



OFFICE OF  
THE **VICE-PRESIDENT, RESEARCH**  
AND **ASSOCIATE PROVOST**

ANNUAL REPORT  
**2005-2006**



UNIVERSITY *of* TORONTO



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The mandate of the **Office of the Vice-President, Research and Associate Provost** is to create a research environment that is supportive of the highest quality research stature by maximizing opportunities for funding, recruiting the highest calibre faculty, staff and trainees, and providing an infrastructure and environment conducive to outstanding individual and interdisciplinary investigation and to opportunities for broad application.

## VICE-PRESIDENT'S MESSAGE

Dear Colleagues,

It gives me great pleasure to present the 2005-2006 Research Report for the University of Toronto. This has been an outstanding year in which we have made significant impact and progress. We have seen the University's research enterprise strengthened and opportunities to enhance the academic life of the university expand.

Over the past year, U of T has continued its leadership role as Canada's top research-intensive university. U of T led all other Canadian universities in overall tri-council support, in support from the individual councils - the Canadian Institutes of Health Research (CIHR), the Social Sciences and Humanities Research Council (SSHRC) and the Natural Sciences and Engineering Research Council (NSERC) - and from the Canada Foundation for Innovation (CFI) and in our numbers of Canada Research Chairs. We are thankful to the federal government, the Province of Ontario, and the various funding organizations for this generous level of support. It has allowed us to carry out world-leading research that puts us among an elite group of public universities in North America.

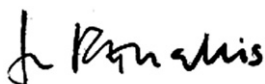
At the same time, the University has fortified that important relationship between world-leading research and undergraduate teaching. As you will read, we have documented some of the ways in which this has been carried out over the past year, including the development of a roadmap for undergraduate students. This roadmap will provide students with a continuous opportunity for research experiences beginning at the end of high school, when they accept admission to the University of Toronto, through regular course work and summer experiences until the point of graduation.

### Some other highlights of the past year include:

- The establishment of Innovations at U of T, which brings together researchers and businesses to capitalize on the ideas developed at U of T and our affiliated hospitals, where more than \$2 million worth of research is conducted daily. Under the direction of Dr. Tim McTiernan, executive director of IUT and assistant vice-president in the Office of the Vice-President, Research and Associate Provost, IUT holds great promise in bringing research to life.
- The restructuring of our awards programs from the Connaught Fund that will help create dedicated time for research or pursuing a research-based sabbatical for our humanities-based researchers.
- Strengthening our close relationships with our partner institutions, particularly the 10 affiliated teaching hospitals.
- Re-organizing the Office of the Vice-President, Research & Associate Provost to both increase interaction, and better fulfill our mandate of enhancing the resources available for research, developing individual researchers and research teams, and maximizing the output and recognition of the research enterprise at the University of Toronto.

This has truly been a remarkable year. Our achievements in research and our focus on students and partnerships give us a great place from which to continue to build the research enterprise at the University of Toronto.

Sincerely,



John R.G. Challis

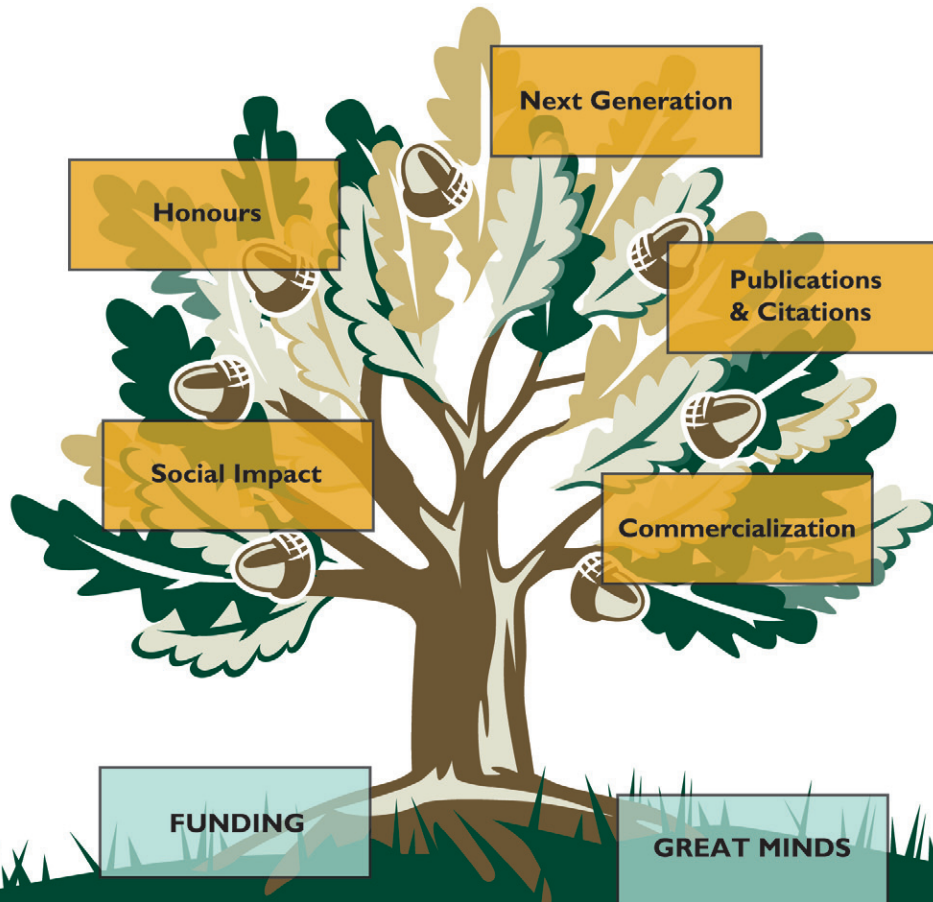
# RESEARCH PERFORMANCE AT THE UNIVERSITY OF TORONTO

## Preamble

Research performance can be measured by a variety of indicators. Traditionally, we have used input measures, focusing on how much research funding the University of Toronto receives. Increasingly, we want to focus on output measures such as the honours conferred on our faculty members, the publications resulting from their research, the citations that follow when the research is influential, the commercial applications of the research, the development of highly qualified personnel, and the social impact of research.

We are adding a new group of input measures for the great minds without which none of this research would be possible. We are focusing on how the University attracts and retains outstanding faculty through salary support and designation programs, such as the Canada Research Chairs and Endowed Chairs.

We have chosen to illustrate these dynamics with the oak tree on the University of Toronto crest, showing the inputs at the roots, and the outputs on the branches.

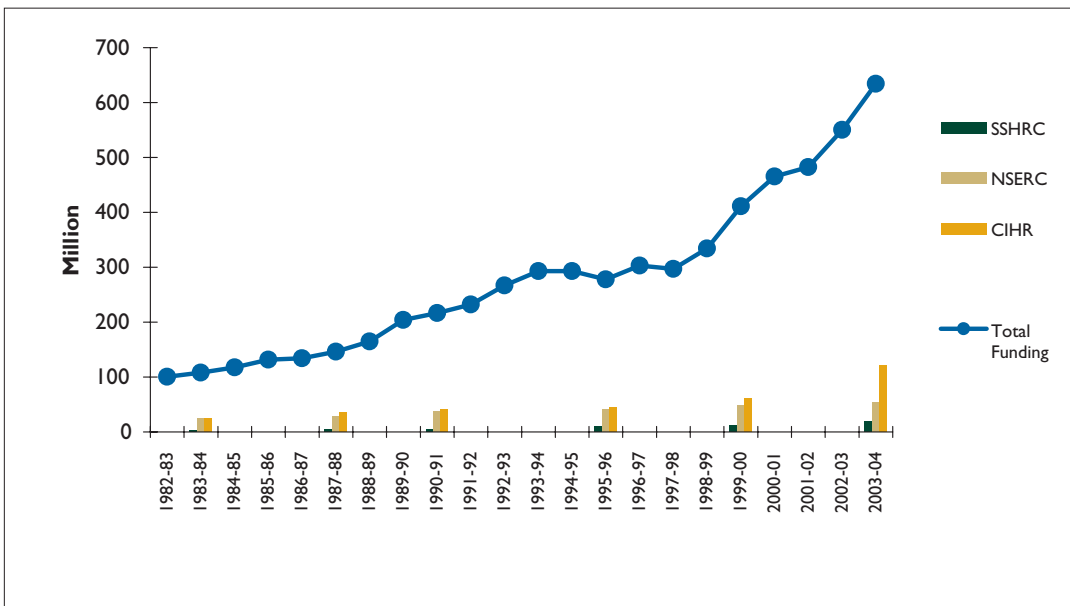


## RESEARCH FUNDING

### Trend

Research funding at the University of Toronto is currently in a phase of accelerated growth compared to the past couple of decades (see Figure 1). This acceleration is due particularly to research infrastructure programs introduced by both the federal and provincial governments at the end of the last millennium. Meanwhile, the contribution to research funding made by the federal granting councils has dropped from as high as 50 per cent of the total in the 1980s, to 31 per cent in 2004-05, despite large increases to the budget of the Canadian Institutes of Health Research during the early years of its transformation from the Medical Research Council of Canada.

**FIGURE 1**  
**Research Funds Awarded\* 1982-83 to 2004-05**  
**University of Toronto and Affiliated Hospitals**



\* Research funds awarded are exclusive of funding from the Research Performance Fund and the federal Indirect Costs program, but include other overhead amounts.

SSHRC, NSERC and CIHR (formerly MRC) funding exclude Networks of Centres of Excellence and Canada Research Chairs.

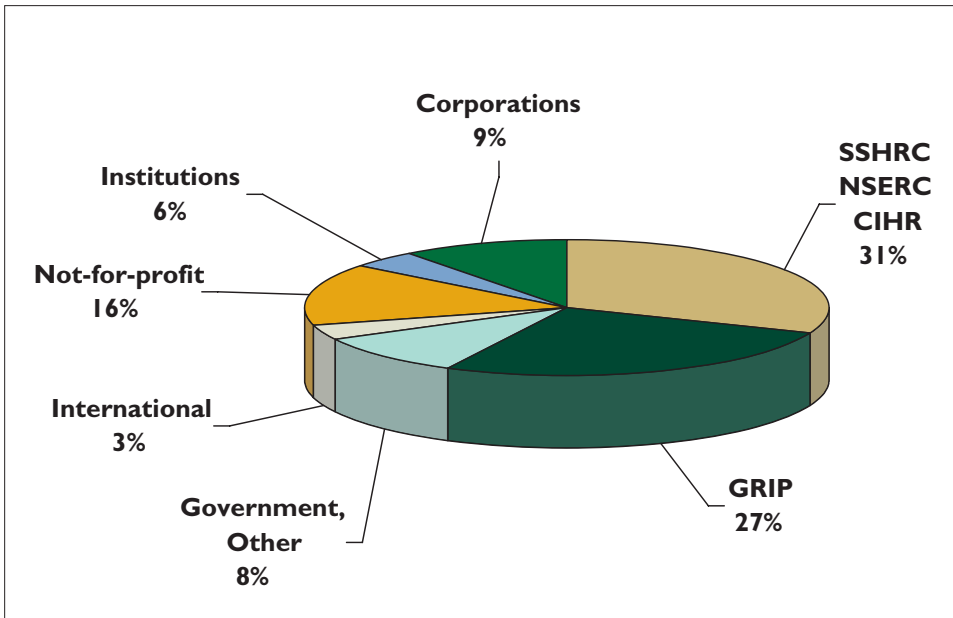
Sources: Councils' annual reports, and Office of the Vice-President, Research and Associate Provost.

