



FOR INFORMATION

PUBLIC

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TO: Academic Board

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JURISDICTIONAL INFORMATION: The Academic Board is one of the three Boards of the Governing Council. It is responsible for matters affecting the teaching, learning and research functions of the University, the establishment of University objectives and priorities, the development of long-term and short-term plans and the effective use of resources in the course of these pursuits.

HIGHLIGHTS:

The University of Toronto (U of T) is Canada's leading research-intensive university and is recognized as one of the top universities worldwide. U of T's strong performance nationally and internationally in research and scholarship across all disciplines is not simply a function of size. Rather, it is the excellence of our faculty and in turn, their graduate students, and our strong tradition of supporting and enabling both investigator-led and partnered research that allow us to achieve such success.

This report highlights some of the key performance metrics of U of T research and describes the activities and service improvements implemented by the administrative offices within the VPRI over the last two years. In addition, we review key challenges that we have been focusing on and our progress in meeting them. Keeping the focus is critical to our continued success, and we are confident that, as an institution, we are able to identify issues before they become major challenges and respond accordingly. Finally,

Academic Board - Keeping the Focus - 2014 Annual Report, Division of the Vice-President, Research & Innovation

we look ahead to the future and describe how this portfolio will continue to work with the Academic Divisions to achieve continued success in research and innovation.

FINANCIAL AND/OR PLANNING IMPLICATIONS:

None

RECOMMENDATION:

For Information

DOCUMENTATION PROVIDED:

Keeping the Focus - 2014 Annual Report, Division of the Vice-President, Research & Innovation



UNIVERSITY OF
TORONTO

KEEPING THE FOCUS

2014 Annual Report

Division of the Vice-President, Research and Innovation

www.research.utoronto.ca/keepingthefocus

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Vice-President,
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MESSAGE FROM THE VICE-PRESIDENT



After seven years in external roles, I am delighted to be back at the University of Toronto.

During that seven-year period, U of T has made impressive progress in key areas, including research funding, faculty awards and honours, innovation, and international rankings.

We cannot, however, afford to be complacent.

Even as U of T continues to improve, so do our peer institutions. Building a relevant, innovative university research enterprise is a competitive activity that demands creativity and commitment.

In our 2010 annual report, three key challenges facing U of T research were set out:

1. increasing U of T's market share in tri-agency funding;
2. meeting increasing demands for administrative oversight of research funding; and
3. enhancing partnerships with the private sector.

This 2014 annual report assesses the University's success in achieving our 2010 goals. We also describe changes in both the Canadian research funding landscape and the University's priorities. We close the report with a look at future challenges.

Our thanks and praise are due to Professor Paul Young for his inspired leadership during his term as Vice-President, Research and Innovation. The healthy state of the U of T research community today is due in very large part to Prof. Young's progressive action and dedication. I also thank Prof. Peter Lewis for ably acting as Interim Vice-President and sustaining our momentum through this last year.

The University of Toronto continues to prove its value to global society. I very much look forward to assisting the University's faculty, students and staff in making our institution's contribution to the world even more profound and meaningful.

Sincerely,

A handwritten signature in blue ink that reads "Vivek Goel". The signature is written in a cursive, flowing style.

Professor Vivek Goel
Vice-President, Research and Innovation

INTRODUCTION

ONE OF THE WORLD'S GREAT RESEARCH-INTENSIVE UNIVERSITIES

The University of Toronto (U of T) is **Canada's leading research-intensive university** and is recognized as one of the top universities worldwide. Internationally, there is a range of organizations that rank universities on their impact based on a variety of metrics, including research/faculty excellence, reputation, the learning environment and internationalization. Among these university rankings organizations, a select few are generally accepted as having sound methodologies. Table 1 shows U of T's position over the last five years in the four most prominent world university rankings. **Today, U of T ranks among the best universities in the world on broad measures of excellence and reputation.**

U of T's great strengths across a broad range of disciplines and subjects is also well recognized. In a recent analysis of the world's top publications in the sciences (including natural and physical sciences, medicine, engineering

and social science), U of T ranked in the top 20 in the world in many fields (Table 2). Compared to North American peer universities, U of T is ranked within the top five or ten, and often first, in number of publications and citations of a broad range of subjects across all disciplines, even when compared to ivy league schools (Table 3). Indeed, based on total publications or citations, **the top two universities in the world are, in order, Harvard and U of T.**¹ Analysis based on such publication data focuses on disciplines where journals are a predominant means for knowledge dissemination. In particular, we are not able to use this type of data to examine our performance in the humanities to the same degree. As shown in Table 3, we do well in humanities disciplines where such data are available. We will continue to seek out data sources and methods for appraising research excellence across all our fields of activity.

Table 1: U of T rankings in the four most prominent global rankings systems.*

Ranking	2010	2011	2012	2013	2014
1. National Taiwan University Ranking¹	9	9	7	8	4
2. QS World University Rankings²	29	23	19	17	20
3. Times Higher Education World University Rankings³	17	19	21	20	20
4. Academic Ranking of World Universities⁴	27	26	27	28	24

*Notes for all figures and tables in this report may be found in the Notes section on page 26.

Why do rankings matter?

Global rankings tell us how we perform over time, how the world perceives our institution, and how we compare to the best institutions around the world. The most highly ranked institutions are more successful at recruiting and retaining the best and brightest faculty and students. The University's consistent rank among the world's top 20 research institutions, across diverse ranking systems, is a strong indicator of the broad strength of U of T research.

Table 2: Subjects and fields where U of T ranked top 20 or better in the world according to the 2014 National Taiwan University Performance Ranking of Scientific Papers for World Universities.

Field/Subject	2014 Rank
Pharmacology & Toxicology	2
Clinical Medicine	3
Social Sciences	8
Civil Engineering	10
Life Science	11
Electrical Engineering	19
Environment/Ecology	20

Table 3 shows that the U of T is a North American leader overall and in a number of specific disciplines. In fact, based on total publications or citations, **the top two universities in the world are, in order, Harvard and U of T.**

Table 3: U of T's rankings on numbers of publications and citations among North American peer institutions in areas of strength across disciplines (2009 to 2013), including partner hospitals.

	Publications	Citations
ALL FIELDS	2	2
HEALTH & LIFE SCIENCES*	2	3
Nursing	3	3
Oncology	2	2
Pharmacology & Pharmacy	2	2
Rehabilitation	1	1
Rheumatology	1	1
Sports Sciences	3	4
ENGINEERING & MATERIALS SCIENCES*	10	13
Biomaterials	5	6
Biomedical Engineering	2	3
Cell & Tissue Engineering	4	3
Environmental Engineering	6	8
PHYSICAL SCIENCES		
Biophysics	2	6
Chemistry, Analytical	4	3
Chemistry, Organic	2	2
Mathematics	6	11

	Publications	Citations
SOCIAL SCIENCES*	2	4
Anthropology	2	7
Behavioral Sciences	2	2
Criminology & Penology	4	4
Education & Educational Research	4	10
Psychology	2	8
Social Work	1	2
HUMANITIES MULTIDISCIPLINARY	2	2
Ethics	2	5
Literature	3	12
Philosophy	1	1
Religion	2	6

WHAT MAKES A GREAT UNIVERSITY? PEOPLE AND PARTNERSHIPS

U of T is Canada's leading research-intensive university. With 5,000 full-time faculty members, over 16,000 graduate students and nine fully-affiliated hospital partners, **the total value of research funds** awarded to investigators at the University was \$390 million. When combined with funding awarded to our nine partner hospitals, the total was **\$1.3 billion** in 2012-13 (Figure 1).

