McGILL UNIVERSITY **SENATE**

McGill Memorandum

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TO:	Senate
FROM:	Denis Thérien, Vice-Principal (Research & International Relations)
SUBJECT:	Report on Research
DATE:	April 30, 2007
DOCUMENT #:	D06-67
FOR:	☐ **DECISION** ☐ **APPROVAL** ☒ **DISCUSSION**
ISSUE:	Apprising Senate of developments in research portfolio and future directions
BACKGROUND:	
MOTION OR RESOLUTION FOR APPROVAL:	Not applicable
RATIONALE:	Not applicable
PRIOR CONSULTATION:	Senate, May 2006 Deans Working Lunch and P7 (senior administration) throughout the year
NEXT STEPS:	
APPENDIX:	Power Point Presentation

Report on Research

Professor Denis Thérien
Vice-Principal (Research and International Relations)
VPRIR

Senate
May 9, 2007

Primary Responsibilities of the VPRIR

Play an active role in shaping McGill's research agenda: key to this is the *Strategic Research Plan.*

Serve as the University's main representative to academic, industrial and governmental organizations that have an influence on the development of research in Canada.

Secure higher levels of support for all research activities of McGill colleagues.

Oversee research services and policies at McGill.

Lead efforts to commercialize research and bring McGill's discoveries to the rest of society.

Contribute to McGill University's presence, visibility and influence abroad.

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The Four Pillars

Research Performance

Improve performance in all funding competitions at provincial, national and international levels, to ensure that key strategic priorities can be driven at world-leading pace: nothing short of being the top research-intensive university in Canada can satisfy us.

Research Services

Construct a research environment where our colleagues are offered services that are on a scale comparable to that of our main competitors.

Industrial Strategy

Develop a comprehensive and realistic industrial strategy and partnerships in the private sector to realize our full potential as a key player in the Quebec economy.

International Strategy

Assume leading role as Canada's primary international institution; this is, as much as excellence in research, our trademark and number one strength; in a context where the competition is fierce, we need to be creative and bold.

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Research = Collaboration

Centre for Interdisciplinary Research in Music Media and Technology (CIRMMT) in the Schulich School of Music - research project on music and the brain

Daniel Levitin, Bell Chair in the Psychology of Electronic Communication – What happens inside the heads (and bodies) of musicians and audience members during a concert (Boston Symphony Orchestra conductor Lockhart) – medicine, music, science

Faculty of Agriculture and Environmental Sciences

Green Crop Network - Don Smith is coordinating the work of 55 researchers from 13 universities across Canada. This network has a goal of researching ways to reduce greenhouse gas emissions from agricultural activities by exploring creative approaches to crop use and developing alternative fuels (biofuels)

Montreal World Health Organization (WHO) Collaborating Centre for Research and Training in Mental Health

Based at the Douglas Hospital Research Centre; one of only two Canadian centres in the WHO network
Scientific mandate: to disseminate research findings; to develop policies and programs to help people with intellectual deficiencies, etc.

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Selected Research Achievements 2006-07

Michel Tremblay and the McGill Cancer Centre identify a gene found in two of five breast cancer patients.

Rob Sladek and **Constantin Polychronakos** discover genes associated with a risk of developing Type 2 diabetes; could lead to a genetic test for the disease.

David Burns, Chemistry, develops ground-breaking test to identify most viable embryos for in-vitro fertilization; could lead to fewer multiple births.

Jody Heymann, Director of the McGill Institute for Health and Social Policy, finds that U.S. protections for working families are the worst of all affluent countries; Heymann testifies before U.S. Senate Committee.

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Recognition of McGill Researchers 2006: A Banner Year (partial list!)