## RESEARCH FUNDING

### Breakdown

Funds awarded to the University of Toronto and affiliated hospitals for the direct costs of research in 2004-05 totalled \$699 million, of which \$367 million was awarded through the affiliated hospitals and \$332 million through U of T.

**FIGURE 2**  
**Research Funds Awarded by Sector**  
**University of Toronto, including Affiliates, 2004-05**  
**Total: \$699M for Direct Costs\***



\*GRIP\* includes the Canada Research Chairs program, the Canada Foundation for Innovation, the Ontario Research Fund and the Ontario Genomics Institute.

\*Government, Other\* includes the Networks of Centres of Excellence, the Provincial Centres of Excellence, Health Canada, Public Works & Government Services Canada, and several other agencies.

\*International\* includes the National Institutes of Health.

\*Not-for-profit\* includes foundations, societies and associations.

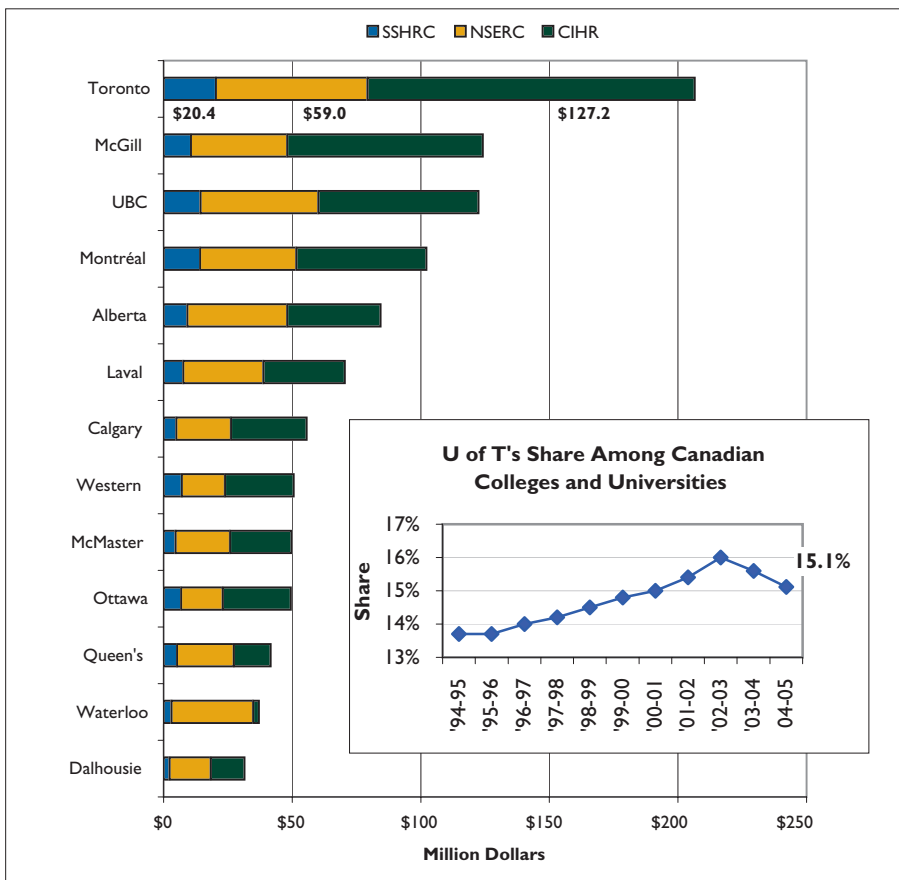
\* Research funds awarded are exclusive of overhead amounts for the U of T campuses but include these amounts for the affiliated hospitals (overhead data currently unavailable).

## RESEARCH FUNDING

### Federal Research Councils for G13 Universities

The University of Toronto continued to perform well in the major competitions of the three federal granting councils. The University maintained its number one ranking in overall funding from all three councils and from each individual council for the 12th consecutive year. U of T's share of funding relative to all Canadian colleges and universities stood at 15.1 per cent in 2004-05.

**FIGURE 3**  
Federal Research Councils Payments  
Canadian G13 Universities, 2004-2005



Figures include funding from affiliated and federated institutions. Figures exclude funding for the Networks of Centres of Excellence, the Canada Research Chairs program, and the Indirect Costs program.

Source: Councils' annual reports.

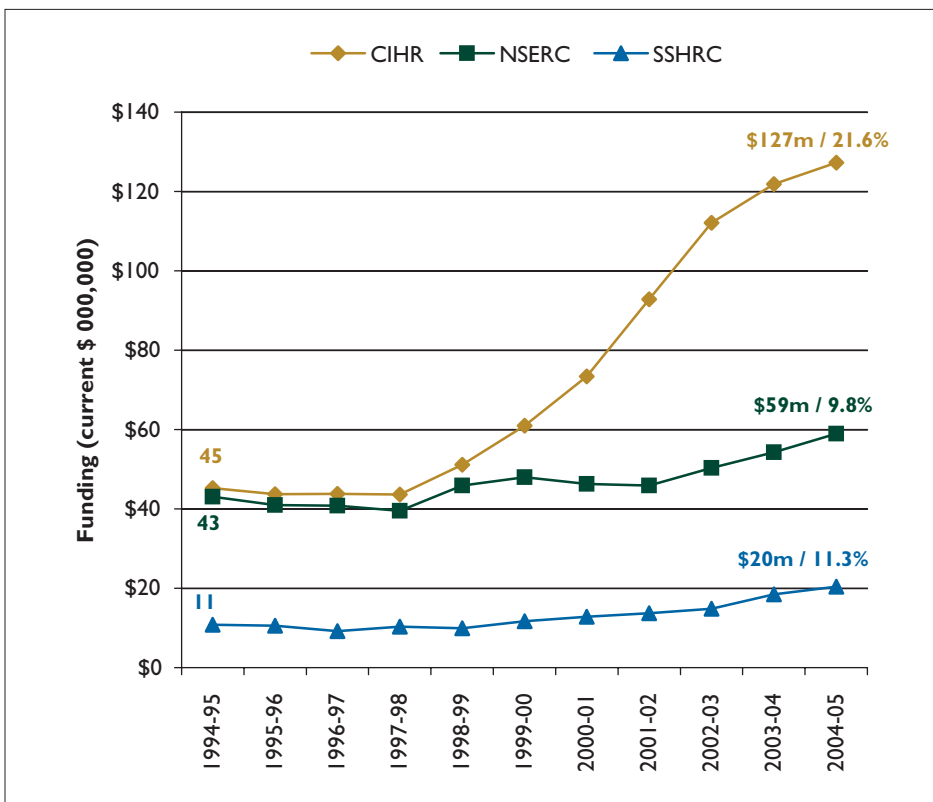


## RESEARCH FUNDING

### Federal Research Councils Payments

As illustrated in Figure 4, the total direct costs of research accruing to the University of Toronto from the federal granting councils have generally increased from year to year. Since 2000, these increases have been truly phenomenal for CIHR while remaining more moderate for the other two councils. Among all research sponsors, tri-council funding is, without a doubt, the gold standard in excellence and credibility. Tri-council funding earned by the University's researchers directly influences our allocations of indirect costs and numbers of Canada Research Chairs.

**FIGURE 4**  
**Federal Research Councils Payments**  
**University of Toronto and Affiliates, 1994-95 to 2004-05**



Percentages represent shares of Canadian colleges and universities  
 Funding for the Networks of Centres of Excellence, the Canada Research Chairs program, and the Indirect Costs program are excluded.  
 Sources: Councils' annual reports

## RESEARCH FUNDING

### Federal Research Councils - U of T Demographics

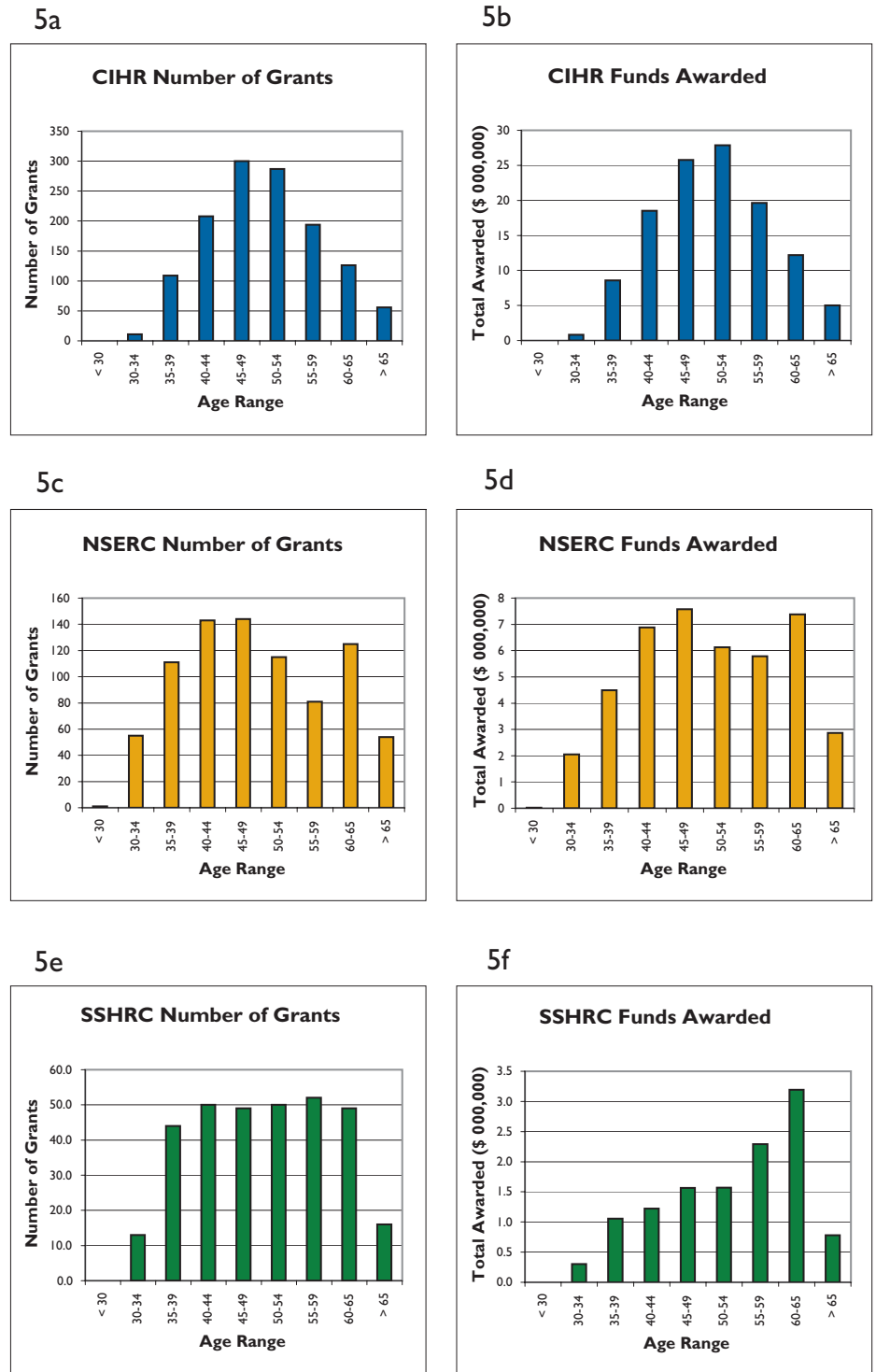
The distributions of *number of grants* and of *funds awarded* as a function of faculty age produce very different patterns from one federal research council to the other.

