

Sustaining Research Excellence: Challenges and Opportunities

**Office of the Vice President, Research
University of Toronto**

Annual Report 2010

A Message from the Vice President, Research

Since its founding in 1827, the University of Toronto has become an academic and research powerhouse ranked among the world's leading institutions. The 2011 Times Higher Education World University Rankings ranked the University 17th internationally.

U of T is the home of Nobel Laureates, discoveries and scholarship that have changed the world. Today, thousands of investigators and students from three campuses and 10 partner hospitals seek to answer the most important societal questions of our time.

With this rich history in mind, the University of Toronto now has a real opportunity to join the ranks of the top 10 research universities in the world.

This aspiration is not based on wishful thinking. Rather, it emanates from the tremendous strength of the University today and the opportunities afforded by recent changes in the Canadian research funding landscape. Taking U of T to an even higher plane, however, requires a plan to answer three essential questions:

- What are the unique areas of strength and opportunity for the University of Toronto to contribute to knowledge and innovation?
- What challenges do we face in today's research funding landscape?
- How can the Office of the Vice President, Research (OVPR) respond to the sea change that has taken place in research administration over the past decade to best support U of T's world-class researchers?

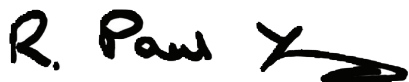
To address these important questions, I am pleased to present the 2010 Annual Report of the OVPR.

The report examines the challenges and opportunities facing the University of Toronto in the critical areas of research services, commercialization and partnerships and accountability and compliance.

We put forward a strategic action plan that addresses these areas and that depends on a collaboration between all Faculties, divisions and research units to ensure the continued prosperity and productivity of the University of Toronto.

On behalf of the OVPR team, I am pleased to share our ideas about how we can continue to work together and build our partnerships to the benefit of U of T's entire research community.

Sincerely,



Professor R. Paul Young, PhD, FRSC

Vice President, Research

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Executive Summary

Responding to major changes in Canadian research funding in recent years, the Office of the Vice President Research (OVPR) has undertaken a critical analysis of the Canadian research funding landscape and the services provided by our office to ensure that the University of Toronto's (U of T) research administration best serves researchers' needs.

This analysis resulted in major transformations in the OVPR's organizational structure, business practices, use of technology, human resources and budget and planning framework. Many of these changes have been successfully implemented or are soon to be underway.

In 2009–2010 the OVPR reorganized its human resources to identify and address specific issues within its three main administrative pillars: Research Services, Research Oversight & Compliance and Innovations & Partnerships.

In implementing these changes, the OVPR was successful in its case for targeted institutional investments in its partnerships and commercialization activities and in information technology to modernize business practices. These steps are designed to enhance the University of Toronto's research success and profile.

Looking beyond 2011, the OVPR is committed to continuous evaluation of its resource use and business practices to ensure that it takes all necessary steps to support the University of Toronto's longstanding position as a global powerhouse of research and innovation.

Introduction

Identifying challenges, seizing opportunities

The transformative research undertaken by U of T's world-class investigators is supported by hundreds of millions of dollars invested by hundreds of sponsors annually. Over the last decade, major changes have taken place in the Canadian research funding landscape and, consequently, in U of T's research and innovation enterprise.

U of T remains Canada's post-secondary research and innovation leader; however, in terms of research funding, the University has lost some ground, relative to other Canadian universities.

To gain a detailed understanding of how U of T has been performing relative to our Canadian peers, the Office of the Vice President, Research (OVPR) has undertaken an in-depth and historical analysis of the Canadian research funding landscape and the functions performed by our office.

Our analysis indicates that there are three key areas in which the University must strengthen its performance in order to maintain its leadership position in Canada and to assume top 10 global ranking.

Challenge #1: Increase market share in Tri-Council competitions

The University has seen a decline in its "market share" of Tri-Council funding programs, which has resulted in a loss of Canada Research Chairs (CRC) funding.¹

While funding is not a comprehensive measure of U of T's research strength or impact, the University's ability to maintain a leadership position or to increase its share of competition-based external research funding is one indicator of the perceived quality of U of T's research.

The Tri-Council provides more than one-third of U of T's total sponsored research funding. In recent years Tri-Council funding has assumed added importance due to its formulaic relationship with other federal research investments such as the CRC and Federal Indirect Costs (FIDC) programs. Additionally, success in securing Tri-Council funding generates an enhanced national and international research profile, additional collaborative research and training opportunities and increased support from other sources, including a number of other formula-based institutional research support allocations.

¹ The "Tri-Council" refers to Canada's three major funding bodies: the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC). The Canada Research Chairs (CRC) program is the nation's major mechanism for attracting and retaining top researchers; each Canadian university is allocated CRCs based on its proportion of Tri-Council funding. Therefore, the better a university does in the Tri-Council competitions, the more Canada Research Chairs it is awarded.

In the last decade, U of T's success in discovery-based grant applications to the Tri-Council has remained strong but its response to other funding opportunities within the Tri-Council has not been as strong as some of our peer institutions. The University research community has been slow to respond to new Tri-Council strategic programs in government priority areas, including new Networks of Centres of Excellence (NCE) competitions. Consequently, there has been gradual erosion in the University's Tri-Council funding market share (Figure 1), leading to a reduction in the number of CRCs allocated to U of T.

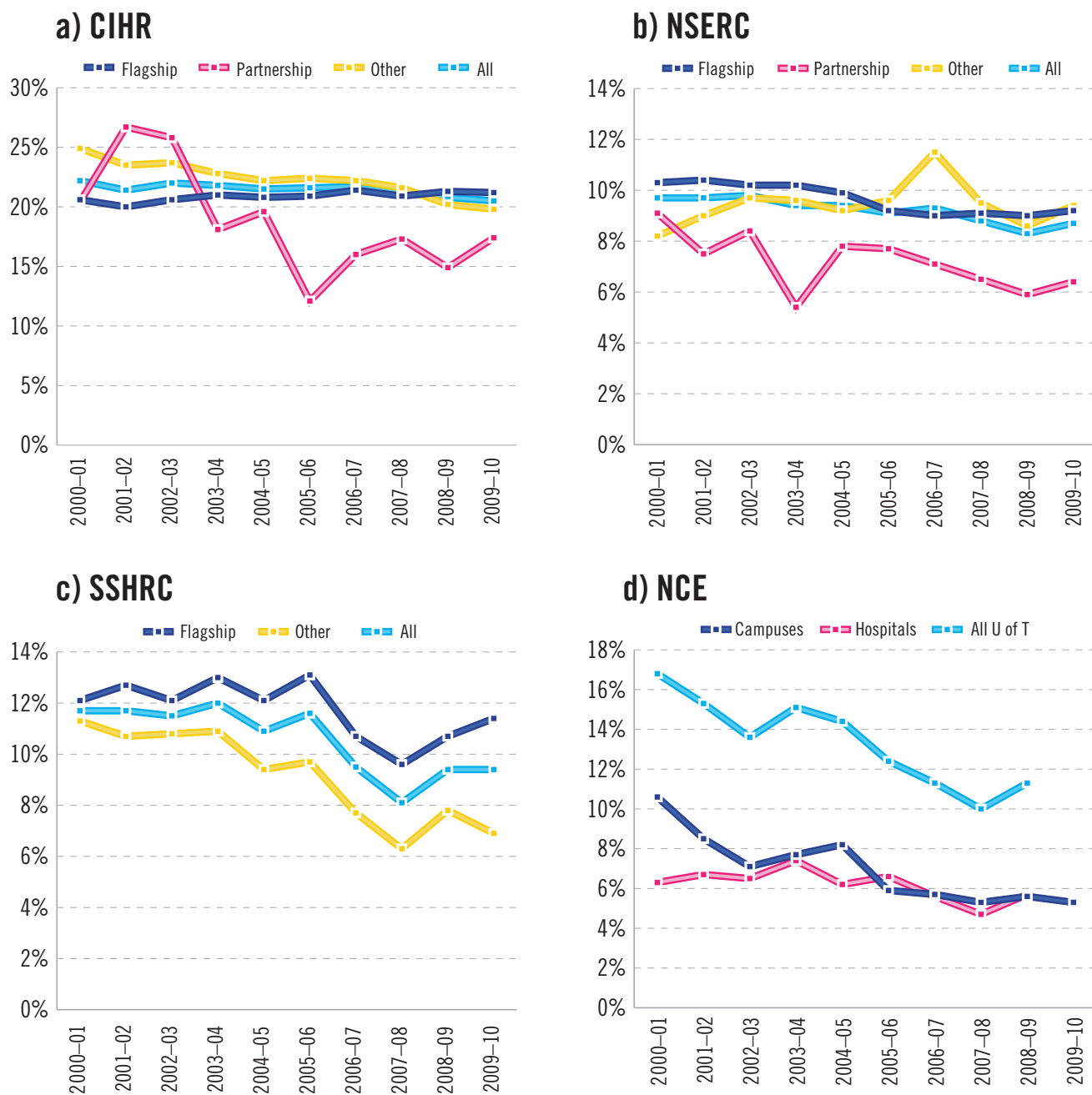
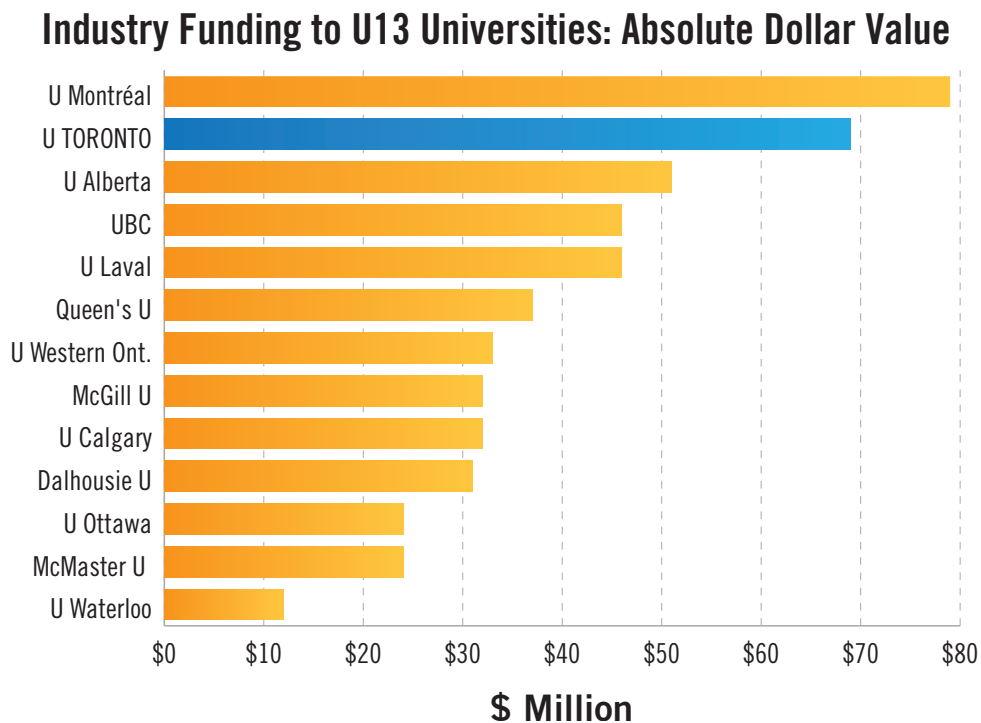


Figure 1: U of T's past market share of Tri-Council and Networks of Centres of Excellence funding by program type (a, b, c) or location (d). With the exception of the CIHR flagship program, note the slow but steady decline in the University's share of funding from these programs over the last 10 years.

Challenge #2: Strengthen research impact and partnerships

Standard research operating grants are no longer the primary source of the University's research funding. The federal and provincial governments have increasingly turned their attention to other types of funding programs. Significant emphasis is now placed on research that can demonstrate direct economic, social and cultural impact by way of commercialization, knowledge translation, development of highly qualified personnel and partnership building. U of T recognizes the value of all modes of research along with what is sometimes referred to as the "basic" to "applied" continuum. However, our analysis suggests that U of T has room to improve in many of the existing and emerging research partnership programs.

- As noted in Figure 1 above, our share of funding from the NCE program has fallen. NCE fosters multi-disciplinary, multi-sectoral partnerships between academia, industry, government and not-for-profit organizations. It also supports academic research and the commercialization of products and ideas.
- Some of our peers amongst the U13 universities in Canada have been more successful than U of T in accessing industry funding, both in absolute terms and as a percentage of each institution's total external funding (Figure 2).



Industry Funding to U13 Universities: As Percentage of Total

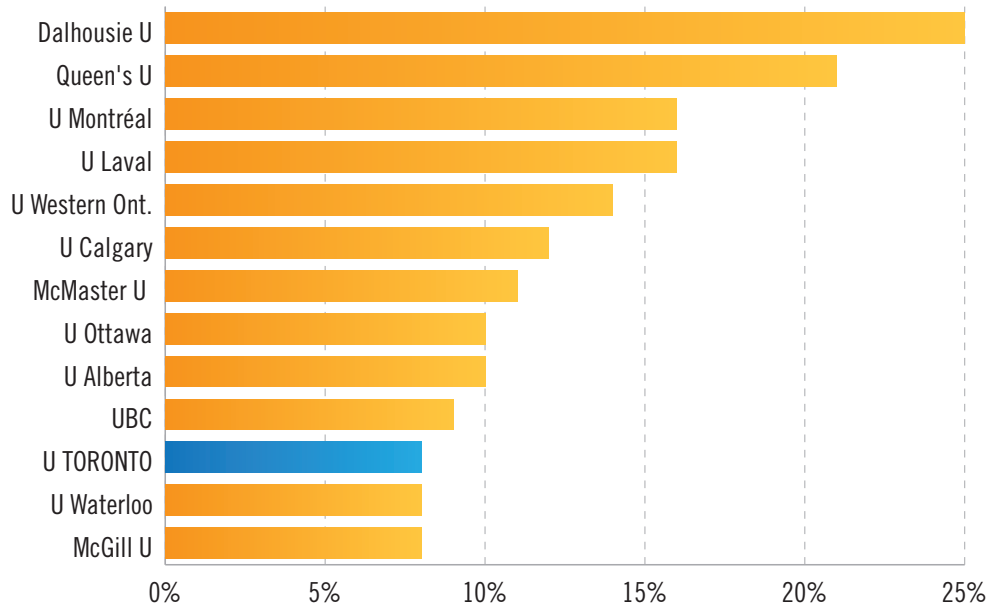


Figure 2: Industry Funding to U13 Universitiesⁱⁱ, 2008–2009

- U of T has been underperforming on Tri-Council partnerships programs, relative to its peer institutions. In particular, in recent years, peer institutions have surpassed U of T in funding from NSERC Strategic Grants (Figure 3) and U of T has consistently lagged in NSERC Strategic Network Grants (Figure 4) although recent additional effort has resulted in notable successes.

