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TO:	Board of Governors
FROM:	Dr. Rosie Goldstein, Vice-Principal (Research and Innovation)
SUBJECT:	Annual Report on Research and Innovation
DATE:	February 2, 2017
DOCUMENT #:	GD16-39
ACTION REQUIRED:	☒ INFORMATION ☐ APPROVAL/DECISION

ISSUE & EXPECTED OUTCOME	The Annual Report on Research and Innovation presents key indicators of McGill's recent research funding performance as well as an update on areas of innovation related to both the commercialization of research and knowledge mobilization.
BACKGROUND & RATIONALE	The Annual Report on Research and Innovation is an annual review of McGill's success in major funding programs, our progress in areas related to all forms of innovation, and the major achievements of University researchers.
	The Report focuses on McGill's performance in Tri-Agency and Trois Fonds programs, including how the University compares to G5 and U15 peers in terms of market share and research intensity over the last five years. In addition, the Report summarizes the University's results in the Association of University Technology Managers (AUTM) Canadian Licensing Survey and provides a review of early successes from the recently created Office of Innovation and Partnerships. Exceptionally for the 2016 report, initial results from a survey conducted in autumn 2016 of McGill researchers on their awareness of and satisfaction with the support services offered by Research and Innovation are included.
ALIGNMENT WITH MISSION AND STRATEGIC PRIORITIES	The goal of the Report is to inform members of the Board of Governors and the wider McGill community of significant issues related to research funding while outlining how the University's research enterprise is becoming better suited to compete in the future.
	The Report therefore aims to apprise Governors of McGill's progress in its mission to remain one of the top research-intensive universities nationally and internationally as well as toward its strategic priority of enhancing and strengthening engagement with community partners.

COMPLIANCE WITH UNIVERSITY POLICY	The Report aligns with best practices to promote transparency and accountability across a major sector of the University's mandate.
	Members of the senior administration as well as internal stakeholders have reviewed the Report, and the Report was presented to Senate on January 18, 2017.
COMPLIANCE WITH LEGISLATION/ EXTERNAL REGULATIONS	There are no legislative requirements associated with the Report.
RISK FACTORS	The University's performance in areas related to research and innovation affects its ability to carry out its missions in research, teaching, and learning and may affect the University's rankings in these areas.
SUSTAINABILITY CONSIDERATIONS	As outlined in the Strategic Research Plan 2013-2017, sustainability is a core commitment of McGill's research plans and activities.
IMPACT OF DECISION AND NEXT STEPS	N/A
MOTION OR RESOLUTION FOR APPROVAL	N/A
APPENDICES	Appendix A: Annual Report on Research and Innovation 2016

McGill

Report on Research and Innovation

2016

Dr. Rosie Goldstein
Vice-Principal (Research and Innovation)

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Executive Summary

Some of the key findings that emerge in the 2016 Report on Research and Innovation are:

- McGill continues its strong performance in federal and provincial funding programs. Over the past five years, we have grown slightly our overall market share – albeit while also experiencing decreases and flat results in some areas – in Canadian and Quebec funding programs.

    - In FY15, McGill's $473 million in total sponsored research funding ranked 4th among Canada's five most research-intensive universities (G5).

    - McGill's market share of Tri-Agency award dollars for FY15, 8.7%, is above what it was five years earlier, 8.2%.

    - Despite some year-to-year fluctuations, McGill's total Fonds de recherche du Québec (FRQ) market share as well as our market share in each of the Trois Fonds have all increased over the previous five years.

- Tri-Agency total funding has seen minimal or no growth over the past five years ($1.89 billion in FY10 versus $1.96 billion in FY15 for a 3.6% increase). During that same period, CIHR funding increased by 2.3% ($807 million to $826 million), NSERC by 4.3% ($819 million to $884 million), and SSHRC by 5.3% ($264 million to $288 million).

- Here are a few key details of McGill's research funding performance in Tri-Agency programs for FY15:

    - McGill's five-year increase in Tri-Agency funding was above the increase in the total envelope (8.96% for McGill versus 3.60% for the Tri-Agency).

    - CIHR research award dollars have increased by 10.34% at McGill in the past five years and by 8.51% in the past year.

    - NSERC research award dollars decreased by 0.89% at McGill in the past five years and increased by 2.73% between FY14 and FY15.

    - SSHRC research award dollars increased by 34.97% at McGill over the past five years and by 9.96% in the past year.

- In innovation-related measurements, as captured by the Association of University Technology Managers (AUTM)'s *Canadian Licensing Activity Survey* for FY15, noteworthy results include that, among Canadian universities, McGill ranked:

  o 1st in New Patent Applications with 180;

  o 2nd in Invention Disclosures with 150;

  o 2nd in Cumulative Active Licenses with 258.

- McGill had a number of noteworthy accomplishments over the past year in terms of funding successes, new partnerships, and major prizes and awards, including the following:

  o McGill was successful in the national competition of the federal government's Canada First Excellence Research Fund (CFREF), which will provide the University with $84-million over seven years for the "Healthy Brains for Healthy Lives" initiative.

  o Shaheen Shariff, Department of Integrated Studies in Education, received a $2.5 million SSHRC Partnership Grant to address sexual violence on university campuses across Canada and internationally.

  o Astrophysicist Vicky Kaspi was the 2016 recipient of the Gerhard Herzberg Canada Gold Medal for Science and Engineering.

  o SSHRC awarded its 2016 Gold Medal to Claudia Mitchell, Department of Integrated Studies in Education.

  o Philosopher Charles Taylor was named the first winner of the $1-million Berggruen Prize.

  o The Royal Society of Canada inducted 10 new Fellows and seven new members to the College of New Scholars, Artists and Scientists from McGill.

Introduction

The Report on Research and Innovation is the Vice-Principal (Research and Innovations)'s annual review of McGill's success in major funding programs, our progress in areas related to all forms of innovation, and the significant achievements of University researchers. The objective of the report is to provide Senate and the Board of Governors with a high-level portrait of McGill's competitiveness in 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 2016 report also includes preliminary results from a survey of McGill researchers, conducted this past autumn, on their satisfaction and awareness of Research and Innovation (R&I) services.

McGill's overall performance in research funding and innovation is extremely important, as it serves as an indicator of the wider social and economic impact of the science and scholarship conducted at the University. Performance in federal Tri-Agency funding programs directly correlates to McGill's access to Canada Research Chairs, Canada Excellence Research Chairs, Canada Foundation for Innovation awards, Banting and Vanier Fellowships (generally the most prestigious graduate awards), and federal funds for indirect costs of research. The University rankings are another area where research and academic reputation are intertwined. For instance, the Times Higher Education World University Rankings has "Research: Volume, Income, Reputation" as a major component, with the category making up 30% of their assessment criteria. Therefore, it is imperative that McGill reaches its full potential in the research sector – not only because of the revenue it brings in, but also because of the ripple effect it has on other areas of the University's access to funding, the strength of our reputation, and our ability to attract and retain talent.

The 2016 Report on Research Funding Performance reviews McGill's overall performance in garnering research funding from all sources (i.e. federal, provincial, non-profits, industry, international, endowment, and miscellaneous programs), including the commercialization of research. Its focus, however, is on McGill's performance in the two most significant funding areas: Tri-Agency programs and Trois Fonds programs for Fiscal Year 2015, looking at how we compare to our G5 and U15 peers in terms of total funding and market share over the last five years.