Templeton Prize in recognition of spiritual advancement for the benefit of humankind to Professor Emeritus Charles Taylor (Philosophy)

Steacie Prize : the most prestigious prize for a young Canadian scientist went to Victoria Kaspi (Physics)

Two ***Killam Prizes***: Engineering – Patrick Selvadurai/Faculty of Engineering (Civil Engineering and Applied Mechanics) and Social Sciences – Roderick Macdonald/Faculty of Law (Constitutional and Public Law)

Canada's ***Top 40 under 40***: Karim Nader (Psychology)

The ***Michael Smith Award for Science Promotion (NSERC)*** went to Ariel Fenster/Office for Science and Society

Scotiabank-AUCC Award for Excellence in Internationalization to Faculty of Law

NSERC's Synergy Award for University-Industry Partnership in R&D to Faculty of Engineering

Four ***Sloan Research Fellowships :*** support & recognition of early-career scientists and scholars: Mathieu Blanchette and Patrick Hayden (Computer Sc.); Aashish Clerk (Physics); Jacques Verstraete (Mathematics)

Three inductees into the **Order of Canada**

Seven **Royal Society of Canada** Fellows

Two **Prix Acfas** and three **Prix du Québec**

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Research Performance

Three out of the last five years, McGill has been ranked as the most research intensive university in Canada - both in terms of sponsored research income per full-time faculty member and in terms of peer-reviewed publications per full-time faculty member.

In 2006, the *Times Higher Education Supplement*, based in London, once again named McGill as Canada's top university and the only Canadian university in the top 25 universities in the world — in 21st position — along with Oxford, Harvard and the University of California (Berkeley).

McGill is in a league of its own in Canada with respect to the quantity and quality of international collaboration.

International Research

In 2006-2007, McGill's Office of International Research (OIR):

- Negotiated and signed 55 new grants or contracts for a total of approximately $5.0 million
- Oversaw a record 152 active projects
- Supported the development of 74 applications or bids
- Played a central role in the success of the McGill India Initiative: establishing 14 new 1-year seed grants; coordinating the November 2006 Scientific Mission to Delhi and Bangalore; and working towards larger and longer-term partnerships with Indian research institutions.

Industrial Research

In 2006-2007, McGill's **Office of Technology Transfer**:

- Negotiated and signed 145 industrial research contracts for a total value of $14.2M (generating overhead revenue)
- Carried out due diligence on 129 report of inventions
- Filed 75 patent applications
- Managed a patent estate of 432 patents issued, and 593 applications pending
- Negotiated and signed 37 licensing deals

McGill has **six active NSERC research chairs**, involving industrial partners in fields such as: pulp and paper, extreme weather and computational fluid dynamics.

McGill researchers have launched about **50 spin-off companies** since the early 90s in areas such as cancer research, applications of carbon activated materials, affordable housing design, and advances in semiconductor tests.

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Reporting on Research Performance: a Note on Methodology

In what follows, we compare McGill's research performance to:

- Total Canadian university research funding
- The **G13 group** of top research-intensive universities in Canada:

  UBC; Alberta; Calgary;
  Western Ontario; McMaster;
  Toronto; Waterloo; Queen's;
  Ottawa; McGill; Montreal; Laval;
  Dalhousie

- The **G4 group**, which includes: UBC, UT, UdeM and McGill

Primary Sources of Research Funding

Federal TriCouncil – direct research

- Canadian Institutes of Health Research (**CIHR**)
- Social Sciences & Humanities Research Council (**SSHRC**)
- Natural Sciences and Engineering Research Council (**NSERC**)

Quebec Provincial agencies – direct research

- Fonds de Recherche en Santé Québec (**FRSQ**)
- Fonds Québécois de la recherche sur la société et la culture (**FQRSC**)
- Fonds Québécois de recherche sur la nature et des technologies (**FQRNT**)

Canada Foundation for Innovation (CFI) - infrastructure funding

Canada Research Chairs (CRC) – academic renewal

Other Partners

- Foundations: ex. Heart & Stroke Foundation; Kidney Foundation
- Corporations: ex. Bombardier; Hydro-Québec; Nortel
- Non-profit sector: ex. Canadian International Development Agency (**CIDA**), Shastri Indo-Canadian Institute