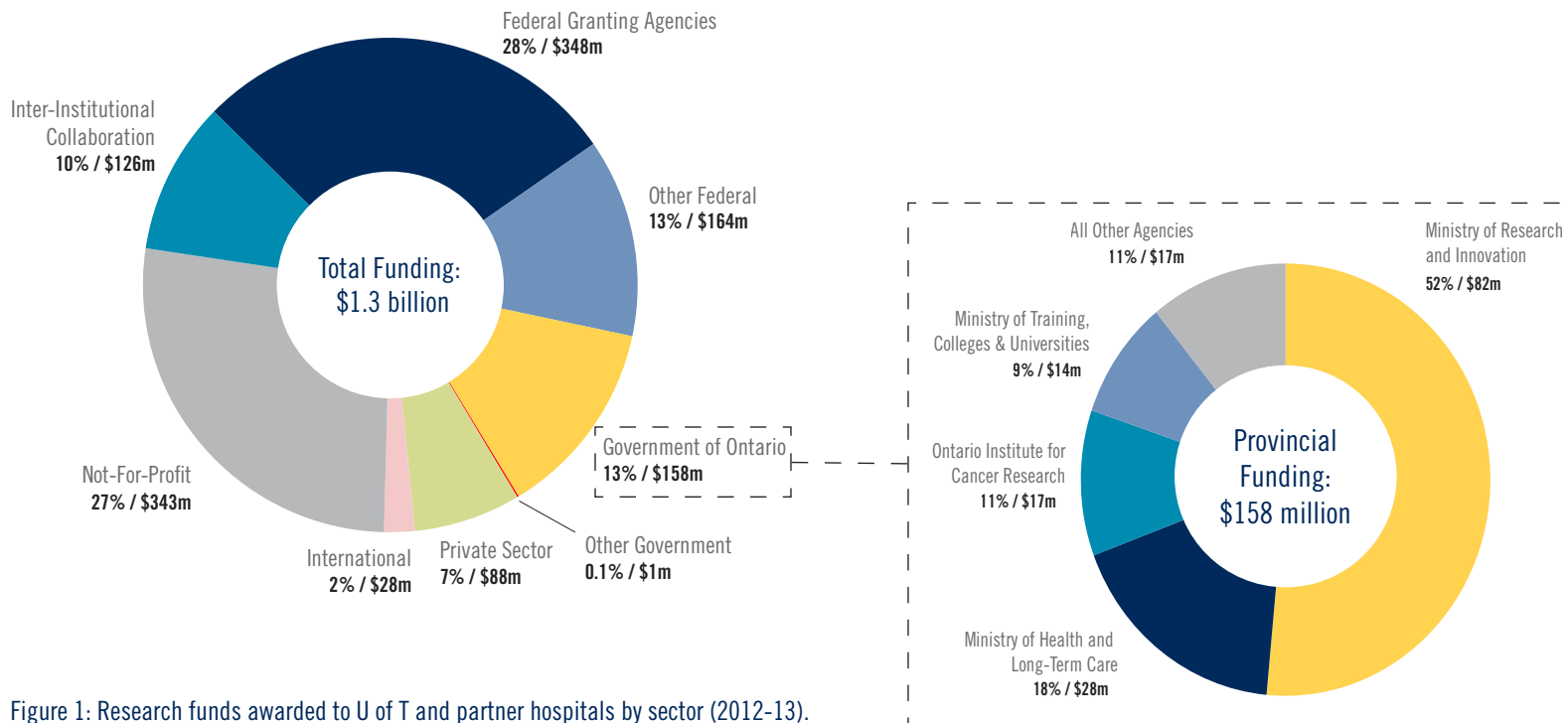


Figure 1: Research funds awarded to U of T and partner hospitals by sector (2012-13).
Inset: Ontario provincial research funding (2012-13).

PEOPLE

U of T's strong performance nationally and internationally in research and scholarship across all disciplines is not simply a function of size. Rather, it is the **excellence of our faculty** (Figures 2, 3 and 4), and in turn, their graduate students, their propensity for **collaborating with leading researchers around the world** (Figure 5), and our **strong tradition of supporting and enabling both investigator-led and partnered research** that allow us to achieve such success.

U of T is home to 25% of the Canadian university researchers named to the prestigious Highly-Cited Researchers list in 2014, more than at any other Canadian university.²

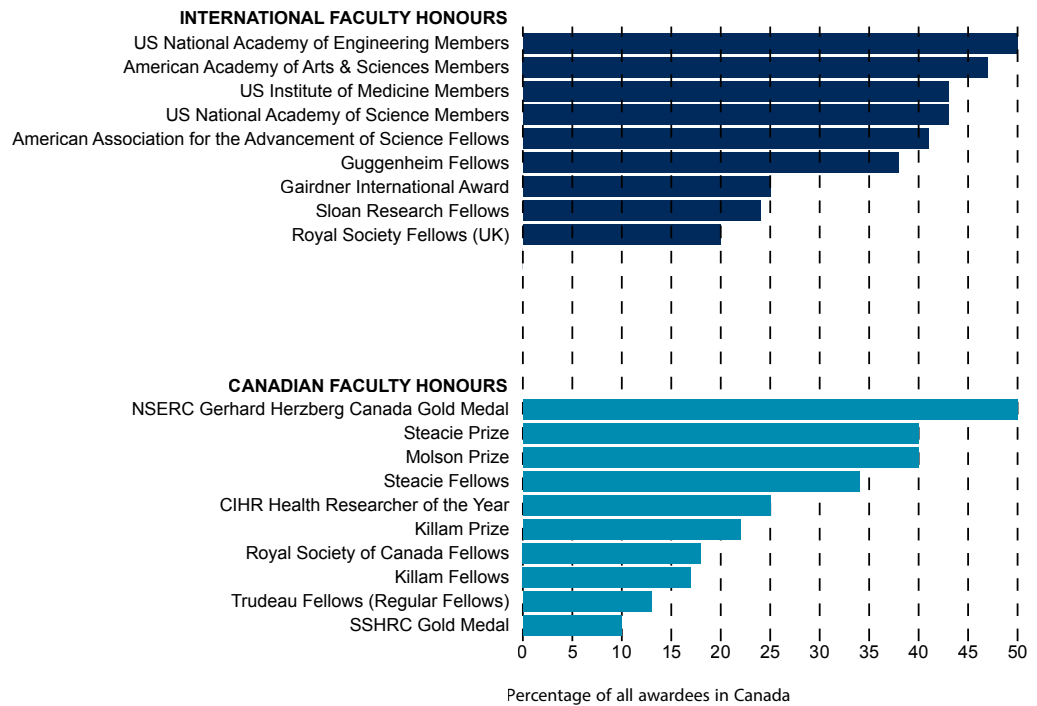


Figure 2: Percentage of major international (upper) and national (lower) awards and honours won by U of T faculty (2004-13), as a proportion of all awards to Canadian university researchers.

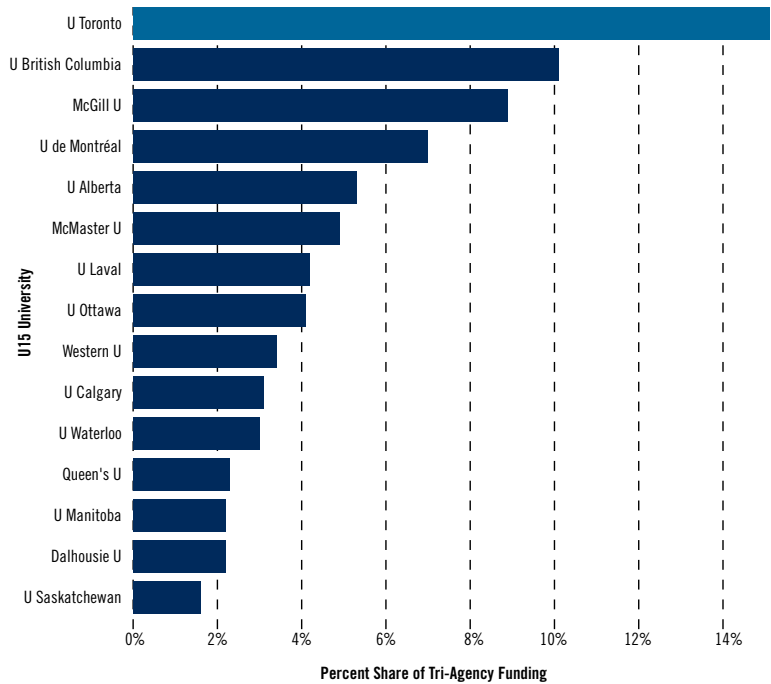


Figure 3: Market share of tri-agency³ funding to U15⁴ universities (2013-14).