Finally, the report highlights a small selection of innovation-related performance indicators as well as some of our major research funding achievements, significant new or strengthened partnerships, and researchers who received major prizes and awards over the past year.

Research Funding Performance
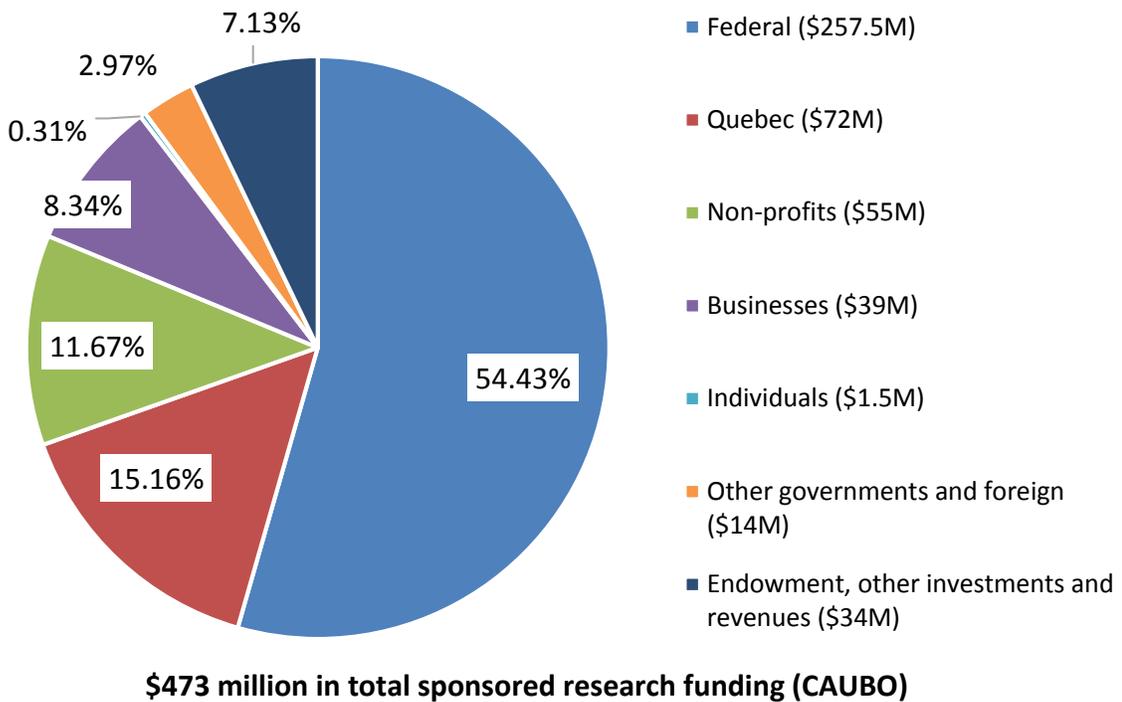
BREAKDOWN OF FUNDING SOURCES (FIGURE 1)

McGill, like all Canadian universities, relies on "traditional" sources for the majority of its research funding. Over the past decade, public funding (federal and provincial) has been the most important source of research funding for McGill, with federal funding accounting for 50-55% (55% in FY15) of research revenue and provincial funding ranging between 10-20% (15% in FY15).

Funding from other entities than the federal and provincial governments, or "alternative" sources of research funding – non-profits, industry, individuals, other governments (including foreign governments), and endowment and other investments – have also remained relatively stable over the past decade.

Collectively, these non-traditional sources generated approximately $144 million in research funding for McGill in FY15: $55 million from non-profits, $39 million from industry, and $36 million from individuals, endowment and other investments funding sources. Revenues from other governments, including foreign governments was $14 million in FY15. Overall, non-traditional sources of revenues decreased by $3 million in FY15 compared to FY14. Sponsored research funding from businesses increased from $37 million in FY14 to $39 million in FY15 while funding from non-profits decreased from $60 million in FY14 to $55 million in FY15.

Small variations from year to year are normal. The results for FY15 indicate that funding in these areas is neither growing nor declining in a significant way.

Figure 1. Percentage of Research Funding by Source FY15

Legend:
- Federal ($257.5M)
- Quebec ($72M)
- Non-profits ($55M)
- Businesses ($39M)
- Individuals ($1.5M)
- Other governments and foreign ($14M)
- Endowment, other investments and revenues ($34M)

Pie chart values: 54.43%, 15.16%, 11.67%, 8.34%, 0.31%, 2.97%, 7.13%

$473 million in total sponsored research funding (CAUBO)

TOTAL SPONSORED RESEARCH (FIGURE 2 AND FIGURE 3)

- In FY15, McGill's $473 million in total sponsored research funding ranked 4th among Canada's five most research-intensive universities (G5), behind the University of Toronto, University of British Columbia, and l'Université de Montréal, and ahead of the University of Alberta. These totals, including McGill's, contain each university's affiliated hospitals and research institutes.

- The positions of the G5 have remained consistent, with only slight changes, over the past five years. For example, McGill moved from fifth to fourth in FY12, passing the University of Alberta, and has been ranked fourth in Canada for total sponsored research funding every year since then.