For CIHR (Figures 5a and 5b), the distributions are both essentially bell-shaped, with faculty in the 45-49 and 50-54 age ranges receiving the largest numbers of grants and the highest amounts awarded.

For NSERC (Figures 5c and 5d), there is a sudden drop in grant numbers and amounts awarded in the 50-54 and 55-59 age ranges; this has been traced to lower numbers of faculty members in these demographic segments.

For SSHRC (Figure 5e and 5f), the grant number pattern is very different from the amounts awarded pattern. The number of grants is almost evenly distributed across six of eight age groups. By contrast, the funds awarded remain moderate between the 30-34 and 50-54 age ranges, and then increase quite dramatically in the next two age ranges. Additional data on number of faculty by age tell us that there are more faculty members in the higher age ranges. Taken together, this means that there is a large difference in the value of average SSHRC grants depending on age, and presumably experience, of the researcher. Note that grants from the SSHRC Institutional Grant (SIG) program were excluded from this analysis.

**FIGURE 5**  
Distributions of Number of Grants and Funds  
Awarded by Faculty Age Range  
University of Toronto and Affiliates, 2004-05



## RESEARCH FUNDING

### Government Research Infrastructure Programs (GRIP)

The government research infrastructure programs are currently responsible for over one quarter of annual research revenues at the University of Toronto. Their introduction by the federal and provincial governments starting in 1998 is still the most significant factor in the accelerated growth in university research funding. U of T continues to lead all other universities in cumulative award totals from each of the sponsors where national statistics are available: Canada Research Chairs (CRC), Canada Foundation for Innovation (CFI), and the Ontario Research Fund (ORF). No national statis-

tics by institution are available for Genome Canada (GC) or the Ontario Genomics Institute (OGI).

The past year continued to be a time of transition, especially at the provincial level, where the ORF created successor programs to those of the Ontario Research and Development Challenge Fund, Ontario Innovation Trust and Premier's Research Excellence Awards. CFI also made changes to its suite of programs. In a number of cases, these changes delayed competitions and adjudications, resulting in fewer dollars awarded in 2005-06.

**TABLE I**  
**GRIP Summary Table**

CFI, CRC, GC/OGI, and ORF awards (in millions)

	May 2005 – April 2006	Cumulative
CRC	\$43.70M <sup>1</sup>	\$253.20M
CFI	\$9.85M <sup>2</sup>	\$340.87M
GC/OGI	\$6.10M <sup>3</sup>	\$78.07M
ORF	\$3.23M <sup>4</sup>	\$358.44M <sup>5</sup>
<b>TOTAL Funding</b>	<b>\$62.88M</b>	<b>\$1,030.58M</b>

<sup>1</sup> Awards from April, September; December 2005 submission dates. Assumes \$200K/year for seven years for Tier I and \$100K/year for five years for Tier II awards. Includes renewal awards for these submission dates. To date 253 awards have been granted (out of the allocation of 267, based on University of Toronto granting council performance).

<sup>2</sup> Includes New Opportunities awards (\$4.90 M) from June, October 2005, February 2006 submission dates and infrastructure awards to CRC holders (\$4.79M) from April, September and December 2005 submission dates, and Infrastructure Operating Funds (\$.157M). Cumulative figure includes awards to U of T & affiliated institutions.

<sup>3</sup> GC/OGI figures includes awards directly to U of T as well as subgrants to U of T for projects administered elsewhere.

<sup>4</sup> Includes matching awards for CFI New Opportunities (\$1.637M) from June 2005, and April and some September 2005 submissions for Ontario Distinguished Researcher Awards (\$1.59M).

<sup>5</sup> ORF Cumulative figure includes previous awards through the ORDCE, OIT, PREA and ERA programs.

## RESEARCH FUNDING

### Indirect Costs of Research

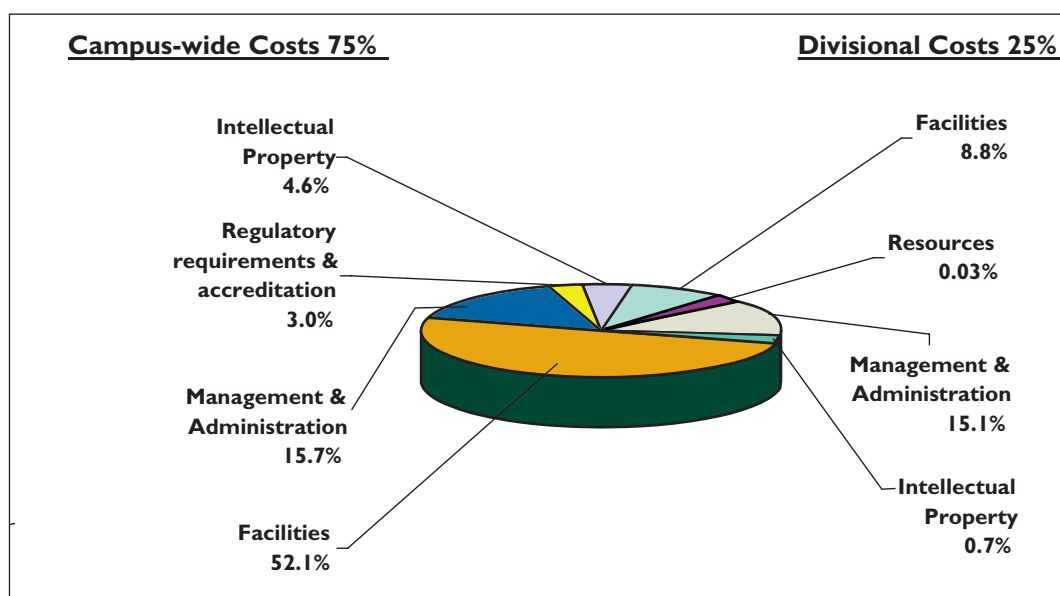
The *direct costs* of conducting research can be related directly to each project's expenditures. These include salaries of research personnel, student stipends, equipment and supplies. Other costs, such as utilities, services provided by departments and central offices, administrative systems, libraries, space maintenance or renovation, and regulatory requirements cannot easily be accounted for on a project-by-project basis. They are known as *overhead* or *indirect costs*.

The federal government recognized the need to fund these costs first through a one-time only Indirect Costs program in 2001-02 and then through the introduction of a permanent Indirect Costs program in 2003-04. This program covers selected funding programs from the tri-councils (CIHR, NSERC, and SSHRC) and the networks of centres of excellence (NCEs). The rate is the result of a sliding scale constrained by the total funding allocated in each federal budget and benefiting smaller institutions. The formula is applied to an average of funding dating between four and two years from the current year. As a result, the

University of Toronto received a rate of 20.9 per cent when calculated according to the distribution formula, but only 14.5 per cent when compared to all tri-council and NCE direct funding for 2004-05.

In actual dollars, the University of Toronto received \$32.2 million in 2005-06 from the federal Indirect Costs program. Of this, \$14.6 million was distributed to the affiliated hospitals, with no university surcharge. Twenty-five per cent of the remainder, or \$4.3 million, was distributed to the faculties, and the rest, representing \$13.2 million, was applied to support campus-wide services and facilities such as research labs and offices. Figure 6 illustrates the distribution of indirect costs monies at U of T. The largest proportion, by far, was for the cost of facilities, including utilities, and renovation and upgrade of research space. Regulatory requirements include the work done for animal care and human ethics protocol review. In 2005-06, the University reviewed 492 animal care protocols and over 3,000 human ethics protocols, an increase of 24 per cent over 2004-2005 in the case of the latter:

**FIGURE 6**  
**Use of Federal Indirect Costs 2005-06**  
**University of Toronto, excluding Affiliates**  
**Total \$17.5M**



Note: use of funding from the Indirect Costs program is restricted to costs considered new in relation to the start of the program and sustained thereafter.

## GREAT MINDS

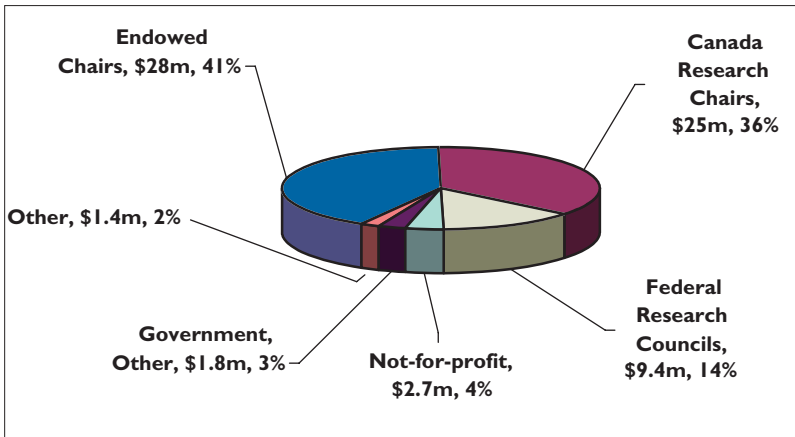
### Personnel Awards and Designations

In 2004-05, over \$69 million from sources other than the provincial operating grant contributed to funding nearly 800 faculty positions at the University of Toronto and affiliated hospitals. This is made up of 476 personnel awards earned through peer-reviewed competitions and 286 endowed chairs. All endowed chairs were created as a result of fundraising and reflect the generosity of individual and corporate donors, with 180 created by the University and 106 created jointly with the affiliated hospitals.

This funding was attracted on the basis of research and scholarly excellence, and allowed the University and affiliated hos-

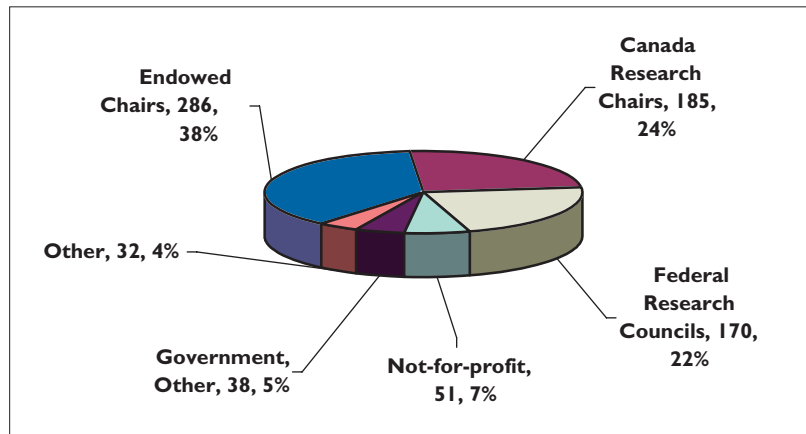
pitals to recruit and retain the very best minds from around the world during a period of severe erosion of provincial higher education budgets. These faculty members not only contributed to the University's stellar international research and scholarly reputation, but also to teaching and research training of undergraduate and graduate students. Most of the personnel awards and designations shown in Figure 7 have relatively stable numbers from year to year, except for the Canada Research Chairs, where the numbers will progressively increase to 267 by 2007-08, and the CIHR investigator awards where competitions in all but the new investigators category have been suspended.