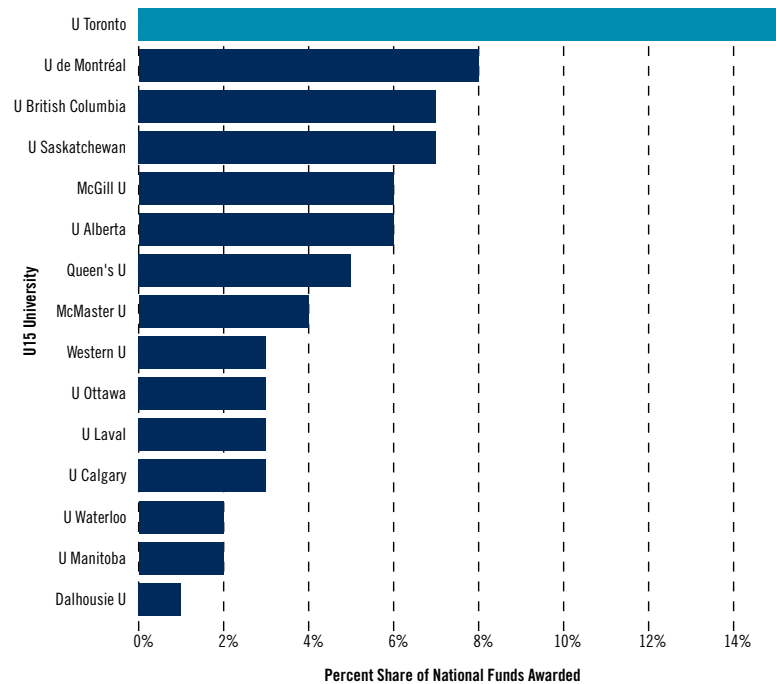


Figure 4: Market share of Canada Foundation for Innovation funding to U15 universities (2009-10 to 2013-14).

GLOBAL REACH

INTERNATIONAL CO-AUTHORSHIP

U of T researchers are collaborating with their peers at leading universities around the world.

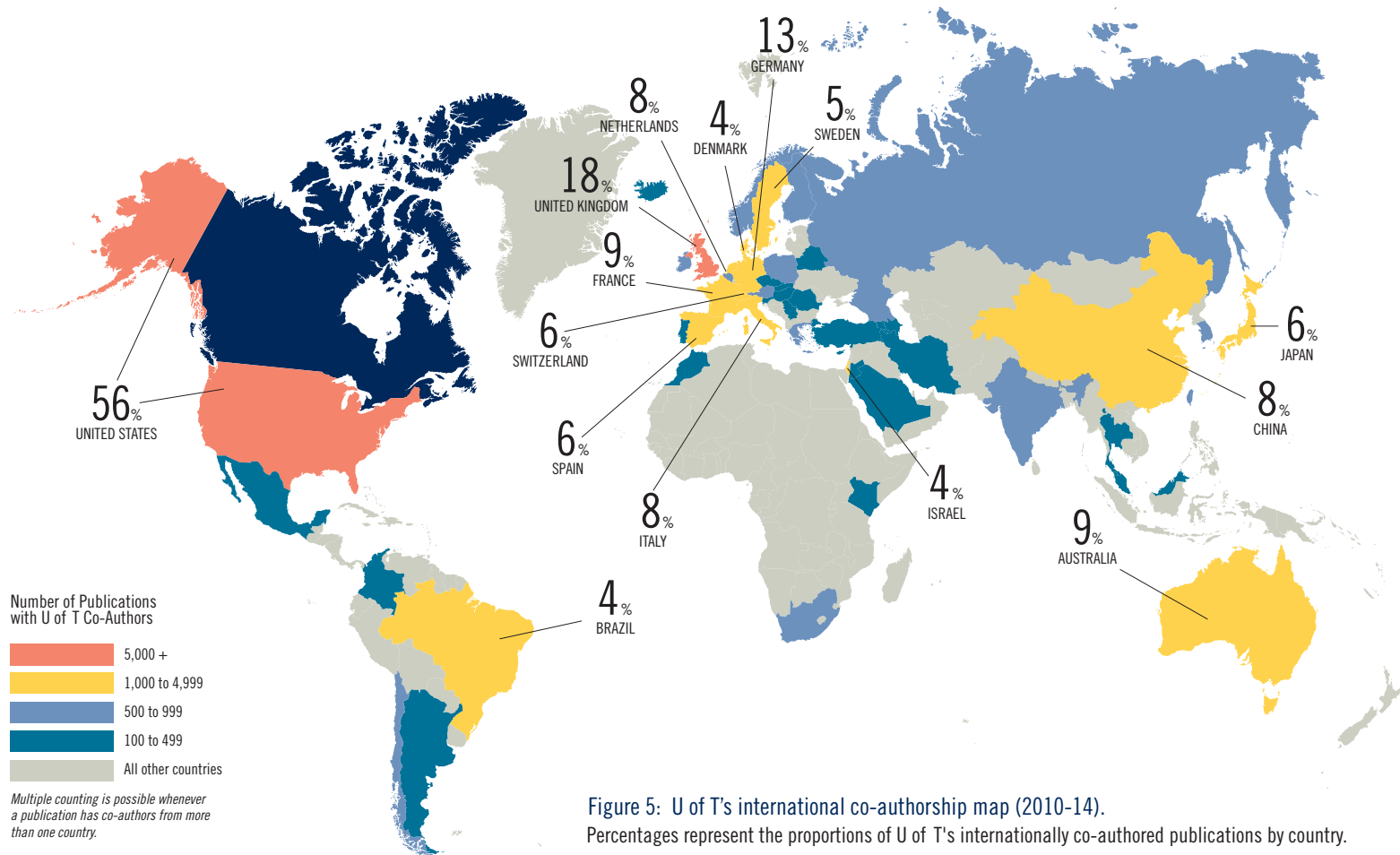


Figure 5: U of T's international co-authorship map (2010-14). Percentages represent the proportions of U of T's internationally co-authored publications by country.

THE POWER OF RESEARCH NETWORKS

Partnerships are critical to our success. Whether local, regional, national or international, research at U of T is strengthened when we work with others. In 2012, a new **Strategic Research Plan** provided a framework and inspiration for building on our strengths and expanding multidisciplinary collaborations and partnerships to have even greater impact. Our 2013 annual report, *Inside the World's Great Questions: The Power of Research Networks*, showcased how, across every discipline and in all seven themes of our Strategic Research Plan, U of T researchers are working with their colleagues across campus, across the country and around the world to tackle some of society's pressing challenges. Thanks to partnership and network funding programs from **NSERC, CIHR, SSHRC, the Networks of Centres of Excellence (NCE) program, FedDev Ontario and the University's own Connaught Fund**, these networks leverage knowledge and resources to have an impact that is greater than the sum of their parts.



BUILD

Global Cities Indicator Facility: Collects and compiles standardized information on urban topics from 253 cities around the world. This information is made available to member cities, allowing effective and meaningful comparisons between urban centres. www.cityindicators.org



ENGAGE

Religion in the Public Sphere: A network of scholars exploring the intersection of religion with various aspects of society. It examines how religion manifests in public spaces, institutions and interactions, and considers the challenges and possibilities of religious diversity around the world. www.rps.chass.utoronto.ca



EXPLORE

Large Hadron Collider at CERN: A particle accelerator that is helping physicists to understand the nature of matter and the origins of the universe. It involves a collaboration among 6,000 researchers from over 40 countries, who make their findings available to the public. home.web.cern.ch



ENABLE

Southern Ontario Smart Computing Innovation Platform (SOSCIP): Brings together researchers and businesses to narrow the gap between research and innovation, using powerful advanced computing technologies. www.soscip.org



ENGAGE

Computational Research on the Ancient & Near East: A digital platform for integrating and analyzing complex archeological information. Researchers can visualize connections among social, economic and environmental factors at various points in time and across regions. www.crane.utoronto.ca



PROMOTE

Music and Health Research Collaboratory: A network of psychologists, neurologists, sound engineers, rehab experts, hearing specialists, and music therapists working to apply music in treating serious health conditions. www.uoftmusicmahrc.ca



SUSTAIN

Canadian Sea Ice & Snow Evolution Network: Bridges university and government researchers to share data and ideas on Arctic climate change. Measurements taken at the surface and in aerial observations and satellite images are used in climate simulations and models. www.cansise.ca

Figure 6: U of T Research Networks

DIVISION OF THE VPRI: SERVING THE U OF T COMMUNITY

Each year, the Division of the VPRI, with a full-time staff of 100, provides a wide range of services and supports to the U of T research community, including managing, negotiating and supporting the activities described in the infographic below.