- Over the past five years, McGill's sponsored research revenue has grown at a slower pace than the average among the G5. McGill has experienced a 1% increase versus a 2.7% average increase among the G5.
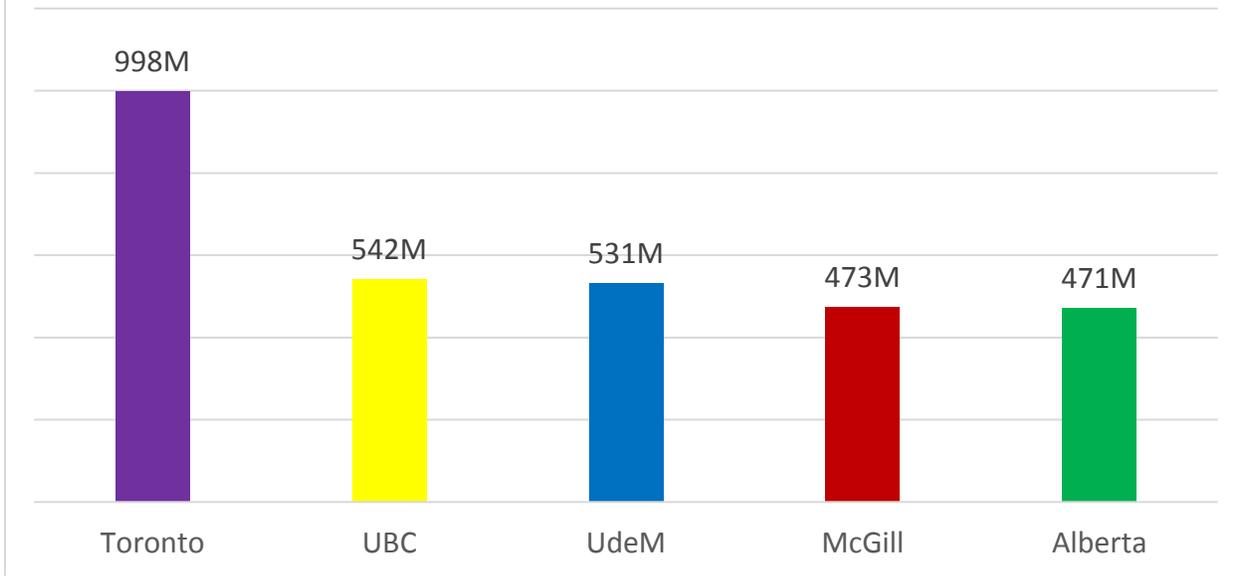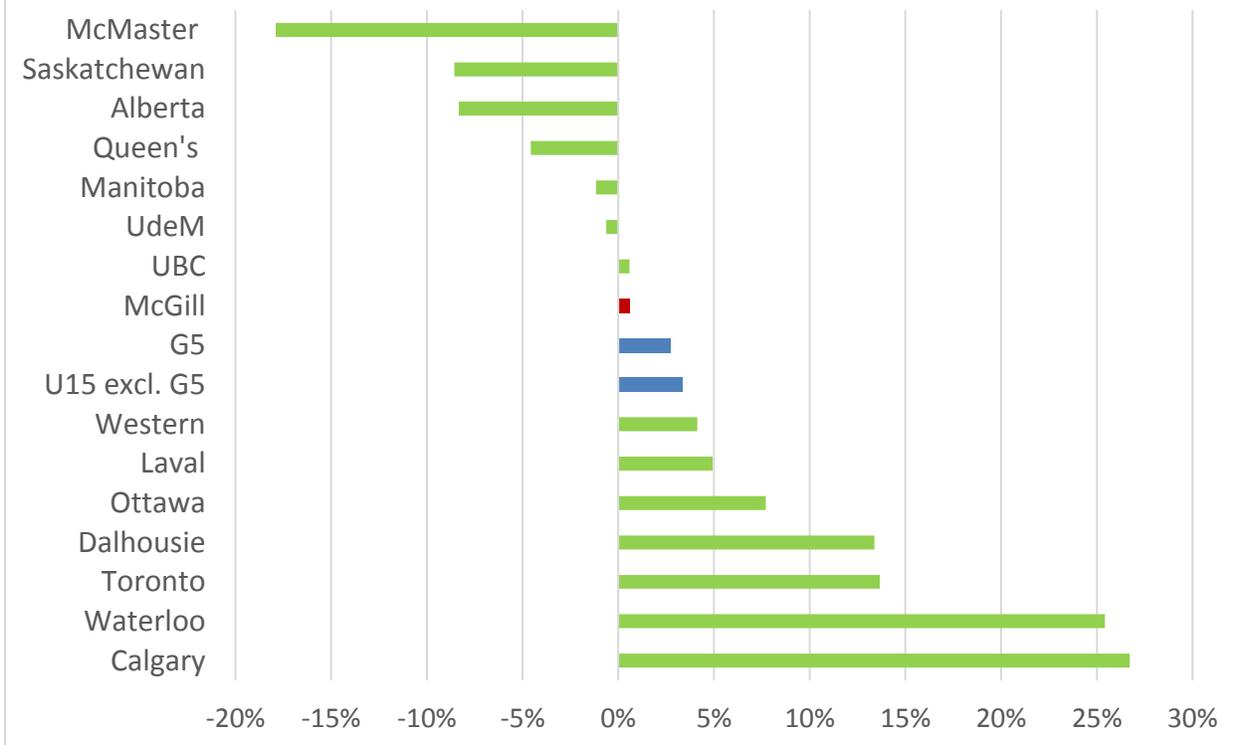
Figure 2. Total Sponsored Research Invome of G5, FY15

Figure 3. Change (%) in total sponsored FY10-FY15

RESEARCH INTENSITY

Research intensity is defined as the research dollars divided by the "full-time professorial" count at an institution. This measurement is intended to evaluate the amount of research funding at an institution relative to its size. However, due to inconsistent faculty counts, this metric can be problematic. Moreover, years of peak funding, such as when a round of Canada Foundation for Innovation (CFI) funding is recorded, can cause substantial variations in research intensity. The metric can nevertheless be a useful point of comparison, if used with caution.

- In terms of research intensity, McGill ranked 3rd in the G5 and 4th in the U15 for FY15. The University of Toronto[1] ranked 1st with $426,522 per full-time professor versus $296,965 at the University of Alberta and $276,995 at McGill. McMaster University ranked 2nd in the U15 with $333,975 per full-time professor.

- McGill ranked 2nd in the G5 in terms of research intensity in FY13[2] and FY14, but ranked 3rd this year due to a slight decline (less than $5,000 per full-time professor) while the University of Alberta increased by more than $18,000 per full-time professors to move into the 2nd position.

- Over the past five years, McGill's research intensity has declined by five percent (-5%). The University of Toronto is the only G5 university to see a growth (16%) in research intensity during this time period.

FEDERAL PROGRAMS (FIGURE 4 AND FIGURE 5)

McGill continues to perform well in programs offered by the three major federal granting agencies: Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering

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[1] Research intensity for the University of Toronto (UofT) is most likely inflated, especially in the area of health sciences, as portrayed by CAUBO, which uses full-time ranked academics in a university to calculate research intensity. For example, UofT has a large number of affiliated hospitals and research institutes as the only medical school in a large metropolitan area. It therefore has significant numbers of researchers receiving CIHR funding, but who are not full-time ranked academics at the university. As a result, UofT's research dollars are being divided by a much smaller pool of applicants, thus inflating their overall research intensity.

[2] Université de Montréal did not provide faculty count data in FY13. Research intensity therefore cannot be calculated for UdeM during that year.

Research Council of Canada (NSERC), and the Social Sciences and Humanities Research Council (SSHRC), known collectively as the Tri-Agency.

As Figure 4 demonstrates, McGill ranks among the top research universities in Canada – both overall and in each of the individual funding agencies. The results described in Figures 4 and 5 include Tri-Agency funding from grants, career awards, and scholarships, but do not reflect funding from Canada Research Chairs or Networks of Centres of Excellence.

