitly been incorporated into one of the Themes: *Design and create sustainable materials, technologies, landscapes, and communities*. The theme highlights research that responds to the challenges of sustaining the life support systems of the planet, advances renewable materials, energy, agricultural, and transportation systems as well as clean technology, in order to develop sound environmental policy.

**IMPACT OF  
DECISION AND  
NEXT STEPS**

Submission for information to the Board of Governors (April 25, 2019)

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**MOTION OR  
RESOLUTION  
FOR APPROVAL**

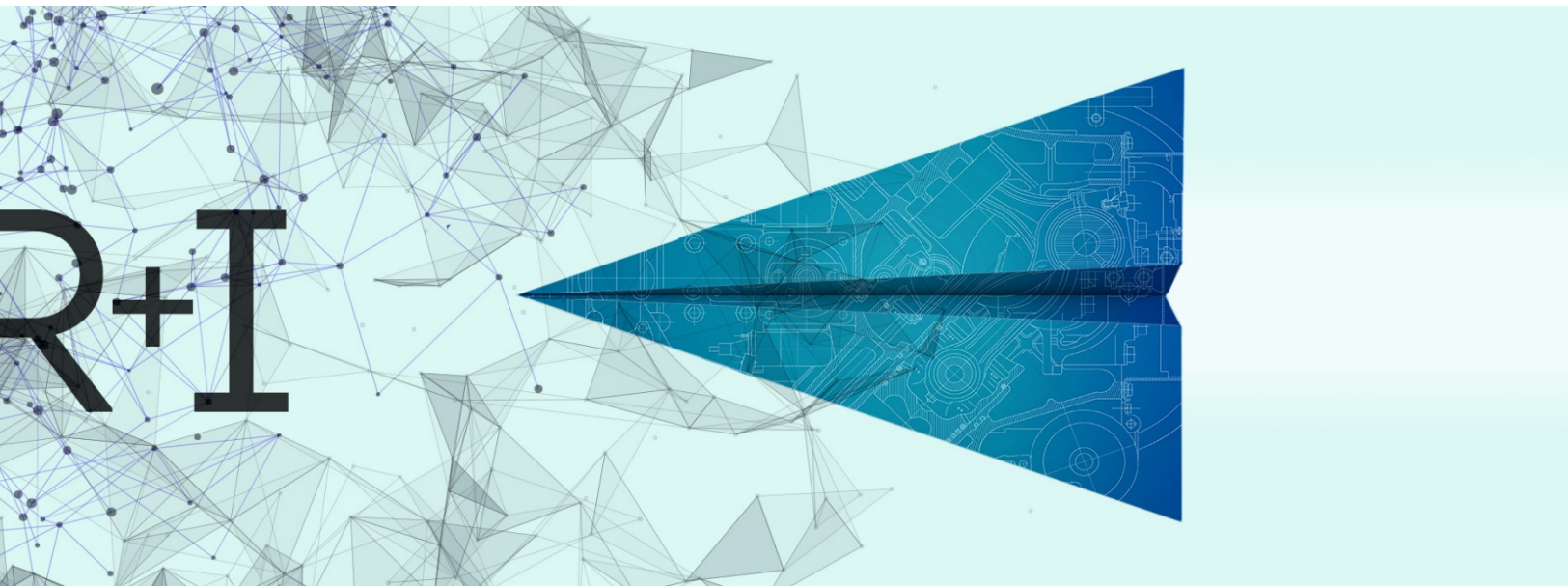
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**APPENDICES**

Appendix A: Annual Report on Research and Innovation 2018

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Report on Research and  
Innovation

2018

Dr. Martha Crago, PhD, C.M.  
Vice-Principal (Research and Innovation)  
*Spring 2019*



# Introduction

The Report on Research and Innovation 2018 reviews McGill's performance in major funding programs and progress in areas related to innovation and partnerships in FY2017 and three-year averages from FY2015 to FY2017. This time period reflects the most recent available data from sources such as the Canadian Association of University Business Officers (CAUBO), a non-profit professional organization representing the chief administrative and financial officers at over 100 universities and affiliated colleges in Canada, the Observatoire des sciences et des technologies (OST), an organization dedicated to science, technology, and innovation, and ReSearch Infosource Inc. a leading research, consulting, and publishing firm specializing in Canadian research and development.

The purpose of the Report is to provide Senate and the Board of Governors with a high-level portrait of McGill's overall research funding, competitiveness relative to our peer Universities, major funding programs, as well as the University's effectiveness in moving discoveries and inventions from our campuses to the community and commercial market. The report also highlights a selection of major research funding achievements and researchers who received major prizes and awards over the past year.

The Report examines the following categories as they pertain to McGill's overall standing among comparable universities and U15 peers:

- Amounts and sources of sponsored research funding
- Sponsored research funding per faculty member also referred to as research intensity
- Tri-Agency funding
- Fonds de recherche du Québec funding
- Industry sponsored research funding including revenue from inventions, licences and options
- Outcomes of national competitions such as Canada Foundation for Innovation (CFI), Canada First Research Excellence Fund (CFREF), and Canada Excellence Research Chairs (CERC)
- Research output in the form of publication quantity and impact

The University of Toronto, University of British Columbia, Université de Montréal, University of Alberta and McMaster University have been selected as comparators due to their strong positioning within Canada as top medical/doctoral, research intensive universities.

For brevity and clarity we have shorted the names of universities and research institutions throughout the Report: University of Toronto (UofT), University of British Columbia (UBC), University of Alberta (Alberta), Université Laval (Laval), Université de Montreal (UdeM), University of Ottawa (Ottawa), University of Calgary (Calgary), Queen's University (Queens), University of Saskatchewan (Saskatchewan), University of Waterloo (Waterloo), McMaster University (McMaster), Dalhousie University (Dalhousie), University of Manitoba (Manitoba), HÉC Montreal (HÉC), Polytechnique Montréal (Poly), University of Prince Edward Island (UPEI), l'Université du Québec à Montréal (UQAM), l'Institut national de la recherche scientifique (INRS), Laurentian University (Laurentian), York University (York), University of Guelph (Guelph), Concordia University (Concordia), Ryerson University (Ryerson).

# McGill University at a Glance

## Sponsored Research Funding (FY2017)

Federal	\$273.1 M	53%
Individuals and Not-for-Profit	\$92.3 M	18%
Provincial	\$64.5 M	13%
Industry	\$41.1 M	8%
Foreign Governments	\$14.0 M	3%
Other (e.g., Municipal Governments, Endowment)	\$30.3 M	6%
<b>Total</b>	<b>\$515.3 M</b>	<b>100%</b>

## Faculty Count (2017)

Tenured and Tenure-Stream Count	1737
Endowed Chairs and Professorships	134
Canada Research Chairs	144
James McGill Professors and William Dawson Scholars	159

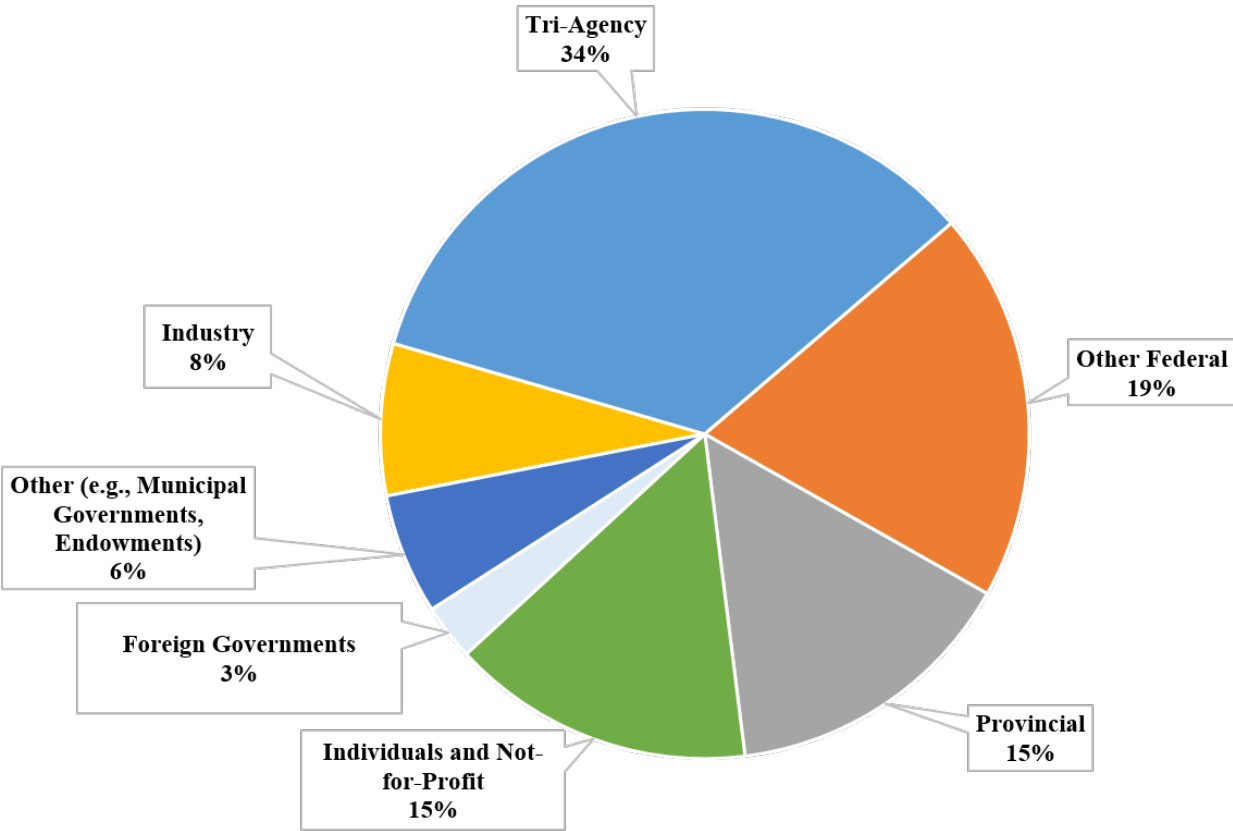
## Student Count (2017)