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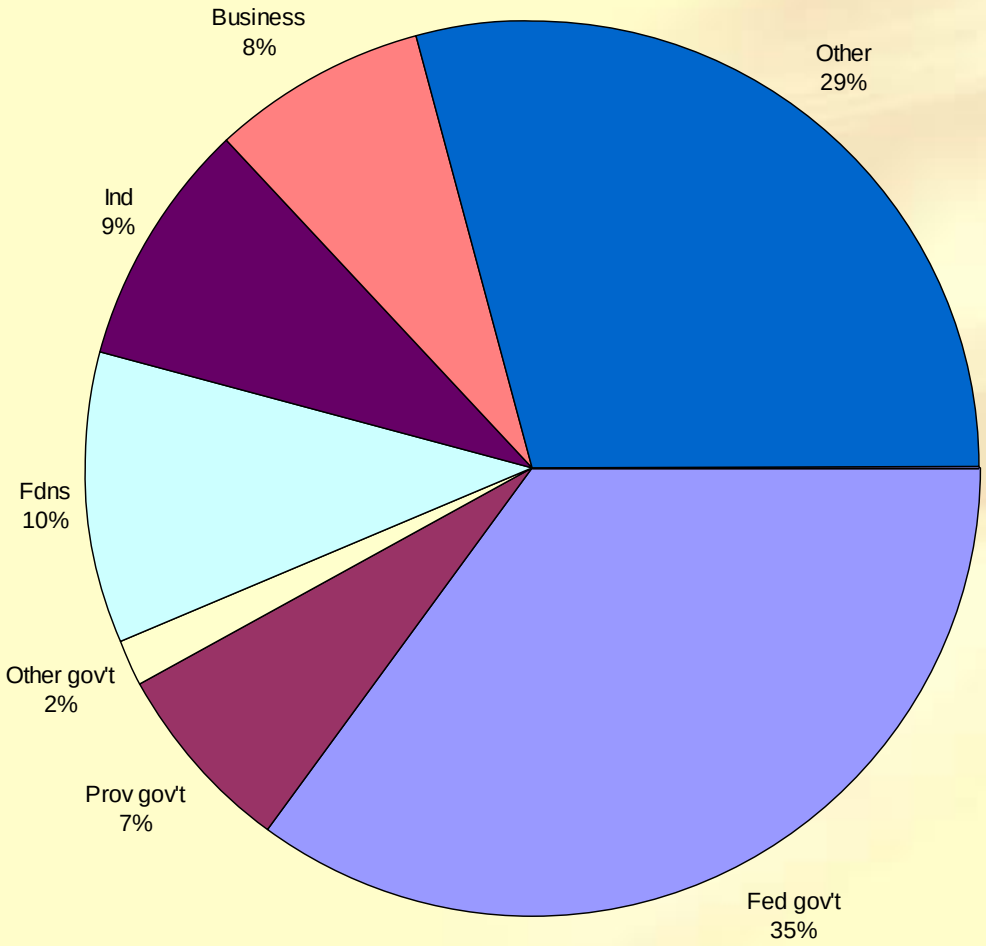