In FY15, McGill was awarded approximately $169 million from the Tri-Agency, 3rd behind the University of Toronto ($283 million) and the University of British Columbia ($176 million). McGill's position in Canada has not changed in the past five years. In FY15, McGill had a market share of 8.7% versus 14.4% for University of Toronto and 9.0% for the University of British Columbia.
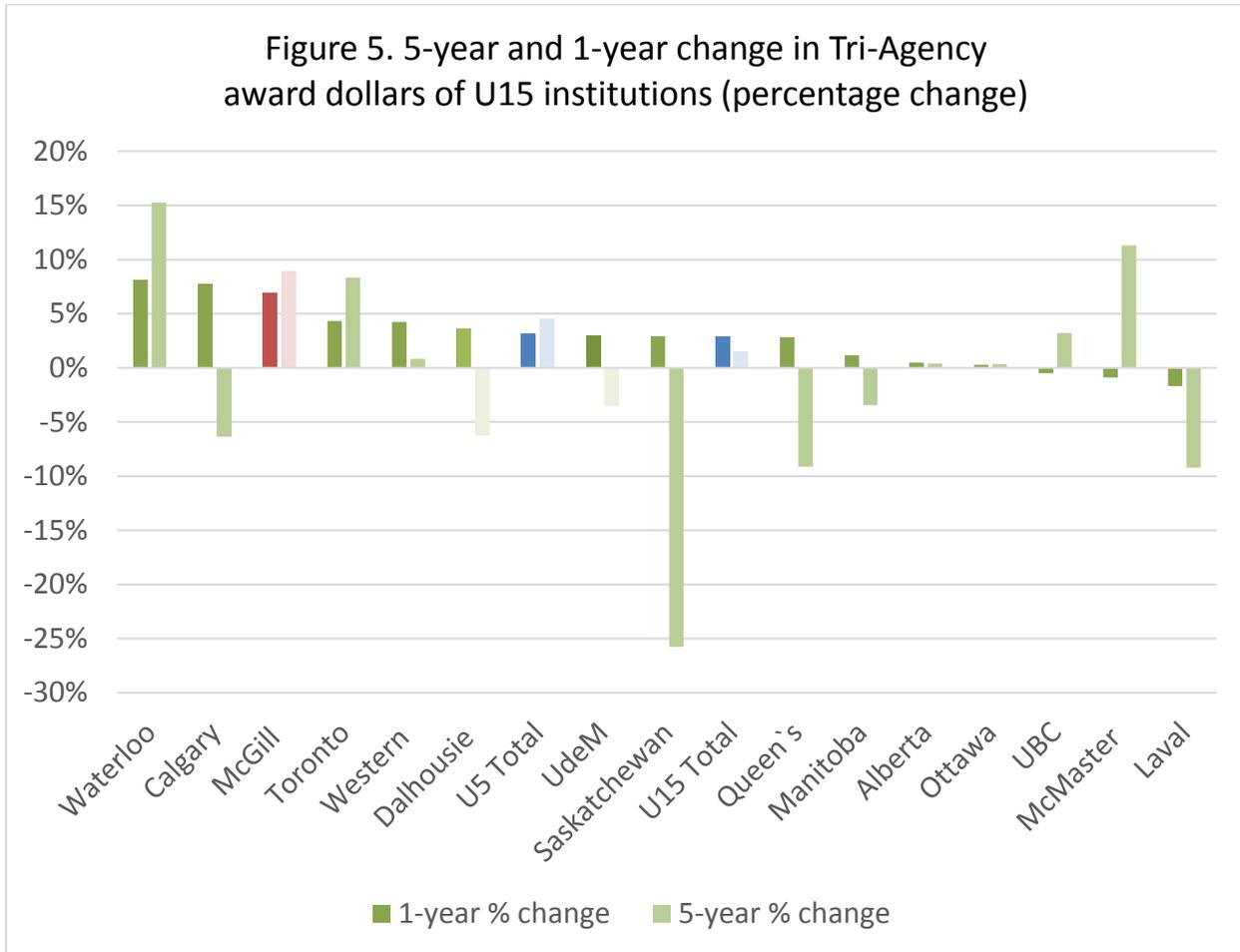
Figure 4. McGill Results by Agency FY15					
	Overall Funding	*Total Dollars Ranking in U15*	*Market Share*	*5-year Trend in Market Share (% Point)*	*1-year Trend in Market Share (% Point)*
Total Tri-Agency	$169M	3rd	8.7%	0.4	0.4
CIHR	$104M	2nd	12.6%	0.9	0.7
NSERC	$48M	4th	5.6%	-0.3	0
SSHRC	$18M	3rd	6.4%	1.4	0.4

HIGHLIGHTS FROM TRI-AGENCY RESULTS

Overall funding

- The Tri-Agency envelope (excluding Canada Research Chairs and Networks of Centres of Excellence) increased by 2.29% ($43.7 million) in FY15, while McGill saw its Tri-Agency funding increase by 6.96% ($11 million) in the same year.

- The overall Tri-Agency envelope increased by 2.29% in FY15, and 12 of the U15 – Canada's 15 largest research-intensive universities – saw their level of funding increase.

- McGill's five-year increase in Tri-Agency funding was above the increase in the total envelope (8.96% for McGill versus 3.60% for the Tri-Agency).

- The University of Waterloo has grown the most in terms of overall Tri-Agency funding over the past five years (15%).

Figure 5. 5-year and 1-year change in Tri-Agency award dollars of U15 institutions (percentage change)

Tri-Agency market share

- McGill's share of Tri-Agency award dollars has fluctuated over the past five years. However, the market share for FY15, 8.7%, is above what it was five years earlier, 8.2%.

- Ten U15 institutions have lost market share between FY10 and FY15. Overall, the U15 has lost 1.5 percentage points in market share, from 74.8% to 73.3% in FY15.

- The gains in market share have been made by "other organizations" (2.4 percentage point gain in market share over the period), rather than by other universities. Other organizations are Cégeps and colleges, foundations, and centres.

Canadian Institutes of Health Research (CIHR)

- In FY15, CIHR awarded McGill and its affiliated hospitals and research institutes approximately $104 million, 2nd behind the University of Toronto ($175 million).

- CIHR research award dollars have increased by 10.34% at McGill in the past five years and by 8.51% in the past year.

- McGill's five-year CIHR performance therefore was better than the G5 average change (4.12%) as well as the rest of the U15 average, which increased by 0.11% over the past five years.

- McGill ranked 2nd among the U15 in CIHR market share (12.6%), behind the University of Toronto (21.2%). McGill's share of CIHR award dollars went up by 0.9 percentage points over the past five years.

Natural Sciences and Engineering Research Council of Canada (NSERC)

- In FY15, McGill was awarded $47.7 million from NSERC, 4th behind the University of Toronto ($79.9 million), the University of British Columbia ($62.5 million), and the University of Alberta ($48.7 million).

- NSERC research award dollars decreased by 0.89% at McGill in the past five years and increased by 2.73% between FY14 and FY15. Over the same five-year period, the G5 average increased by 4.06% and, overall, the U15 average increased by 2.23%.

- In FY15, McGill ranked 4th among the U15 in terms of NSERC market share (5.6%), behind the University of Toronto (9.4%), the University of British Columbia (7.3%), and the University of Alberta (5.7%). McGill's share of NSERC award dollars decreased from 5.9% in FY10 to 5.6% in FY15.

Social Sciences and Humanities Research Council (SSHRC)

- In FY15, McGill was awarded $17.9 million from SSHRC, ranking 3rd behind the University of Toronto ($28 million) and the University of British Columbia ($18.9 million). In the last two years McGill has moved from 4th to 3rd position in Canada, surpassing Université de Montréal.

- SSHRC research award dollars increased by 35% at McGill over the past five years and by 10% in the past year. This five-year increase is significantly higher than both the G5 average (8.4%) and the rest of the U15 average (5.5%). In addition, this increase occured while the SSHRC envelope grew by only 5.3% during the same period.

- In FY15, McGill ranked 3rd among the U15 in terms of SSHRC market share (6.4%), behind the University of Toronto (10.1%) and the University of British Columbia (6.8%).