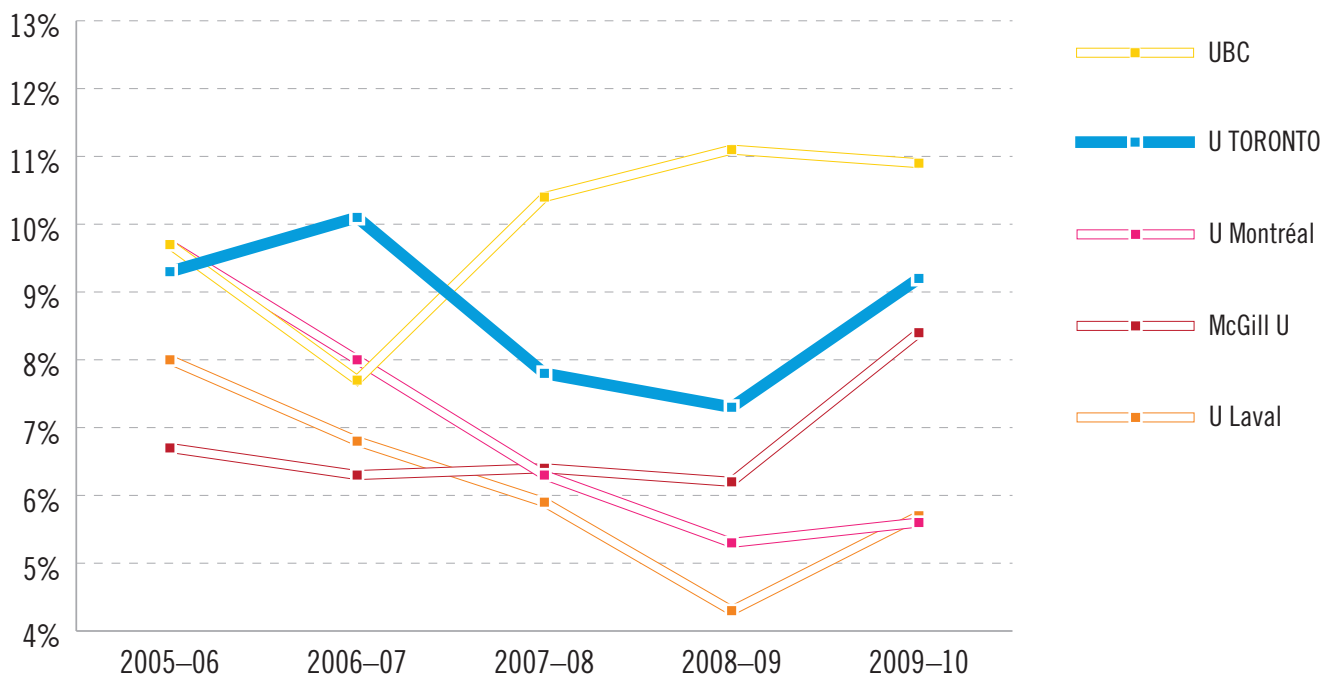


Figure 3: NSERC Strategic Grant (excluding Research Networks) market share comparison of the top 5 Canadian universitiesⁱⁱⁱ.

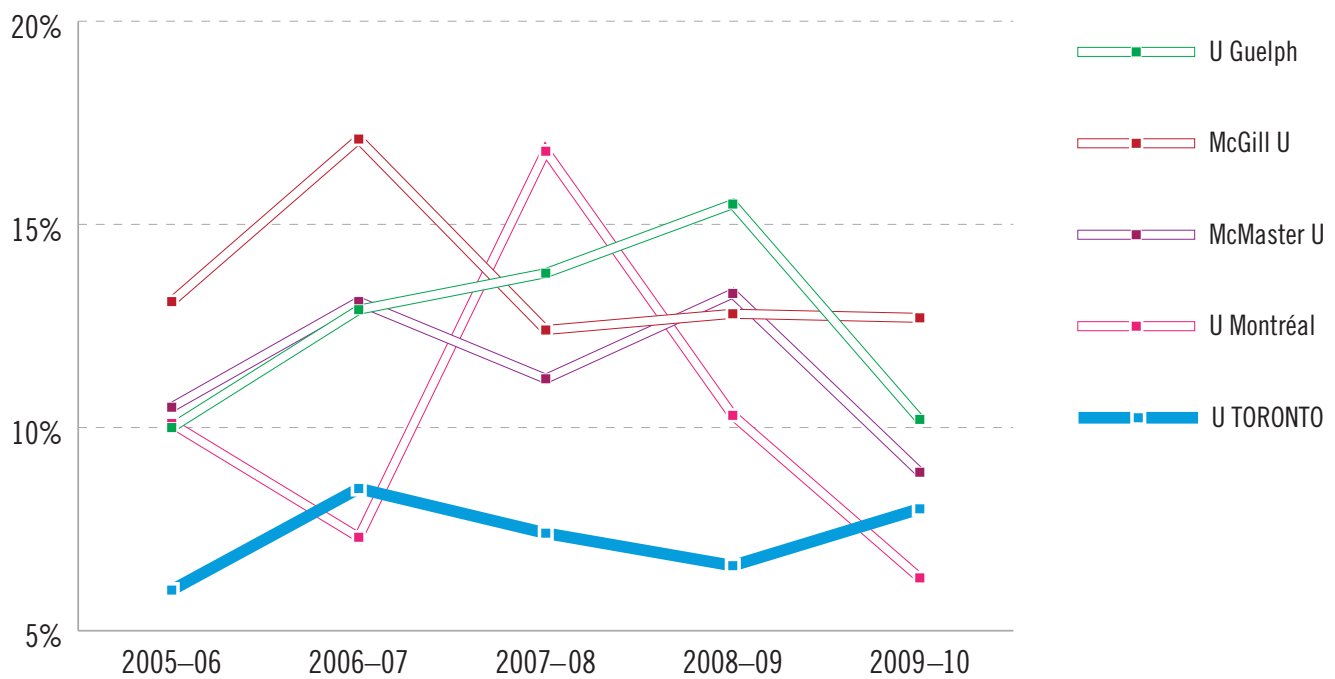


Figure 4: NSERC Strategic Network Grant market share comparison of the top 5 Canadian universities^{iv}.

Challenge # 3: Establish an organization that meets the new demands for oversight and compliance obligations

Requirements for oversight and compliance have grown significantly in the last decade (this theme will be addressed in more detail later in this report). The University must address two key areas in this regard:

- Increased demands for accountability, compliance and auditing mean that the University must devote more resources to effectively manage a much heavier workload.
- Increasing Tri-Council oversight requirements have increased the need for ethics reviews for both funded and unfunded research activities. In the fiscal year that ended in 2009 such reviews increased 30 per cent over the prior year.

Increasing Tri-Council funding, building partnerships with external organizations and updating our business practices are challenging objectives. In addressing them the OVPR has seized the opportunity to critically examine U of T’s research administration enterprise, redefine our goals and priorities, and identify ways to work more closely with our stakeholders, as outlined in this document.

Section 1

A new research landscape demands a stronger administrative enterprise

The last 10 years have seen enormous changes in the research and innovation landscape in Canada. Simply put, things have become more complex. For example, compared to a decade ago:

- There is fiercer competition for research funding, including from the Tri-Council, where demand increasingly exceeds supply (see Figure 5).

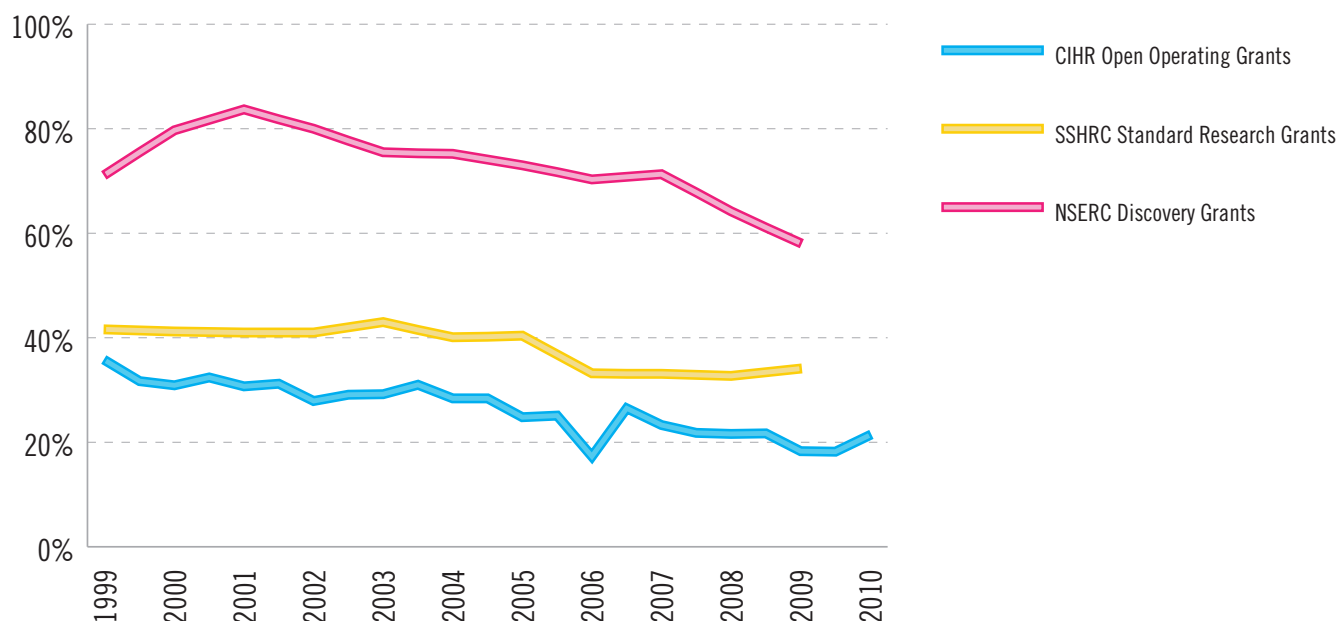


Figure 5: National success rates in the flagship Tri-Council operating grants competitions^v.

- New and more administratively complex funding programs have been introduced. In 1997 the federal government created the Canada Foundation for Innovation (CFI) and in 2000, launched the Canada Research Chairs (CRC) program. University of Toronto researchers have benefitted tremendously from these excellent programs, but the associated administrative requirements are intense and have placed heavy demands on OVPR human resources.
- Federal and provincial governments have refocused their priorities for funding research and innovation. The provincial government created a new ministry—the Ministry of Research and Innovation – devoted to supporting and enhancing Ontario’s capacity in this sphere. New funding programs are increasingly focused on large, multi-institutional collaborations and partnership with external groups—frequently from the private sector.

- Introduction of the Federal Accountability Act in 2006. As a step to restore Canadians' trust in government, the Act strengthens the power of the Auditor General, codifies principles of procurement and introduces tougher penalties for the misuse of public funds.

All of these factors have converged to create a research funding landscape that is dramatically different today than it was 10 years ago. Administrative burdens have substantially increased in volume and complexity of the research funds with much higher accountability regulations and expectations. To understand the impact of the changing research funding landscape on U of T, the OVPR undertook a detailed analysis of the workload currently shouldered by its research funding administrators and compared the results to data from two other time periods, going back to the mid-1990s.

Increased volume and complexity in research administration

In the mid-1990s, the largest proportion of research funding dollars came to the University of Toronto via the Tri-Council, primarily in the form of standard research operating grants to individual faculty members. These grants were awarded based on annual competitions run by the Councils and were fairly straightforward to administer, both pre- and post-award.

The intervening years have seen a shift away from this simple operating grants scenario, towards a more heterogeneous funding landscape. While the Tri-Council still accounts for approximately half of the funding applications that are processed by the OVPR (Figure 6a), today those Councils each have a number of programs in addition to their annual operating grants competitions, often including large multi-partner initiatives with the private sector and/or other institutions.

Overall, the number of active grants or contracts being administered by the OVPR has nearly doubled in an 11-year period (Figure 6b). This explosion in active funding agreements can be attributed primarily to three source categories:

1. The federal granting council programs, which themselves increased in administrative complexity and accountability ("Tri-Council," green bars).
2. Institutional initiatives (II). These are large-scale government research funding programs, such as the CFI programs, the CRC program, Genome Canada and the Ontario Research Fund programs. This category also includes funding from international sources and research contracts (applied, deliverable-specific research projects conducted in collaboration with the private sector). Together, institutional initiatives, research contracts and funding from foreign sources now account for the lion's share (46%) of research revenue.

- Smaller funding programs from diverse sources, for example, foundation grants (“Other,” yellow bars).

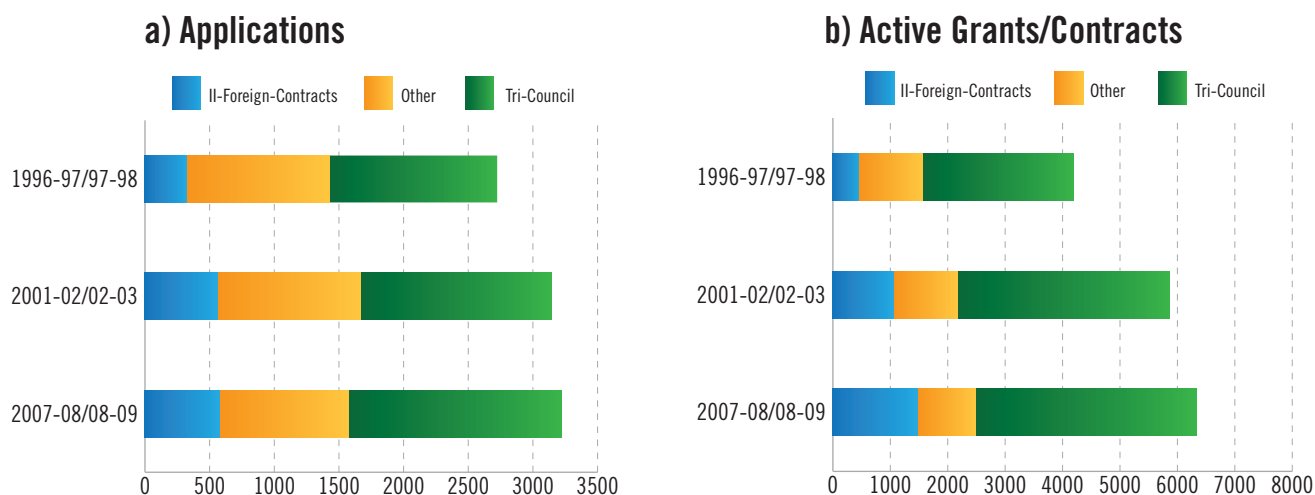


Figure 6: Breakdown of research applications and active grants into the three primary sources: 1. Tri-Council; 2. institutional initiatives, foreign sources, and research contracts (II-Foreign-Contracts); and 3. other miscellaneous arrangements (Other) at three time periods over the last 15 years. A) Number of applications processed. B) Number of active grants or contracts under administration.

Taken together, the increased diversity of funding sources and the dramatic increase in the number of active grants and contracts under administration by the OVPR has increased the burden on research administrators. Workload has nearly doubled since the mid-1990s. As the number of active grants and contracts has increased, the number of FTEs per \$100 million in research revenue has dropped from nearly 14 to 7.6 (Table 1).