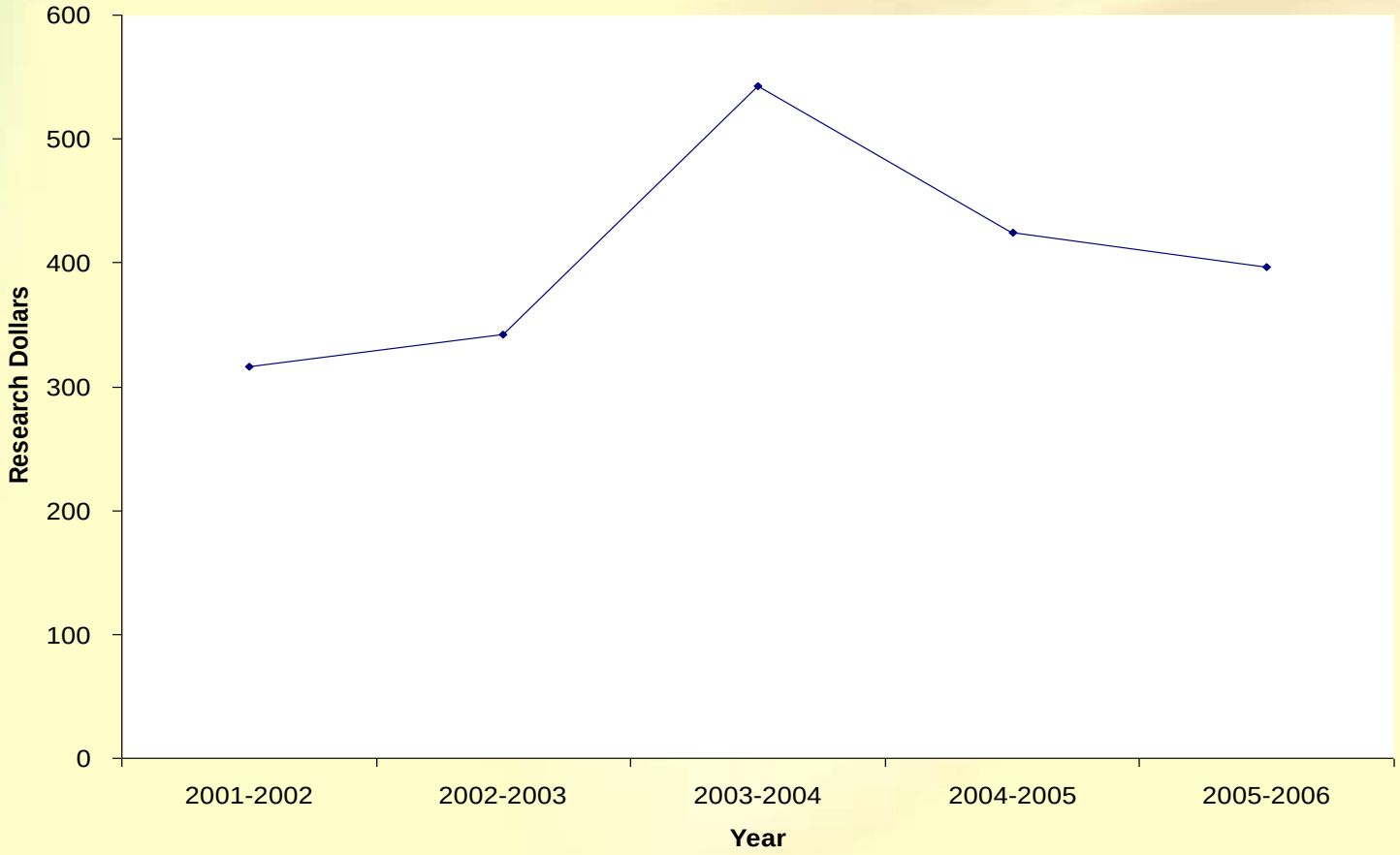
Distribution of Sponsored Research Income
All Sources