**FIGURE 7**  
**Personnel Awards and Designations by Source**  
**University of Toronto and Affiliates 2004-05**



**FIGURE 7a**  
**Annual Value**  
**Total \$69M**

**FIGURE 7b**  
**Annual Count**  
**Total 762**



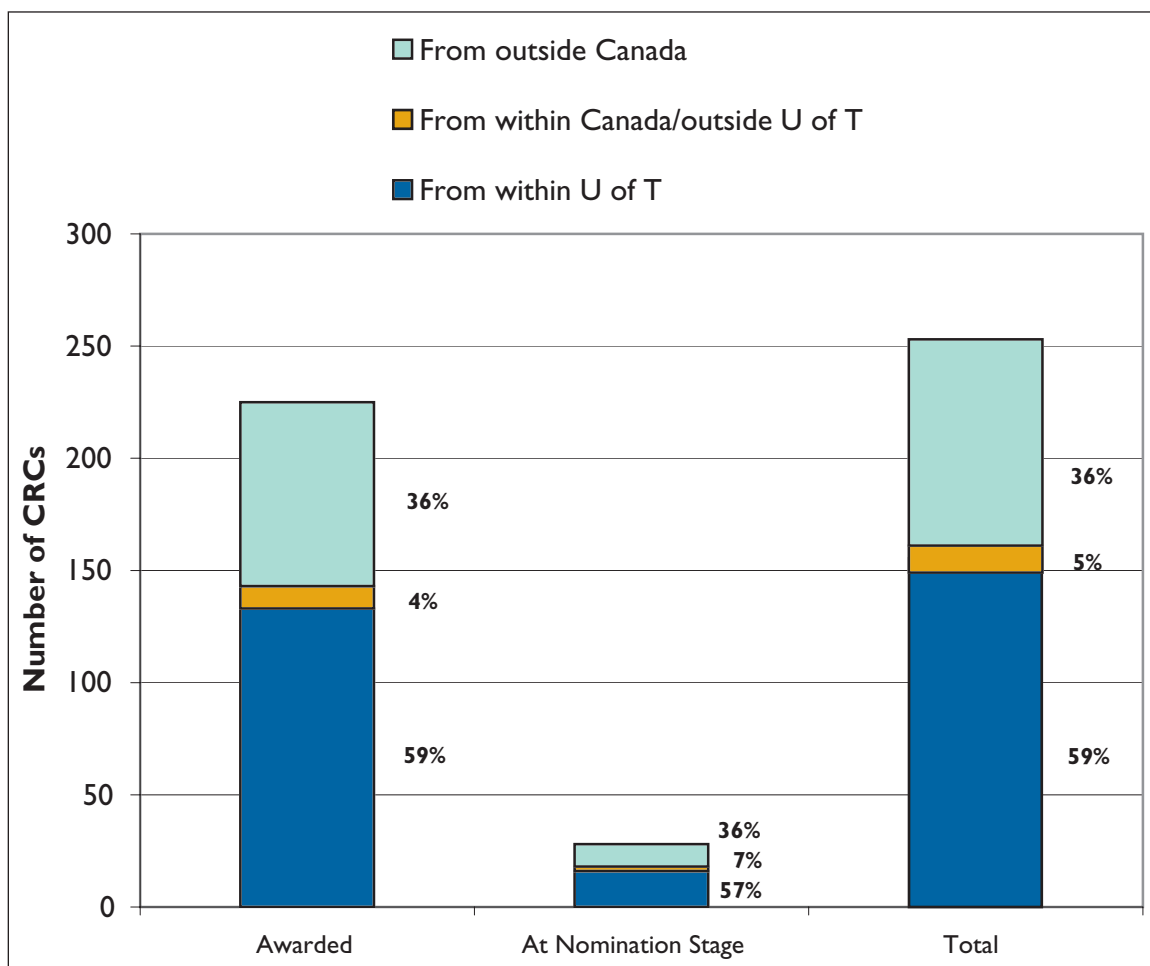
Notes: Among personnel awards from the federal research councils, 88% were from CIHR, 12% from NSERC, and none from SSHRC. The category "other" includes corporations, institutions and international organizations other than the U.S. government.

## GREAT MINDS

### Canada Research Chairs - Origin

The University of Toronto's current allocation of Canada Research Chairs stands at 267, the largest by far in Canada. To date, this has allowed the University to retain 149 great minds, representing 59 per cent of awards or nominations, and to recruit 104 new faculty members — with the majority, 92, coming from outside Canada and 12 coming from within Canada (see Figure 8). In addition to conducting leading-edge research and training graduate students, U of T's Canada Research Chairs are all expected to teach undergraduate students.

**FIGURE 8:**  
Distribution of Canada Research Chairs by Origin  
University of Toronto and Affiliates, June 2006  
Total 253 Chairs



Source: Office of the Vice-President, Research and Associate Provost; excludes vacated Chairs

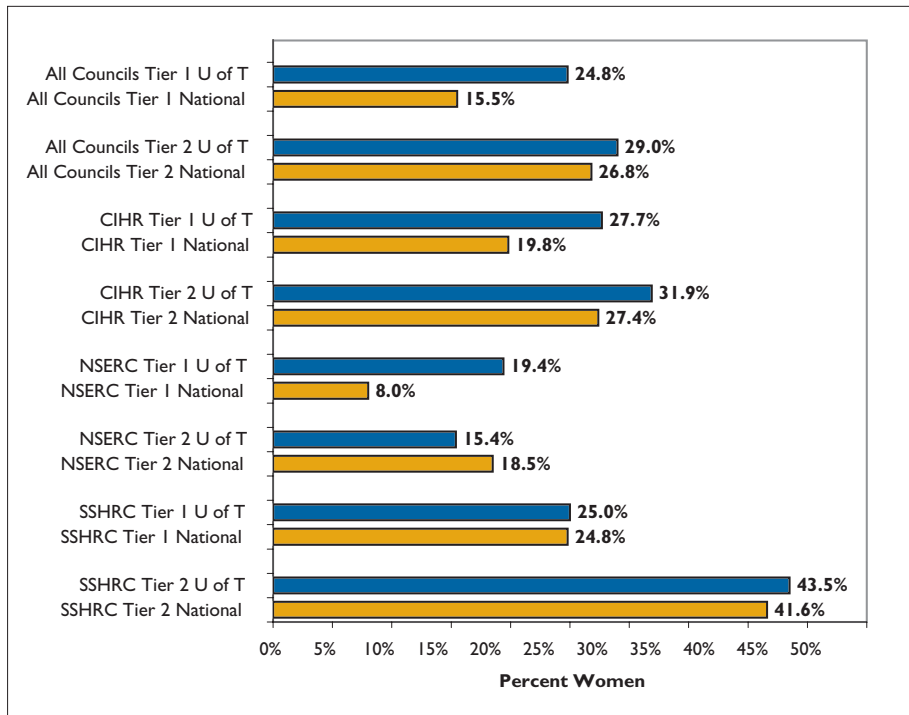
## GREAT MINDS

### Canada Research Chairs - Gender

The Canada Research Chairs program is, without a doubt, the most visible research personnel awards program in Canada and is attracting a considerable amount of international attention. Certainly, the advent of this visionary program has contributed to leveling the field for Canadian universities in recruiting the best minds. The University of Toronto, at 27 per cent, is well ahead of the current national average of 22 per cent women among

chairholders. Comparative breakdowns are illustrated in Figure 9. It shows that U of T's proportion of women appointed as CRCs exceed national proportions in all but one category. In addition, as indicated previously (see Figure 7 on page 12), the CRC program is only one of several that provide salary support to outstanding faculty, and among CIHR awardees of federal research councils' personnel awards, for example, 37 per cent are women.

**FIGURE 9**  
**Comparison of Percentage of Women Among Canada Research Chairs**  
**University of Toronto and Affiliates vs National, 2006**



Sources: Canada Research Chair Secretariat, updated July 2006 (excludes nominations pending decisions); Office of the Vice-President, Research and Associate Provost, updated June 2006 (includes nominations pending decisions).

## GREAT MINDS

### Canada Research Chairs - Clusters

In order to be eligible for Canada Research Chairs, each institution must submit a strategic research plan (SRP). The University of Toronto's SRP classifies its high research priorities into four areas, 24 themes, and 45 clusters. The list below illustrates how these are organized, how many CRCs are currently planned for each, and how many are occupied.

In addition to helping the University plan ahead for the deployment of its Canada Research Chairs allocation, the

cluster list is very useful in identifying notable research strengths. In particular, within the SSHRC disciplines, literature, culture and discourse, as well as global development, health and prosperity, stand out. Similarly, in the NSERC disciplines, computational technology, and biomaterials, tissue engineering and regeneration, are two examples of exceptional research strength, as are neurobiology, and proteomics, bioinformatics and functional genomics, in the CIHR disciplines.

### Canada Research Chairs by Cluster, University of Toronto and Affiliates

Area		Area	
Theme	Cluster (# filled/#planned)	Theme	Cluster (# filled/#planned)
Social Sciences		Humanities	
Urban Environment		Literature, Arts and Culture	
Urban Society and Culture	(3/3)	Literature, Culture and Discourse	(9/9)
Public Policy		Medieval Studies	
Social Justice, Diversity and Equity	(1/2)	Music in Medieval Society	(1/1)
Education Policy	(5/5)	History and Culture	
Health and Public Policy	(5/5)	Transitions in Ancient Thought	(2/2)
Public Policy/Public Management	(1/1)		
Human Development and Life Cycle	(1/1)	Science and Technology	
Innovation, Immigration and Democracy	(1/1)	Information Technologies	
Global Development		Computational Technology	(9/9)
Global Development, Health and Prosperity	(11/11)	Human-Computer Interaction	(3/3)
		Information Processing Algorithms and Technologies	(6/6)
Health & Life Sciences		Intelligent Infrastructure	(1/1)
Molecular Biology and Applied Genomics		Advanced Materials and Manufacturing	
Proteomics, Bioinformatics, and Functional Genomics	(25/26)	Advanced Materials	(6/7)
Molecular Medicine	(23/23)	Advanced Manufacturing with New Materials	(4/4)
Membrane Biology	(4/4)	Biotechnology	
Comparative and Evolutionary Genomics	(16/16)	Biomaterials, Tissue Engineering and Regeneration	(8/8)
Models and Mechanisms of Disease		Nanoscience and Nanotechnology	
Inflammation, Infection, Trauma, and Repair	(17/17)	Nanoengineering and Photonics	(5/5)
Vascular and Metabolic Biology	(11/12)	Nanoscience and Photonics	(5/5)
Neurosciences		The Planet Earth	
Neurobiology	(32/33)	Dynamic Earth: Physical and Biological Change	(5/5)
Pain	(3/3)	The Structure of the Universe	
Improvement in Health and Function		Astronomy and Astrophysics	(4/4)
Improvement in Function, Participation, and Well-being	(10/10)	Mathematical and Computational Sciences	
Population Health	(7/7)	Mathematical Foundations	(7/7)
Fetal, Neonatal and Maternal Health	(1/1)		
Health Information and Knowledge Transfer			
Health Systems and Knowledge Transfer	(5/6)		
Medical Imaging			
Imaging Technologies in Human Disease and Preclinical Models	(6/6)		
		ALL	(263/269)

Source: Office of the Vice-President, Research and Associate Provost, at November, 2006  
Includes nominations awaiting decisions.