- McGill's share of SSHRC award dollars has gone up steadily in the past five years, from 5.0% in FY10 to 6.4% in FY15.

Source Figures 1-5: CAUBO, Research Infosource and University and College Academic Staff System (UCASS); OST Tri-Agency Funding database, compiled by Analysis, Budget and Planning.

PROVINCIAL FUNDING (FIGURE 6 AND FIGURE 7)

The Fonds de recherche du Québec (FRQ) is the province's primary research funding organization. Its three agencies, known collectively as the "Trois Fonds," are the Fonds de recherche du Québec – Santé (FRQ-S), Fonds de recherche du Québec – Nature et technologies (FRQ-NT), and the Fonds de recherche sur la société et la culture (FRQ-SC).

Trois Fond research performance results for Fiscal Year 2015 were previously reported in last year's Report on Research and Innovation. Quebec has yet to provide updated research funding statistics. The information is being included once again in the 2016 report for easy reference and to provide a direct comparison among federal and provincial research funding results.

In FY15, McGill was awarded just under $30 million from the FRQ, behind only Université de Montréal at $47 million. McGill also ranked 2nd, again behind Université de Montréal, in FRQ market share (20.2% vs. 31.7%). Université de Montréal, McGill University, and Université Laval together receive about 70% of all FRQ funding.

Figure 6. McGill Results by Agency FY15					
	Overall Funding	*Total Dollars Ranking in Quebec*	*Market Share*	*5-year Trend in Market Share*	*1-year Trend in Market Share*
FRQ	$30M	2nd	20.2%	+3.3	+0.3
FRQ-S	$20.4M	2nd	26.1%	+5.9	+2.4
FRQ-NT	$6.6M	3rd	18.9%	+0.7	-2.5
FRQ-SC	$3M	4th	10%	+1.3	-1.4

HIGHLIGHTS FROM TROIS FONDS RESULTS

Overall funding

- FRQ funding increased by only 3.5% over the past five years, rising from $144 million in FY10 to $149 million in FY15.

- FRQ award dollars, which exclude scholarships, increased by 24% at McGill in the past five years and by 1.8% in the past year.

- Only the FRQ-NT envelope has grown in the past five years (+24.8%). The FQR-SC envelope has not changed significantly (+2.5%) and the FRQ-S envelope has decreased slightly (-4.6%). McGill's total FRQ market share as well as its market share in each of the Trois Fonds have increased during the same period.

Figure 7. 5-year and 1-year change in FRQ award dollars of Quebec institutions
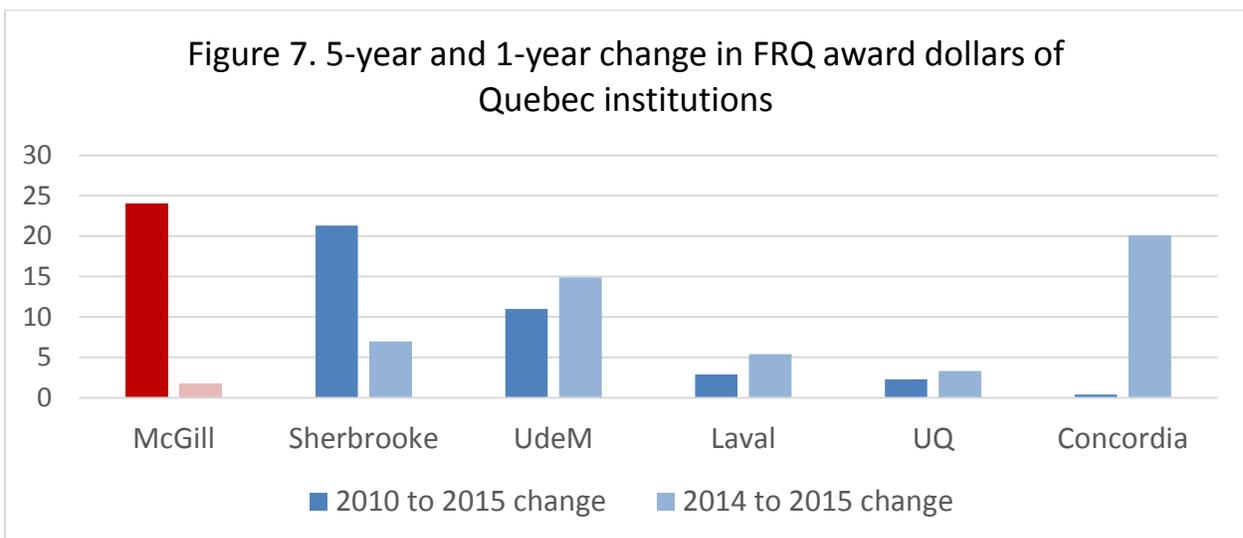
Fonds de recherche du Québec – Santé (FRQ-S)

- In FY15, FRQ-S awarded McGill and its affiliated hospitals and research institutes $20.4 million, 2nd behind Université de Montréal ($29.5 million).

- FRQ-S award dollars increased by 23.2% at McGill in the past five years and by 8.8% in the past year. McGill's achieved this increase despite a 4.6% decrease in FRQ-S dollars ($82 million to $78 million) over this same five-year period.

- In FY15, McGill ranked 2nd in Quebec in terms of FRQ-S market share (26.1%), behind Université de Montréal (37.7%) – an increase of 2.4 percentage points over the previous year and 5.9 percentage points since FY10.

Fonds de recherche du Québec - Nature et technologies (FRQ-NT)

- In FY15, FRQ-NT awarded McGill $6.6 million, 3rd behind Université de Montréal ($9.6 million) and Université Laval ($9 million).

- FRQ-NT award dollars increased by 30.4% at McGill in the past five years but decreased by 7.2% in the past year.

- In FY15, McGill ranked 3rd in Quebec in terms of FRQ-NT market share (16.3%), behind Université de Montréal (23.9%) and Université Laval (22.4%) – a decrease of 2.5 percentage points over the previous year, but an increase of 0.7 percentage point since FY10.

Fonds de recherche sur la société et la culture (FRQ-SC)

- In FY15, FRQ-SC awarded McGill $3 million, ranking us 4th behind Université de Montréal ($8 million), Université du Québec à Montréal ($5.4 million), and Université Laval ($3.9 million).

- FRQ-SC award dollars increased by 17.3% at McGill in the past five years but fell by 17% in the past year.

- In FY15, McGill ranked 4th in Quebec in terms of FRQ-SC market share (10%), behind Université de Montréal (26.4%), UQAM (17.6%), and Université Laval (12.8%). McGill

saw a decrease of 1.3 percentage points in its market share in FY15, but an increase of 1.3 percentage points over the previous five years.

Source Figures 6-7: Data obtained from FRQ (PIA, September 2015) [Excludes scholarships; Bishop's not included.]

Innovation Performance

BACKGROUND

In recent years, the annual Report on Research and Innovation has stressed the need for McGill to work differently with its researchers, its community partners (including investors and alumni), and industry to both create new sources of research funding as well as deliver knowledge, ideas, and new technologies that address societal needs. This means more and better collaboration, a more strategic and open approach to our patent portfolio, and a concerted effort to take our research beyond the academy to the market or translate it into new means of engaging and improving our communities.