	1996–97 to 1997–98	2001–02 to 2002–03	2007–08 to 2008–09
Number of FTEs^{vi}	19	31	32
Number of FTEs per \$100 million in revenue	13.8	11.6	7.6

Table 1: Staff of the OVPR responsible for research grant and contract administration.

Changing accountability regulations and expectations

At the same time that Canada’s research funding landscape has become more complex, a significant regulatory shift has resulted in demands for greater transparency and accountability in both the private and public sectors. This shift resulted from various scandals in the last decade, particularly the collapse of Enron and WorldCom in the United States as a result of suspect accounting practices and other examples here in Canada.

New legislation has been adopted in the United States and Canada to enforce high standards of financial oversight and transparency. While additional examples of mishandling of public and private funds continue to come to light, the legal and ethical obligations and societal expectations of public and private institutions are now clear.

Today, individuals, businesses and institutions operate in a new environment of accountability, requiring total transparency and compliance with a multitude of laws, regulations and ethical principles. This inevitably leads to a massive increase in the workload of organizations dedicated to upholding those standards as they strive to carefully and openly monitor, oversee, audit and report on their activities.

As a public institution, U of T is dedicated to upholding the highest standards in financial and ethical accountability. More than one third of all research funds awarded to the University and our partner hospitals are derived from the Tri-Council, and these taxpayer dollars are subject to intense oversight and reporting obligations under the Federal Accountability Act. Given the OVPR's responsibilities to administer research funds provided by both public and private sources, we take our oversight role seriously.

What have these general changes meant in terms of the burden on research administration at U of T?

To understand the impact of the increased complexity and oversight requirements of many of the research funds currently under our administration, we looked more closely at the three primary categories of funds identified above in Figure 6 (Tri-Council, Institutional Initiatives-Foreign-Contract, and Other). Looking at two recent time points, we analyzed the number of changes or modifications required post-award for the more complicated funding agreements compared to Tri-Council programs (Table 2). Based on the annual rates of changes and modifications to our active grants, we assigned a complexity index to the three primary types of funds, taking Tri-Council programs as the “gold-standard” with a complexity index of 1.0. We found that the more complicated funds involve 2.4 to 3 times more post-award attention by our administrators (Table 2). This increased complexity in the administration of non-Tri-Council funds has been used to calculate an effective number of grants at a complexity of 1 (Table 2).

	Agreements per year	Avg # Changes / Modifications per year	Annual Rate of Changes / Modifications per Agreement	Complexity Factor	Effective # of Agreements at 1.0 Complexity
Tri-Council	3,851	1,093	0.28	1	3,851
II-Foreign Contracts	1,479	1,246	0.84	3.0	4,391
Other	2,573	1,782	0.69	2.4	6,279
Total	7,903	4,121	0.52		14,521

Table 2: Complexity index assigned to three types of research revenues based on review of past changes to award agreements. Assuming Tri-Council programs have a complexity factor of 1, all other programs have been weighted accordingly, and are 2.4 to 3 times more complex to administer.

Furthermore, looking back to the mid-1990s, we found that the complexity of administering institutional initiatives, foreign research revenues and the smaller, but more diverse funding programs that our faculty members are accessing has increased dramatically. Overall, we estimate that 80 per cent of the work of the OVPR in the administration of research funding happens in the post-award phase.

Not only has the absolute number of active grants and contracts under our administration increased substantially, but so has the amount of effort required for administration of these funds, in both the pre-award and post-award administrative phases. Our staff complement has not kept pace with these increased demands.

Section 2

Strengthening services: The tri-pillar model

To address the challenges that have arisen over the past decade, we have created a new organizational model for the OVPR that will enable it to best support and promote excellence in research and innovation at U of T. Our primary objectives in developing this new organizational structure were:

1. To reduce the administrative burden for investigators so they can focus on their research;
2. To enable our investigators to access the necessary funding for their research, innovation and scholarship in an increasingly competitive environment;
3. To carefully manage the institutional risk associated with research and to ensure that the whole enterprise continues in a safe, ethical and accountable fashion.

With these objectives in mind, the OVPR created a new structure for itself, with a focus on serving the U of T research community more effectively. The core of this restructuring is what we call the tri-pillar model, comprising reorganized groupings of the majority of OVPR staff into the Research Services Office (RSO), the Innovations and Partnerships Office (IPO) and the Research Oversight and Compliance Office (ROCO) (see Figure 7).

While each pillar has its own role and constituency, communication and collaboration amongst the three is strong and the boundaries between them are permeable. The three groups work together to support and enhance the research and innovation enterprise of the University.



Figure 7: Structure of the OVPR, with three pillars working collaboratively to support and enhance the research enterprise of the University.

Each of the three administrative pillars has been tasked with performing a critical evaluation of challenges and opportunities associated with its organizational structure and business practices, and with developing solutions. The details of this important exercise for each office are outlined in this section.

Research Services Office (RSO)

RSO is responsible for the administration of over 90 per cent of the University's annual research revenue. It functions as a source of expert administrative support and advocacy for the University research community and as an institutional liaison with research sponsors (see Appendix 1 for the organizational structure of the RSO).

Since its establishment in 2008, the RSO has streamlined its administrative processes through a series of initiatives that involve optimizing resources, clarifying the roles and responsibilities of staff and systematizing communication. At the same time, the RSO's preoccupation has been with strategies to increase the University's participation and success across a broad range of funding programs, with a particular focus on the Tri-Council market share, the related Federal Indirect Costs (FIDC) and CRC allocations, research infrastructure through CFI and MRI and other key provincial programs.

The reorganization of the OVPR provided a perfect opportunity for the newly established RSO to consider which changes to research services and related operational practices it could initiate to help it better serve its stakeholders and advance the research enterprise at the University. To that end, the RSO has pursued a number of initiatives aimed at sustaining a research environment that responds effectively to challenges and opportunities and, in so doing, facilitates a greater degree of success for the University's researchers and an enhanced national and international research profile for the University.

Taking Action: Research Services Office

- The RSO, through its Internal Programs Team, is currently engaged in launching a new suite of strategic research funding programs, under the auspices of the University's Connaught Committee and with the essential support of several academic review panels. These programs range from scholarships for international graduate students, to new faculty support, grants to facilitate development and commercialization of inventions, summer institutes and Global Challenge awards of \$1 million — all of which are intended to recognize excellence, enhance the University's profile and have an important impact on society.
- Recognizing that a well-written, effectively presented research proposal is critical to success in securing research funding, the RSO has expanded its capacity to assist with proposal development. The RSO now employs two full-time Editorial and Proposal Development Officers. During the most intense research application periods, the RSO also engages the services of highly-qualified contract writers and editors to assist with proposal development.

- The RSO has been working with its colleagues both within the OVPR and across the University to clarify the roles and responsibilities of each partner in the University's research enterprise so as to avoid unproductive duplication of effort or other inefficiencies and maximize any synergies and economies of scale that are available. To that end, the RSO has developed a template that categorizes the services it offers for funding programs it administers (see Appendix 2), as a basis for discussion and coordination with research offices in the academic divisions.
- To help ensure effective communication and sharing of best practices, the RSO has recently established a Divisional Research Facilitators Group (DRFG), chaired by the Assistant Vice-President. The goal of the DRFG is to ensure that all centrally and divisionally located research services staff interact productively and regularly to their mutual benefit and enrichment in working to advance the University's research endeavours.
- The RSO is actively participating in a series of high-level meetings between the OVPR executive and the University's academic leadership, with the goal of strengthened coordination and mutual support in the pursuit of key research objectives. Part of the discussion will be dedicated to each Faculty's participation in major funding opportunities and the CRC- and FIDC-eligible Tri-Council programs in particular.
- One of the most efficient and timely ways to relay important information about research funding opportunities and related matters is electronically. The RSO has driven the development of a web-based communication tool – accessible via the University's "Research and Innovation" website – to enhance the ability of all units within the OVPR to communicate effectively and expeditiously with the University's research community. "Research Alerts" will help to facilitate the early identification and dissemination of information on research funding opportunities, sponsor updates, workshops and other events, financial management, research-related policies and guidelines and other matters of import to the University's research community.
- To help further advance its capacity to employ information and communication technologies in support of the University's research enterprise, the RSO has recently hired a Data Management and Web Content Coordinator, who will, among other duties, facilitate enhanced communication with the University's research community through the web and web-based tools.
- Post-award administration of research funds (undertaken in close collaboration with the Research Financial Reporting & Analysis team in ROCO) consumes the vast majority of RSO resources and is becoming increasingly complex and demanding in character. To help ensure the efficient and responsible management of research activities, the RSO

is deeply involved in the Research Administration Improvement and Systems Enhancement Project (Project RAISE), which will strengthen, streamline and automate business processes to enhance accountability and minimize the administrative burden on researchers and research administrators.

Through the above-noted initiatives and its commitment to ongoing evaluation and continuous improvement, the RSO will be able to better serve its stakeholders and, in so doing, help facilitate greater success for the University's research community.

Innovations and Partnerships Office (IPO)

In the past two years, the advent of MaRS Innovation (MI) has dramatically changed the delivery of technology transfer and commercialization services at U of T. With MI providing additional resources for commercialization, the OVPR is able to direct more of its resources to developing relationships with industry partners.

Consequently, the former The Innovations Group (TIG) was renamed the Innovations and Partnerships Office (IPO) in 2010 to more accurately reflect the activities of this part of the OVPR (see Appendix 1 for the organizational structure of IPO).

MI provides an integrated commercialization platform that harnesses the economic potential of the exceptional discovery pipeline of 16 Toronto academic institutions (see Figure 8). MI is a non-profit organization with an independent industry-led board of directors, funded through the Government of Canada's Centre of Excellence for Commercialization and Research (CECR) program and contributions of its member institutions, as well as support from the Province of Ontario. U of T is a founding member of MI, which is a separate entity from the MaRS Discovery District.

The mission of IPO is twofold: to enhance the stature of the University by establishing partnerships with private, public and government sectors to enable and facilitate the transfer of research results, new technologies and social innovation to all sectors for the benefit of business and society; and to foster internal entrepreneurship and collaboration and to provide incentive for these activities.

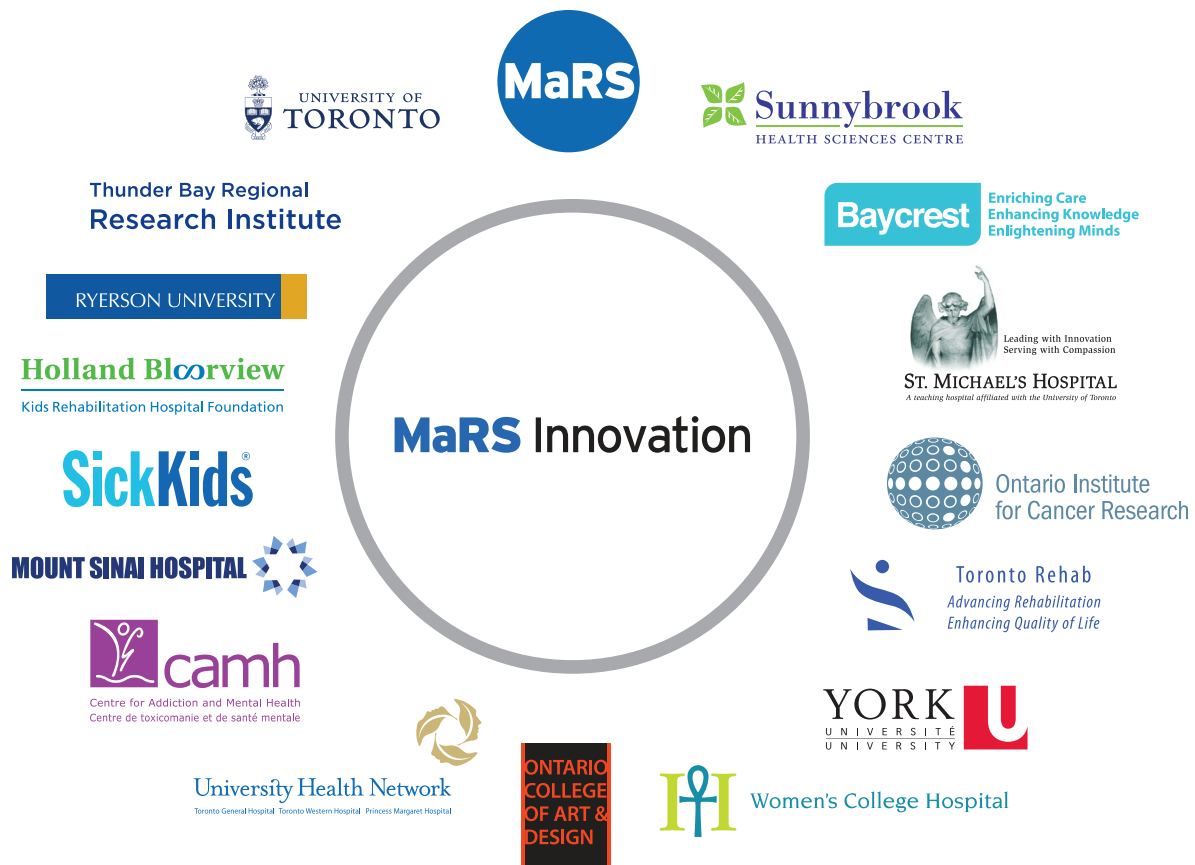


Figure 8: MaRS Innovation is a Centre of Excellence for Commercialization and Research. MI's members include the 16 Toronto academic institutions shown here.

Taking Action: Innovations and Partnerships Office

- The international search for a dynamic and dedicated leader for the Innovations & Partnerships Office (IPO) is well under way with the expectation that a new Chief Innovations and Partnerships Officer will be in place by the summer of 2011. The new Chief of IPO will have a proven track record of successful industrial collaboration and effective management and leadership skills. He or she will pursue an aggressive strategy to encourage and support partnerships between our researchers and the private sector and help enhance knowledge translation and technology transfer.
- In the meantime, we have addressed a throughput challenge in the area of research agreements (“contracts”) administration by revising some of our administrative processes and hiring temporary staff to eliminate the backlog. Already, in a period of only six months, the percentage of completed funded agreements is 80%, and our new processes, including streamlining and template agreements, where possible, will help to

prevent administrative bottlenecks from reappearing in the future. This administration will be further facilitated by the improvements planned under Project RAISE.

- MaRS Innovation (MI) is already proving to be an effective commercialization engine for the Greater Toronto Area. Importantly, U of T has already had some tangible successes in the short time period that MI has been operational. Five of the six inventions currently under development by MI have a U of T component, with our faculty being either sole-inventors or co-inventors with collaborators from our affiliated research hospitals. In addition, MI's first spin-off company, Xagenic Inc., announced in October 2010, is based on technology developed by U of T professors. IPO continues to work closely with MI to find financial backing for the many inventions developed by U of T faculty each year.
- Partnerships are a new focus for IPO, and in the past year the following achievements have been realized:
 - A Centre of Excellence for Commercialization of Research in Regenerative Medicine was awarded to Professor Peter Zandstra and his team. The \$30 million, five-year project will be located in the Banting building. The focus will be on turning biomedical research and engineering into treatments for debilitating diseases.
 - A \$750,000 Applied Research and Commercialization Initiative project has been awarded to the University by Fed Dev Ontario. The program is to address the gap between research and commercialization in Southern Ontario and to encourage collaboration between small- and medium-sized enterprises and post-secondary institutions.
- Partnerships are being explored with other universities and industrial partners in the areas of medicine, health, digital communications, green technology and social innovation.