# PUBLICATIONS & CITATIONS

## Counts by Institution

Publications and citations are indexed by a number of organizations including Thomson ISI, whose data were used in the present analysis. Our goal was to rank the University of Toronto against members of two leading research-intensive university groups: the Canadian G13 group and the American Association of Universities<sup>1</sup> (AAU). U of T is a member of both groups, as is McGill.

<sup>1</sup>Note that the University of California, San Francisco, has all its four faculties in the health sciences and is a recognized leader in these fields, but is not a member of AAU.

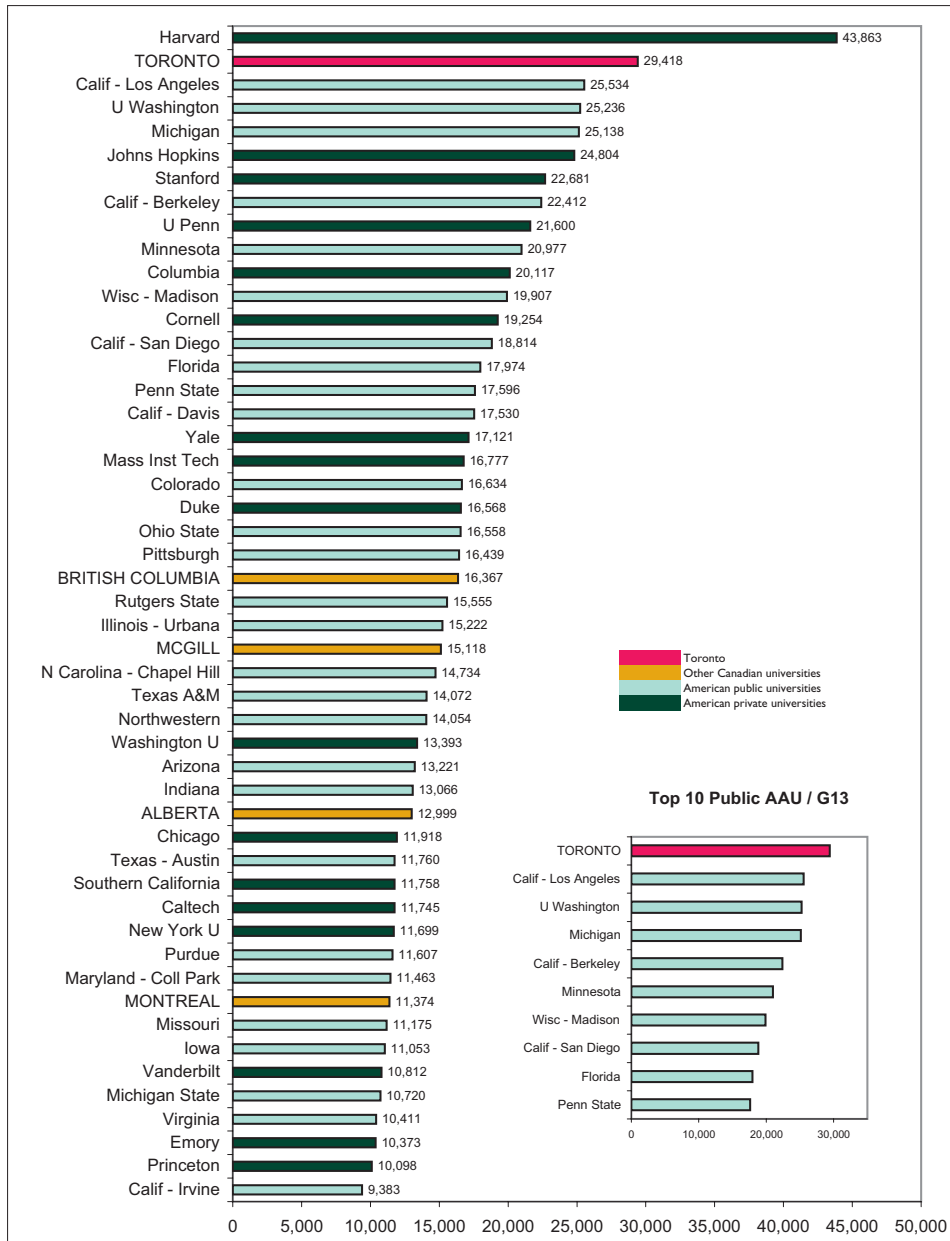


FIGURE 10  
 Number of Publications Indexed by Thomson ISI Top 50 AAU and/or G13 Institutions, 2001-2005 All Fields

The University of Toronto is clearly a leader among North American multi-disciplinary universities even when private universities are included in the comparisons. In all categories, U of T consistently ranked well ahead of all other Canadian G13 universities, as exemplified by figure 11, shown here, and figure 10 on page 16.

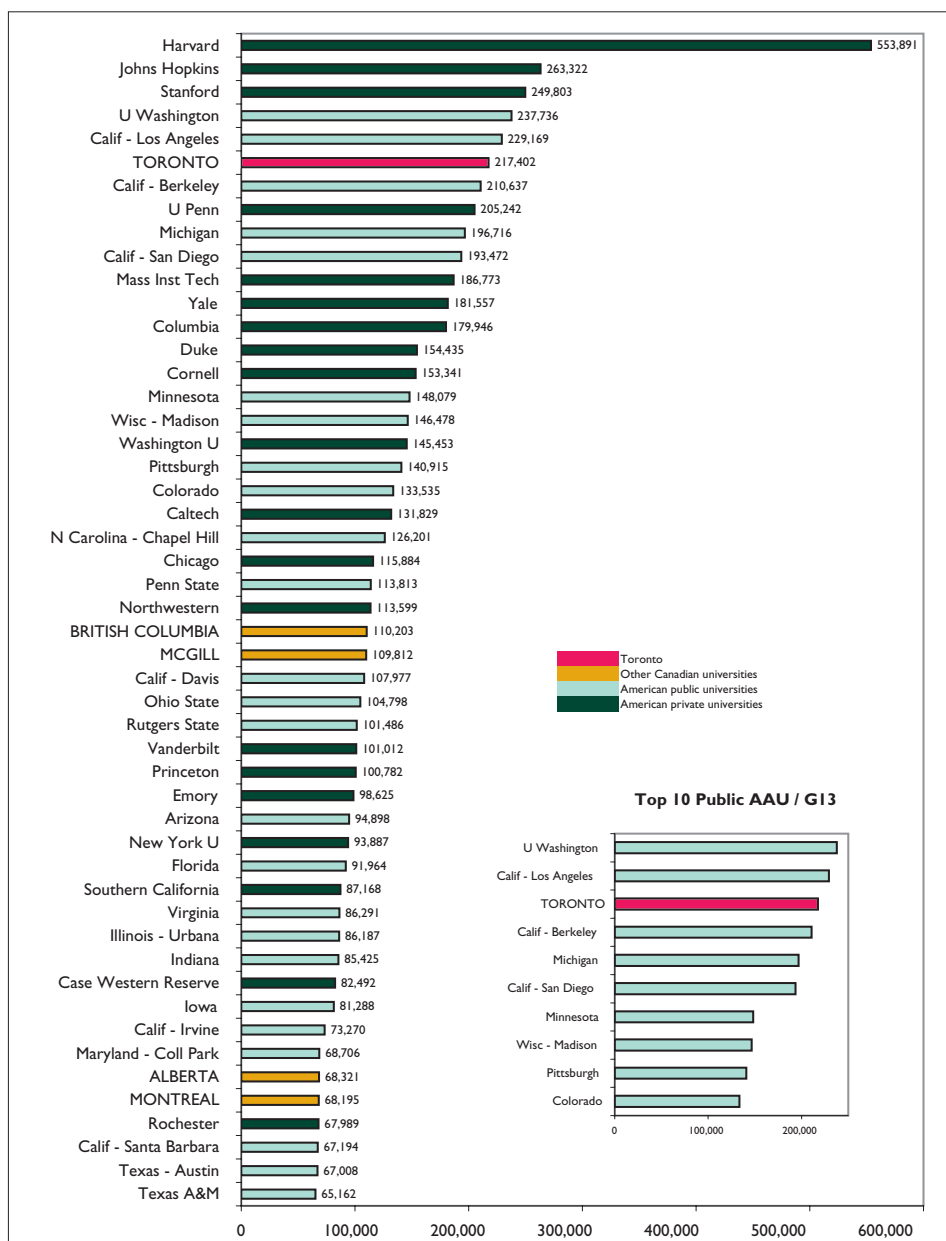


FIGURE 11  
Number of Citations  
Indexed by Thomson ISI  
Top 50 AAU and/or G13  
Institutions, 2001-2005  
All Fields

Sources of primary data: Thomson ISI U.S. and Canadian University Indicators - Deluxe Edition, 2005.

## PUBLICATIONS & CITATIONS

### Rankings for the University of Toronto, including Affiliates

Similar analyses were conducted for an aggregate of all science fields (combining health sciences, other life sciences, computer science & engineering, and other physical sciences) as well as five discrete disciplinary groupings. The results for the latest five-year period, from 2001 to 2005, are summarized in Table 2. The first two columns focus on U of T's rank among 47 public universities as, arguably, private universities are advan-

tagged in several respects relevant to research, including lower ratios of undergraduate students to faculty members. The last two columns show U of T's ranks when the analysis includes all 26 private universities. The inclusion of the private universities barely diminishes the predominance of U of T on these measures. The University's strength is particularly apparent in the health sciences, other life sciences, and social sciences.

**TABLE 2**  
**Summary of Rankings for the University of Toronto, 2001-2005**  
**Among AAU and G13 Universities**

University Type (number)	Public (47)		All (73)	
	Publications	Citations	Publications	Citations
All Fields	1	3	2	6
All Sciences Fields	1	3	2	6
Health Sciences	1	1	2	3
Other Life Sciences	3	1	5	3
Computer Science & Engineering	9	8	11	11
Other Physical Sciences	13	16	17	28
Social Sciences	3	8	6	16

Source of primary data: Thomson ISI U.S. and Canadian University Indicators -- Deluxe Edition and Standard Edition, 2005.