McGill is also working to expand our zone of interaction with key players in the local, national, and international innovation ecosystem. In 2016, the University made a number of significant decisions that re-emphasize the importance of innovation on our campuses and in how we engage with our external communities, such as: renaming our portfolio as Research and Innovation; recruiting its first Associate Vice-Principal, Innovation and Partnerships; and creating the Office of Innovation and Partnerships centrally.

COMMERCIALIZATION OUTCOMES

Of the 34 universities, research institutes, and hospitals participating in the Association of University Technology Managers (AUTM) *Canadian Licensing Activity Survey* for FY15, McGill had the following rankings in FY15. (FY14 information is also included as a comparison.)

- 1st in New Patent Applications (180), followed by the University of British Columbia (112)

    o   FY14: 1st with 144

- 2nd in Invention Disclosures (150), while the University of Toronto, excluding its affiliated hospitals was 1st (174)

    o   FY14: 3rd with 128

- 2nd in Cumulative Active Licenses (258), while the University of British Columbia led Canadian universities (361)

- o FY14: 3rd with 239

- 5th in Patents Issued (19), behind the University of Toronto, excluding its affiliated hospitals (39)

  - o FY14: 2nd with 23

- 5th in Cumulative Invention Disclosures 2013-15 (373), while the University of Guelph was 1st (581)

  - o FY14: 7th with 304

- 8th in 2015 Licenses and Options Executed (29), while the McMaster University and its affiliated hospitals led Canadian universities (190)

  - o FY14: 6th with 34

- 8th in 2013-2015 Cumulative Adjusted Gross Income ($6.4 million), while University of Saskatchewan was 1st ($39.4 million)

  - o   FY14: 10th with $6.4 million

- 11th in Startups (2), while the University of Toronto (17), excluding its affiliated hospitals, led the country

  - o FY14: 3rd with 6

- 14th in 2015 Gross Licensing Running Royalty Income ($339,295), while the University of Saskatchewan was 1st ($14.6 million)

  - o FY14: 4th with $3.7 million

- 18th in 2015 Adjusted Gross Income, which includes running royalties, cashed-in equity, and miscellaneous sources, minus license income paid out to other institutions ($810,644), while the University of Saskatchewan led Canadian universities ($14.4 million)

  - o FY14: 4th with $4.7 million

Source: AUTM Canadian Licensing Activity Survey: FY2015

IMPACT OF THE OFFICE OF INNOVATION AND PARTNERSHIPS

Research and Innovation (R&I) is home to one of McGill's key units dedicated to increasing McGill's engagement with community and industry partners, the Office of Innovation and Partnerships (OIP). The OIP was created in the summer of 2016 when three teams – Invention Development and Entrepreneurship Assistance (IDEA), Innovation in Practice (formerly the Quartier de l'innovation), and the McGill University Business Engagement Centre (MUBEC) – were physically brought together in one space in the James Administration Building.

The following are significant achievements from the OIP in 2016 as they relate to building new and stronger collaborations between McGill and community, university, and industry partners:

- [Angelique Mannella](#) was appointed McGill's first Associate Vice-Principal, Innovation and Partnerships in June 2016. Previously, she was the founder and CEO of Decode Global, a social enterprise that developed mobile games. AVP Mannella has 15 years of experience in technology product design and business development, and has worked for companies such as Cisco Systems and Nokia in North America, Europe and Asia.

- The [McGill Agrifood Innovation Network (MAIN)](#) received $1 million of funding per year for the next five years from the Government of Quebec. MAIN is an initiative led by the Faculty of Agricultural and Environmental Sciences and CTAQ (Conseil de la Transformation Alimentaire du Quebec) in collaboration with Saint-Hyacinthe Food Research and Development Centre (CRDA) and other universities. Additional funding has been provided by food and beverage companies, the federal government's Agriculture and Agri Food Canada's Growing Forward 2 program, and the provincial Ministère Économie, Science et Innovation's ACCORD program. MAIN aims to align and focus McGill's research and innovation strengths with academic, government and industry policies related to agribusiness, while promoting scientific entrepreneurship, talent development, and industrial partnerships and commercialization.

- In 2014, the Innovation Steering Committee recommended that the Desautels Faculty of Management lead an expansion of undergraduate academic offerings related to entrepreneurship. Shortly thereafter, the Provost and Vice-Principal (Academic) mandated Desautels to design a standardized framework for new Minor programs, which ultimately resulted in a series of similar but unique collaborations between each host Faculty and the Desautels Faculty of Management, led by Steve Maguire, Director of the Marcel Desautels Institute for Integrated Management (MDIIM). The Faculty of Agricultural and Environmental Sciences' new Minor in Agribusiness Entrepreneurship launched in September 2015; the Faculty of Engineering's Minor in Technological Entrepreneurship was revised in 2016 to be in line with the new framework; and

undergraduate students in the Faculty of Arts, the Faculty of Science, and the Schulich School of Music began enrolling in their own new 18-credit Minor in Entrepreneurship programs during the fall 2016 term.

- The 4th edition of McGill Innovation Week, held November 13 to 19, attracted almost 1,200 people to 25 events. The event has the goal of raising awareness of McGill's activities in support of innovation and entrepreneurship on campus as well as reaching out to various communities, student associations, and internal stakeholders.

- Since beginning our partnership in 2014, more than 15 new projects have launched as part of McGill's agreement with Centre d'entreprises et d'innovation de Montréal (CEIM), giving McGill students and faculty access to CEIM services for the start-up and development of companies in information technology, new media, clean and industrial technologies as well as life sciences.

- MUBEC generated approximately $7.3 million in new funding (sponsored research contracts, technology licensing, fees, and strategic gifts), for McGill in FY16.

- Since its official launch in July 2012, MUBEC has also generated new or renewed engagement with more than 340 corporations.

Survey Results: Services Provided by Research and Innovation

During the fall semester, Research and Innovation (R&I) surveyed all members of the McGill community who are eligible to hold grants at the University. The survey invited nearly 4,700 participants to complete an online survey and ultimately had a response rate of 16%, comparable with other recent surveys of the McGill community, when it closed on November 14, 2016. Out of those who responded, 269 had to be removed because they only completed their researcher profile, leaving 462 who fully or partially completed the survey. The survey's margin of error is 3.3%.

Respondents were asked about their satisfaction with and awareness of R&I's educational and outreach initiatives, support in applying for grants and negotiating agreements, and management of successful awards as well as their interactions with R&I staff members during these processes.

AREAS OF STRENGTH

The percentages described in this section reflect the proportion of respondents who answered either **"very satisfied"** or **"somewhat satisfied"** on the survey. It excludes those respondents who indicated that they did not use the service or who were not aware of the service. R&I performed well in:

- Guides for major competitions (80%);

- Information sessions on specific funding programs or grant-writing skills (75%);

- Advising on rules, regulations, and submission procedures for sponsored research applications (74%);

- Weekly funding alerts (72%);

- The funding opportunities/deadlines database (71%).

Other noteworthy results included the following:

- When asked to rank areas where R&I performs particularly well, "Advising on rules, regulations, and submission procedures for sponsored research applications" ranked the highest.