Undergraduate Count	29,869
Graduate Count	9,511

*Sources: Sponsored Research Funding – CAUBO. Faculty Count – ReSearch Infosource Inc® and McGill Senate Staffing Report. Student Count – U15.*

# Research Funding Performance

## Sources of Sponsored Research Funding, McGill Three-Year Average (2015-2017)



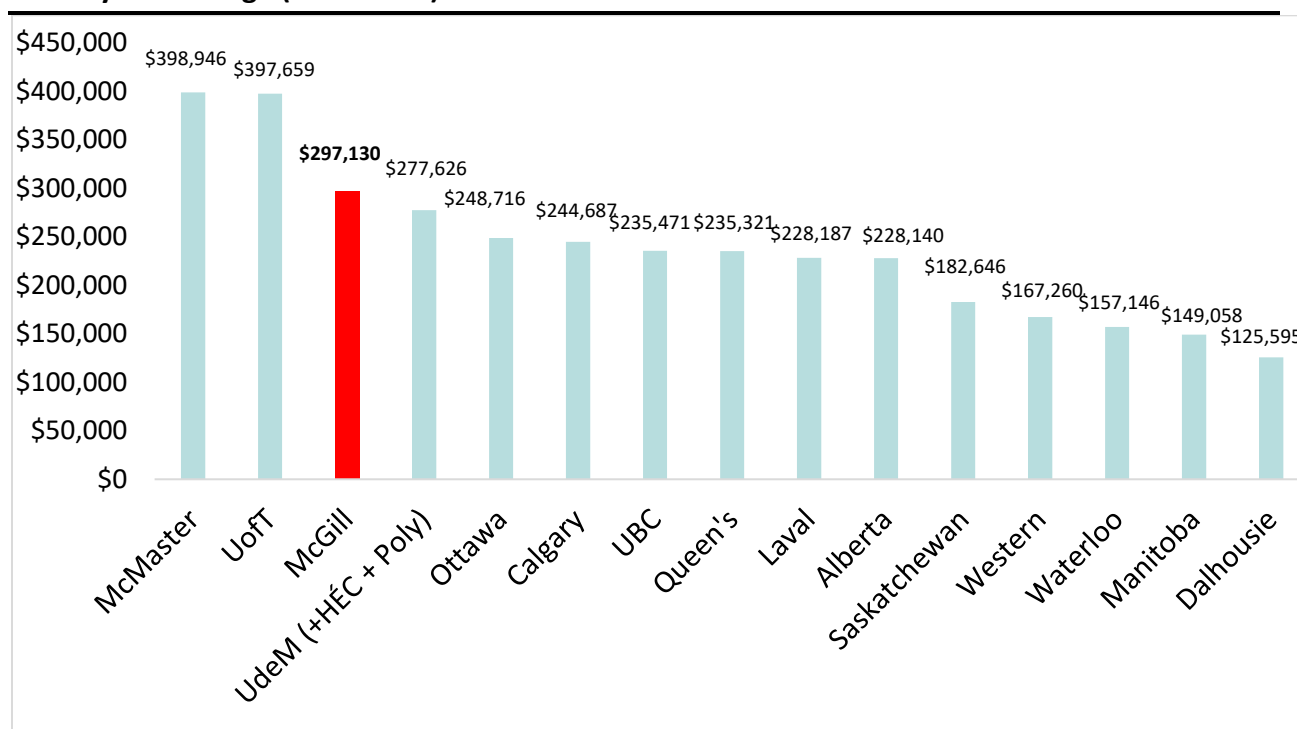
Source: CAUBO

More than half of McGill’s research funding comes from the Tri-Agency and other federal sources.

**Other Federal includes:** Research Support Fund (RSF), Canada First Research Excellence Fund (CFREF), and Canada Foundation for Innovation (CFI), Canada Research Chairs (CRC), Health Canada, Agriculture Canada, International Development Research Centre (IDRC), and Canadian International Development Agency (CIDA).

**Other includes:** Municipal Governments, Other Provinces, Endowment, Other Investments, Sale of Services & Products, and Miscellaneous.

## Total Sponsored Research Funding per Faculty Member, U15 Three-year Average (2015-2017)



Source: Sponsored Research Funding – CAUBO. Faculty Count – ReSearch Infosource Inc. ®

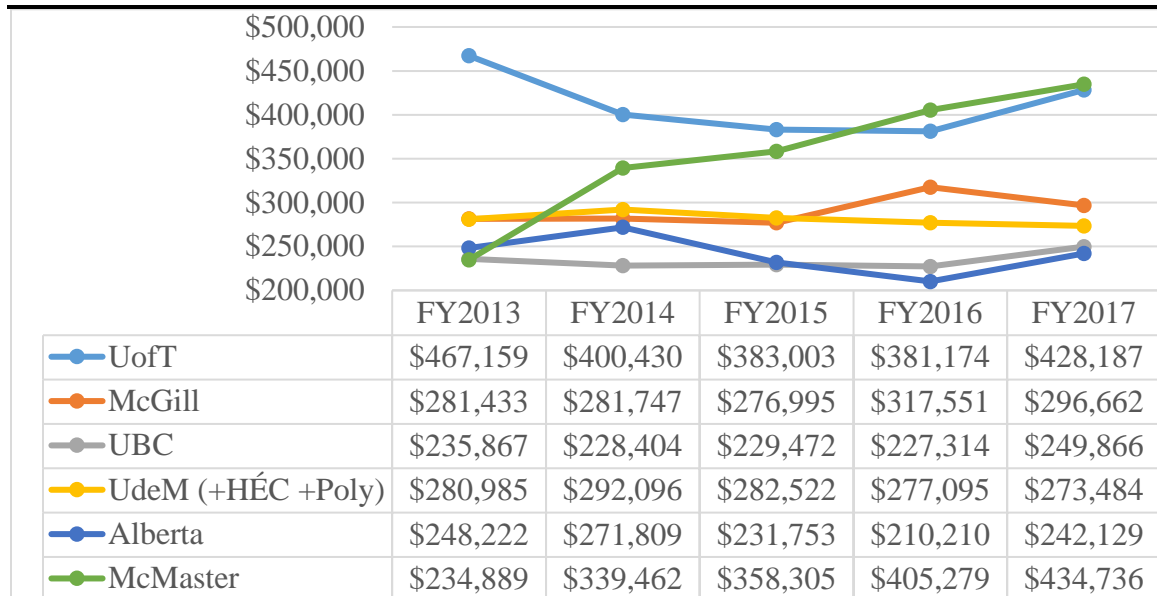
McGill is among the top research intensive universities in Canada as measured by 3-year average amounts of sponsored research funding per faculty member. This indicator can change over time due to changing revenues and/or a change in the number of faculty members.

## Faculty Counts for Six Universities Last Five Years (2013-2017)

	2013	2014	2015	2016	2017
UofT	2377	2600	2607	2645	2680
McGill	1653	1696	1708	1724	1737
UBC	2403	2395	2360	2341	2310
UdeM	1879	1879	1879	1887	1979
Alberta	1683	1703	2031	2063	2120
McMaster	1373	915	906	875	874