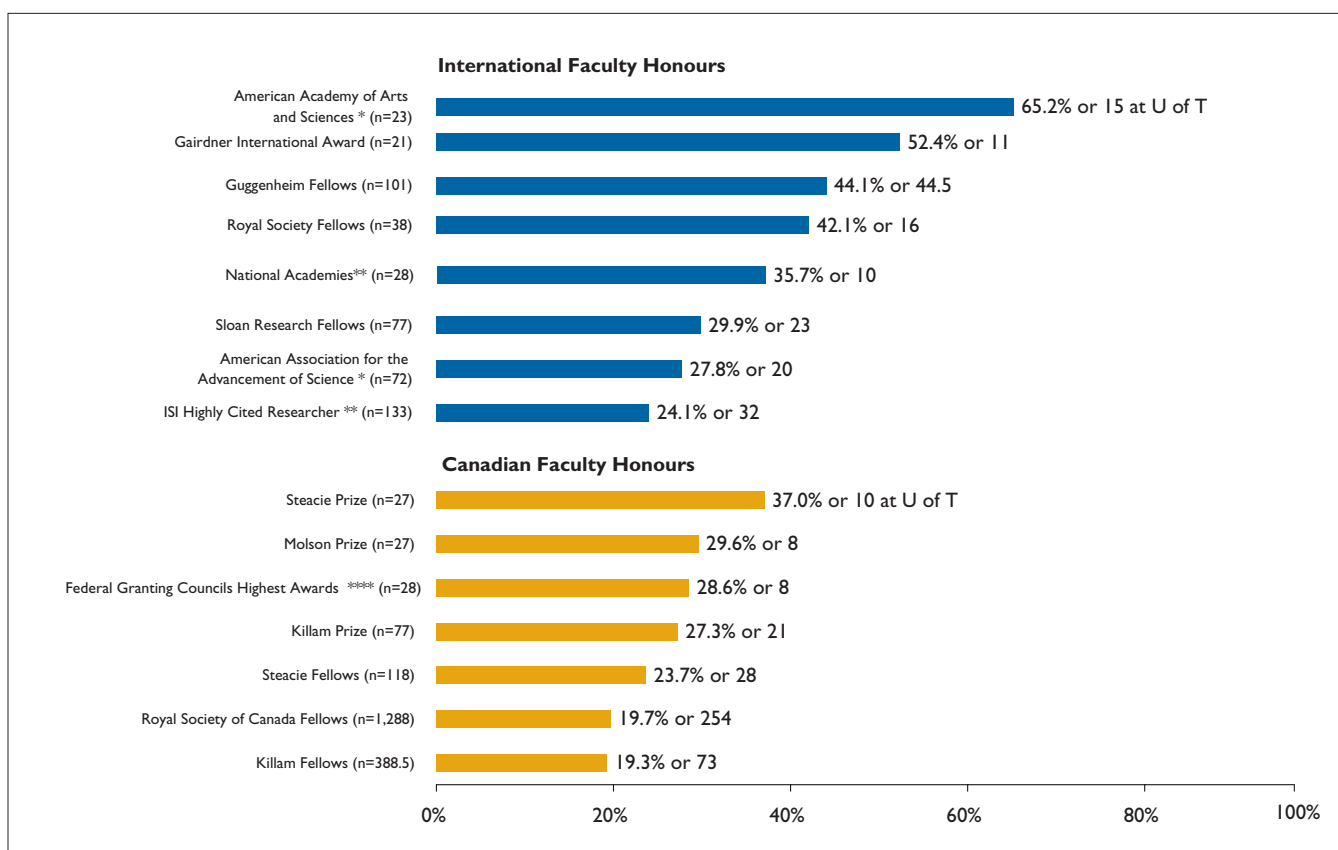
## FACULTY HONOURS

### U of T's Proportion

As illustrated in Figure 12, University of Toronto faculty members continued to receive honours and prizes, fellowships and election to groups recognizing outstanding scholarship and achievement, in proportions far exceeding U of T's proportion of faculty members in Canada (seven per cent excluding clinical faculty and those based in hospital research institutes, who are not reported to Statistics Canada).

The University is particularly encouraged to find that its faculty members are receiving an overwhelming proportion of international honours bestowed on very few researchers in Canada, such as membership in the American Academy of Arts and Sciences and the National Academies of Science, the Gairdner International Award, fellowship in the Royal Society and research fellowships from the Alfred P. Sloan Foundation. Indeed, our proportions of international prizes and awards exceed those from Canadian sources.

**FIGURE 12**  
**Faculty Honours by Award, 1980-2006**  
**University of Toronto and Affiliates Compared to Canadian Universities**



\* Current members only

\*\* The National Academies consist of: Institute of Medicine, National Academy of Engineering, and National Academy of Science

\*\*\* As of 2006

\*\*\*\* Federal Granting Councils Highest Awards: NSERC: Gerhard Hertzberg Canada Gold Medal for Science and Engineering (n=14); CIHR: Michael Smith Prize in Health Research (n=11); SSHRC: Gold Medal for Achievement in Research (n=3)

"n" refers to the number of honours held at all Canadian universities.

Sources: award announcements for each program.

The 2006 Steacie Prize and Royal Society of Canada Fellows not yet available.

For descriptions of each honour, see Awards and Honours section.

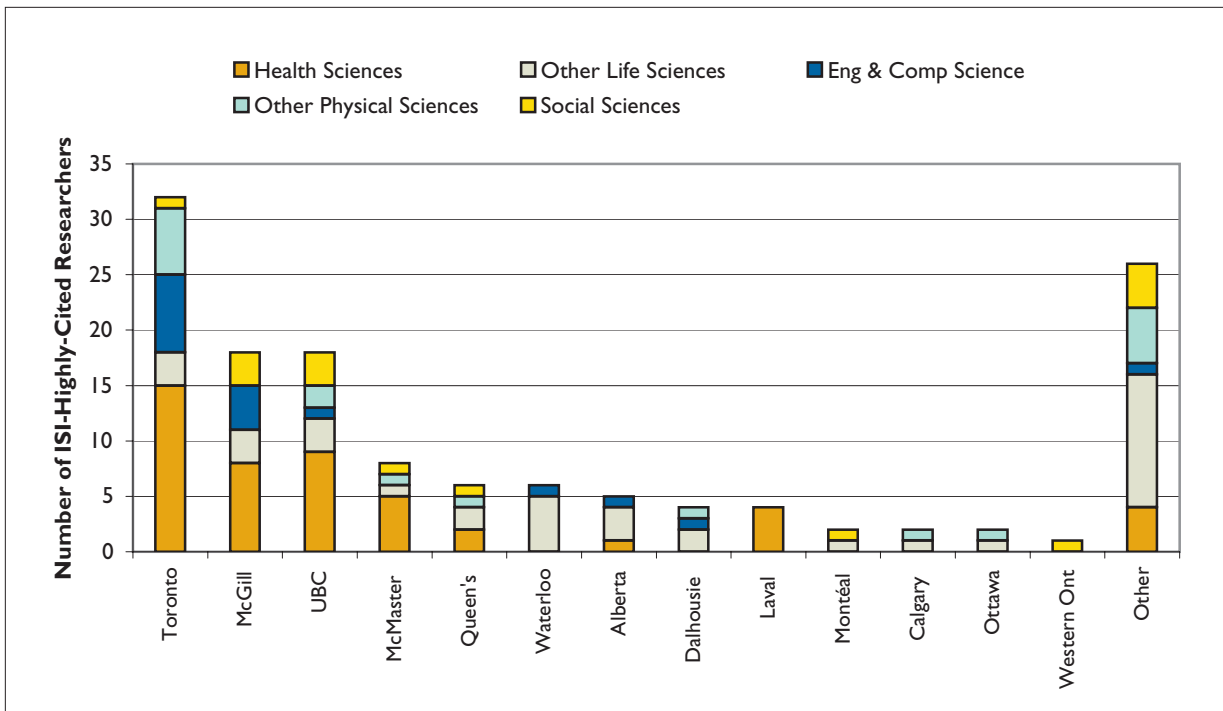
## FACULTY HONOURS

### ISI Highly-Cited Researchers

The Institute for Scientific Information's Highly Cited Researchers list is one of the best international indicators of research excellence. It identifies the 250 most highly cited (quoted in other publications) researchers in each of 21 broad subject areas.

In Canada, the University of Toronto has the highest number of researchers on the ISI Highly-Cited list for all fields, as well as for the health sciences, engineering & computer science, and other physical sciences, as illustrated in Figure 13.

**FIGURE 13**  
ISI Highly-Cited Researchers Distribution Among G13 Canadian Universities



Source: <http://isihighlycited.com/>, May 2006

## FACULTY HONOURS

Selected Honours and Awards in the past five years

### INTERNATIONAL AWARDS AND HONOURS

This list is limited to the international Awards and Honours shown on Figure 12.

#### American Academy of Arts & Science

*Membership in the American Academy - which includes more than 150 Nobel laureates and 50 Pulitzer Prize winners - recognizes outstanding intellectual achievement, leadership and creativity in all fields. The following U of T faculty members are the honorary members of the past few years:*

2005

**Tak Mak**, Medical Biophysics, Faculty of Medicine  
**Richard Borshay Lee**, Anthropology, Faculty of Arts and Science  
**Janice Gross Stein**, Political Science, Faculty of Arts and Science

2004

**Anthony J. Pawson**, Medical Genetics and Microbiology, Faculty of Medicine, Samuel Lunenfeld Research Institute

2003

**James G. Arthur**, Mathematics, Faculty of Arts and Science  
**Richard J. Bond**, Canadian Institute for Theoretical Astrophysics, Faculty of Arts and Science  
**Geoffrey E. Hinton**, Computer Science, Faculty of Arts and Science  
**Linda Hutcheon**, Centre for Comparative Literature, Faculty of Arts and Science  
**Janet Rossant**, Molecular and Medical Genetics, Faculty of Medicine, Samuel Lunenfeld Research Institute

#### American Association for the Advancement of Science (AAAS)

*Fellowship in the AAAS is an honour bestowed upon members by their peers. Fellows are recognized for meritorious efforts to advance science or its application. The following U of T faculty members are the AAAS Fellows in the past 6 years:*

2006

**Keren Rice**, Linguistics, Faculty of Arts and Science  
**Donald Stuss**, Medicine, Faculty of Medicine, Baycrest Centre for Geriatric Care.