RESEARCH FUNDING



3,300
new funding applications

\$400M
in funding awarded to

3,300
principal investigators

9,400
research funds involving

1,100
sponsors and

2,100
funding programs

INTELLECTUAL PROPERTY



150
invention disclosures

30
priority patent applications

25
licensing agreements

10+
new companies

ACCOUNTABILITY & REPORTING



75
external audits

8,000
financial reports

1,200
new human ethics protocols

560
new animal ethics protocols

50
post-approval laboratory visits

RESEARCH SERVICES OFFICE

The Research Services Office (RSO) provides support and guidance to the U of T research community and acts as a liaison with sponsoring organizations including the **federal tri-agencies, Canada Research Chairs** and **Canada Excellence Research Chairs**, the **Canada Foundation for Innovation**, the **Ministry of Research and Innovation**, and numerous others. RSO works in partnership with staff, faculty and academic administrators in the divisions to achieve optimal participation and maximum success across a broad range of regional, national and international research funding programs. RSO provides “grantsmanship” tools and workshops, editorial assistance in proposal development for selected programs, expertise in crafting complex budgets, negotiation of funding agreements,

and planning for ever-increasing administrative compliance. In addition, **RSO oversees 8,000 active research funds**, working with faculty members to ensure that while compliance obligations are met, the budget, terms and conditions continue to support their research objectives.

Of increasing importance over recent years is the need to monitor and undertake advocacy on the **changing landscape of core funding programs**, the tri-agencies in particular. Facing their own financial constraints, the tri-agencies are engaged in program evolution to increase impact and efficiency. How this plays out for researchers and research institutions is the subject of continuous dialogue through the well-established channels of communication that RSO has cultivated over many years.

Staff Profile



Jenny Korolik
RESEARCH FUNDING OFFICER

Jenny supports the day-to-day administration of the Canada Research Chairs (CRC) program at the University, including the successful submission of new nominations. She also facilitates CRC-related research infrastructure applications and awards from the Canada Foundation for Innovation.

RESEARCH OVERSIGHT & COMPLIANCE OFFICE

Staff Profile



Daniel Gyewu
RESEARCH ETHICS MANAGER,
HEALTH SCIENCES

Daniel is responsible for managing all areas of the ethics review process of the Health Sciences Research Ethics Board (REB). He acts as an advisor to researchers and REB members on complex research ethics issues, policies and best practices.

Since 2012, the **Human Research Ethics Program** has worked on several initiatives to simplify the ethics review process while supporting compliance with policies and regulations. The first phase of the **Research Administration Improvement and Systems Enhancement (RAISE)** project automated notifications to researchers including submission receipts, annual renewal reminders and approval letters. Departmental and faculty delegated ethics review committees were pared down to streamline review of course-based human research. Finally, the **Post-Approval Review** site visit program was designed, created, piloted and launched to help researchers meet ethical standards and regulatory requirements including informed consent, privacy and data security.

Over the last few years the **Animal Ethics and Compliance Program** has improved oversight operations and user services to ensure compliance and efficiency simultaneously. The post-approval review program that was implemented in 2013 has facilitated continued improvement in animal care and use practices in research and teaching at U of T. By examining the findings of visits, outreach and support resources are being strategically directed to continually improve the program. An online animal use protocol system that is part of the RAISE project was

planned and constructed within the last few years and will soon be implemented to improve efficiency of protocol submission and review while improving protocol history tracking and documentation for regulatory purposes.

Since 2012, the Research Financial Reporting and Audit Office has increased the timeliness of submission of reports for high risk, significant dollar funding projects from our major sponsors, thus reducing the risk of loss of funding due to non-submission of financial reports. In total **annually, our office completes approximately 8,000 financial reports**, and we are working on significant improvements and efficiencies to ensure they are submitted on a timely basis. We are currently working with the RAISE team on the calendaring project, a new tool to clearly identify financial reporting and audit deadlines and allow us to improve the level of service we provide. Our office initiates and executes external audits on those projects whose terms and conditions dictate that an audit is required. Over the next year we plan to work with the education & outreach coordinator to clearly identify roles and responsibilities of various stakeholders in the financial reporting and audit process, and educate business officers in various aspects of financial management of Restricted Research Funds.

INNOVATIONS & PARTNERSHIPS OFFICE

In 2012, the Innovations and Partnerships Office (IPO) outlined several ongoing **strategies for building successful partnerships** including: improving the turnaround time to complete industry-sponsored contracts and agreements, developing new “industry-friendly” templates, and increasing business development activity to encourage and facilitate connection. Results from a recent client survey clearly indicate that the various initiatives and efforts implemented since 2012 have made a tangible impact. These activities include streamlined work processes and reduced paperwork, expedited invoicing procedures, more consistent approaches to contractual terms, extensive staff development and education, and new website content for internal and external audiences. Of the **1200+ funded and non-funded agreements and contracts** handled annually, **40-50% are completed in less than 10 days**, 60-70% are completed in less than 30 business days, and 90% within 100 days. The remaining 10% that take longer than 100 days to process are those that have very complex terms or relationships

and require extensive negotiation with the sponsor. Building on these successes, the team will continue to carefully monitor overall agreement turnaround times and additional areas for improvement and efficiency will be sought and implemented.

The second aspect of IPO’s mandate is to **enhance innovation and entrepreneurship**. Since 2012, IPO has implemented several changes to improve its processes and provide clarity for inventors. The invention disclosure intake forms and processes have been improved, specific language has been included on the website regarding options for the assignment of IP ownership and the commercialization process, and a new streamlined reporting mechanism has been established to ensure compliance with the University Inventions Policy. In addition, a new position was created (industry licensing officer) to assist our private sector partners in efficiently accessing U of T intellectual property and to increase licensing of U of T inventions to industry.

Staff Profile



Kurtis Scissons
ENTREPRENEURSHIP MANAGER AND
CO-DIRECTOR, UTEST

In his role as Entrepreneurship Manager, Kurtis works with U of T entrepreneurs to facilitate the creation of companies based on intellectual property created at U of T. Kurtis is also Co-Director of the UTEST accelerator, which provides entrepreneurship education, investment capital, space and advisory services to U of T-affiliated companies.

VPRI OPERATIONS

Staff Profile



Nadia Saracoglu
RESEARCH SYSTEMS TECHNOLOGY
MANAGER

Nadia works as an analyst on RAISE projects, including My Research and RIS-based projects. She manages the RAISE Helpdesk team and delivers training on various research information tools to faculty and administrative staff.

The VPRI Operations team is dedicated to **four key functions:** effective and efficient management of divisional investment in the VPRI operating budget and human resource management within the portfolio; research information analysis supporting strategic research planning, including annual market share analyses that support U of T's Canada Research Chair and other allocations; continuous improvement in service to the community through innovative development of new administrative systems and tools (see, for example, Project RAISE, below); and responsible administration of internal research funding resources, the Connaught Fund chief among them.

Research Administration Improvement and Systems Enhancement (RAISE)

RAISE is a joint initiative of VPRI and the office of the Chief Information Officer to **improve risk management practices in the management of research while reducing clerical administrative demands on faculty, academic administrators and staff.** To date, RAISE has enabled several important business process improvements including: new robust tools for faculty members and business officers to increase transparency and monitoring capacity of research funds, reducing the risk of

research deficits; redirection of payroll postings away from closed/frozen restricted research funds; and automation of close-out activities for expired restricted research funds.