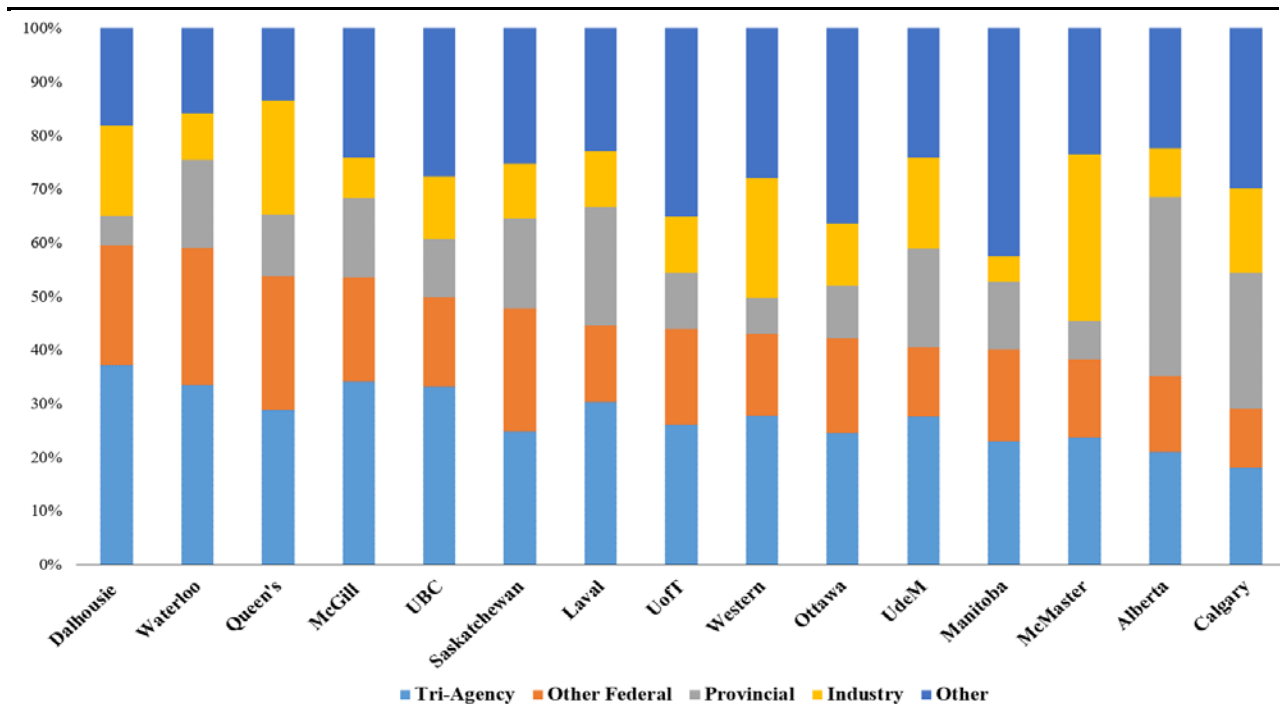
Source: ReSearch Infosource Inc. ®

## Total Sponsored Research Funding per Faculty Member for Six Universities Last Five Years (2013-2017)



Source: Sponsored Research Funding – CAUBO/ Faculty Count – ReSearch Infosource Inc. ®

## Within-University Shares of Sponsored Research Funding, U15 Three-year Average (2015-2017)

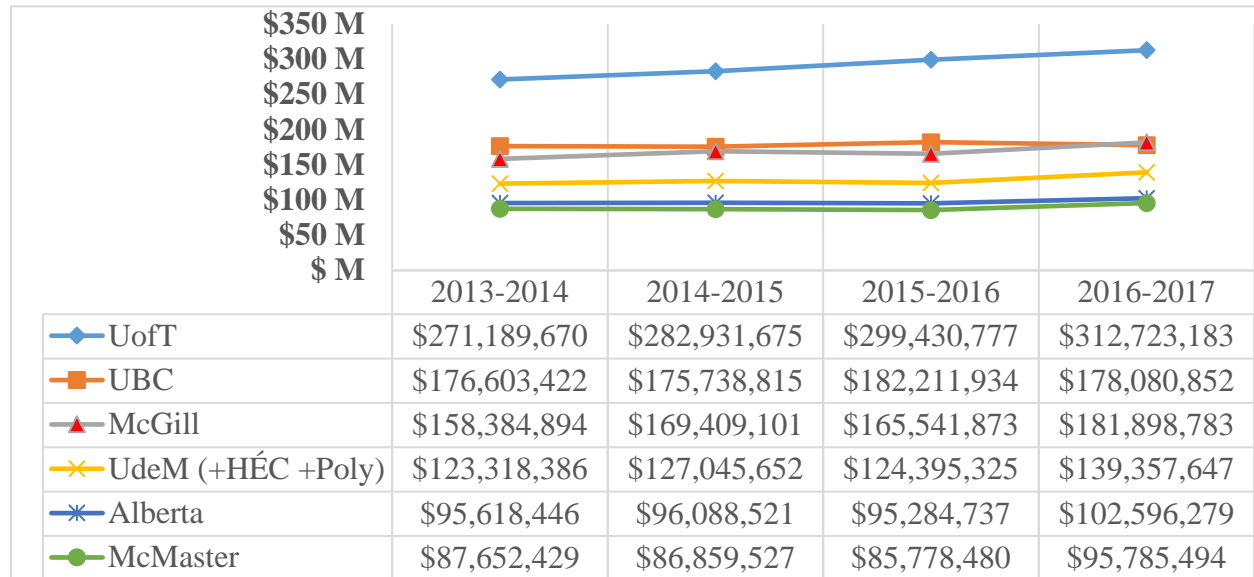


Source: CAUBO

Universities have been arranged in order of overall federal funding (Tri-Agency + Other Federal). McGill is 4<sup>th</sup> in the U15 and 1<sup>st</sup> in the U5 in proportional reliance on federal funding.



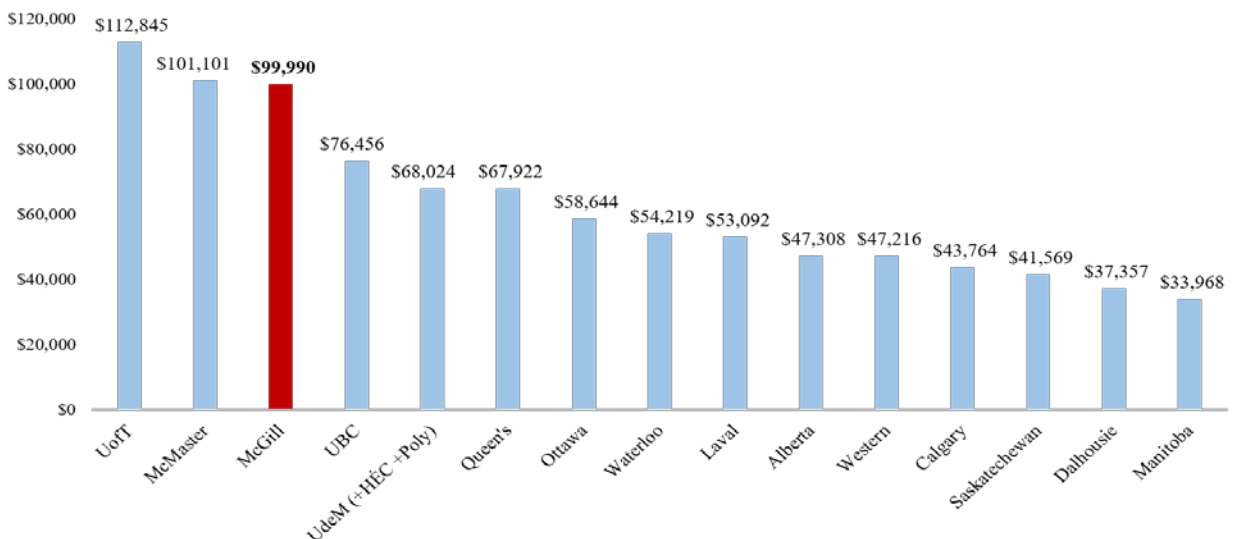
## Tri-Agency Overview: Total Funding for Six Universities Last Four Years (2013-2017)



Source: Tri-Agency Statistics compiled by OST; excludes Network of Centres of Excellence (NCEs), CFI, CRCs, and CFREF.

Funding from the Tri-Agencies remains relatively stable over time for most institutions.

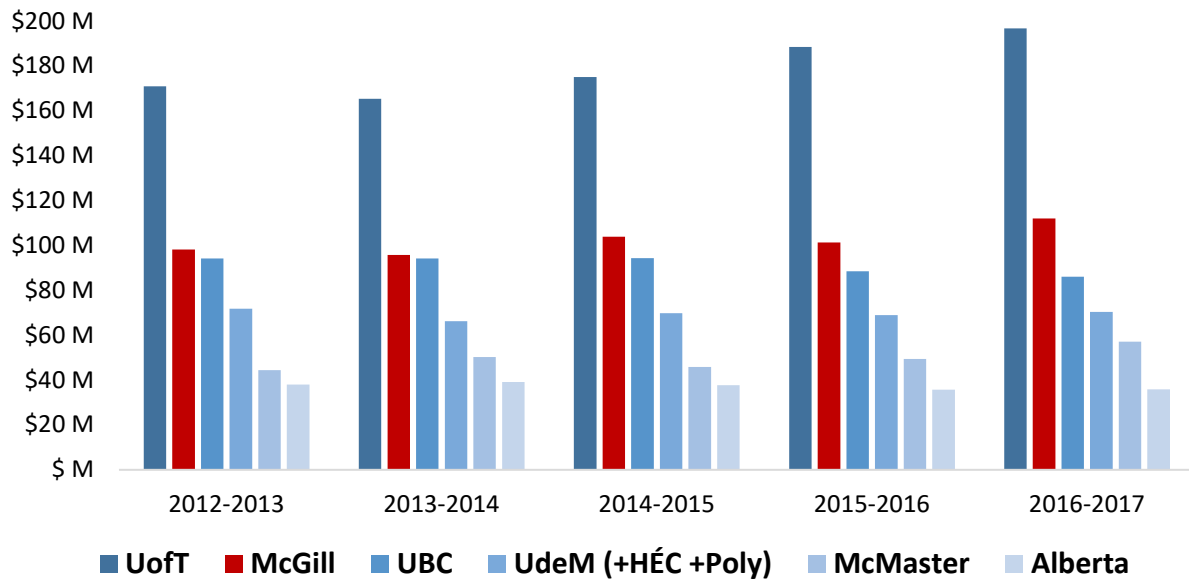
## Total Tri-Agency Funding per Faculty Member, U15 Three-Year Average (2015-2017)