Year-Over-Year Sponsored Research at McGill University



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Natural Sciences and Engineering Research Council (NSERC) Funding

NSERC 2000-2001

	Funding (in thousands $)	
	Total $	McGill % of Total
McGill	21,610	5.3
G13	269,512	8.0
G4	117,927	18.3

NSERC 2005-2006

	Funding (in thousands $)	
	Total $	McGill % of Total
McGill	33,738	6.1
G13	350,625	9.6
G4	155,696	21.7

Social Sciences and Humanities Research Council (SSHRC) Funding

SSHRC 2000-2001

	Funding (in thousands $)	
	Total $	McGill % of Total
McGill	3,955	4.3
G13	53,533	7.4
G4	27,151	14.6

SSHRC 2005-2006

	Funding (in thousands $)	
	Total $	McGill % of Total
McGill	8,031	5.5
G13	81,738	9.8
G4	46,110	17.4

Canadian Institutes of Health Research (CIHR) Funding

CIHR 2000-2001

	Funding (in thousands $)	
	Total $	McGill % of Total
McGill	50,415	13.5
G13	325,741	15.5
G4	191,883	26.3

CIHR 2005-2006

	Funding (in thousands $)	
	Total $	McGill % of Total
McGill	69,912	12.1
G13	499,412	14.0
G4	302,535	23.1

Cumulative G13 Canada Foundation for Innovation (CFI) Awards 1998-2006

University *(includes affiliated hospitals and schools)*	CFI Cumulative Award	% Total
U of T	$803,392,105	15.5%
UBC	$673,164,658	13.0%
UdeM	$652,700,150	12.6%
McGill	**$467,950,453**	**9.0%**
Alberta	$449,664,845	8.7%
Laval	$399,612,385	7.7%
Western Ontario	$349,414,077	6.7%
McMaster	$287,477,757	5.5%
Calgary	$265,516,980	5.1%
Ottawa	$262,496,890	5.1%
Waterloo	$252,894,870	4.9%
Queen's	$232,077,955	4.5%
Dalhousie	$94,573,280	1.8%
G13 Total	$5,190,936,405	

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Canada Foundation for Innovation (CFI) Infrastructure Funding (thousands $)

78% of cumulative total ($366,311) has been awarded via five, distinct competitive “rounds” on infrastructure funding:

Round 1 -	15 projects approved:	$ 31,431
Round 2 -	22 projects approved:	$158,971
Round 3 -	9 projects approved:	$132,307
Round 4 -	2 projects approved:	$ 27,660
Round 5 -	2 projects approved:	$ 15,942
Overall:	50 projects approved:	$366,311

22% ($101,639) awarded via other CFI programs

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CFI-funded Research Infrastructure at McGill
- Selected Examples -

- Experimental Therapeutics in Cancer
- Pharmaco-Proteomics and Structural Genomics
- Brain Imaging Research
- Advanced Bone and Periodontal Research
- Centre de recherche et d'innovation en santé mentale à l'Hôpital Douglas
- Tools for Nanoscience and Technology (“Nanotools”)
- Laboratory for Experimental Ecology and Evolution
- Interdisciplinary Research in Music, Media, and Technology
- Multi-Media Communication Systems Technology

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Canada Research Chairs (CRC) Program

Universities are allocated Chairs in proportion to the amount of research grant funding they have received from the three federal granting agencies: NSERC, CIHR, and SSHRC in the three years prior to the year of the allocation.

Canada Research Chair allocations are re-calculated every two years. McGill currently has a total of 157 CRCs.

The CRC Program has allowed McGill to draw outstanding research expertise to McGill.

Dr. Patrick Hayden, from California Institute of Technology, research on quantum computing

Dr. Jody Heymann, from Harvard, research on the impact of social changes on human health and well-being

Dr. David Colman (Director MNI), from Mount Sinai School of Medicine, research on understanding of the causes of neurological disorders

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Challenges Ahead (1)

Research Performance

- Revise Strategic Research Plan
- Achieve success in upcoming CFI competitions
- Regain top position in research intensiveness

Research Services

- Hire Chief Research Officer
- Build on our strengths
- Provide more support for large grants
- Improve on the integration of pre- and post-award services
- Minimize bureaucracy

Challenges Ahead (2)

Industrial Strategy

- Increase industrial contracts and chairs
- Develop incentives for McGill colleagues
- Change the culture

International Strategy

- Maintain our leading position
- Develop new internal programs with key partners
- Maximize our participation in upcoming national and international initiatives