2005

**Harold Atwood**, Physiology, Faculty of Medicine  
**D.A.S. Fraser**, Statistics, Faculty of Arts and Science  
**Ping Lee**, Pharmacy, Faculty of Pharmacy  
**Howard D. Lipshitz**, Medical Genetics and Microbiology, Faculty of Medicine  
**Albert E. Litherland**, Physics, Faculty of Arts and Science  
**Barbara Lee Keyfitz**, Mathematics, Faculty of Arts and Science  
**Ronald H. Kluger**, Chemistry, Faculty of Arts and Science  
**John R. Percy**, Astronomy, UTM  
**John W. Sender**, Mechanical and Industrial Engineering, Faculty of Applied Science and Engineering  
**Sara L. Shettleworth**, Psychology, Faculty of Arts and Science  
**Thomas T. Tidwell**, Chemistry, UTSC

2004

**Linda Kohn**, Botany, UTM

2003

**Nancy M. Reid**, Statistics, Faculty of Arts and Science

2000

**Janet Rossant**, Molecular and Medical Genetics, Faculty of Medicine, Samuel Lunenfeld Research Institute

### Gairdner Foundation

*These annual awards recognize the world's top medical research scientists.*

#### 2005 Gairdner International Award

**Dr. Endel Tulving**, Department of Psychology,  
Collaborative Program in Neuroscience, Rotman  
Research Institute of Baycrest Centre

#### John Simon Guggenheim Memorial Foundation Fellowship:

*The U.S.-based John Simon Guggenheim Memorial Foundation provides fellowships across the disciplines for advanced professionals who have demonstrated exceptional accomplishment in their fields. The following U ofT faculty members are the winners of the past six years:*

2006

**Thomas Hurka**, Philosophy, Faculty of Arts and Science

2005

**Alexander R. Jones**, Classics and Institute for the History and Philosophy of Science and Technology, Faculty of Arts and Science

2004

**David Zingg**, Aerospace Studies, Faculty of Applied Science and Engineering

2003

**Lynne Viola**, History, Faculty of Arts and Science

2002

**Peter Abrams**, Zoology, Faculty of Arts and Science  
Alan John Bewell, English, Faculty of Arts and Science

2000

**James G. Arthur**, Mathematics, Faculty of Arts and Science  
Anthony Feinstein, Psychiatry, Faculty of Medicine  
Sajeev John, Physics, Faculty of Arts and Science

### ISI highly cited Researcher (at October 2006)

*This list represents 250 of the most highly cited researchers over the last 20 years in the articles indexed by the Institute for Scientific Information (ISI) in each of 21 broad subject categories in life sciences, medicine, physical sciences, engineering and social sciences. These individuals comprise less than one-half of one per cent of all publishing researchers - truly an extraordinary accomplishment. The following is a list of U ofT researchers as of October 2006 by discipline:*

#### Biology & Biochemistry

**Sergio Grinstein**, Biochemistry, Faculty of Medicine,  
Hospital for Sick Children

**David H. MacLennan**, Banting and Best Department of  
Medical Research, Faculty of Medicine

#### Chemistry

**Lewis Edward Kay**, Medical Genetics and Microbiology,  
Faculty of Medicine

#### Computer Science

**Radford M. Neal**, Statistics and Computer Science, Faculty  
of Arts and Science

**Subbarayan Pasupathy**, Electrical and Computer  
Engineering, Faculty of Applied Science and Engineering

**Charles Rackoff**, Mathematics and Computer Science,  
UTM

**Kenneth C. Sevcik**, Computer Science, Faculty of Arts and  
Science

#### Ecology/Environment

**Peter A. Abrams**, Ecology and Evolutionary Biology,  
Faculty of Arts and Science

#### Engineering

**Bruce Allen Francis**, Electrical and Computer Engineering,  
Faculty of Applied Science and Engineering

#### Geosciences

**W. Richard Peltier**, Physics, Faculty of Arts and Science

**Immunology**

**Pam S. Ohashi**, Immunology, Faculty of Medicine, Ontario Cancer Institute

**Immunology and Molecular Biology & Genetics**

**Tak Mak**, Medical Biophysics, Faculty of Medicine, Ontario Cancer Institute

**Materials Science**

**Geoffrey A. Ozin**, Chemistry, Faculty of Arts and Science

**Mathematics**

**Nancy Reid**, Statistics, Faculty of Arts and Science

**Mathematics & Engineering**

**W. M. Wonham**, Electrical and Computer Engineering, Faculty of Applied Science and Engineering

**Molecular Biology & Genetics**

**Anthony J. Pawson**, Medical Genetics and Microbiology, Faculty of Medicine, Samuel Lunenfeld Research Institute

**Johanna M. Rommens**, Medical Genetics and

Microbiology, Faculty of Medicine, Hospital for Sick Children

**Janet Rossant**, Medical Genetics and Microbiology, Faculty of Medicine, Samuel Lunenfeld Research Institute

**Jeffrey L. Wrana**, Medical Genetics and Microbiology,

Faculty of Medicine, Samuel Lunenfeld Research Institute

**Pharmacology**

**Werner Kalow**, Pharmacology, Faculty of Medicine

**Philip Seeman**, Pharmacology, Faculty of Medicine

**Edward M. Sellers**, Pharmacology, Faculty of Medicine

**Plant & Animal Science**

**Stephen S. Tobe**, Cell and Systems Biology, Faculty of Arts and Science

**Psychology/Psychiatry**

**R. Michael Bagby**, Psychiatry, Faculty of Medicine, Centre for Addiction and Mental Health

**Paul E. Garfinkel**, Psychiatry, Faculty of Medicine, Centre for Addiction and Mental Health

**Janet Polivy**, Psychology, UTM

**Endel Tulving**, Psychology, Faculty of Arts and Science

**Social Sciences**

**Keith E. Stanovich**, Human Development and Applied Psychology, OISE/UT

**Space Sciences**

**J. Richard Bond**, Canadian Institute for Theoretical Astrophysics, Faculty of Arts and Science

**Ray G. Carlberg**, Astronomy and Astrophysics, Faculty of Arts and Science

**Howard K.C. Yee**, Astronomy and Astrophysics, Faculty of Arts and Science

**The National Academies (U.S.)**

*The National Academies consists of the National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council. Membership in the Academies, or for those outside of the U.S. a Foreign Associate is one of the highest honours accorded to a scientist or engineer, recognizes distinguished and continuing achievement in original research. The following U ofT faculty members were elected Foreign Associates:*

**Institute of Medicine - Foreign Associate Members:**

2005

**C. David Naylor**, Medicine, Faculty of Medicine

**National Academy of Engineering - Member:**

2006

**Christina Amon**, Faculty of Applied Science and Engineering

**National Academy of Engineering - Foreign Associate:**

2005

**Walter Murray Wonham**, Electrical and Computer Engineering, Faculty of Applied Science and Engineering

**National Academy of Sciences - Foreign Associates:**

2004

**Robert J. Birgeneau**, Physics, Faculty of Arts and Science

**Lap-Chee Tsui**, Medical Genetics and Microbiology, Faculty of Medicine

**Anthony J. Pawson**, Medical Genetics and Microbiology, Faculty of Medicine, Samuel Lunenfeld Research Institute

2002

**Tak Mak**, Medical Biophysics, Faculty of Medicine, Ontario Cancer Institute

2001

**David H. MacLennan**, Banting and Best Department of Medical Research, Faculty of Medicine



### The Royal Society Fellows

*Internationally recognized as one of the highest honors in science, fellowship in the Royal Society, which admits only six foreign members each year, is offered to scientists who have made a distinguished achievement in their fields. The following U of T faculty members were elected Foreign Members:*

2004

**Spencer Barrett**, Botany, Faculty of Arts and Science  
**Peter St. George-Hyslop**, Centre for Research in Neurodegenerative Disease, Faculty of Medicine

2001

**Robert J. Birgeneau**, Physics, Faculty of Arts and Science  
**J. Richard Bond**, Canadian Institute for Theoretical Astrophysics, Faculty of Arts and Science

2000

**Janet Rossant**, Molecular and Medical Genetics, Faculty of Medicine, Samuel Lunenfeld Research Institute  
**James Edgar Till**, Medical Biophysics, Faculty of Medicine

1999

**Ernest McCulloch**, Medical Biophysics, Faculty of Medicine

### Alfred P. Sloan Foundation: Sloan Research Fellowship

*These U.S. - based awards are intended to enhance the careers of the very best young faculty members in specific fields of science.*

2006

**Aaron Hertzmann**, Computer Science, Faculty of Arts and Science  
**Arun Paramekanti**, Physics, Faculty of Arts and Science

2005

**Sam Roweis**, Computer Science, Faculty of Arts and Science

2004

**Gregory Scholes**, Chemistry, Faculty of Arts and Science  
**Balint Virag**, Computer and Mathematical Sciences, UTSC

2003

**Peter Andolfatto**, Zoology, Faculty of Arts and Science  
**James Ellis Colliander**, Mathematics, Faculty of Arts and Science  
**Kentaro Hori**, Physics and Mathematics, Faculty of Arts and Science  
**Hae-Young Kee**, Physics, Faculty of Arts and Science  
**Daniel A. Lidar**, Chemistry, Faculty of Arts and Science

2002

**Amanda Peet**, Physics, Faculty of Arts and Science

2001

**Kiriakos Kutulakos**, Computer Science, Faculty of Arts and Science  
**Barth C. Netterfield**, Physics and Astronomy, Faculty of Arts and Science

2000

**Michael Molloy**, Computer and Mathematical Sciences, UTSC

### NATIONAL HONOURS

This list is limited to Canadian Awards and Honours graphed on Figure 13.

### Federal Granting Councils Highest Awards

#### CIHR: The Michael Smith Prize in Health Research

*Created by the Canadian Institute of Health Research, this prize is given annually to an outstanding Canadian researcher who has demonstrated a high degree of innovation, creativity, leadership and dedication in health research.*

2005

**Janet Rossant**, Molecular and Medical Genetics, Faculty of Medicine, Samuel Lunenfeld Research Institute

2004

**Sergio Grinstein**, Biochemistry, Faculty of Medicine. Hospital for Sick Children

2002

**Anthony J. Pawson**, Medical Genetics and Microbiology,  
Faculty of Medicine, Samuel Lunenfeld Research Institute.

2000

**Michael Tyers**, Medical Genetics and Microbiology, Faculty  
of Medicine, Samuel Lunenfeld Research Institute.

#### Killam Prize

*The Killam Prize honors eminent Canadian scholars in engineering,  
health sciences, natural sciences, social sciences and humanities.*

2005

**Linda Hutcheon**, Centre for Comparative Literature,  
Faculty of Arts and Science

2004

**James G. Arthur**, Mathematics, Faculty of Arts and Science  
**Janet Rossant**, Molecular and Medical Genetics, Faculty of  
Medicine, Samuel Lunenfeld Research Institute

2003

**Edward J. Davison**, Electrical and Computer Engineering,  
Faculty of Applied Science and Engineering  
**Tak Mak**, Medical Biophysics, Faculty of Medicine

2002

**Ian M. Hacking**, Philosophy, Faculty of Arts and Science  
**Lap-Chee Tsui**, Medical Genetics and Microbiology,  
Faculty of Medicine

2001

**Werner Kalow**, Pharmacology, Faculty of Medicine

2000

**Paul Brumer**, Chemistry, Faculty of Arts and Science  
**Fergus I. M. Craik**, Psychology, Faculty of Arts and Science  
**Anthony J. Pawson**, Medical Genetics and Microbiology,  
Faculty of Medicine

#### Killam Research Fellowship

*Awarded by the Canada Council for the Arts, these fellowships  
recognize and support distinguished Canadian scholars, normally  
full professors at Canadian universities and research institutes,  
who have established outstanding reputations in their areas of  
research.*

2005

**Virginia Brown**, Medieval Studies, Faculty of Arts and  
Science (Renewed in 2006)

2004

**Ian Lancashire**, English, Faculty of Arts and Science  
(Renewed in 2006)

2003

**John B. Friedlander**, Mathematics, UTSC  
**Barbara Sherwood Lollar**, Geology, Faculty of Arts and  
Science (Renewed in 2005)  
**Lynne Viola**, History, Faculty of Arts and Science  
(Renewed in 2005)

2002

**J. Edward Chamberlin**, English, Faculty of Arts and Science  
**Victor Ivrii**, Mathematics, Faculty of Arts and Science  
**Thomas L. Pangle**, Political Science, Faculty of Arts and  
Science

2001

**Timothy D. Barnes**, Classics, Faculty of Arts and Science  
**Heather Jackson**, English, Faculty of Arts and Science  
**Pierre D. Milman**, Mathematics, Faculty of Arts and  
Science (Renewed from 1999)  
**Thomas T. Tidwell**, Chemistry UTSC  
**Stephen Waddams**, Faculty of Law (Renewed from 1999)

#### Molson Prize

Awarded by the Canada Council for the Arts, this prize  
recognizes an outstanding lifetime contribution to the cultural  
and intellectual life of Canada.