Source: Tri-Agency statistics compiled by OST. Faculty Count - Research Infosource Inc.®

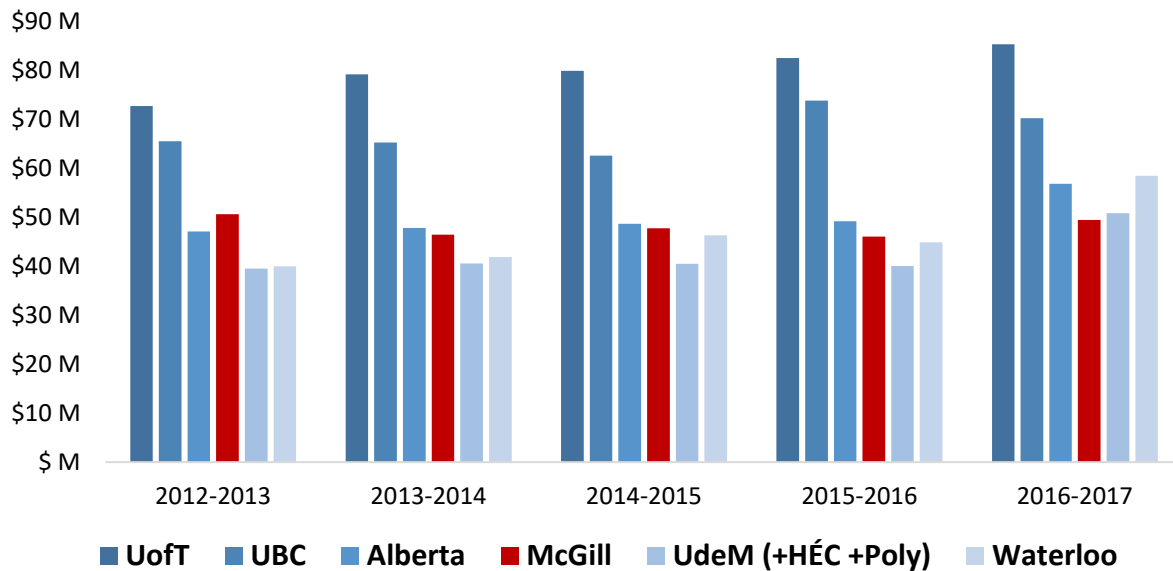
McGill is in a small group of Canadian universities whose Tri-Agency funding per faculty member is near or above \$100K.

**Total Canadian Institutes of Health Research (CIHR) Funding for Six Universities  
Last Five Years (2012-2017)**



Source: Tri-Agency statistics compiled by OST

**Total Natural Sciences and Engineering Research Council (NSERC) Funding for Six Universities  
Last 5 Years (2012-2017)**

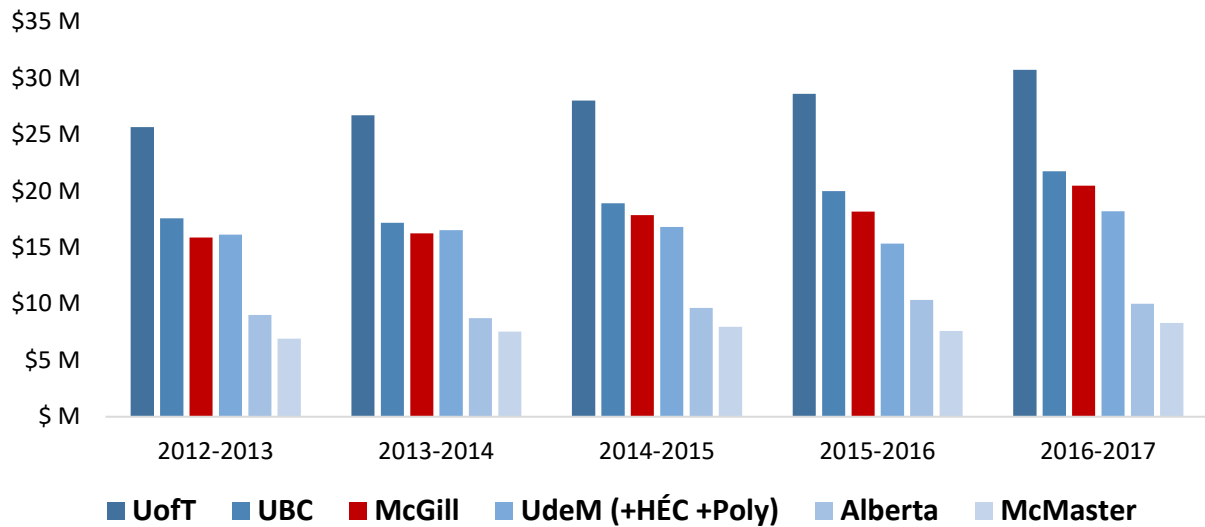


Source: Tri-Agency statistics compiled by OST

Waterloo is included as a benchmark institution for NSERC funding given their specific strengths within the natural sciences and engineering domains.

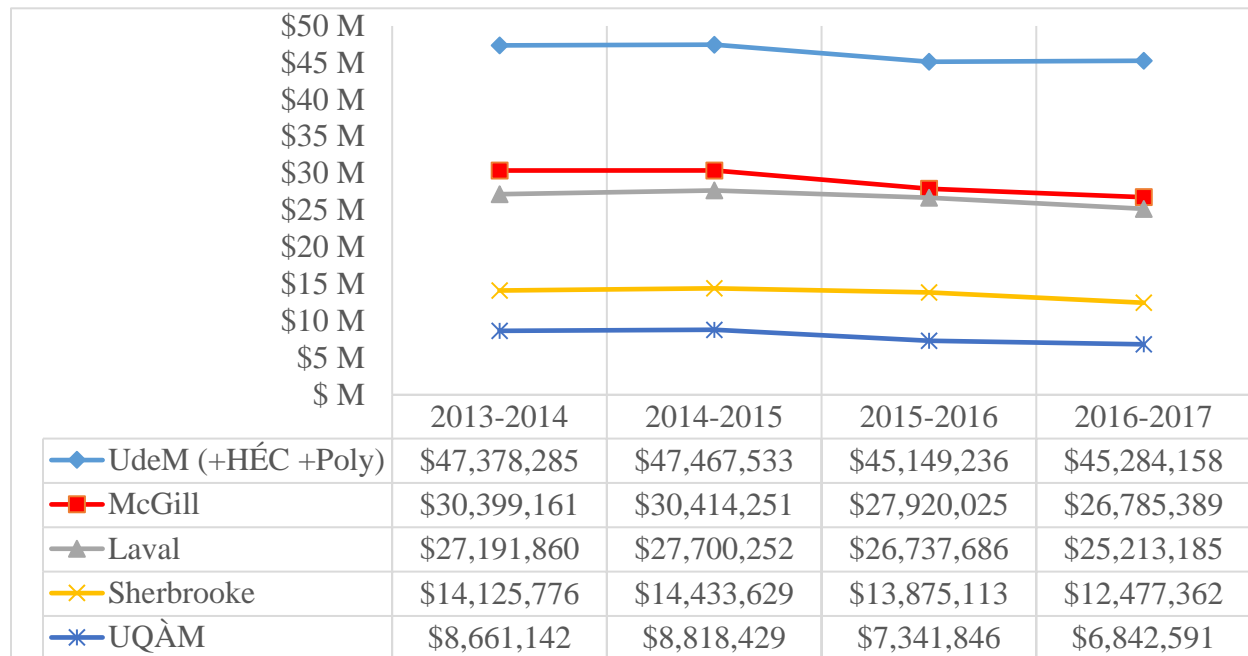
**Total Social Sciences and Humanities Research Council (SSHRC)  
Funding for Six Universities  
Last 5 Years (2012-2017)**

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*Source: Tri-Agency statistics compiled by OST*

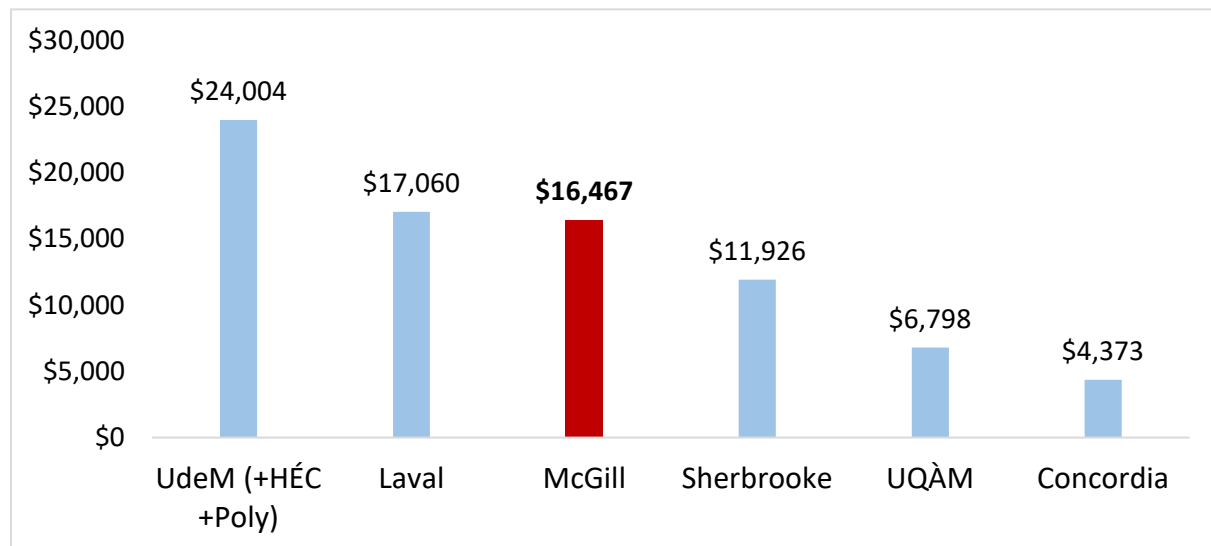
**Fonds de recherche du Québec (FRQ) Overview: Total Funding for Five Universities  
Last Four Years (2013-2017)**