My Research - Applications (MRA), a web-enabled solution, has replaced the previous paper-based process for internal review and approval of research applications, leading to a broad range of benefits for the University, its research community and the environment. A major initiative, MRA established important groundwork on which other automated systems are being built. **My Research - Animal Protocols (MRAP)** will be rolled out in mid-2015; **My Research - Human Protocols (MRHP)** will be rolled out in mid-2016. Future initiatives include a calendaring function to send automated reminders of key research administration deliverables, including invoicing dates, financial and progress reports, and business process review and automation of the inventions lifecycle.

THE CONNAUGHT PROGRAM

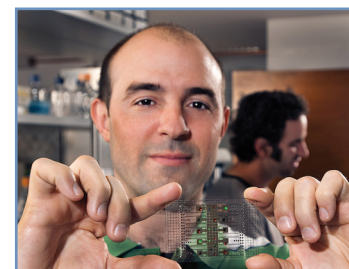
The Connaught Fund was created in 1972 from the sale of Connaught Medical Research Laboratories, which was the first to mass-produce insulin, the **Nobel Prize-winning discovery by U of T researchers Frederick Banting, Charles Best, J.J.R. Macleod and Bertram Collip**. The University has stewarded the fund in the years since, awarding more than \$150 million to U of T researchers. Today, the Connaught Committee is chaired by the Vice-President, Research and Innovation and supported by five standing review panels. The committee awards almost \$4 million annually to emerging and established scholars through a range of programs designed to support research excellence, target unmet societal needs and cultivate collaborations with transformative impact.

Table 4: Connaught Fund programs and allocations (2014-15).

PROGRAM	MAXIMUM ALLOCATION	APPROXIMATE # OF AWARDS IN 2014-15
Global Challenge Award	\$30,000	3 proposal development awards
	\$1,000,000	1 full award
New Researcher Award	\$1,000,000	60 awards of \$10,000 16 'Top-Up' awards of \$25,000
Innovation Award	\$500,000	Approximately 10 awards
Summer Institute Award	\$150,000	Up to 3 awards
McLean Award	\$50,000	1 award matched by McLean Endowment
International Doctoral Scholarship	\$1,000,000	Numerous awards, administered by SGS
Faculty Recruitment Support	\$50,000	Numerous awards, in partnership with the Provost's Office
	\$3,780,000	Total



**2013 McLean Award:
Professor David Sinton**



**2014 McLean Award:
Professor Aaron Wheeler**

The 2013 and 2014 McLean Awards went to Professors David Sinton (Dept. of Mechanical and Industrial Engineering and Director, Institute for Sustainable Energy) and Aaron Wheeler (Dept. of Chemistry), respectively. The McLean Award honours emerging leaders in basic research in the engineering sciences, physics, chemistry, computer science, mathematics or theory and methods of statistics.

Sinton and Wheeler work in different areas of microfluidics, a multidisciplinary field that involves using or analyzing small volumes of fluid for practical applications. Sinton's work is focused on harvesting the energy generated by algae during photosynthesis. His eventual goal is to scale up these photosynthetic energy factories to help meet society's energy needs. Wheeler's work is focused on developing new personalized approaches to cancer treatment. Ultimately, his goal is to be able to test a small sample of a patient's biopsy tissue and rapidly screen it to see which chemotherapy drugs it responds to.

For more information, visit connaught.research.utoronto.ca.

STRATEGIC INITIATIVES

Staff Profile



Nadine McHorgh
SPECIAL PROJECTS OFFICER

Nadine is responsible for supporting the development of international institutional research partnerships, researching and reporting on the research strengths of U of T and peer institutions around the world and coordinating institutional research-related meetings and events.

Global Research Partnerships

U of T has research partnerships with academic institutions in many countries around the world. Highlights in 2014 include:

Brazil: In 2012, U of T signed a memorandum of understanding with the **University of São Paulo** to collaborate in the areas of neuroscience, global cities, oncology and international relations. Symposia on oncology and international relations were held in Toronto in November 2013. In October 2014, a conference on global cities was held in São Paulo. Joint research projects have been initiated in all of these areas.

India: In 2013, U of T (in partnership with the **University of British Columbia** and the **University of Alberta**) was awarded \$15 million for a Canada-India Research Centre of Excellence entitled *Innovative Multidisciplinary Partnerships to Accelerate Transformation & Sustainability (IC-IMPACTS)*. This initiative has three areas of focus: sustainable and safe infrastructure, integrated water management, and public health disease prevention and treatment, to be applied synergistically to underserved communities in India and Canada. Five U of T projects have been funded in the areas of infrastructure and water (*ic-impacts.com*).

Sweden: The U of T Faculty of Medicine has a long-term partnership with the **Karolinska Institute** featuring a **developmental & perinatal biology workshop** incorporating both basic science and clinical perspectives. Students and faculty from both institutions spend one week in alternate years in Toronto or Stockholm. The workshop combines a lecture/seminar program with an active research component.

Research Awards & Honours

We continue to build on our national and international success in garnering recognition for our world-class faculty through their nomination for prestigious awards and honours. The Strategic Initiatives team works closely with staff and research leaders in the academic divisions to support nominations for prestigious national and international prizes, collects and manages institutional data regarding nominations, works with the divisions to develop nomination strategies for individuals or groups, and informs the University community of opportunities for nominations and to celebrate the many successes achieved by U of T faculty.

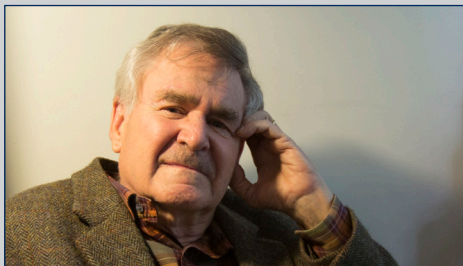
In 2014, U of T saw its **largest cohort ever recognized by the Royal Society of Canada (RSC)**, with 21 new Fellows



Professor Peter St George-Hyslop

Enhancing U of T's reputation as a research powerhouse through nominations for major prestigious international awards and honours across all disciplines has been a strategic priority for several years. In 2013-14, the significant contributions of two U of T researchers earned international accolades. Professor Peter St George-Hyslop (Director of the Tanz Centre for Neurodegenerative Diseases) won the 2013 BIAL Award in Medical Sciences and the 2014 Dan David Prize (along with colleagues Brenda Milner, McGill University and John Hardy, University College London) for his work on identifying two genes involved in Alzheimer's Disease.

In 2014, Professor Emeritus Ian Hacking (Dept. of Philosophy) was awarded the Balzan Prize for his "fundamental and pioneering contributions to philosophy and the history of social and natural sciences, for the thematic breadth of his research, for his original epistemological perspective centred on a version of scientific realism and defined in contrast with the dominant paradigm in the philosophy of science of the twentieth century."



Professor Emeritus Ian Hacking

humanities, where one-third of all new Fellows elected across Canada were U of T scholars. Learn more about U of T's Fellows of the Royal Society of Canada at: www.research.utoronto.ca/about/awards-honours/rsc.

elected, five faculty receiving RSC Medals and Awards, and three of our brightest young scholars elected to the inaugural cohort of the College of New Scholars, Artists & Scientists. Our success was **particularly strong in the**

RESEARCH COMMUNICATIONS

Since its founding in 1999, the VPRI Research Communications team has served the University and VPRI extremely well through *Edge magazine*, the **Research + Innovation website** and a variety of annual reports. These print and electronic materials have won **more than 20 major awards**.

The past year has been one of change for the Research Communications team—or, to be more accurate, the beginning of a change. In early 2014, President Gertler announced that the University would undertake a re-design of how communications would be organized centrally. As part of this initiative, **the VPRI Research Communications group is merging with the central Strategic Communications group and some members of the DUA communications team**. The result will be a central communications organization that works in a much more integrated manner, that will be better resourced and, therefore, be able to provide U of T with improved communications services.