Research Oversight and Compliance Office (ROCO)

The Research Oversight and Compliance Office (ROCO) is responsible for mobilizing the University to address much of the institutional risk inherent to the activities of academic scholarship and research. U of T is one of the first universities in the country to have created such an entity. The office (see Appendix 1 for the organizational structure of ROCO) is responsible for ensuring that the University fulfills its ethical, legal and financial reporting obligations associated with research, as defined by our sponsors and the laws of Ontario and Canada.

In recent years, this already complex task has grown, as the standards for research oversight and accountability have become substantially more demanding. The Tri-Council, in particular, has revised and expanded its expectations for the transparent and accountable management of

its funds and for ethical review of research activities, and is requiring accountability measures consistent with the Federal Accountability Act of 2006.

The potential impact of non-compliance with these new Tri-Council standards goes beyond simply delaying the progress of an individual research program: it impacts the very core of the University's reputation as the nation's leading institution for research and innovation. Furthermore, accountability demands of other funding jurisdictions, namely sponsors and collaborating institutions in the US, are even more onerous than those in Canada.

Taking Action: Research Oversight and Compliance Office

- With the creation of ROCO, one of its units, Research Accounting, was renamed Research Financial Reporting and Analysis. The new name clarified the responsibility as the compilation of the financial reports, not the “accounting” or “bookkeeping”, as these transactional activities were done in the divisions, with the exception of recording cash received from the sponsors.
- In 2009-10, ROCO undertook a review of non-Tri-Council research funds in deficit positions to understand the actual economic position of each fund and identify the root cause of the deficit. As a consequence of this extensive analysis, appropriate action can be taken to resolve these deficits and establish procedures to prevent new deficits in the future.
- The Office of Research Ethics (ORE) has the mandate to establish and maintain the appropriate governance of the ethical review and approval of research protocols involving humans and animals. Table 3 details the number of protocols reviewed by our research ethics boards and animal care committees over the past three fiscal years:

Protocols Received By Board/Committee

	FY 2008	FY 2009	FY 2010
Research Ethics Boards			
Health Sciences & HIV	1,341	1,778	1,928
Social Sciences & Humanities	1,413	2,003	2,125
Subtotal	2,754	3,781	4,053
Animal Care	444	423	434
Total	3,198	4,204	4,487

Human Resources

	FY 2008	FY 2009	FY 2010
FTE (Office of Research Ethics)	11	8	8
Board & Committee Members	11	11	11

Table 3: Number of ethics protocols received by committee by fiscal year and the associated human resources.

During the fiscal year ended 2009, the number of protocols reviewed increased by approximately 30 per cent over the prior year, and increased by 5 per cent again in fiscal year 2010. This increase is attributed to the requirements from the Tri-Council that (i) all research activities of the University, whether funded or unfunded, be subject to the same governance required under the Tri-Council Policy Statement (TCPS), and (ii) funding be suspended by the University to researchers who have not renewed protocols after the one year expiry limitation. The ORE responded to these requirements by (i) delegating the ethics review process to the Faculties as appropriate under the TCPS, and (ii) notifying researchers of the future protocol expiry and blocking access to funds tied to an expired protocol through the University's financial system.

- The Tri-Council conducts regular monitoring visits to all universities to review the administrative and financial controls framework over grants and awards and to assess the adequacy and application of existing policies to ensure compliance with the federal granting agency terms. The report on the most recent U of T monitoring visit was issued in February 2010 and indicated satisfaction with our progress and our commitment to research oversight activities. Though we are still in the process of addressing a number of their recommendations, we have developed information technology solutions to several, and these will be incorporated into Project RAISE.
- On December 6th, 2010 the Tri-Council released the 2nd edition of the Tri-Council Policy Statement, the official human research ethics policies of the Agencies, replacing the 1st edition published in 1998. In summary, the 2nd edition imposed a higher level of governance by requiring (i) an increase in oversight by the research ethics boards of delegated ethics reviews performed by the faculties and (ii) the preservation of independence of the research ethics board from University administration. The Office of Research Ethics and the University's research ethics boards are currently addressing these new requirements.
- Immediately after the reorganization of the portfolio into the three pillars, the University supported a significant investment into the automation of processes to increase the productivity and efficiency of various administrative tasks. The project – “Research Administrative Information Systems Enhancement” or “Project RAISE” – includes all the IT solutions being implemented in response to Tri-Council recommendations, the issue of unresolved deficits in research funds, and a number of other initiatives to strengthen research administration in a cost-effective manner. To date, nine months into the project, Project RAISE has already had a significant impact on the transparency of expiration of ethics protocols and the permitting of biohazards used in research. The impact of Project RAISE will be even greater as the project enters its second year of execution.

Adding Value to the Tri-Pillar Model: Strategic Initiatives and Communications

A key component of our strategy has been the investment of resources into specific areas where there were opportunities to add value to the work already being done by the portfolio.

Strategic Initiatives

Recognizing that there was no existing institutional strategy around prestigious honours and awards nominations, a new position was created in 2008 to work in partnership with the divisions. The goal was to develop an aggressive strategy to increase the University's recognition for our outstanding researchers by enhancing awards and honours nominations and to coordinate these efforts across the University, creating a network of excellence promotion.

This effort has already been fruitful. Our researchers and scholars have gained increased recognition for their outstanding contributions by major national and international organizations. In particular, successful nominations have been made to prestigious international prizes not previously won by Canadian scholars, including (but not limited to) the Holberg Prize (often referred to as the Nobel Prize for the Humanities), awarded in 2009 to Prof. Ian Hacking (Dept. of Philosophy) and in 2010 to Prof. Natalie Zemon Davis (Dept. of Medieval Studies), and the 2010 Bower Award and Prize for Achievement in Science to Prof. Richard Peltier (Dept. of Physics, Centre for Global Change Science). U of T researchers also continue to be recognized by major provincial and national awards. In 2010, U of T's strong tradition in being recognized by Ontario's highest research honours, the Premier's Innovation Awards, continued, with Premier's Summit Awards to Dr. Janet Rossant (Dept. of Molecular Genetics, Hospital for Sick Children) and Dr. Jeff Wrana (Dept. of Molecular Genetics, Mount Sinai Hospital), and Premier's Discovery Awards to Prof. Geoffrey Ozin (Dept. of Chemistry) and Prof. Michael Trebilcock (Faculty of Law). Most recently, the 2010 NSERC Gerhard Herzberg Canada Gold Medal for Science and Engineering, NSERC's highest honour, was awarded to Prof. Geoffrey Hinton (Dept. of Computer Science).

The Strategic Initiatives team was established in 2008, to conduct research on and analysis of U of T research and innovation activities in targeted areas, coordinate the development of strategic research clusters within the University, and facilitate institutional partnerships with external organizations. This team has also spearheaded the creation of catalogues and databases of U of T research, thus enabling the OVPR to respond more rapidly and effectively to calls for proposals or collaboration.

The structure and organization of the Strategic Initiatives team evolved during 2010. It now includes a director, a special projects officer and an administrative assistant. In addition to ongoing and annual strategic initiatives (e.g. the Strategic Research Clusters program and the

Institutional Strategic Research Plan), the team is also now responsible for overseeing the University's honours and awards strategy (including working with divisions to identify candidates and put forward nomination packages for major national and international honours).

Research Communications

The award-winning Research Communications team in the OVPR has re-focused its primary communications tools — *Edge* magazine, its annual reports and the Research and Innovation website — to address issues, topics and audiences more strategically.

Edge

Each issue now focuses on one topic that is of broad interest to global society and that usually corresponds to strategic priorities. Examples include research commercialization, social innovation, green technology and stem cell research.

Annual Reports

OVPR adopted a new strategy whereby every two years, an annual report is published that is targeted at communicating the impact and relevancy of U of T research. The most recent example was entitled *Ideas That Could Change the World: Research at the University of Toronto*. It focused on insights from 39 U of T research leaders (as well as prominent alumni and honorary degree recipients) on 10 questions that face global society. The report also included a separate pamphlet, *By the Numbers*, detailing U of T research activity, impact and special achievements by way of statistical reporting. In alternating years, OVPR publishes an annual report targeted to the internal U of T community, focusing on statistical reporting and operational matters.

Website

In 2007, the OVPR undertook the creation of a new website. In addition to offering information on research funding and operations to the U of T research community, the new site provides a venue for celebrating and promoting U of T's leadership in research and scholarship, especially by way of insight into and impact on global issues.

The new site also includes a separate path for the U of T research community to access important information it needs to conduct its work. In 2010, the OVPR undertook a major re-engineering of that part of the website. Entitled "For Researchers and Administrators", this section of the site was overhauled in terms of architecture, navigation and design to promote easier accessibility for researchers and staff members.

Section 3

The next step: Enabling research partnerships and enhancing administrative support

Now that the short-term strategy to reorganize our human resources and invest in areas of potential opportunity has had a tangible impact, the long-term strategy has become the focus of the portfolio.

We recognize that throughout the OVPR portfolio the solution for many of our challenges and the best mechanism to capitalize on opportunities presented in today's research funding and administration landscape is through creating, nurturing and stewarding relationships internally and externally.

Only in working more closely in partnership with our stakeholders (the research community, the academic divisions and our sponsors) and our current and potential collaborators (the private sector, government agencies, community groups and other institutions) will we achieve our goals of providing the best possible support to our researchers. Across the portfolio, we have adopted the strategy of fostering partnerships as our driving force.

Action Plan – How the OVPR will enable research and enhance administrative support

Each of the organizational pillars of the OVPR has developed specific objectives for working with the University's research community, the academic divisions, external partners and our research sponsors.

In the Research Services Office (RSO), we will:

- Establish incentives for academic divisions to participate and succeed in CRC-eligible Tri-Council programs, for example, by using Tri-Council performance as the basis for internal allocations of CRCs, SSHRC Institutional Grant funds, FIDCs, Ministry of Research & Innovation Post-Doctoral Fellows, University of Toronto Excellence Awards, etc.
- Work with divisional leaders to establish participation objectives for major research funding programs, identify and communicate sponsor and internal deadlines, and connect researchers with compatible funding opportunities (see Appendix 3, table on Tri-Council participation, by Faculty).
- Work with divisional leaders to provide support and resources to maximize the quality of grant submissions, such as “tips” documents, workshops and information sessions,

and the identification of veteran researchers with adjudicative experience who can provide internal peer review services.

- Mitigate limitations due to RSO staff resource constraints through automation of processes and enhanced use of the website to provide strategic and timely information and support to faculty applicants (e.g. participating in and guiding Project RAISE).
- Engage with other OVPR offices, other central service offices, divisional offices and other institutions to advance the research objectives of the U of T research community.
- Monitor trends in the longitudinal and comparative performance of the University and identify areas for strategic investment of resources – centrally and divisionally – that will raise the University’s level of success in securing competition-based external research funding.

In the Innovations and Partnerships Office (IPO), we will:

- Continue to work with MaRS Innovation to identify strong opportunities for knowledge translation and shepherd inventions through the commercialization process.
- Work closely with faculty inventors of innovations not picked up by MaRS Innovation, to devise a plan for developing the invention further, including providing support for grant applications to programs such as OICR, CIHR POP, NSERC-I2I and OCE.
- Provide intensive support to faculty members developing large-scale, private sector-partnered proposals for funding (e.g. NSERC Strategic Network Grants, the development of other research consortia, NCEs and CECRs).
- Work with divisional leaders to establish participation objectives for Tri-Council partnerships programs, identify and communicate sponsor and internal deadlines, and connect researchers with compatible funding opportunities.
- Identify strategies for raising awareness around the benefits and importance of knowledge translation and to develop targeted entrepreneurial education forums for faculty members and graduate students. The goal will be to improve the number and quality of invention disclosures.
- Connect with faculty inventors by “walking the halls” to provide hands-on guidance and assistance with the disclosure process.

- Engage potential partners in the private sector by identifying research areas at the University in which there are strong opportunities for collaboration and performing a match-making function with external groups.
- Consolidate our physical space with other units of the University dedicated to commercialization. In 2011, we will move our office out of the MaRS building and across the street to the Banting building to create a new linked innovation hub. The space will also be used to house two new commercialization enterprises (the Centre for Commercialization of Regenerative Medicine and UHN's Techna), as well as several start-up "incubator" labs. Cost savings to the portfolio from this move will be re-invested in additional human resources.
- Celebrate innovation at U of T with annual events like the Inventor of the Year Awards (the inaugural competition was held in December 2010).

In the Research Oversight and Compliance Office (ROCO) we will:

- Continue to spearhead Project RAISE as a means to (i) improve productivity and accuracy, and reduce workload in a severely resource-constrained environment, and (ii) to implement preventive controls to protect people from executing inappropriate activities.
- Continue with a comprehensive training campaign for chairs, PIs and business officers, to address the remaining Tri-Council recommendations and other aspects of risks in research. We are already starting to see evidence that our efforts to enhance accountability in research administration are taking hold.
- Continue to work with the Tri-Council to act upon the recommendations laid out in the 2004 and 2008 audit reports.
- Continue to work closely with our research sponsors to develop solutions to recommendations that arise from their audits.
- Continue to partner with the academic divisions when individual grants are audited. Audits are extremely labour-intensive exercises for ROCO and the division. In the third quarter of fiscal 2011 alone, the University was audited for 13 separate grants by five audit firms. The trend for audit activities is increasing as sponsors continue to invoke their audit rights under the terms of the contracts and audit standards escalate from the demands of stakeholders.
- Work closely with divisional leaders and our research ethics board members to implement the new Tri-Council guidelines on human ethics review and to find solutions to mitigate the workload of all our ethics organizations, including technological solutions via Project RAISE.

Measuring our success

No action plan is complete without some clearly defined metrics and targets. While increasing Tri-Council market share and fostering partnerships are our overarching objectives, we have also identified three important benchmarks against which we will measure our success.

Benchmark 1: Reaching a steady-state of 250 CRCs

Each university's annual CRC allocation is based on an average of the previous 3 years of Tri-Council funding. Improving our performance in this area therefore requires a long-term strategy so that increased success accumulates over a 3-year period to achieve a steady-state.

The OVPR has identified an allocation of 250 CRCs as an appropriate and attainable goal for the University. To achieve and sustain that allocation, we need to understand in which programs we can achieve the most improvement.

An analysis of the University's Tri-Council market share performance indicates that our relative performance (participation and success) in CIHR Operating, NSERC Discovery and SSHRC Standard Research Grants programs is, in general, strong. The introduction of a new program architecture at SSHRC has brought certain transitional challenges to the social science and humanities research communities, but U of T faculty have been very active in their uptake of these new opportunities, supported by highly experienced and supportive staff in the Agency & Foundation Funding team and their divisional counterparts.