Source: FRQ

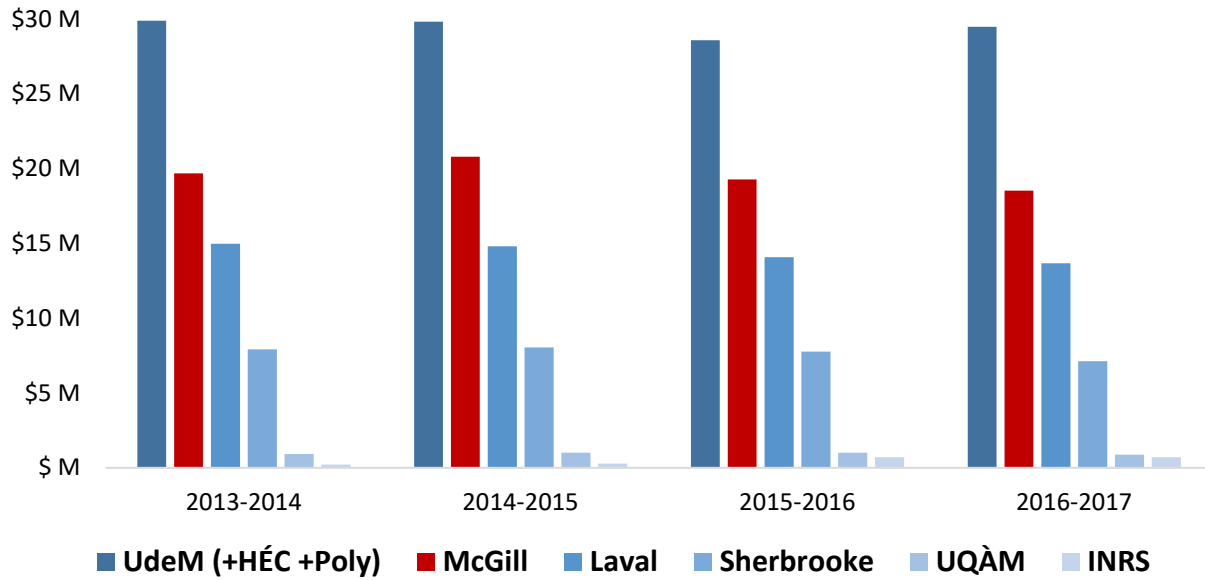
FRQ funding remains relatively stable over time for most institutions. There is, however, room for growth given McGill’s size and strengths.

**Total FRQ Funding Per Faculty Member for Six Universities  
Three-Year Average (2015-2017)**



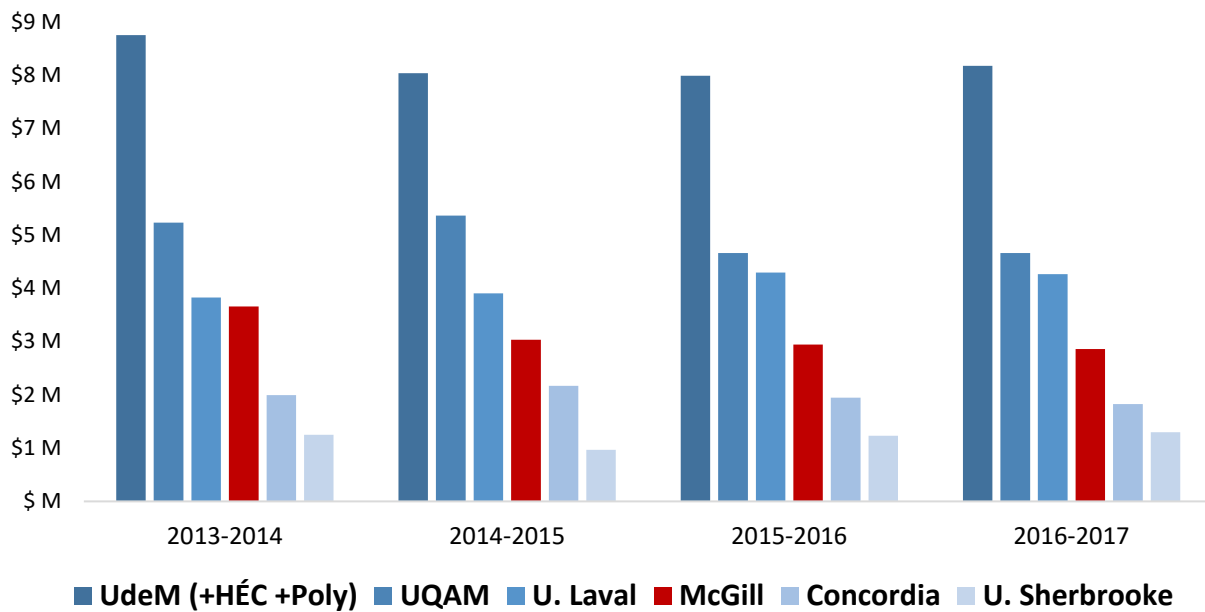
Source: FRQ. Faculty Count – ReSearch Infosource Inc. ®