- "Assisting with proposal development, and reviewing of grant applications or bid applications" ranked 2nd as an area where R&I performs particularly well, but was also ranked 1st as an area for improvement.

- Responding in a timely manner was an area where R&I performed well: 76% in areas related to applying for grants and agreements, and 70% in relation to activating and managing awards.

- There was similar satisfaction with regards to "Activating awards and opening fund authorization promptly" (75%).

AREAS REQUIRING IMPROVEMENT

One area where there are indications that improvements should be made concerned the support software for animal care:

- Only 40% satisfaction was reported in regards to the University Animal Care Committee website.

- "Assisting in maintaining compliance with Canadian Council on Animal Care (CCAC) and University Animal Care Committee (UACC) policies and guidelines for the use of animals in research" received a 39% satisfaction rating.

- "Processing submissions of protocols for research involving animal subjects via the Darwin system" had only 37% satisfaction.

Another area for improvement was related to large-scale initiatives:

- "Assisting in the development of grant applications for infrastructure (e.g. CFI)" achieved only a 46% satisfaction rating.

- "Supporting and facilitating the development of large-scale research networks (e.g. NSERC Collaborative Research and Training Experience Program, Networks of Centres of Excellence)" received a mark of 38% satisfaction.

- "Liaising with McGill Facilities to set up infrastructure" was rated with only 30% satisfaction.

RAISING AWARENESS OF R&I SERVICES

Researchers seem to underutilize some resources or services provided by R&I that are general in nature and therefore available and relevant to a large portion the research community. Examples include the following:

- 62% did not use educational outreach about research involving animals (e.g. training courses, informational emails).

- 56% did not participate in educational outreach about conducting research involving human participants (e.g. weekly drop-in sessions, presentations to classes and groups, or one-on-one consultations).

- 48% did not use services in support of developing and submitting nominations for prestigious prizes, awards, and public recognition memberships.

- 44% did not attend the annual Bravo Gala, which recognizes winners of major national and international prizes and awards.

- 40% did not use face-to-face meetings targeted to the needs of an individual researcher or a group of researchers.

Respondents rarely reported being "unaware" of R&I services in general, suggesting that the services are well-publicized. The services that were least well-known were:

- The annual Bravo Gala (19%);

- "For Researchers" section of the R&I website (18%).

NEXT STEPS

Initial observations from the survey are presented here. Further analysis will be done, notably by discipline and career stage of the researcher, in order to establish more specific areas for adjustment or improvement of R&I services. A full analysis of the results, as well as an action plan for areas requiring improvement, will be shared with the McGill community in 2017.

Selected Major Achievements in 2016

EXAMPLES OF NOTEWORTHY GRANTS AND FUNDING SUCCESSES

- McGill was successful in the national competition of the [Canada First Excellence Research Fund (CFREF)](#), which will provide the University with an $84-million grant over seven years to support an ambitious effort in neuroscience to advance understanding of the human brain and ease the burden of neurological and mental-health disorders. McGill's program, called "Healthy Brains for Healthy Lives" (HBHL), will build on the University's leading position and its partnerships in neuroscience to make McGill a global hub for brain research – one of the major frontiers for 21st century medicine.

- The Montreal Neurological Institute and Hospital received a [$20 million donation from the Larry and Judy Tanenbaum family](#) to establish the Tanenbaum Open Science Institute, a bold initiative that will facilitate the sharing of neuroscience findings worldwide to accelerate the discovery of leading edge therapeutics to treat patients suffering from neurological diseases.

- In spring 2016, McGill committed $10 million over five years to support the [Sustainability Sciences and Technologies Initiative (SSTI)](#), led by the Faculties of Science, Engineering, and Agricultural and Environmental Sciences. The goal SSTI is to establish McGill as a global hub for scientific and technological solutions to some of the most intractable problems surrounding sustainable growth.

- McGill researchers were awarded 41 new and renewed Canada Research Chairs (CRC) in 2016, with [25 CRCs announced in February](#) and [16 CRCs announced in December](#). CRCs are granted to outstanding researchers acknowledged by their peers as world leaders in their fields.

- CFI invested more than $1.1 million in CBRAIN, one of the world's most advanced computing platforms for brain research, under the new [Cyberinfrastructure Initiative](#). CBRAIN, a national network of brain imaging centres linked with Compute Canada's high-performance computing grid, is an important element in the HBHL program.

- Shaheen Shariff, Department of Integrated Studies in Education, received $2.5 million for a seven-year project to address sexual violence on university campuses across Canada and internationally through the [SSHRC Partnership Grant](#) program.

- Five McGill researchers were awarded $2.4 million over the next three years in [NSERC Strategic Partnership Grants](). All five awards will fund projects working to either mitigate environmental impact or produce more efficient manufactured goods.

- Samy Suissa, Departments of Epidemiology and Biostatistics and of Medicine, will receive [$17.5 million in CIHR funding]() over five years for the project Canadian Network for Observational Drug Effect Studies (CNODES). CNODES provides state-of-the-art applied research infrastructure specifically designed for studying drug safety via large databases in seven provinces.

- Yaoyao Fiona Zhao, Department of Mechanical Engineering, earned a €2.6 million ($3.8 million CAD) grant over four years for her project "Additive Manufacturing Optimization and Simulation Platform for Repairing and Re-manufacturing of Aerospace Components." The project is supported by the European Commission through the [Horizon 2020 Programme]() and by the Consortium for Aerospace Research and Innovation in Canada and NSERC. It is one of the first European-Canadian projects to be funded under the "Mobility for Growth" collaboration in aeronautics R&D.

- Michael Ngadi, Department of Bioresource Engineering, received $2.6 million over three years from the [International Fund for Agricultural Development](). The project, entitled "Strengthening capacity of local actors in nutrition-sensitive agri-food value chain in Zambia, Malawi and Eritrea," is a collaboration between McGill, Worldfish, Bioversity International, and local partners.

- A team led by Jake Barralet, Faculty of Dentistry, received a six-year, $1.65 million grant through NSERC's [Collaborative Research and Training Experience (CREATE)]() initiative to provide nearly 90 students with cross-disciplinary training to prepare them for high-skill jobs in the surgical devices industry.

- The International Development Research Centre (IDRC) and Global Affairs Canada announced $1.5 million over three years each to two McGill-led projects under the [Canadian International Food Security Research Fund (CIFSRF)](). The projects will develop, test, and apply ways to scale up innovations in food security and nutrition. They are: "Expanding adoption of nutritious, disease-resistant potatoes in Colombia," led by Hugo Melgar-Quiñonez, School of Dietetics and Human Nutrition, and "Reducing barriers to millet production and consumption in India," led by Vijaya Raghavan, Department of Bioresource Engineering.

- The International Progressive MS Alliance awarded a four-year, $6.1 million [Collaborative Network Award]() to a project led by Douglas Arnold, Department of

Neurology and Neurosurgery, at The Neuro to study progressive multiple sclerosis. As principal investigator, Arnold will lead a team of 16 investigators from the Netherlands, Switzerland, UK, and US.

- The Sandra and Alain Bouchard Foundation gave $4-million to the Montreal Neurological Institute and Hospital to establish the [Sandra and Alain Bouchard Intellectual Disability Research Program](#).