A key factor in the decrease in our CRC allocation has been under-participation and/or under-performance in partnerships programs, compared to our peer institutions (see e.g. Figures 3 & 4). Partnership programs currently constitute a considerable portion of the Tri-Council programs and overall budgets for NSERC and CIHR, and are a key component of SSHRC's new program architecture. Hence, increasing Tri-Council market share in order to achieve the goal of 250 CRCs will require additional success in developing partnerships and leveraging private research investment against CRC-eligible Tri-Council programs (e.g. NSERC Collaborative Research and Development Grants, Strategic Network Grants and Industrial Research Chairs; SSHRC Partnership Grant and Partnership Development Grant programs) and the federal NCE program, which is operated outside of the Tri-Council, but is CRC-eligible. The RSO has layered on new forms of encouragement and support to faculty interested in applying to these programs. Several of these programs are administered through the Innovations and Partnerships Office and the strategy for regaining ground in those programs is outlined below.

Benchmark 2: Increasing private sector funding by at least 50 per cent over the next 5–10 years

One of the ways that we can directly measure the impact of our efforts to foster partnerships is to examine the amount of research funding generated by partnerships with the private sector. As noted throughout this document, private sector partnerships, including Tri-Council partnerships programs, contract research and commercialization of research are areas where we can improve our performance. Our goal is to increase private sector funding by at least 50 per cent over the next 5–10 years (Figure 9). An important component of this strategy is the leveraging of private sector funds towards CRC-eligible programs, thereby having a direct impact on our Tri-Council market share and contributing to benchmark 1, above.

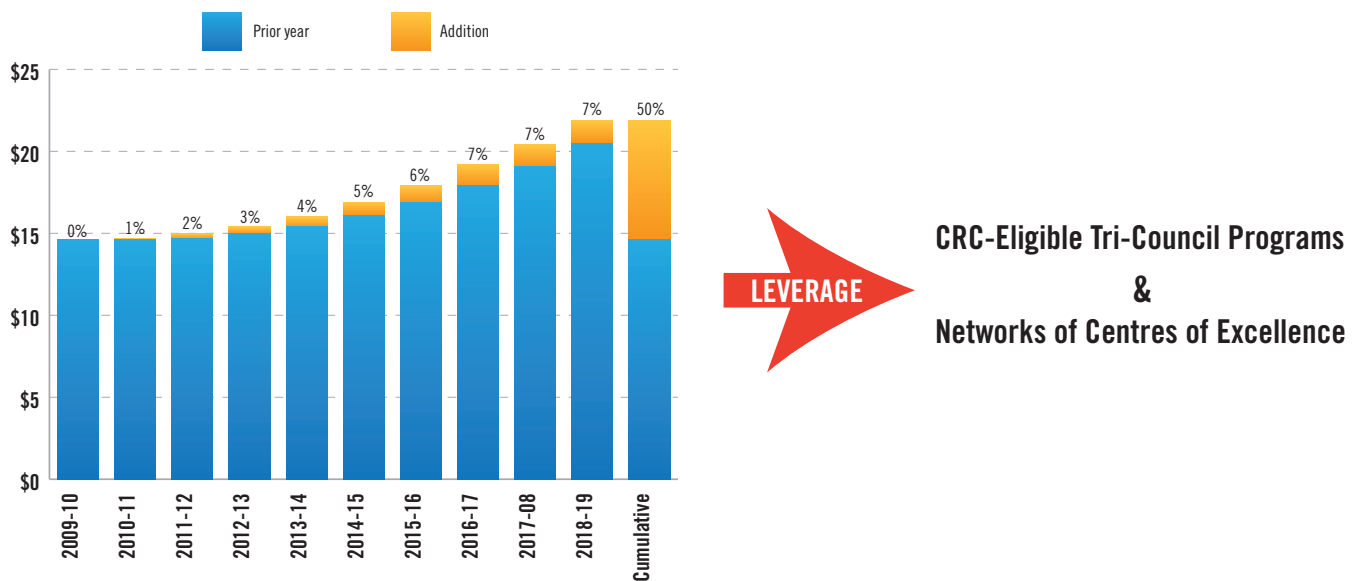


Figure 9: Long-term plan for increasing private sector funding to U of T by 50 per cent over 10 years. Private sector investment will be leveraged against Tri-Council and other federal CRC-eligible programs.

Benchmark 3: Receiving a “satisfactory” rating from Tri-Council at the next monitoring visit in 2015 and beyond

Tri-Council monitoring visits happen at regular intervals, generally every 4 years. The Tri-Council was so satisfied at their last visit with the progress made and direction of our research oversight activities that they extended the interval for the next monitoring visit by an additional 3 years (next visit is 2015 instead of 2012). We are committed to upholding the highest standards in research oversight and compliance, and our goal is to continue to stay innovative and proactive in this area, as demonstrated by continued “satisfactory” ratings from the Tri-Council in 2015 and beyond.

Conclusion

In response to the challenges created by a new research landscape across Canada, the OVPR has begun implementing changes to address these challenges and assist the University of Toronto in building a stronger future. The institution and divisions are responding by providing additional resources for staffing, which are scaled to the OVPR's increased activities within RSO, IPO and ROCO.

The critical step involved strategically reorganizing OVPR human resources into the tri-pillar model. The creation of three focused business units within the portfolio immediately addressed the challenges as follows:

- Dedicated teams within the **Research Services Office (RSO)** have allowed us to focus our efforts on increasing success in targeted funding programs.
- Refocusing the efforts of the **Innovations & Partnerships Office (IPO)** on the fostering of partnerships with private sector research collaborators will have a direct impact on our ability to take U of T research to society and provide an indirect impact on our CRC allocation.
- Creating a **Research Oversight and Compliance Office (ROCO)** has enabled heightened and necessary attention to be paid to accountability and compliance responsibilities around research ethics and the administration of funds demanded by the current climate of accountability.

We now have a research administration enterprise that is designed to address the needs of our stakeholders and allow us to pursue an aggressive long-term strategy for the continued success of U of T's research enterprise.

The concept of fostering partnerships — both within the university's research community and with external organizations — forms the basis of our long-term strategy for improving the performance of the research and innovation enterprise at U of T. Each of our administrative pillars has developed an action plan to identify exactly how it will work with current and potential partners to achieve our goals. An important component of our strategy is that each administrative pillar has also identified a benchmark against which our success can be measured.

Our success in this strategy is critical to maintaining the reputation and prestige of the University of Toronto within Canada and internationally. Together, we can seize the opportunities of today's research funding landscape to help U of T achieve the goal of "Sustaining Excellence" and joining the ranks of the world's 10 leading research institutions.

Appendix 1

Organizational structure of the OVPR

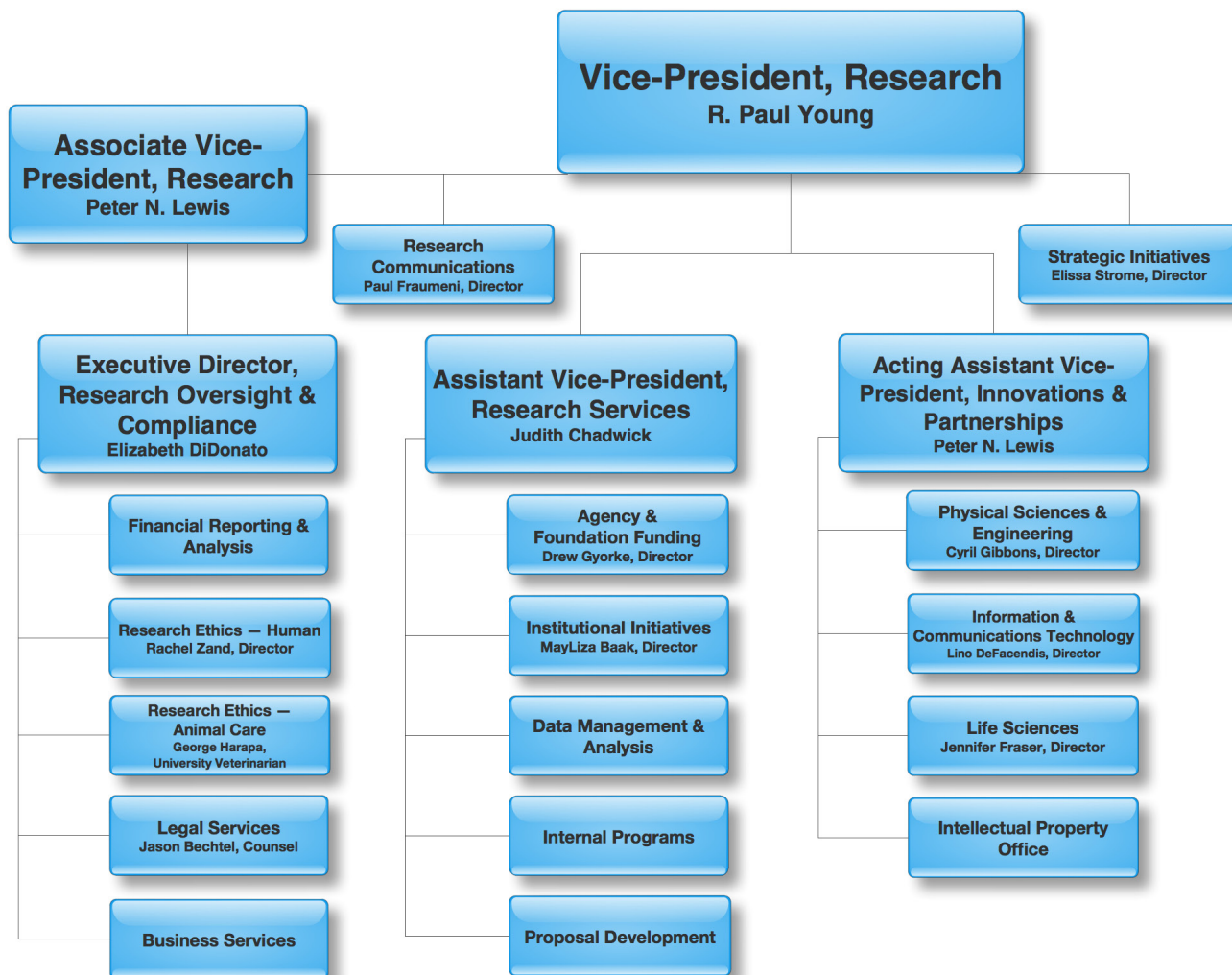


Figure 10: Organizational structure of the Office of the VP Research (OVPR).

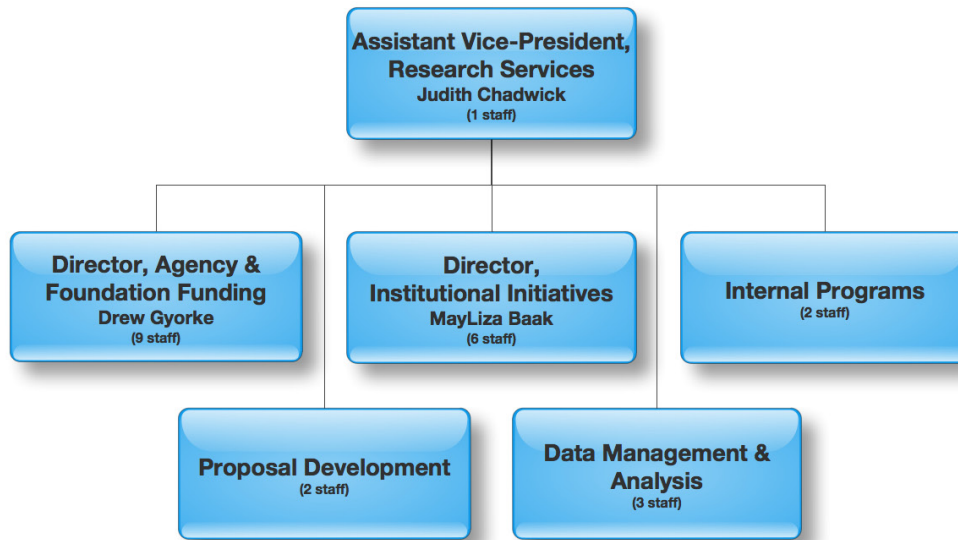


Figure 11: Organizational structure of the Research Services Office (RSO).

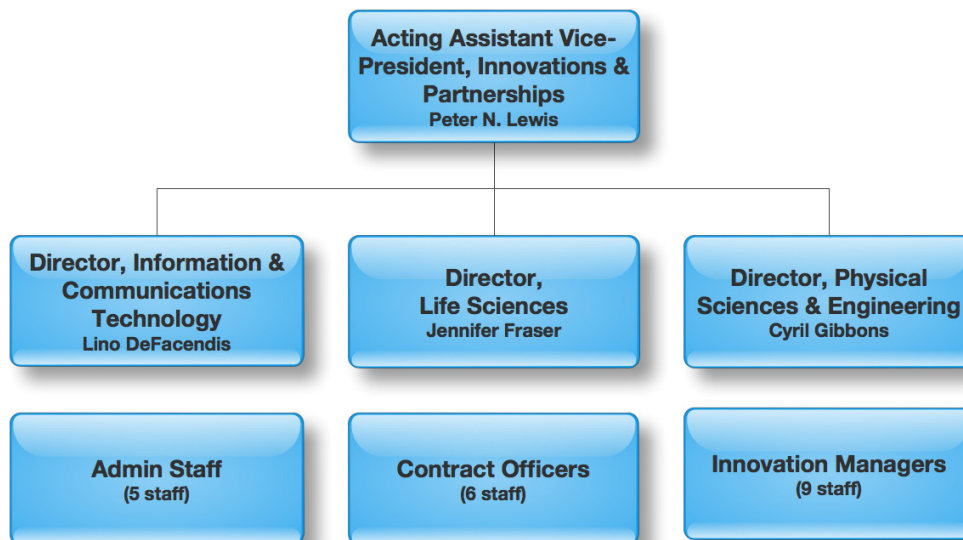


Figure 12: Organizational structure of the Innovations and Partnerships Office (IPO).