**Total FRQ-Santé Funding for Five Universities  
Last Four Years (2013-2017)**



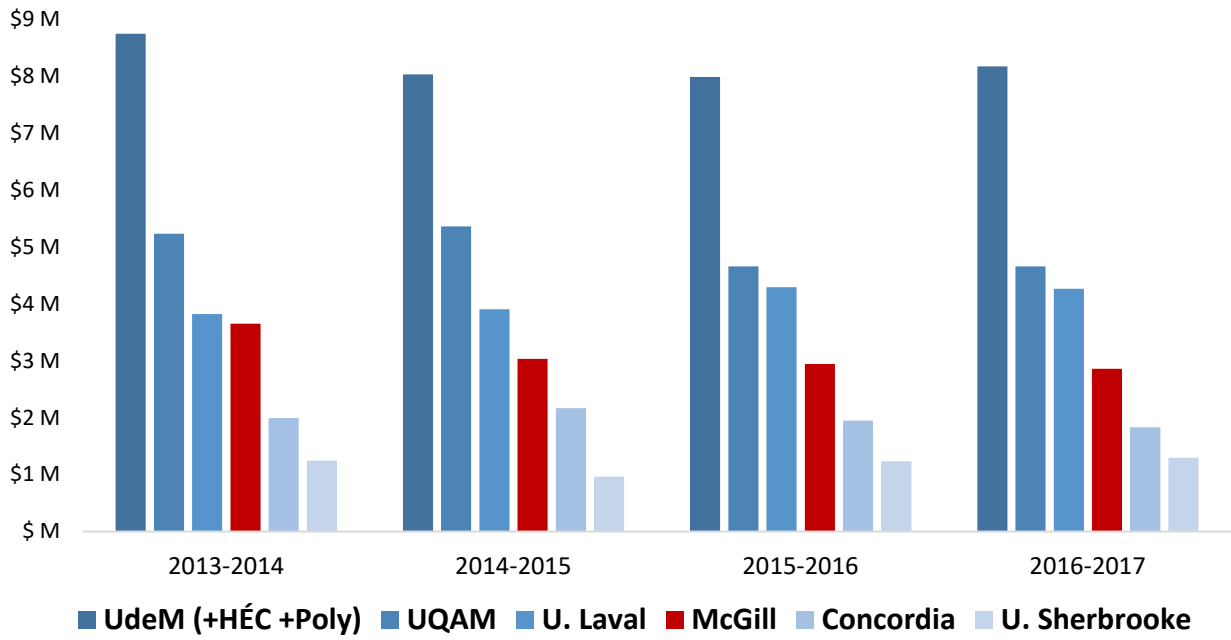
Source: FRQ

**Total FRQ-Nature et Technologies Funding for Five Universities  
Last Four Years (2013-2017)**



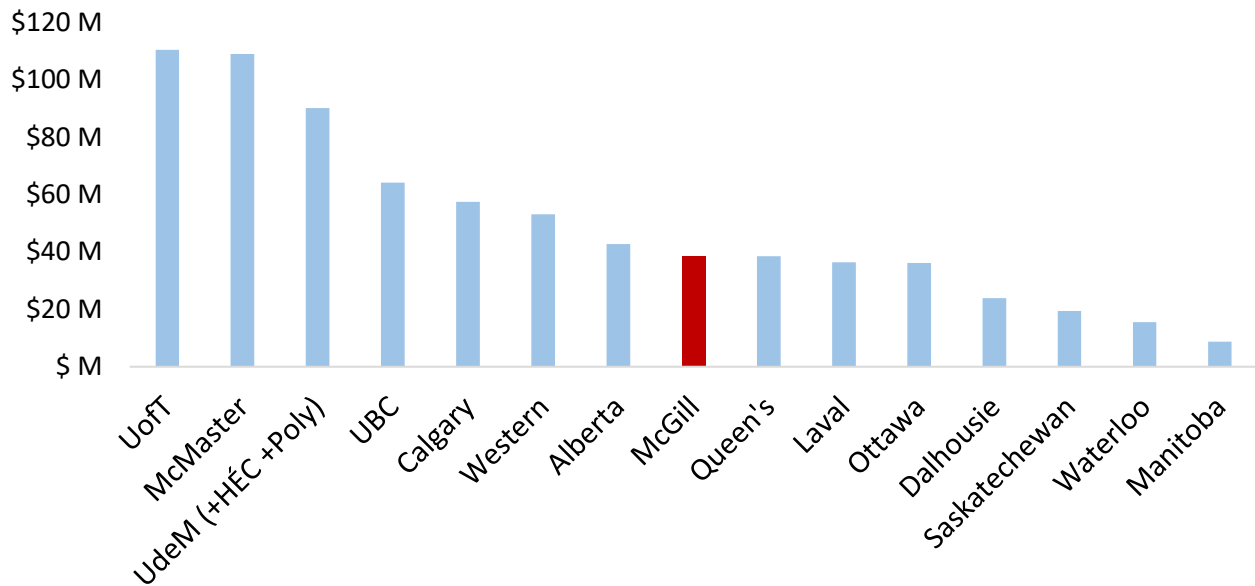
Source: FRQ

**Total FRQ-Société et Culture Funding for Five Universities  
Last Four Years (2013-2017)**



Source: FRQ

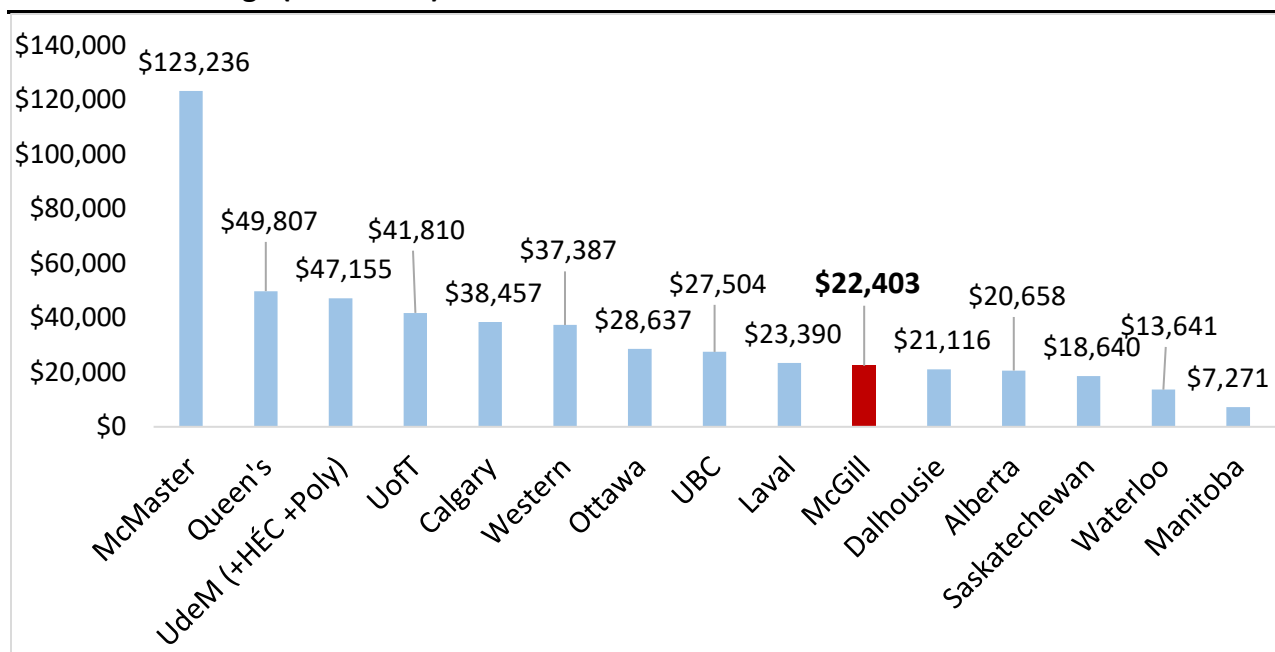
## Overview of Industry Funding, U15 Three-Year Average (2015-2017)



Source: CAUBO

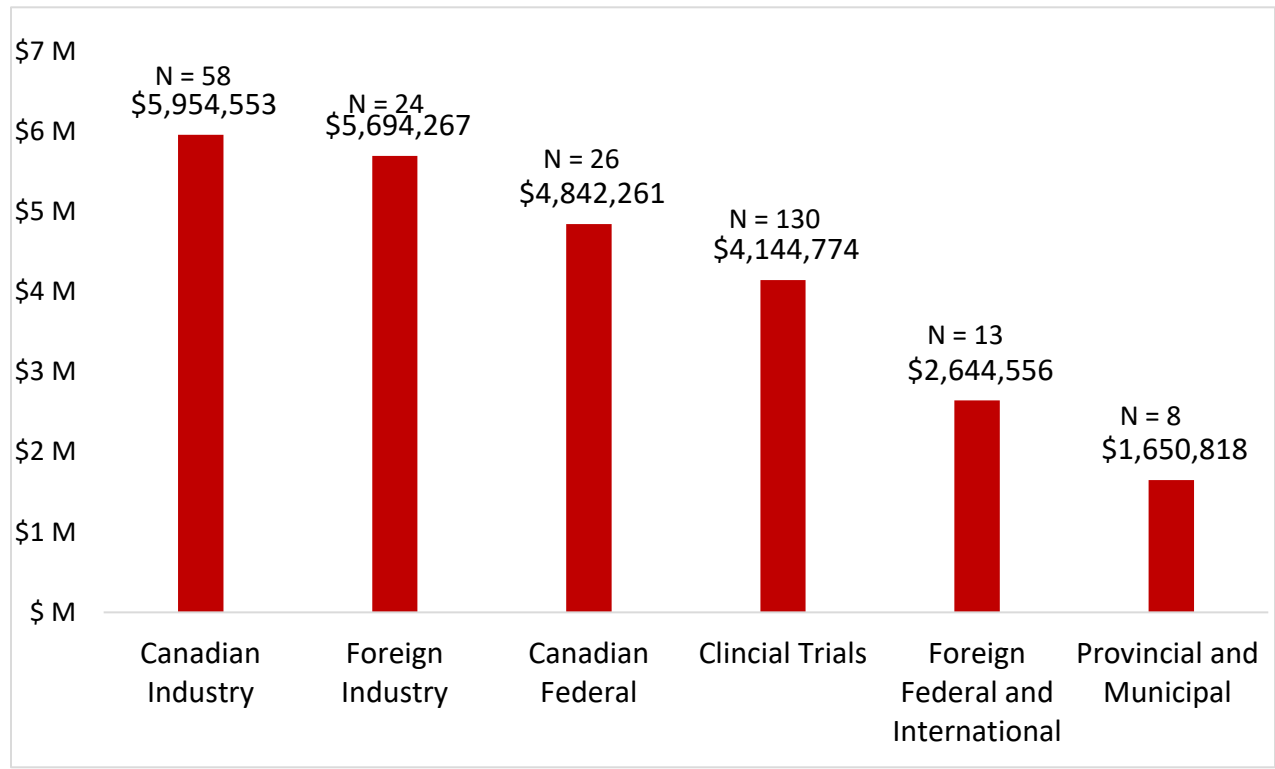
McGill researchers attract a comparatively modest amount of funding from industry. Data includes grants (including the industry portion of NSERC's Collaborative Research and Development Grants), contracts, clinical trials as well as donations for the purpose of research from business enterprises.