- The Montreal Neurological Institute and Hospital announced that it will embark on a five-year project in "[open science](#)," during which all of its research results, and all of the data associated with that research, will be made widely available.

EXAMPLES OF SIGNIFICANT NEW OR STRENGTHENED PARTNERSHIPS

- Thanks to technology from [EMC Corporation](#), McGill will establish a research-and-development centre that will serve as a test bed to adapt EMC Isilon scale-out NAS for powerful visualization and data-storage technology to support the complex needs of leading-edge neuroscience.

- The Institut Nordique du Québec announced the establishment of three [Northern Research Chairs](#). McGill's Murray Humphries of the Department of Natural Resource Sciences will hold a three-year Chair in Northern Research – Wildlife Conservation and Traditional Food Security.

- Elsa Vasseur, Department of Animal Science, was appointed [NSERC industrial Research Chair in Sustainable Life of Cattle](#). With $1.8 million in support, Vasseur is launching a five-year longitudinal study based at the dairy farm on McGill's Macdonald Campus in collaboration with NSERC, Novalait, Dairy Farmers of Canada, and Valacta.

- Fabrice Labeau, Department of Electrical and Computer Engineering, was renewed for a second five-year term as the [NSERC/Hydro-Québec Industrial Research Chair in Interactive Information Infrastructure for the Power Grid](#). With $1.5 million in new support, the proposed research program will explore, design, and implement new communication paradigms within power substations, new strategies for robust deployment and fast recovery from failures in networked sensors, and new data gathering and validation techniques that are more resistant to cyberattacks.

- Geza Joos, Department of Electrical and Computer Engineering, was renewed for a second, five-year term as the [NSERC/Hydro-Québec Industrial Research Chair on the](#)

[Integration of Renewable Energies and Distributed Generation into the Electric Distribution Grid](). The $1.5 million in new funding will support research that will help Canadian utilities make better use of the integration of distributed energy resources into their electric grids and deploy microgrids and interactive distribution systems.

- CQDM announced $1 million in funding over two years for "Protein trafficking and misfolding under scrutiny," co-led David Y. Thomas, Department of Biochemistry, with Bert Klebl from Lead Discovery Center (LDC) in Dortmund, Germany. It is the first project under the [Canada/Germany Program](), funded in partnership with the German Federal Ministry for Economic Affairs and Energy.

- [Carbicrete](), a McGill spin-off created from technology developed in the Department of Civil Engineering and Applied Mechanics by Yixin Shao and Mehrdad Mahoutian, was named one of 27 teams advancing to the second round in the $20 million [NRG COSIA Carbon XPRIZE](), a global competition to develop breakthrough technologies that convert carbon-dioxide emissions from power plants into high-value products.

- [Domain Therapeutics]() has licensed a biosensor technology co-developed by McGill University Stéphane Laporte, Department of Medicine, and Michel Bouvier of the Université de Montréal. This is the second licensing and partnership agreement signed between Domain, McGill, and UdeM, and further strengthens Domain's leading position in the field of drug discovery and drug profiling.

- [Laurent Pharmaceuticals Inc.](), a McGill spin-off created with an invention from Danuta Radzioch, RI-MUHC, and Stan Kubow, School of Dietetics and Human Nutrition, announced the close of a financing round led by Cystic Fibrosis Canada. This investment will allow the preparation of the upcoming Phase 2 clinical trial with LAU-7b in cystic fibrosis patients.

EXAMPLES OF MAJOR PRIZES, AWARDS, AND RECOGNITIONS

- McGill ranked first in Canada and 37th globally in the [Nature Index 2016 Rising Stars]() supplement, which identifies institutions showing the most significant growth in high-quality scientific research publications over the past four years.

- McGill astrophysicist Victoria Kaspi was the 2016 recipient of the [Gerhard Herzberg Canada Gold Medal for Science and Engineering](), NSERC's highest honour, in recognition major discoveries throughout her career in the study of rapidly spinning compact

neutron stars called pulsars. Kaspi is the first woman and one of the youngest researchers to ever win the Herzberg Canada Gold Medal.

- Victoria Kaspi was also named a [Companion of the Order of Canada](). Companion is the highest rank in the Order of Canada.

- SSHRC awarded its 2016 [Gold Medal]() – the organization's highest honour – to Claudia Mitchell, Department of Integrated Studies in Education, in recognition of her work to strengthen HIV/AIDS education and prevention.

- Celebrated McGill philosopher Charles Taylor was named the first winner of the $1-million [Berggruen Prize](). The prize, awarded by the California-based Berggruen Institute, will be given annually "to a thinker whose ideas are of broad significance for shaping human self-understanding and the advancement of humanity."

- Isabelle Daunais, Département de langue et littérature françaises, was awarded the Canada Council's [Killam Prize for the Humanities]() for her "major studies that over the past decades have contributed to demonstrating how the novel is one of the greatest tools of our culture for formulating hypotheses about the world and our existence in it."

- McGill researchers were once again well represented during the Royal Society of Canada's annual inductions and awards, which included:

  o The induction of [10 new Fellows]() and [seven new members to the College of New Scholars, Artists and Scientists]();

  o The awarding of the [Innis-Gérin Medal]() for distinguished and sustained contribution to the literature of the social sciences to John A. Hall, Department of Sociology;

  o The election of Vijaya Raghavan, Department of Bioresource Engineering, as [President of the RSC's Academy of Science]().

- Graham Bell, Department of Biology, was elected as a [Fellow of the Royal Society (UK)]().

- The Government of Quebec bestowed its highest citation for accomplishments in cultural and scientific fields, the [Prix du Québec](), on two McGill researchers. John A. Hall, Department of Sociology, received the Prix Léon-Gérin for human and social sciences, and Alan Evans received the Prix Wilder-Penfield for biomedical research.

- Catherine Potvin, Department of Biology, and Adelle Blackett, Faculty of Law, garnered two of this year's five Trudeau Fellowships.

- NSERC presented Elena Bennett, Department of Natural Resource Sciences and School of Environment, with one of six E.W.R Steacie Memorial Fellowships.

- Adam Oberman, Department of Mathematics and Statistics, was named a 2016 Simons Fellows in Mathematics.

- The John Simon Guggenheim Memorial Foundation awarded a Guggenheim Fellowship to Daniel Wise, Department of Mathematics.

- McGill researchers were the recipients of three of the six Killam Research Fellowships in 2016. They are: Charles Gale, Department of Physics; Andrew Gonzalez, Department of Biology; and Stephen McAdams, Schulich School of Music.

- Tobias Rees, Social Studies of Medicine, and Joelle Pineau, School of Computer Science, were named Fellows at the Canadian Institute for Advanced Research (CIFAR).

- Two McGill professors are in the first cohort of 18 CIFAR Azrieli Global Scholars: Corinne Maurice, Department of Microbiology and Immunology, and Kieran O'Donnell, Department of Psychiatry.

- Three members of McGill's faculty received the Principal's Prize for Outstanding Emerging Researchers. They are: Jessica Coon, Department of Linguistics; Tomislav Friscic, Department of Chemistry; and Nathalie Tufenkji, Department of Chemical Engineering.

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