Paul Fraumeni, VPRI's long-time Director, Research Communications will be one of the leaders of the new centralized team as Executive Director, Creative Services. He will be joined by Senior Research Communications Officer Jenny Hall and Web Developer Mel Racho on the new U of T communications team.

RESPONDING TO CHALLENGES

CHALLENGE 1: INCREASE MARKET SHARE IN TRI-AGENCY COMPETITIONS

In 2010, we reported on a decade-long erosion in the University's market share in tri-agency funding, resulting in a reduction in the number of Canada Research Chairs (CRCs) allocated to U of T (Figure 7). The CRC allocation is an important indicator of our success in generating tri-agency funding, which is also related to the allocation we receive for the indirect costs of research from the federal government under the Research Support Fund (formerly the Indirect Costs Program). We immediately struck a plan to work with leaders in the academic divisions to reverse the trend, and set **an institutional goal of achieving a steady state of 250 CRCs**.

Our proactive approach to analyzing trends, identifying opportunities for improvement and working with the academic divisions to seize those opportunities has been effective. Over the past five years, our faculty have succeeded in reversing the trend of decreasing tri-agency market share. Our gains have translated into the recovery of 10 CRCs in the 2013 recalculation and we have just received the exciting news that the University has won back an additional seven chairs, **bringing our CRC allocation to 255**, ahead of the steady-state target we set in 2012 (Figure 7).

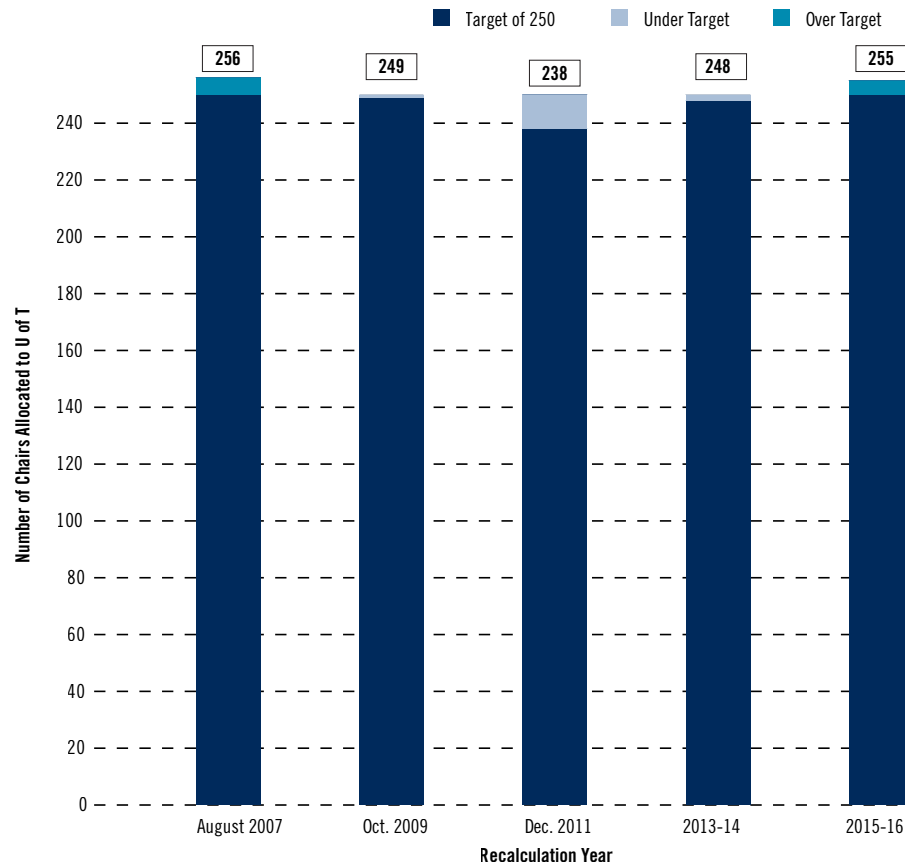


Figure 7: Allocations of Canada Research Chairs to U of T following the latest five recalculation exercises.

CHALLENGE 2: STRENGTHEN RESEARCH PARTNERSHIPS

In 2010, we identified strengthening private sector research partnerships as a strategic priority, and set a **target of doubling private sector investment over a ten-year period**. Thanks to the efforts of our academic divisions and research leaders to support industry partnerships and improve application and success rates in tri-agency partnerships programs, U of T is ahead of schedule in achieving that goal (Figure 8). In 2012-13, over \$19M of private sector funding was invested in research at U of T, a 17% increase over the previous year. While we have made great strides, and U of T currently ranks first among Canadian universities (Figure 9), global and national competition for private sector research funding remains fierce.

Entrepreneurship continues to be a strategic priority for the University. In 2011, the University launched the Banting & Best Centre for Innovation and Entrepreneurship, a physical home to collect the diverse range of accelerators, incubators, services and other resources available to U of T entrepreneurs under one roof. In September 2014, U of T received more than \$3M in funding from the Province of Ontario's Campus-Linked Accelerator Program to support these initiatives. As a catalyst for innovation, in 2012, VPRI and our commercialization partner,

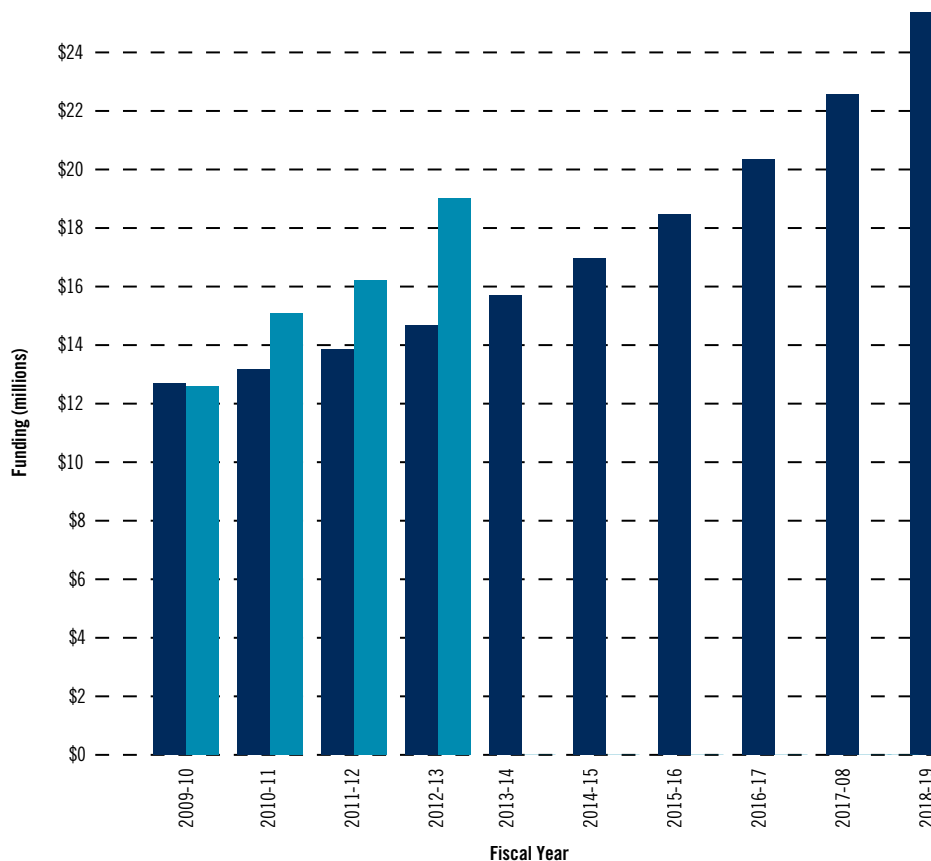


Figure 8: Target (dark blue) and actual (light blue) increases in private sector funding to U of T (excluding partner hospitals) over ten years.