## Total Industry Funding per Faculty Member, U15 Three-Year Average (2015-2017)



Source: Industry Research Funding—CAUBO. Faculty Count—ReSearch Infosource Inc. ®

**McGill Research Contracts by Sponsor Type  
(2017-2018)**

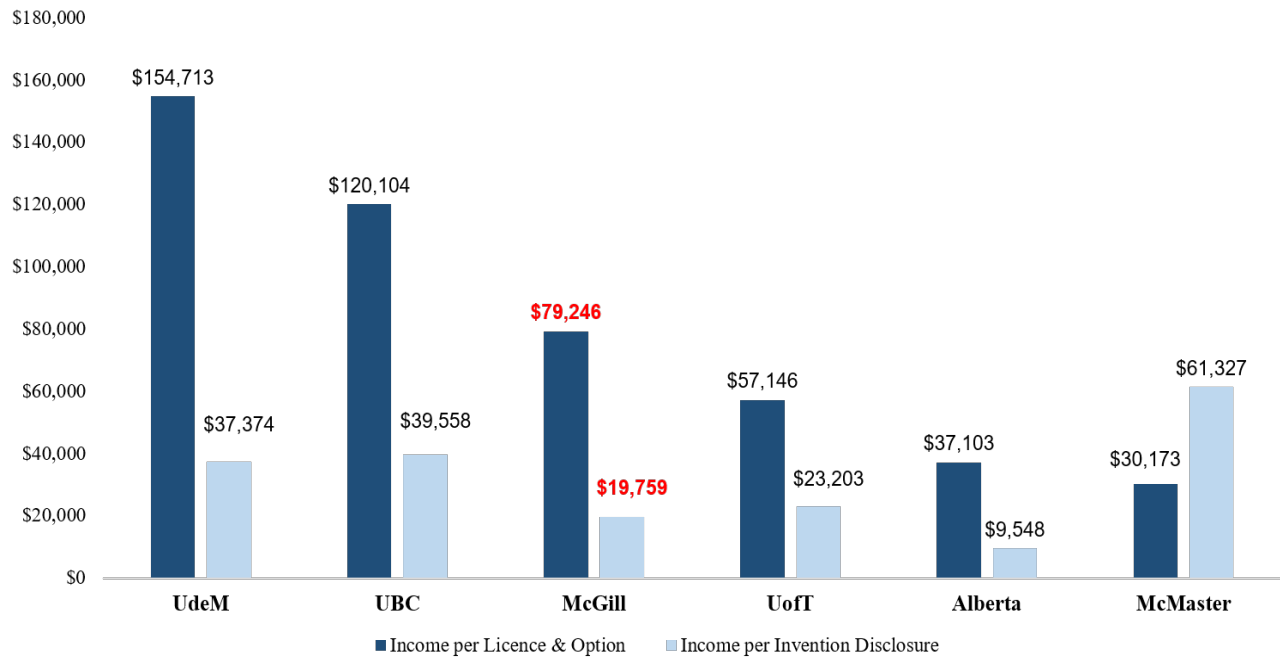


Source: InfoEd Global®

Canadian and foreign industry are the largest sources of research contracts to McGill. Data includes clinical trials administered at McGill excluding affiliated Research Institutes. N=Number of projects and contracts.



## Invention Disclosures and Licenses and Options 2015-2017



*Source: Association of University Technology Managers (AUTM) Licensing Survey*

It is important to highlight that every institution works differently when it comes to reporting and licensing of innovations. Some may sign many licenses, while others have a high number of reports of invention. Figures can also change depending on the timeframe chosen as the amount of funding can vary significantly from year to year. Data includes hospital affiliates.

## Outcomes of National Competitions

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### Canada Foundation for Innovation (CFI)

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2015 Round 8		Awarded Amount	Proportion of Institutional Allocation
<b>1</b>	<b>McGill</b>	<b>\$41.7 M</b>	<b>59.0%</b>
2	UofT	\$33.3 M	29.3%
3	UBC	\$20.5 M	26.1%
4	UdeM	\$16.8 M	30.4%
5	Alberta	\$2.1 M	4.6%
2017 Round 9		Awarded Amount	Proportion of Institutional Allocation
1	UofT	\$80.1 M	46.2%
2	UBC	\$67.5 M	57.0%
<b>3</b>	<b>McGill</b>	<b>\$31.0 M</b>	<b>29.3%</b>
4	UdeM	\$27.6 M	33.8%
5	Alberta	\$23.8 M	35.1%

*Source: CFI Statistics compiled the Office of the Vice-Principal (Research and Innovation)*

The proportion of institutional allocation reflects the ability of each institution to capture their share of the national pool as per the allocation envelopes calculated by CFI at the application stage. Data includes affiliated hospitals.

## Canada First Research Excellence Fund (CFREF)

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### 2015

1	UofT	\$114.0 M
2	Laval	\$98.0 M
3	UBC	\$66.5 M
4	Saskatchewan	\$37.2 M
5	Sherbrooke	\$33.5 M

In 2015, 5 applications out of 36 were successful across Canada.

In 2016, 13 applications out of 29 successful across Canada. A third competition is expected in 2021/2022.

### 2016

1	Dalhousie	\$93.7 M
2	UdeM	\$93.6 M
3	<b>McGill</b>	<b>\$84.0 M</b>
4	Saskatchewan	\$77.8 M
5	Guelph	\$76.6 M
6	Waterloo	\$76.2 M
7	Calgary	\$75.0 M
8	Alberta	\$75.0 M
9	Western	\$66.0 M
10	Queen's	\$63.7 M
11	Laurentian	\$49.3 M
12	Polytechnique	\$35.6 M
13	York	\$33.3 M

Source: [CFREF](#)

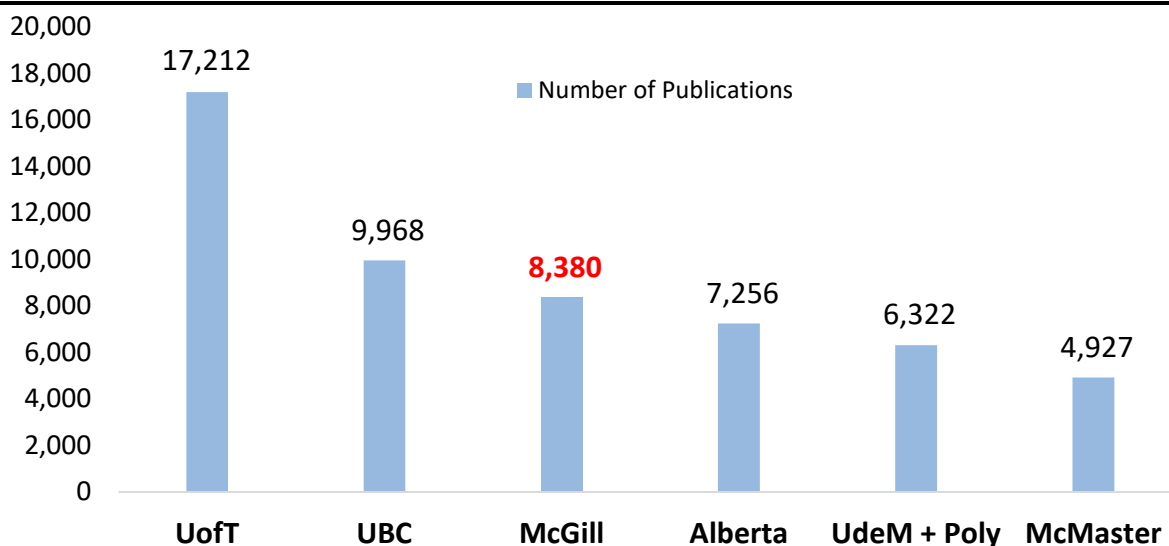
		2008	2012	2018	
<b>Canada Research</b>	Alberta	4		1	<b>Excellence Chairs (CERC)</b>
	UBC	1	2 (-1)	2	
	Laval	2	2		
	UofT	2		2	
	Waterloo	2		1	
	<b>McGill</b>		<b>2 (-1)</b>	<b>1</b>	
	Saskatchewan	1	1		
	Manitoba	1		1	
	Dalhousie	1			
	Sherbrooke	1			
	McMaster	1			
	UPEI	1			
	Ottawa	1			
	Western	1			
	Queen's		1		
	Calgary		1		
	Polytechnique		1		
	Ryerson			1	
	Concordia			1	
	UdeM			1	
<b>Total Allocated</b>		<b>19</b>	<b>10</b>	<b>11</b>	

Source: [CERC](#)

In 2008, 19 awarded applications were successful. Four McGill proposals were invited to the selection phase (Phase II) but the recruitment of chairholders was not successful. In 2012, 10 awarded applications were

successful. Two McGill proposals were invited to Phase II and both were awarded \$10 million each. One is currently active. In 2018, 11 Chairs could potentially be awarded across Canada. One McGill proposal was invited to Phase II and successful applications will be announced in March 2019.