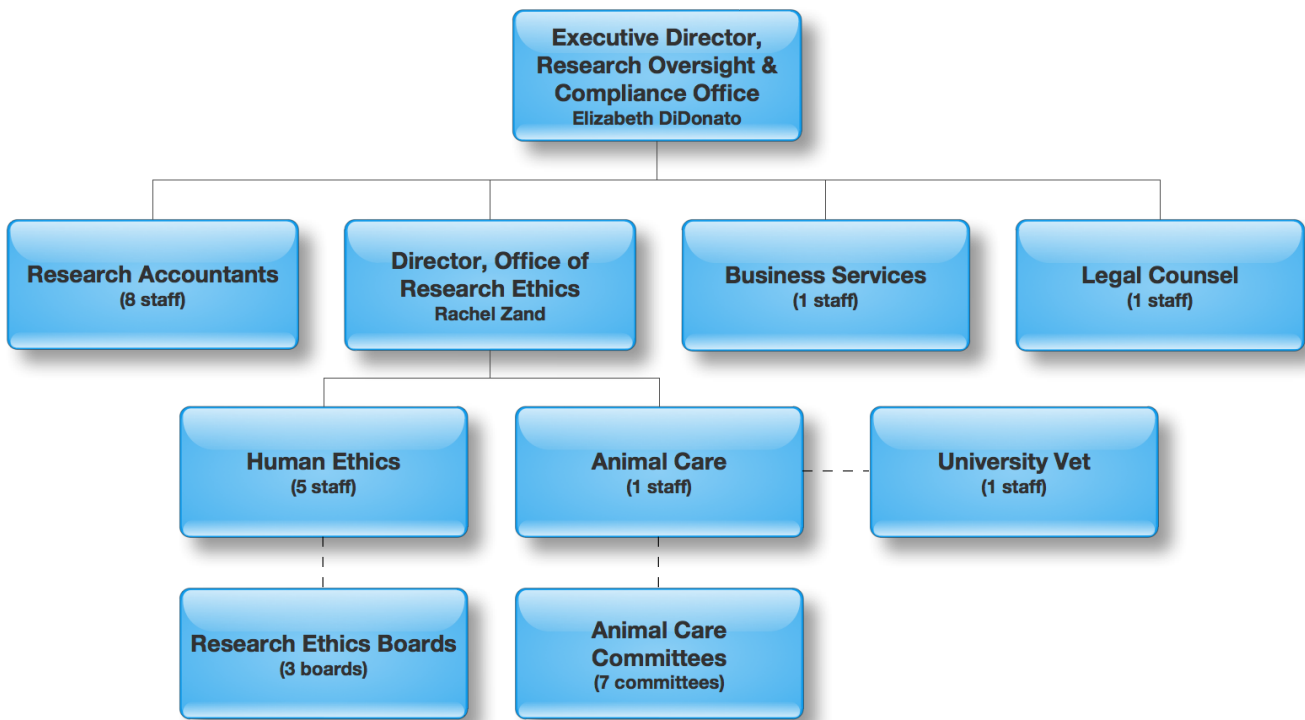


Figure 13: Organizational structure of the Research Oversight and Compliance Office (ROCO).

Appendix 2

Table 4: Research Services Office proposal development categories

	A	B	C	D	E
Program Category	<ul style="list-style-type: none"> • \$ Thousands • Investigator led <p>e.g. Various smaller funding opportunities</p>	<ul style="list-style-type: none"> • \$ Thousands • Investigator led <p>e.g. MRI Early Researcher Awards, SSHRC Insight & Insight Development, CIHR Operating; non-government Calls for Proposals</p>	<ul style="list-style-type: none"> • 100s Thousands • Faculty/ Investigator led <p>e.g. NSERC Strategic Project Grants, SSHRC Partnership Development Grants, NIH/DOD/ DOE</p>	<ul style="list-style-type: none"> • \$ Millions • Faculty Led with Central Input • Likely Includes Internal Selection of Proposals <p>e.g. SSHRC Partnership Grants, NSERC CREATE, NSERC Discovery Frontiers, MRI ORF-RE, Genome Canada/OGI</p>	<ul style="list-style-type: none"> • \$ Millions • Institution Led with Faculty Input • Institutional Selection/ Identification of Proposals • Special Reports & Information/ Other Tools <p>e.g. CFI LOF, CFI LEF/NIF, CRC, CERC</p>
RSO Role	<ul style="list-style-type: none"> • Administrative Review 	<ul style="list-style-type: none"> • Workshops/ Information Sessions • “Tips” • Eligibility Review 	<ul style="list-style-type: none"> • Workshops/ Information Sessions • “Tips” • Editorial Review (Selected) • Administrative Review 	<ul style="list-style-type: none"> • Workshops/ Information Sessions • “Tips” • Internal Peer Review • RSO Editorial & Administrative Review 	<ul style="list-style-type: none"> • Internal and/ or External Peer Review • “Tips” & special information resources • Writing support • Editorial & Administrative Review • IPO support re: commercialization plans
Divisional Role	<ul style="list-style-type: none"> • Proposal review, as appropriate 	<ul style="list-style-type: none"> • Participation in workshops • Proposal review, particularly for 1st time applicant 	<ul style="list-style-type: none"> • Participation in workshops • Budget approval • Faculty level proposal review 	<ul style="list-style-type: none"> • Budget development & approval, including matching contributions Construction/reno est. oversight • Faculty level proposal review 	<ul style="list-style-type: none"> • Strategic selection at faculty level • Budget development & approval including matching contributions • Faculty level proposal review

Appendix 3

Table 5: Participation in Tri-Council CRC-eligible programs by SGS division and Faculty^{vii}

SGS Division	Faculty	Eligible				Participating				Percent Participating			
		2006-07	2007-08	2008-09	2009-10	2006-07	2007-08	2008-09	2009-10	2006-07	2007-08	2008-09	2009-10
Humanities	A&S	272	278	291	292	107	115	107	104	39%	41%	37%	36%
	UTM	48	55	60	58	29	36	39	35	60%	65%	65%	60%
	UTSC	46	45	42	46	17	19	21	20	37%	42%	50%	43%
	MUSIC	27	26	29	28	8	7	*	*	30%	27%	7%	7%
	SGS	*	*	*	*	*	*	*	*	0%	0%	33%	0%
	ALL FACULTIES	393	404	422	424	161	177	167	159	41%	43%	40%	38%
Life Sciences	A&S	68	77	76	76	62	66	66	66	91%	86%	87%	87%
	UTM	40	39	38	38	33	31	29	31	83%	79%	76%	82%
	UTSC	33	33	35	37	30	31	33	32	91%	94%	94%	86%
	DENTISTRY	39	45	44	44	14	12	13	16	36%	27%	30%	36%
	FORESTRY	14	13	13	11	10	10	9	9	71%	77%	69%	82%
	MEDICINE	180	187	193	192	121	125	133	140	67%	67%	69%	73%
	NURSING	20	21	21	21	14	14	14	15	70%	67%	67%	71%
	PEH	13	13	14	13	8	7	5	*	62%	54%	36%	23%
	PHARMACY	26	25	31	30	18	20	25	26	69%	80%	81%	87%
	TYP	*	*	*	*	*	*	*	*	0%	0%	0%	0%
	ALL FACULTIES	433	453	465	462	310	316	327	335	72%	70%	70%	73%
Physical Sciences	A&S	169	178	178	185	153	163	162	171	91%	92%	91%	92%
	UTM	31	31	33	30	27	28	28	27	87%	90%	85%	90%
	UTSC	31	32	32	34	28	29	26	29	90%	91%	81%	85%
	APSE	193	193	195	197	185	186	188	189	96%	96%	96%	96%
	MEDICINE	*	*	*	*	*	*	*	4	100%	100%	100%	100%
	SGS	7	7	6	6	6	6	5	5	86%	86%	83%	83%
	ALL FACULTIES	431	441	444	456	399	412	409	425	93%	93%	92%	93%

SGS Division	Faculty	Eligible				Participating				Percent Participating			
		2006-07	2007-08	2008-09	2009-10	2006-07	2007-08	2008-09	2009-10	2006-07	2007-08	2008-09	2009-10
Social Sciences	A&S	140	150	156	156	71	86	83	82	51%	57%	53%	53%
	UTM	75	79	77	76	45	46	49	45	60%	58%	64%	59%
	UTSC	46	53	57	54	10	24	26	30	22%	45%	46%	56%
	ARCH	14	14	16	19	*	*	*	*	7%	14%	13%	5%
	FI	12	17	15	21	8	8	9	11	67%	47%	60%	52%
	LAW	48	49	50	52	19	26	21	20	40%	53%	42%	38%
	MANAGEMENT	71	75	84	88	26	31	38	37	37%	41%	45%	42%
	OISE/UT	133	135	137	134	74	79	85	68	56%	59%	62%	51%
	SGS	7	7	7	8	5	*	6	*	71%	29%	86%	25%
	SOCIAL WORK	22	19	21	24	15	13	18	16	68%	68%	86%	67%
	TYP	*	*	*	*	*	*	*	*	33%	50%	50%	67%
	ALL FACULTIES	568	598	620	632	273	313	335	309	48%	53%	54%	49%
ALL DIVISIONS	1,825	1,896	1,951	1,974	1,143	1,218	1,238	1,228	63%	64%	64%	63%	

Appendix 4

By the Numbers

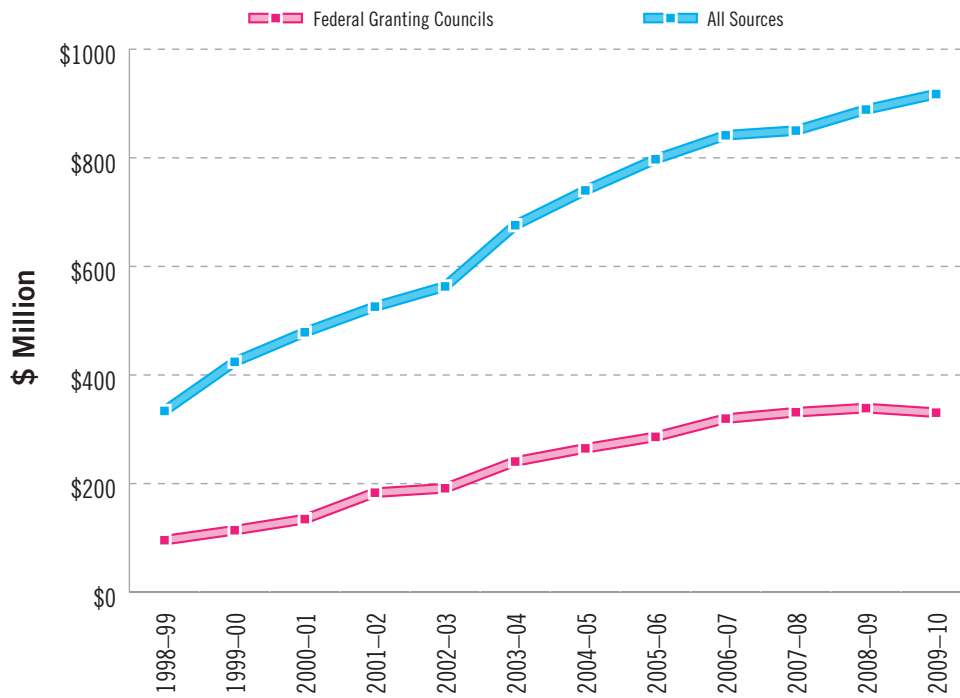


Figure 14: Research funds awarded, U of T & partner hospitals^{viii}.

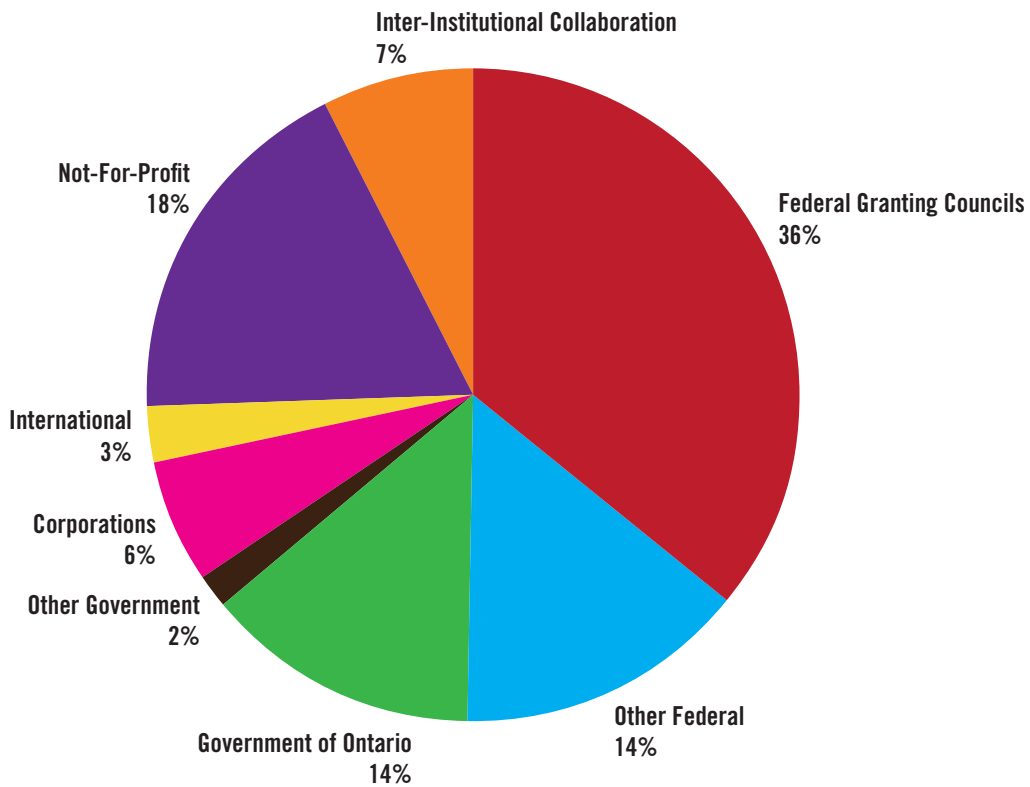


Figure 15: Research funds awarded by sector, 2009-10 (U of T & partner hospitals, direct & indirect costs). Total: \$917M^{viii}.

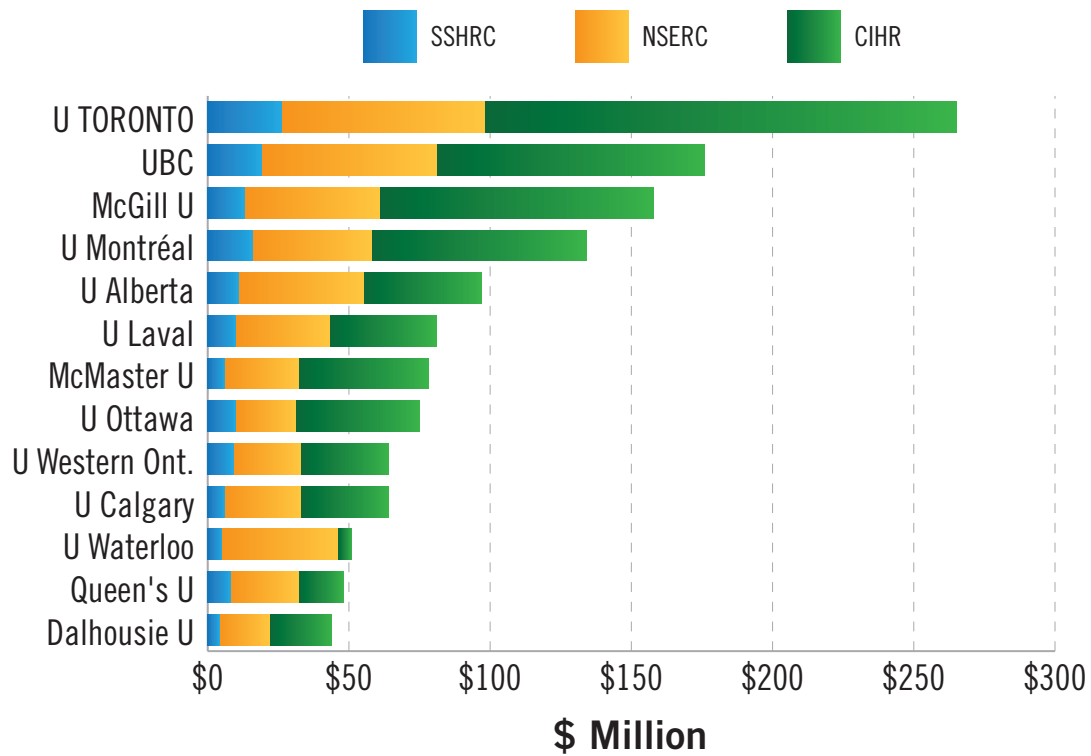


Figure 16: Federal granting council funding to U13 universities^{ix}, 2008–09.