MaRS Innovation, created our own incubator, the U of T Early Stage Technology (UTEST) Accelerator Program as a development program for nascent software companies. Start-ups selected to join the UTEST incubator receive \$30,000 in funding, as well as mentorship, business strategy support and office space in the MaRS Discovery District. Now entering

year four, UTEST's 17 portfolio companies have raised over \$8M in follow-on investment and have generated over 120 jobs. UTEST was recently recognized as one of Canada's top accelerators by both the MaRS Catalyst Group and Betakit, a Canadian start-up news site.

Across the University, a strategic focus on entrepreneurship is showing promising results.

In the most recent reporting, **U of T was first among North American universities in the number of new start-ups created** (Figure 10). One of our companies, DNNresearch, a start-up focused on neural networks and artificial intelligence out of Professor Geoff Hinton's lab in the Department of Computer Science, was acquired by Google Inc. in 2013.

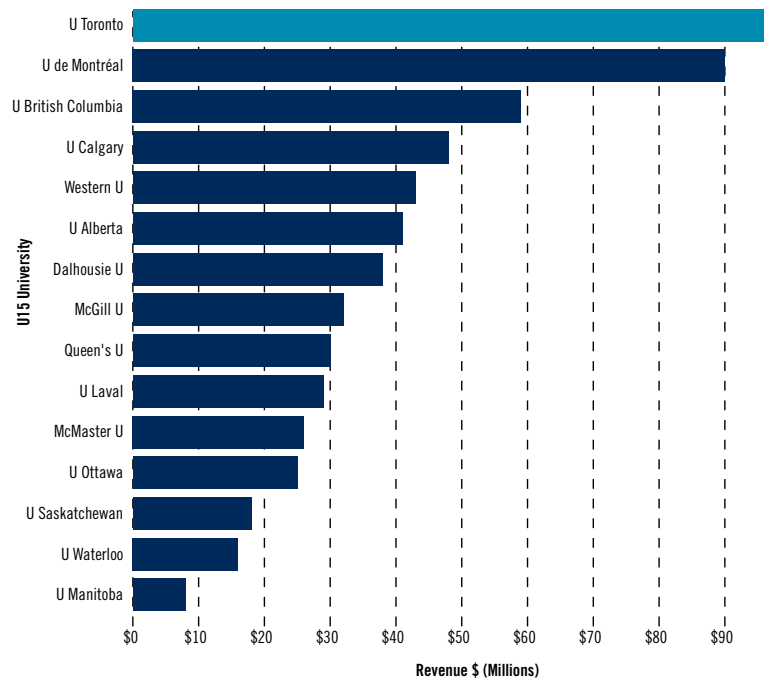


Figure 9: Private sector research revenue by U15 universities (2012-13).

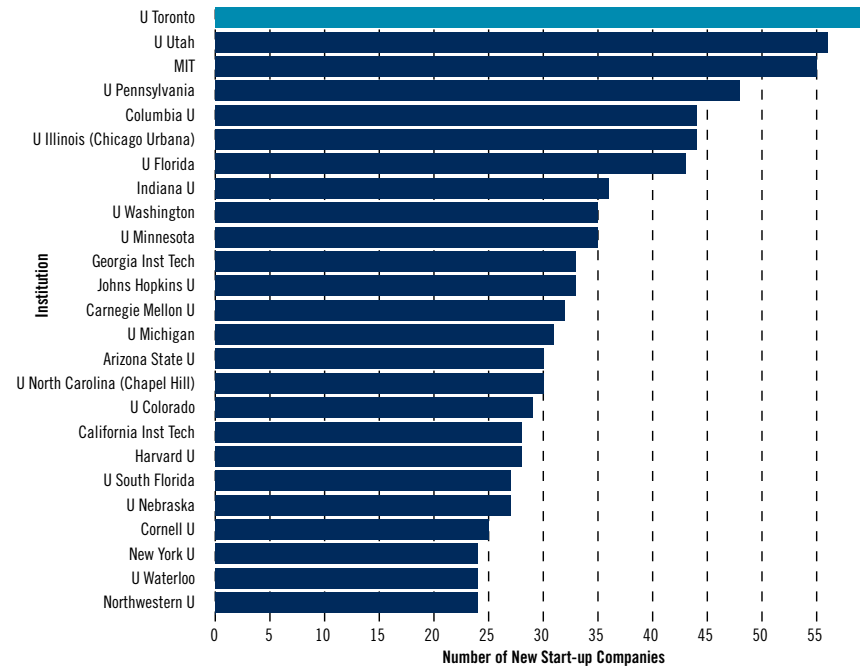


Figure 10: New start-up companies created at US and Canadian universities (2010-11 to 2012-13). Note: Universities reporting as systems are excluded.

CHALLENGE 3: ADDRESS CHANGING REQUIREMENTS IN OVERSIGHT & COMPLIANCE

In 2010, we described how new expectations for transparency and accountability were creating increased demands for research oversight and compliance and generating much heavier workloads for staff involved in managing the University's research ethics, accounting and financial reporting operations.

We responded to those demands by reorganizing our staff into dedicated teams and creating new senior leadership positions to manage the risks associated with the University's research enterprise. In 2014, Lori Ferris, a professor in the Dalla Lana School of Public Health and senior scientist at the Institute for Clinical Evaluative Sciences, joined the VPRI executive team as Associate Vice-President, Research Oversight & Compliance. Prof. Ferris' mandate in this role is to oversee the Research Oversight and Compliance Office, including **working with the academic divisions to manage**

the risks associated with research and to improve processes and tools for research oversight and accountability. We also created a new position, University Regulatory Veterinarian, and Dr. David Hanwell was recruited in 2014 to ensure the highest level of animal care and use standards are being met across the entire University. Furthermore, we have worked closely with the academic divisions to clarify roles and responsibilities in research oversight and developed new technologies to make it easier for both researchers and staff to fulfill their obligations. We also invested in education and outreach on these matters. Demands for oversight and compliance continue to increase, but with the right systems, supports, processes and tools in place, we can ensure that the University is achieving a high level of transparency and accountability in research administration.

Staff Profile



Emi Yano
RESEARCH ADMINISTRATION
TRAINING SPECIALIST

Emi supports research administration skills development and training for U of T staff and faculty, including the development and enhancement of educational and outreach tools to help researchers and administrators better understand their roles and fulfill their research administration obligations.

KEEPING THE FOCUS

The research funding landscape in Canada continues to require strategic focus, vigilance, leveraging of all available resources and creativity for institutions to remain competitive. As our experience with the impact of decreasing tri-agency market share on CRC allocation taught us in the last decade, we can't afford to be complacent. **Keeping the focus is critical to our continued success**, and we are now confident that, as an institution, we are able to identify issues before they become major challenges and respond accordingly. An example of this concept put into practice is the recent improvement in our success in obtaining CFI funding. In 2008-9, recognizing that there was room for improvement in our CFI success rates, VPRI implemented an internal review process to identify the University's most compelling CFI proposals, and provided editorial support to develop the strongest possible applications. The strategy paid off and in the 2012 competitions, U of T and partner hospitals garnered more than 20% of the total funding allocated by CFI to institutions across the country (Figure 11).

Finally, **recovering the full costs of research** continues to be an important budgetary and advocacy issue. Each year, the University's Planning and Budget Department undertakes

a detailed analysis of the institutional costs associated with supporting the University's research enterprise. This analysis has been refined over several years and is now a reliable and well-documented approach to calculating the indirect costs of research and expressing them as a percentage of direct research costs. The most recent analysis indicates that for each direct dollar of research expenditure, 56.7 cents is required to support occupancy, IT, financial and human resource management, libraries, etc.

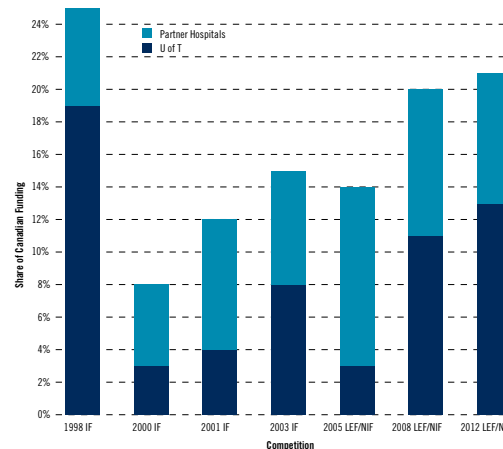


Figure 11: U of T's share of CFI Innovation Fund (IF), Leading Edge Fund (LEF) and New Initiatives Fund (NIF), since inception.