**Total Annual Publication Output (Publications Indexed in Scopus®) and Proportion of Publications in Top Journal Percentiles for Six Universities  
Three-Year Average (2015-2017)**

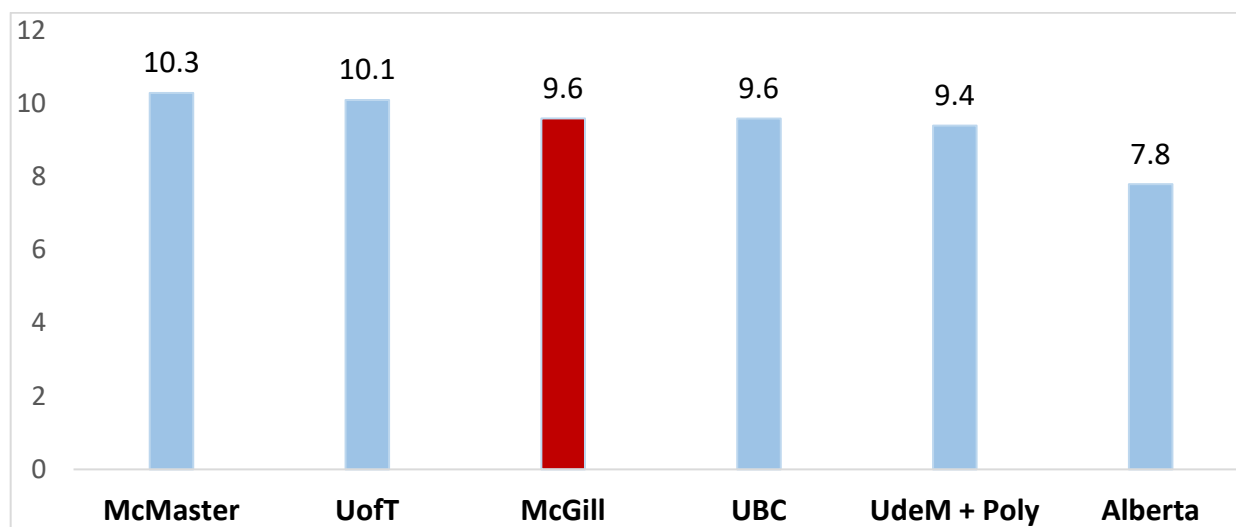


<b>Top 1 Percentile of Journals</b>	<b>5.4%</b>	<b>4.9%</b>	<b>4.7%</b>	<b>4.4%</b>	<b>4.1%</b>	<b>4.0%</b>
<b>Top 10 Percentile of Journals</b>	<b>41.2%</b>	<b>41.9%</b>	<b>43.7%</b>	<b>39.4%</b>	<b>36.7%</b>	<b>38.4%</b>

*Source: SciVal Global®*

These data provide an indicator of the average annual research output of the institution and an institution’s ability to have a presence in journals that are likely to be perceived as very prestigious worldwide. McGill ranks first in its peer group for the percentage of works that appear in the top 10 percentile of journals but behind the University of Toronto and the University of British Columbia in the percentage of works that appear in the top 1 percentile of journals. If the total publication output is divided by count of faculty members, this works out to seven articles per year for the University of Toronto, six for McMaster, five for McGill, four for both The University of British Columbia and the University of Alberta, and three for Université de Montréal.

**Annual Count of Citations per Publication  
Three-Year Average (2015-2017)**



Source: SciVal Global®

Citation counts per publication may be viewed as a measure of research impact. Self-citations are excluded.

**Publications and Collaborations**

1	Université de Montréal	Québec
2	University of Toronto	Ontario
3	University of British Columbia	British Columbia
4	University of Ottawa	Ontario
5	Harvard University	United States
6	Université Laval	Québec
7	University of Alberta	Alberta
8	McMaster University	Ontario
9	University of Calgary	Alberta
10	Centre national de la recherche scientifique	France

Top 10 Institutions for co-authored publications with McGill from 2015 to 2017. The data exclude publications with 100 or more authors.

## Notable Achievements

- **Jonathan Sievers and Jennifer Welsh** were named [Canada 150 Research Chairs](#), valued at \$7 million and \$2.45 million respectively.
- **Nine McGill scholars**, whose expertise ranges from cosmological string theory to reducing the health burden of poverty, became [Canada Research Chairs](#). Another four McGill chair holders had their terms renewed. The total investment for McGill topped \$9 million.
- Thirty McGill researchers received grants totaling \$5.1 million from the Canada Foundation for Innovation's (CFI) John R. Evans Leaders Fund (JELF). The McGill recipients received matching funds from the Quebec government.
- More than \$59 million was awarded by the [CFI and the Government of Quebec](#) to **six McGill research projects** to collaborate, innovate and train the next generation of scientists for the jobs of tomorrow.
- The McGill University and Génome Québec Innovation Centre and the Canadian Centre for Computational Genomics received a total of \$9.8 million in funding through [Genome Canada Awards](#).
- Dozens of McGill University researchers were chosen to participate in two of the five "superclusters" selected by the Government of Canada for funding under its [Innovation Superclusters Initiative](#): AI-Powered Supply Chains Supercluster (SCALE.AI) and Protein Industries Supercluster.
- The Canadian Institute for Advanced Research (CIFAR) announced the inaugural cohort of 29 Canada [CIFAR AI \(CCAI\) Chairs](#), including six from McGill. **Doina Precup and Joëlle Pineau**, professors in the School of Computer Science, were among those named as part of the \$125 million Pan-Canadian AI Strategy, and will help maintain Canada's leadership in artificial intelligence research.
- **Derek Nowrouzezahrai**, Department of Electrical & Computer Engineering, was awarded the [NSERC/Ubisoft Industrial Research Chair in Believable Virtual Character Experiences](#). Funding for the research chair totaled \$2.5 million.

- **Nada Jabado's** work in the Department of Pathology investigating brain cancer in children received \$13 million in funding after emerging as one of the four winning projects in [Quebec in Genome Canada's 2017 Large-Scale Applied Research Project Competition](#): Genomics and Precision Health.

## Selected Major Prizes, Awards, and Recognitions

- **Tomislav Friščić**, Department of Chemistry, was awarded the [Steacie Prize for Natural Sciences](#) for his exceptional contributions to Green Chemistry research in Canada, the first ever to win it for research in chemistry.
- The Natural Sciences and Engineering Research Council of Canada (NSERC) awarded William Dawson Scholar **Joëlle Pineau**, School of Computer Science, one of six prestigious [E.W.R Steacie Memorial Fellowships](#). Dr. Pineau was also elected as [a Fellow of the Association for the Advancement of Artificial Intelligence](#).
- **Jozsef Kövecses**, Professor of Mechanical Engineering, was awarded the [NSERC Synergy Award for Innovation](#).
- Seven McGill researchers were elected to the [College of New Scholars, Artists and Scientists Members of the Royal Society of Canada](#): **Tomislav Friščić**, Department of Chemistry, **Iwao Hirose**, Department of Philosophy and the McGill School of Environment; **Krista Muis**, Department of Education and Counselling Psychology; **Lorenz Lüthi**, Department of History and Classical Studies; **Nitika Pant Pai**, Department of Medicine; **Vincent Pouliot**, Department of Political Science.
- [Six Royal Society of Canada Fellows](#) were awarded to McGill: **Hans Beck**, Department of History and Classical Studies; **Susanne Lajoie**, Department of Education and Counselling Psychology; **Stephen Menn**, Department of Philosophy; **T.V Paul**, Department of Political Science; **Samy Suissa**, Department of Epidemiology, Biostatistics and Occupational Health; **Daniel Wise**, Department of Mathematics and Statistics.
- **Sangyong Jeon**, Department of Physics, was elected as an [American Physical Society Fellow](#).
- **George Demopoulos**, Department of Mining and Materials Engineering and **Jim Nicell**, Dean, Faculty of Engineering, were elected [Canadian Academy of Engineering Fellows](#).
- Four McGill researchers were elected [Canadian Academy of Health Sciences Fellows](#): **James Brophy**, Department of Epidemiology, Biostatistics and Occupational Health; **Julien Doyon**,



Departments of Neurology and Neurosurgery and the Montreal Neurological Institute; **Lily Hechtman**, Department of Psychiatry; **Nada Jabado**, Department of Pediatrics and the Montreal University Health Centre; **Mindy Levin**, School of Physical and Occupational Therapy; **Moshe Szyf**, Department of Pharmacology and Therapeutics.

- **Adrian Liu**, Department of Physics and McGill Space Institute, was appointed a [CIFAR Azrieli Global Scholar](#).
- **CJ Li**, Department of Chemistry and **Hanadi Sleiman**, Department of Chemistry, were awarded [Killam Research Fellowships](#).
- **Iwao Hirose**, Department of Philosophy, McGill School of Environment was awarded the [Kitty Newman Memorial Award from the Royal Society of Canada](#).
- L'[Ordre national du Québec](#) was awarded to **John Bergeron**, Department of Medicine and **Nicolas Steinmetz**, Departments of Pediatrics and Epidemiology, Biostatistics and Occupational Health.
- [Order of Canada Memberships](#) were awarded to **Abraham Fuks**, Department of Medicine; **John Rea**, Department of Music Research; **Yvonne Steinert**, Department of Family Medicine.
- **Cindy Blackstock**, School of Social Work, and **Suzanne Fortier** Principal and Vice Chancellor, were made [Officers of the Order of Canada](#).
- The [Prix Acfas Michel-Jurdant](#) was awarded to **Alfonso Mucci**, Department of Earth and Planetary Sciences.
- The [Prix Wilder Penfield, Prix du Québec](#), was awarded to **Nahum Sonenberg**, Department of Biochemistry.
- A [Royal Architectural Institute of Canada Membership](#) was awarded to **Vikram Bhatt**, Peter Guo-hua Fu School of Architecture.
- The [Rutherford Medal in Chemistry from the Royal Society of Canada](#) was awarded to **Tomislav Friščić**, Department of Chemistry.
- [The Sloan Foundation awarded Research Fellowships](#) to **Hamed Najafabadi**, Department of Human Genetics and **Stuart Trenholm**, Department of Neurology and Neurosurgery.



# Acknowledgements

The 2018 Report on Research and Innovation was produced by Research and Innovation (R+I), with input from R+I's Strategic Initiatives team, the Office of Sponsored Research, the Office of Innovation and Partnerships, and the Office of Analysis, Planning, and Budget.

If you have questions about this report, please contact [martha.crago@mcgill.ca](mailto:martha.crago@mcgill.ca) or 514-398-3991.