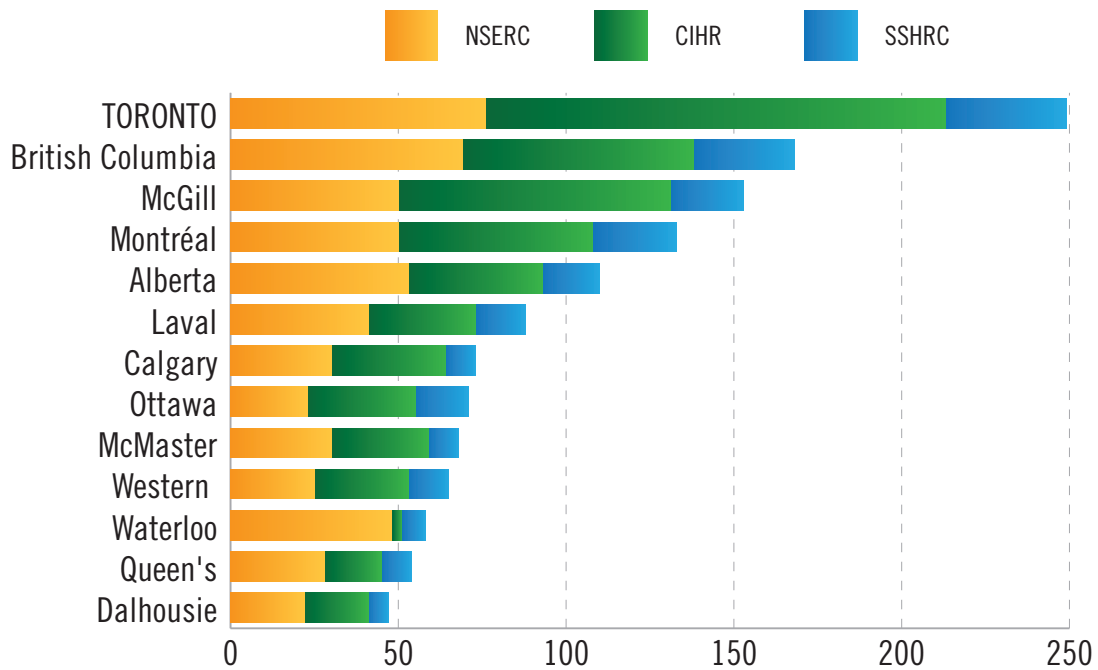


Figure 17: Canada Research Chairs at U13 universities^x, 2008–09.

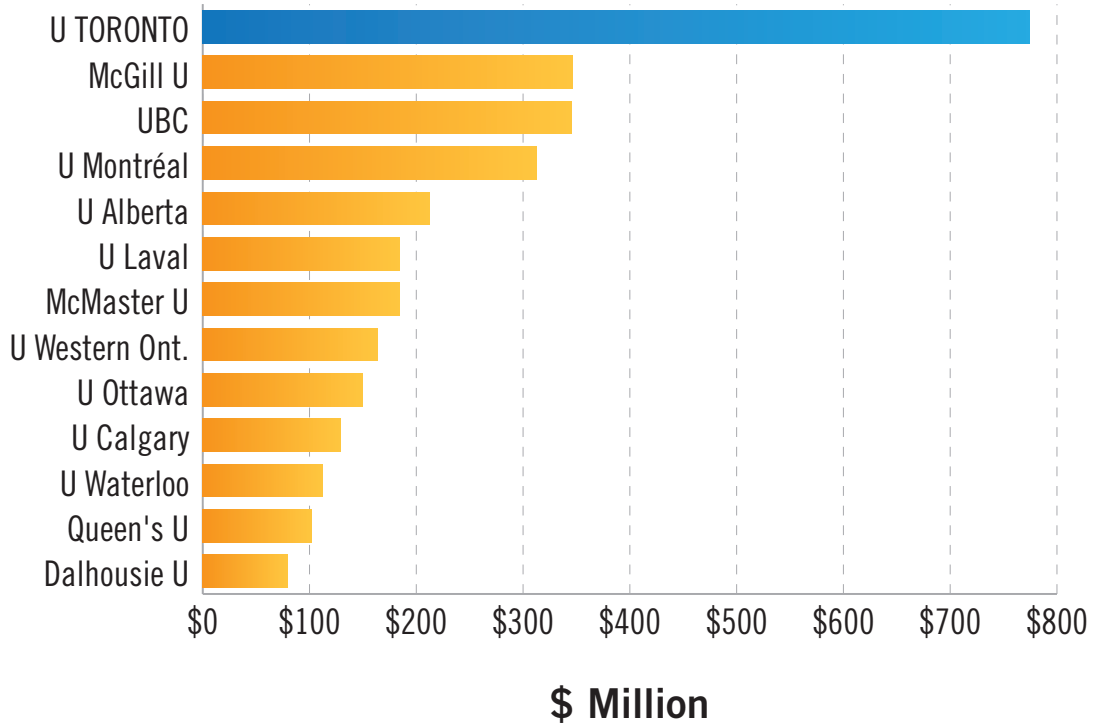


Figure 18: Canada Foundation for Innovation funding since inception to U13 universities^{vi}.

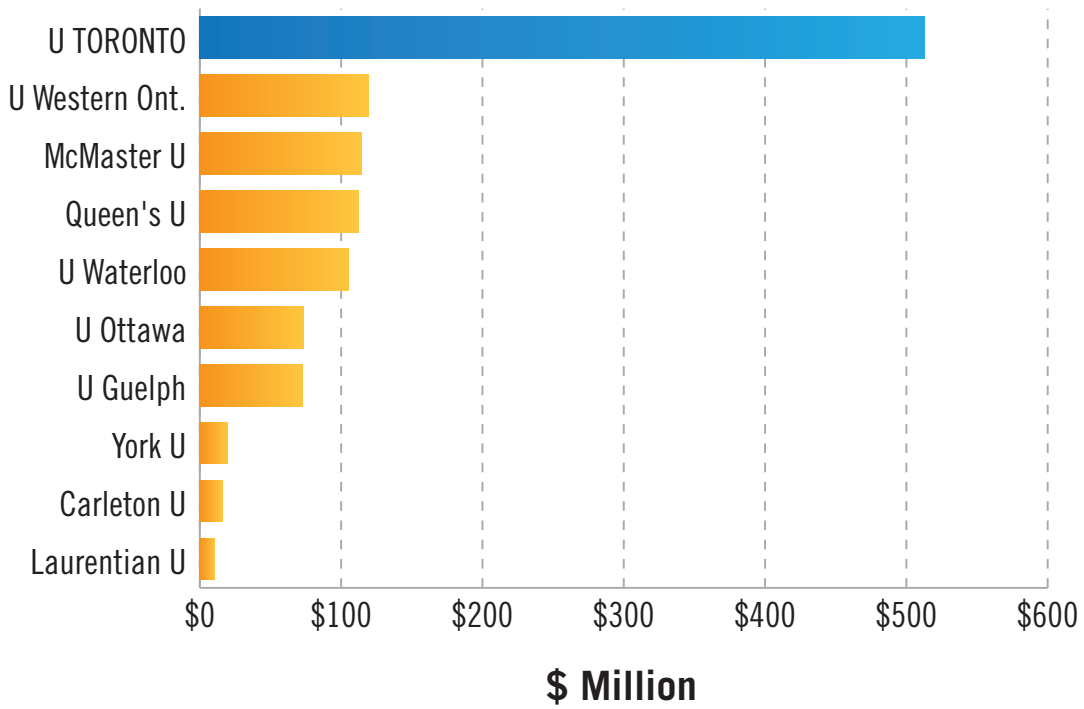
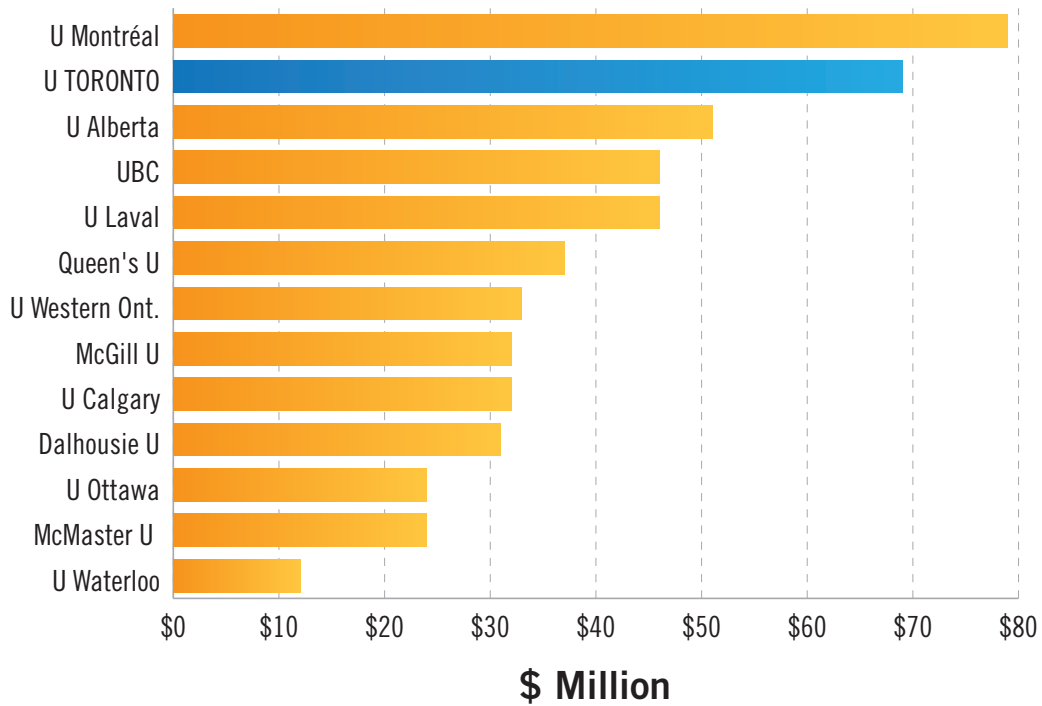


Figure 19: Ontario Ministry of Research and Innovation funding (main competitions since inception)^{vii}.

Industry Funding to U13 Universities — Absolute Dollar Value



Industry Funding to U13 Universities — As Percentage of Total

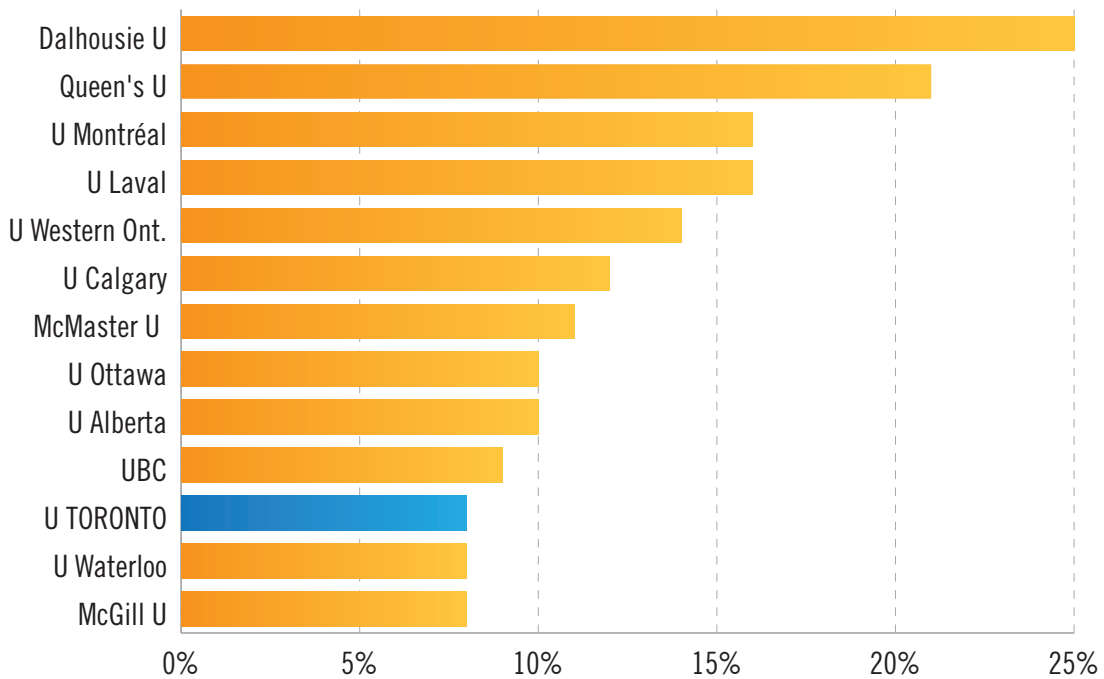


Figure 20: Industry funding to U13 universities^{xiii}, 2008–09.