These are real costs, and the consequences of not addressing them are also real. Part of the annual exercise involves mapping U of T's actual indirect costs into the eligible categories under the federal Research Support Fund for reporting purposes under that program. U of T reports annually on this analysis and its outcomes (www.research.utoronto.ca/publications) and is subject to audit. A breakdown of indirect cost expenditures for the most recent year is shown in Figure 12.

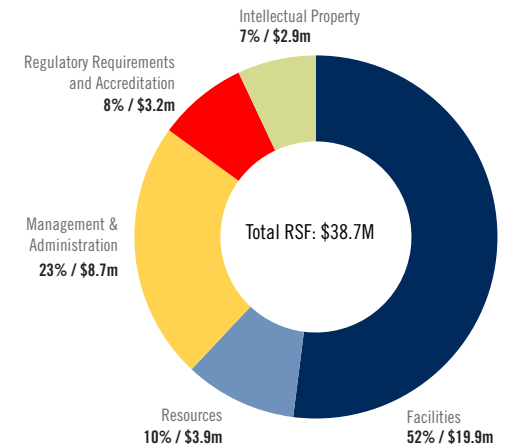


Figure 12: Research Support Fund allocations made by U of T and partner hospitals across the five allowable expenditure categories (2013-14).

LOOKING AHEAD

The University of Toronto is poised to have even greater impact in research and innovation over the next decade. Under President Gertler's leadership, the University will be focused on three primary objectives: leveraging our location in Canada's most innovative urban region; developing new international partnerships and capitalizing on existing ones; and re-inventing undergraduate education so that the next generation has the skills and experiences they will need to get great jobs and drive the economy. We have a significant opportunity in each of these areas to focus our research efforts.

Our commitment over the next few years is to work with the academic divisions to develop strategies to address these objectives. Fundamental to our approach will be the principle that, to improve U of T's standing in the world, we will **need to focus on both quantity and quality when it comes to research outputs**. Now that we are confident that we have improved policies, processes,

resources and tools to support the University's research mission, it's time to further develop strategies for measuring and improving the quality and impact of our research outputs across all disciplines.

We are also committed to searching for new opportunities to enhance and support research and innovation at U of T. In December 2014, the Government of Canada launched the Canada First Research Excellence Fund. This new program will provide up to \$200M per year over seven years to "help Canada's post-secondary institutions excel globally in research areas that create long-term economic advantages for Canada." The inaugural round of applications was due in March 2015, with a second round due in October 2015. A final round is expected in 2021. In round one, VPRI coordinated the development of a strategic and high-impact proposal based on one of our world-leading multidisciplinary research strengths, regenerative medicine. In the spring of 2015, we are soliciting concepts for round

two that again represent areas where **U of T has the opportunity to lead the world as a result of this transformative funding program**.

We owe a great debt of thanks to our researchers, students and post-doctoral fellows, research and technical staff, and research administrative staff across the University for their passion and dedication to the highest standards of research, innovation and training. More than anything else, it is people who make this institution one of the greatest universities in the world.

To enhance our position as one of the leading institutions in the world, and to support and enable research and innovation that make a real difference to global society, U of T will require vision and leadership from our faculty, students and staff, our academic leaders, our research sponsors and the provincial and federal governments. Under the right conditions, together we can achieve even greater things.

NOTES

Tables

Table 1: Each ranking system has its own provenance and methodology, including different metrics and how they are weighted, as described below.

1. Was the Higher Education Evaluation & Accreditation Council of Taiwan (HEEACT) until 2011; based on bibliometric measures including publication and citation counts, average citations per publication, h-index, highly cited publications and articles in high-impact journals.
2. Based on citations normalized by faculty count, reputational surveys, average class size and internationalization.
3. Based on reputational surveys, internationalization measures, average class size and a number of metrics normalized over faculty count: PhDs awarded, publications, citations, overall institutional income and research income from all sources and industry.
4. Conducted by researchers at the Center for World-Class Universities of Shanghai Jiao Tong University; based on faculty and alumni Nobel Prizes and Fields medals, articles in *Science* and *Nature*, and Thomson Reuters Highly Cited Researchers.

Table 2: Data source: National Taiwan University Performance Ranking of Scientific Papers for World Universities, field and subject rankings, 2014. nturanking.lis.ntu.edu.tw

Table 3: Data source: U of T analysis of publication and citation counts from InCites™, Thomson Reuters (2013). Report created October 9, 2014. Data processed March 31, 2014. Primary data source: Web of Science®. Unless otherwise indicated, fields are Web of Science fields. * indicates an Essential Science Indicators field or field grouping. Peers include universities in the U15 and the Association of American Universities (AAU), and the University of California at San Francisco.

Table 4: Actual spending varies year by year depending on demand, quality of submissions and funds availability.

Figures

Figure 1: Data source: VPRI. Based on government fiscal year, April to March. The federal granting agencies also include the Canada Research Chairs program and the Research Support Fund (formerly the Indirect Costs Program).

Figure 2: Data sources: VPRI, based on individual agency websites. Fellows/Members/Foreign Associates include new awards only, not cumulative totals.

Figure 3: Data sources: CIHR expenditures by University and Program Category, 2013-14 report; NSERC Awards Database and SSHRC Awards Search Engine. Based on government fiscal year, April to March. Funding for the Networks of Centres of Excellence nodes, the Canada Research Chairs program, the Research Support Fund, the Canadian Microelectronics Corporation (NSERC funding held at Queen's U) and the Canadian Light Source (NSERC funding held at U Saskatchewan) are excluded. Partner hospitals and affiliates data are counted with each university.

Figure 4: Data source: CFI website, projects funded database updated January 23, 2014. Based on government fiscal year, April to March. National projects excluded. Partner hospitals and affiliates data are counted with each university.

Figure 5: Data sources: Scopus® and SciVal® accessed March 12, 2015. Based on calendar year.

Figure 7: Data source: Canada Research Chairs program. U of T includes partner hospitals. Based on government fiscal year, April to March.

Figure 8: Data source: VPRI. Based on U of T fiscal year, May to April.

Figure 9: Data source: Financial Information of Universities and Colleges 2012-13, Canadian Association of University Business Officers (CAUBO). Fiscal year varies by university. U of T's is May to April. Partner hospitals and affiliates data are

counted with each university. Toronto data corrected for one-year lag in reporting for partner hospitals. McMaster: only entities consolidated were included.

Figure 10: Data source: Association of University Technology Managers (AUTM). Fiscal year varies by university. U of T's fiscal year is May to April. Where available, Canadian universities includes partner hospitals. Johns Hopkins U includes Johns Hopkins U AP Lab. Universities reporting as systems are excluded.

Figure 11: Data source: CFI website. Based on government fiscal year, April to March.

Figure 12: Data source: VPRI. Full report at www.research.utoronto.ca/wp-content/uploads/documents/2014/07/Final_FIDC_OnlineSummary_20140702.pdf

Endnotes

1. Data source: U of T analysis of publication and citation counts from InCites™, Thomson Reuters (2013). Report created October 9, 2014. Data processed March 31, 2014. Primary data source: Web of Science®. Includes partner hospitals.
2. <http://highlycited.com>
3. The term “tri-agency” used throughout this report refers collectively to Canada's three primary federal granting agencies, the Natural Sciences and Engineering Research Council (NSERC), the Social Sciences and Humanities Research Council (SSHRC) and the Canadian Institutes of Health Research (CIHR).
4. U15 is Canada's group of research-intensive universities. www.u15.ca

Images

Caz Zvyatkauskas (Cover), Nadia Molinari (p.4) Elissa Strome (p.13-16, 18, 23), Henry Feather (p.17), Sara Collaton (p.17), Johnny Guatto (p.19). Icons (p.12) from the Noun Project by Martha Ormiston, Arthur Shlain and Miroslav Koša.



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