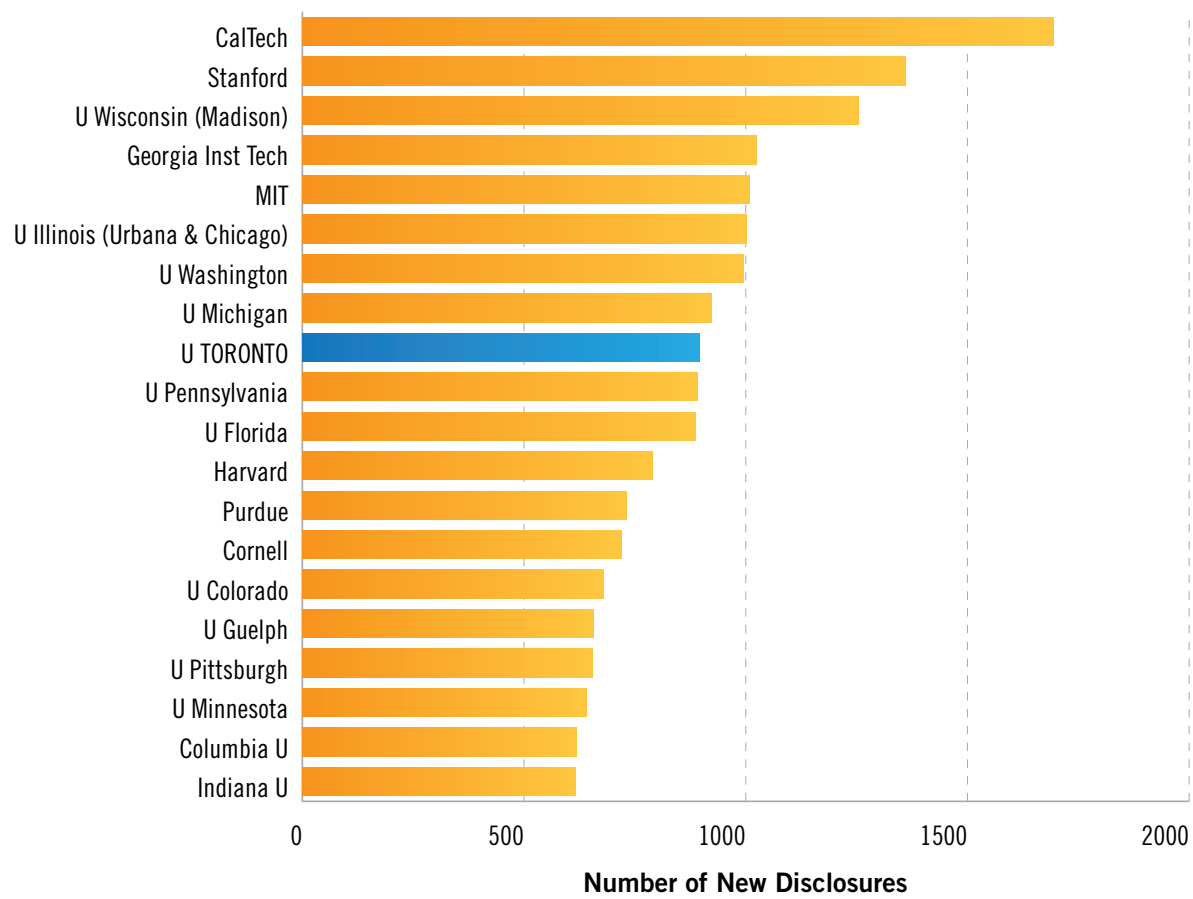


Figure 21: Invention disclosures, top 20 North American universities^{xiv}, 2005–08.

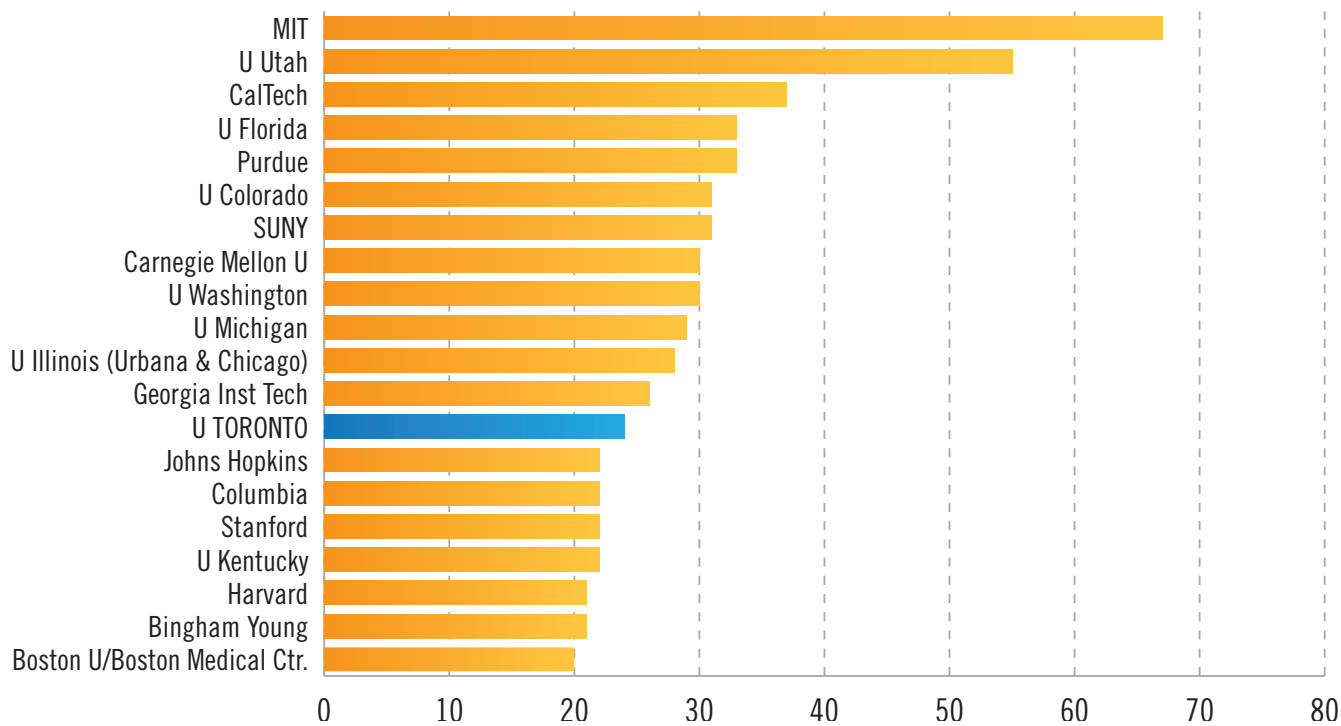
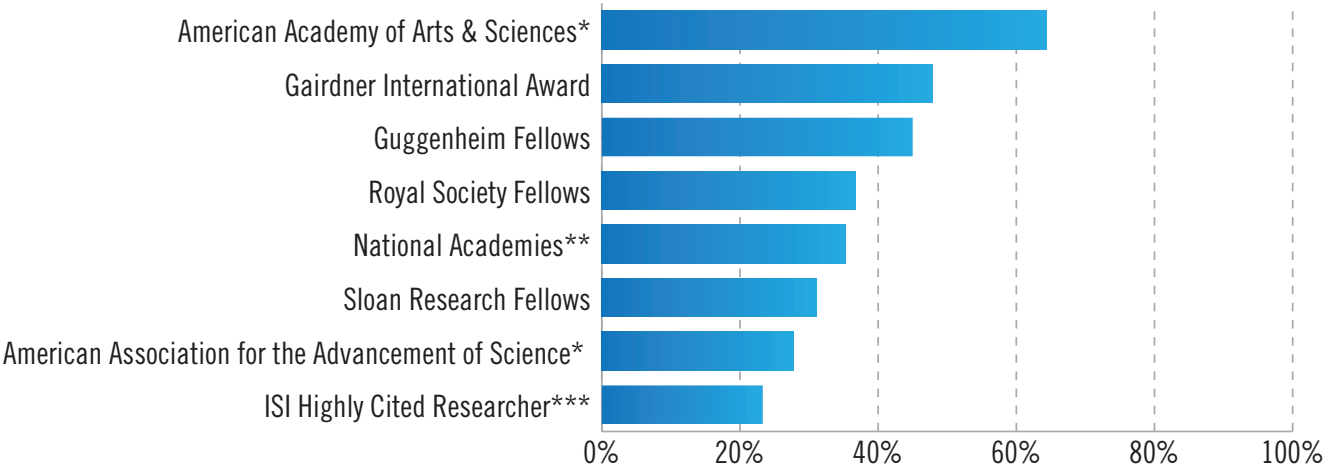


Figure 22: New spin-off companies, top 20 North American universities^{xiv}, 2005–08.

Field	U13 (Canada)		AAU† Public		AAU† All	
	Publications	Citations	Publications	Citations	Publications	Citations
All Fields*	1	1	1	1	2	3
All Sciences*	1	1	1	1	2	3
Health & Life Sciences*	1	1	1	1	2	3
Molecular Biology & Genetics**	1	1	1	1	2	5
Neuroscience & Behavior**	1	1	1	2	3	6
Cardiac & Cardiovascular System	1	1	1	1	3	4
Nursing	1	1	1	1	2	2
Engineering & Materials Science*	1	1	7	7	8	10
Environmental Engineering	1	1	2	1	2	1
Biomaterials	1	1	1	4	2	6
Acoustics	1	1	5	3	5	3
Biophysics	1	1	2	8	5	14
Mathematics	1	1	5	8	7	12
Social Sciences**	1	1	2	5	3	7
Social Work	1	1	3	2	3	2
Psychology	1	1	2	4	3	7
Anthropology	1	1	3	6	4	9
Humanities, Multidisciplinary	1	1	2	1	4	2
Language & Linguistics	1	1	1	3	1	6
Philosophy	1	1	1	4	1	8

Table 6: U of T's rankings on publications and citations in various fields compared to U13 universities and our American peers ^{xv}.

International Faculty Honours



Canadian Faculty Honours

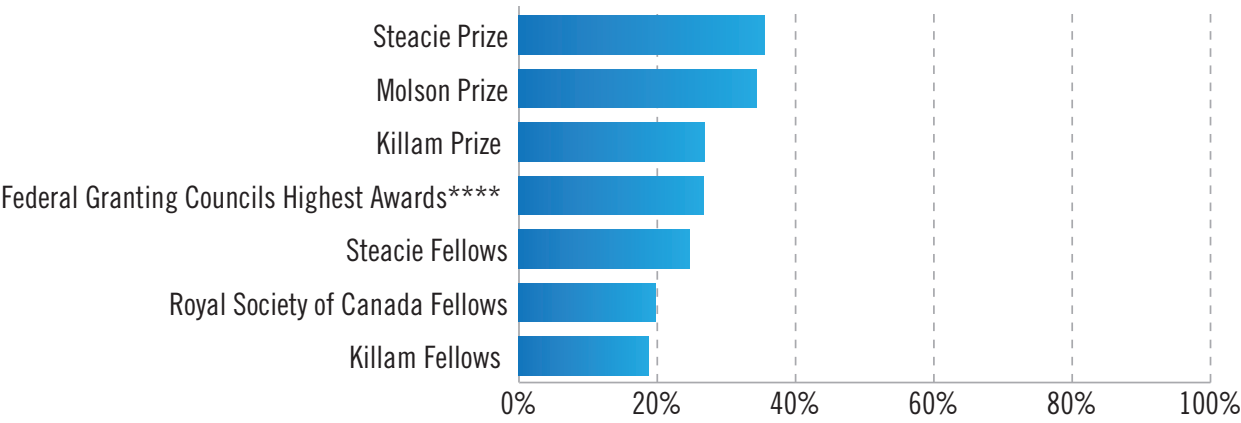


Figure 23: Faculty honours held by U of T investigators compared to awards held at other Canadian universities, 1980–2010^{xvi}.

Notes

ⁱ Flagship: refers to each Council's operating grants program (CIHR Open Operating Grants, NSERC Discovery Grants, and SSHRC Standard Research Grants). Partnership: refers to programs involving partnership with industry such as the NSERC Collaborative Research and Development Grants; limited to CRC-eligible programs. Other: refers to all other CRC-eligible programs. All: refers to all CRC-eligible programs. Percentages are based solely on the totals for Canadian universities and colleges and their affiliates. Data sources: Council data and NCE national totals: council reports and award search engines. NCE data for U of T: Research Information System

ⁱⁱ Data source: CAUBO. U of T data corrected for 1-year lag in reporting for affiliates. McMaster: only entities consolidated were included. Partners and affiliates included with each other university.

ⁱⁱⁱ Percentages are based solely on the totals for Canadian universities and colleges and their affiliates. Data based on annual funding received by each lead university. Data source: NSERC Facts and Figures.

^{iv} Percentages are based solely on the totals for Canadian universities and colleges and their affiliates. Data based on annual funding received by each lead university. Data source: NSERC awards search engine.

^v Data sources: NSERC, SSHRC and CIHR websites, respectively.

^{vi} FTEs are limited to grant and contract officers, accountants and legal counsel.

^{vii} Limited to tenure/tenure-stream professorial ranks paid by U of T. Data sources: Fall 2005, 2006, 2007 & 2008 academic databases (VP-FAL) for eligible faculty; Research Information System for participating faculty [for 2006-07: held (April 2006 to March 2007) or applied (June 2005 to December 2006) for a grant in a Tri-Council CRC-eligible program; other years defined similarly. * Denotes counts of 3 or lower.

^{viii} Excluding in-kind contributions. Federal Granting Councils include funding for the CRC and the FIDC Programs.

^{ix} Excludes revenues from the NCE, CRC and FIDC Programs and funding for the Canadian Light Source and Canadian Microelectronic Corporation. Affiliates and partner hospitals counted with each university.

^x Data source: CRC website, updated January 2009.

^{xi} Data source: CFI website, January 21 2011. National projects excluded. Funding to partners and affiliates included with each university.

^{xii} Top ten universities, with partners and affiliates. Data sources:

- ORF-RI (Ontario Research Fund Research Infrastructure Award) to March 19, 2010 (data from MRI)
- ORF-RE (Ontario Research Fund Research Excellence Award) Rounds 1 to 4 (MRI web site November 16, 2010)
- ORF-GL² (Ontario Research Fund Global Leadership Round in Genomics and Life Sciences) One-time round (MRI web site March 15, 2011)
- ERA (Early Researcher Award) estimated to be \$140,000 per award; Rounds 1 to 6 (MRI web site December 1, 2010)

- PDF Post-Doctoral Fellowship Allocations - Rounds 1 to 3, valued at \$50,000 each (MRI September 4, 2009)
- ORC (Ontario Research Chair) Round 1 (website November 23, 2008)
- Premier's Discovery Award Rounds 1 to 4 (MRI web site December 2, 2010)
- Premier's Summit Award Rounds 1 to 4 (MaRS web site December 2, 2010)

^{xiii} Data source: CAUBO. U of T data corrected for 1-year lag in reporting for affiliates. McMaster: only entities consolidated were included. Partners and affiliates included with each other university.

^{xiv} Data source: AUTM Survey FY 2008, 2007 and 2006. Note – University of Toronto includes the following affiliated hospitals: Bloorview Kids Rehab, Centre for Addiction and Mental Health, Hospital for Sick Children, Mount Sinai Hospital, Sunnybrook Health Sciences Centre, Toronto Rehabilitation Institute and University Health Network. University of California, only available as a system aggregate, is not shown.

^{xv} Data source: University Science Indicators 2009 Standard and Deluxe Editions, Thomson Reuters.

- (No star) From Deluxe Edition
- * From U of T-specified groupings using Standard and Deluxe Editions
- ** From Standard Edition
- † Association of American Universities supplemented with the Canadian U13 institutions (only 2 are members)

^{xvi} * Current members only. ** The National Academies consists of: Institute of Medicine, National Academy of Engineering, National Academy of Sciences. *** As of Sep 2010. **** Federal Granting Councils Highest Awards: NSERC: Gerhard Hertzberg Canada Gold Medal for Science and Engineering (n=20); CIHR: Michael Smith Prize in Health Research (n=18); SSHRC: Gold Medal for Achievement in Research (n=7). Due to timing of announcements, the following honours are updated until 2009 only: Federal Granting Councils, American Association for the Advancement of Science.



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