2005

**Ramsay Cook**, History, Faculty of Arts and Science

2003

**Janice Gross Stein**, Political Science, Faculty of Arts and  
Science

2001

**Ian M. Hacking**, Philosophy of Science and Technology,  
Faculty of Arts and Science

#### E.W.R. Steacie Foundation Prize

*The Steacie Prize is Canada's most prestigious research award for young scientists and engineers.*

2003

**Stephen Scherer**, Medical Genetics and Microbiology, Faculty of Medicine

2001

**Jerry Xhelal Mitrovica**, Physics, Faculty of Arts and Science

2000

**Ian Manners**, Chemistry, Faculty of Arts and Science

#### Steacie Memorial Fellowship Award

*Awarded by the Natural Sciences and Engineering Research Council, these fellowships are given annually to university researchers who are capturing international attention for outstanding scientific or engineering achievement.*

2006

**Locke Rowe**, Zoology, Faculty of Arts and Science

2005

**Roberto Garcia Abraham**, Astronomy and Astrophysics, Faculty of Arts and Science

**Peter Zandstra**, Chemical Engineering and Applied Chemistry, Faculty of Applied Science and Engineering

2004

**George Eleftheriades**, Electrical and Computer Engineering, Faculty of Applied Science and Engineering

**Lisa Jeffrey**, Mathematics, Faculty of Arts and Science

2003

**Molly Shoichet**, Chemical Engineering and Applied Chemistry, Faculty of Applied Science and Engineering

**Kim Vicente**, Mechanical and Industrial Engineering, Faculty of Applied Science and Engineering

2002

**Jerry Xhelal Mitrovica**, Physics, Faculty of Arts and Science

#### Royal Society of Canada Fellows

*Fellowship in the Royal Society is a prestigious honour recognizing outstanding contributions to the arts and sciences.*

2006

**Ronald Beiner**, Political Science, Faculty of Arts and Science

**Alan Bewell**, English, Faculty of Arts and Science

**Jing M. Chen**, Geography, Faculty of Arts and Science

**Joseph G. Culotti**, Medical Genetics and Microbiology, Faculty of Medicine

**Abdallah Daar**, Public Health Sciences - Joint Centre for Bioethics, Faculty of Medicine

**Hector Levesque**, Computer Science, Faculty of Arts and Science

**Lewis E. Kay**, Medical Genetics and Microbiology, Faculty of Medicine

**Andreas Mandelis**, Mechanical and Industrial Engineering, Faculty of Applied Science and Engineering

**Pamela Ohashi**, Medical Biophysics, Faculty of Medicine

**Terence W. Picton**, Medicine, Faculty of Medicine

**Janet Polivy**, Psychology, UTM

**Stephen Scherer**, Medical Genetics and Microbiology, Faculty of Medicine

**Demetri Terzopoulos**, Computer Science, Faculty of Arts and Science

**William Trimble**, Biochemistry, Faculty of Medicine

**Mariana Valverde**, Criminology, Faculty of Arts and Science

**Jeffrey Wrana**, Medical Genetics and Microbiology, Faculty of Medicine

2005

**Peter Abrams**, Zoology, Faculty of Arts and Science

**Brenda Andrews**, Banting and Best Department of Medical Research, Faculty of Medicine

**Charles M. Boone**, Banting and Best Department of Medical Research, Faculty of Medicine

**James Alan Dainard**, French, Faculty of Arts and Science

**Ronald de Sousa**, Philosophy, Faculty of Arts and Science

**James Drummond**, Physics, Faculty of Arts and Science

**Monica Heller**, Sociology and Equity Studies in Education, OISE/UT

**Mark R. Henkelman**, Medical Biophysics, Faculty of Medicine

**John M. Kennedy**, Psychology, UTSC

**Alexander Maxwell Leggatt**, English, Faculty of Arts and Science

**John F. MacDonald**, Physiology, Faculty of Medicine

**Alberto O. Mendelzon**, Computer and Mathematical Sciences, UTSC  
**Freda Miller**, Medical Genetics and Microbiology, Faculty of Medicine  
**Robert Morris**, Chemistry, Faculty of Arts and Science  
**Peter Richardson**, Centre for the Study of Religion, Faculty of Arts and Science  
**Michael Salter**, Physiology, Faculty of Medicine  
**Michael Sefton**, Chemical Engineering and Applied Chemistry  
**John Edward Sipe**, Physics, Faculty of Arts and Science

## 2004

**Daniel Brooks**, Zoology, Faculty of Arts and Science  
**Gregory Brown**, Psychiatry and Physiology, Faculty of Medicine  
**John Dick**, Medical Genetics and Microbiology, Faculty of Medicine  
**Stephen Clarkson**, Political Science, Faculty of Arts and Science  
**Alison Fleming**, Psychology, UTM  
**John Myles**, Sociology, Faculty of Arts and Science  
**C. David Naylor**, Medicine, Faculty of Medicine  
**Barbara Sherwood Lollar**, Geology, Faculty of Arts and Science  
**Richard Simeon**, Political Science and Law  
**Donald Stuss**, Medicine and Psychology, Faculty of Medicine  
**Rosemary Sullivan**, English, Faculty of Arts and Science

## 2003

**Ian Blake**, Electrical and Computer Engineering, Faculty of Applied Science and Engineering  
**Roland Le Huenen**, Centre for Comparative Literature, Faculty of Arts and Science  
**Meric S. Gertler**, Geography, Faculty of Arts and Science  
**Allan Griffin**, Physics, Faculty of Arts and Science  
**David J. A. Jenkins**, Nutritional Sciences, Faculty of Medicine  
**Jill Levenson**, English, Faculty of Arts and Science  
**Patrick Macklem**, Faculty of Law  
**Yoshio Masui**, Zoology, Faculty of Arts and Science  
**Adel Sedra**, Electrical and Computer Engineering, Faculty of Applied Science and Engineering  
**Carolyn Tuohy**, Political Science, Faculty of Arts and Science  
**Gordon F. West**, Physics, Faculty of Arts and Science

## 2002

**Robert J. Birgeneau**, Physics, Faculty of Arts and Science  
**Janice Boddy**, Anthropology, Faculty of Arts and Science  
**David Cameron**, Political Science, Faculty of Arts and Science  
**Mitchell Halperin**, Medicine, Faculty of Medicine  
**Sajeev John**, Physics, Faculty of Arts and Science  
**Brian Merrilees**, Victoria College  
**Morris Moscovitch**, Psychology, Faculty of Arts and Science  
**Heather Munroe-Blum**, Research and International Relations  
**Kent Roach**, Faculty of Law  
**Michael Saary**, Medical Genetics and Microbiology, Faculty of Medicine  
**Ben-Zion Shek**, French, Faculty of Arts and Science  
**Peter St.George-Hyslop**, Centre for Research in Neurodegenerative Disease, Faculty of Medicine  
**Cecil Yip**, Vice-Dean of Research, Faculty of Medicine

## 2001

**Sylvia Beth Bashevkin**, Political Science, Faculty of Arts and Science  
**Charles M. Deber**, Biochemistry, Faculty of Medicine  
**Tom Hurka**, Philosophy, Faculty of Arts and Science  
**Mark Lautens**, Chemistry, Faculty of Arts and Science  
**Ian Manners**, Chemistry, Faculty of Arts and Science  
**Roderick McInnes**, Paediatrics, Faculty of Medicine  
**Cheryl Misak**, Philosophy, Faculty of Arts and Science  
**Keith Oatley**, Human Development and Applied Psychology, OISE/UT  
**Nancy M. Reid**, Statistics, Faculty of Arts and Science  
**Jeffrey G. Reitz**, Department of Sociology, Faculty of Arts and Science  
**C. Andre T. Salama**, Electrical and Computer Engineering, Faculty of Applied Science and Engineering

## 2000

**William J. Callahan**, History, Faculty of Arts and Science  
**J. Edward Chamberlin**, English, Faculty of Arts and Science  
**Sergio Grinstein**, Biochemistry, Faculty of Medicine  
**Alexander R. Jones**, Classics, Faculty of Arts and Science  
**Amira Klip**, Paediatrics, Faculty of Medicine  
**Michael Lambek**, Anthropology, Faculty of Arts and Science  
**Alexander McLean**, Metallurgy and Materials Science, Faculty of Applied Science and Engineering  
**Janet M. Paterson**, French, Faculty of Arts and Science  
**James Woodgett**, Medical Biophysics, Faculty of Medicine

## ADDITIONAL AWARDS AND HONOURS

### Lasker Foundation

#### *Albert Lasker Award for Basic Medical Research*

2005

Ernest A. McCulloch and James Till, Medical Biophysics,  
Faculty of Medicine

### Massachusetts Institute of Technology

#### *World's Top 35 Innovators Under the Age of 35*

2005

Parham Aarabi, Electrical and Computer Science, Faculty  
of Applied Science and Engineering

Aaron Hertzmann, Computer Science,  
Faculty of Arts and Science

### *Top 100 Young Innovators*

2003

Edward H. Sargent, Electrical and Computer Engineering,  
Faculty of Applied Science and Engineering

### NSERC

#### *Synergy Award for Innovation*

2005

Joseph Paradi, Mechanical and Industrial Engineering,  
Faculty of Applied Science and Engineering

2004

Douglas Reeve, Chemical Engineering and Applied  
Chemistry, Faculty of Applied Science and Engineering

#### *Brockhouse Canada Prize for Interdisciplinary Research in Science and Engineering*

2005

Sajeev John (Physics) and Geoffrey A. Ozin (Chemistry)

### Canada Council for the Arts

#### *John D. Diefenbaker Award*

2000

Joachim Fiebach, Victoria College

### Royal Society of Canada Awards

2006

#### *The Bancroft Award:*

David J. Dunlop, Physics, Faculty of Arts and Science

#### *The Thomas W. Eadie Medal:*

Alberto Leon-Garcia, Electrical and Computer  
Engineering, Faculty of Applied Science and Engineering

#### *The McLaughlin Medal:*

Michael D. Tyers, Department of Medical Genetics &  
Microbiology, Faculty of Medicine

#### *The Mirosław Romanowski Medal:*

Richard Peltier, Physics, Faculty of Arts and Science

#### *The Rutherford Memorial Medal in Chemistry:*

Molly Shoichet, Chemical Engineering and Applied  
Chemistry, Faculty of Applied Science and Engineering

#### *The Rutherford Memorial Medal in Physics:*

Aephraim M. Steinberg, Physics, Faculty of Arts and  
Science

#### *The John L. Synge Award:*

Stephen A. Cook, Computer Science, Faculty of Arts and  
Science

### The Royal Society

#### *The Glaxo Wellcome Prize*

2000

David H. MacLennan, Banting and Best Department of  
Medical Research, Faculty of Medicine

#### *The Royal Society of Literature*

2003

Fellow

Margaret MacMillan, Provost, Trinity College

## INNOVATION & COMMERCIALIZATION

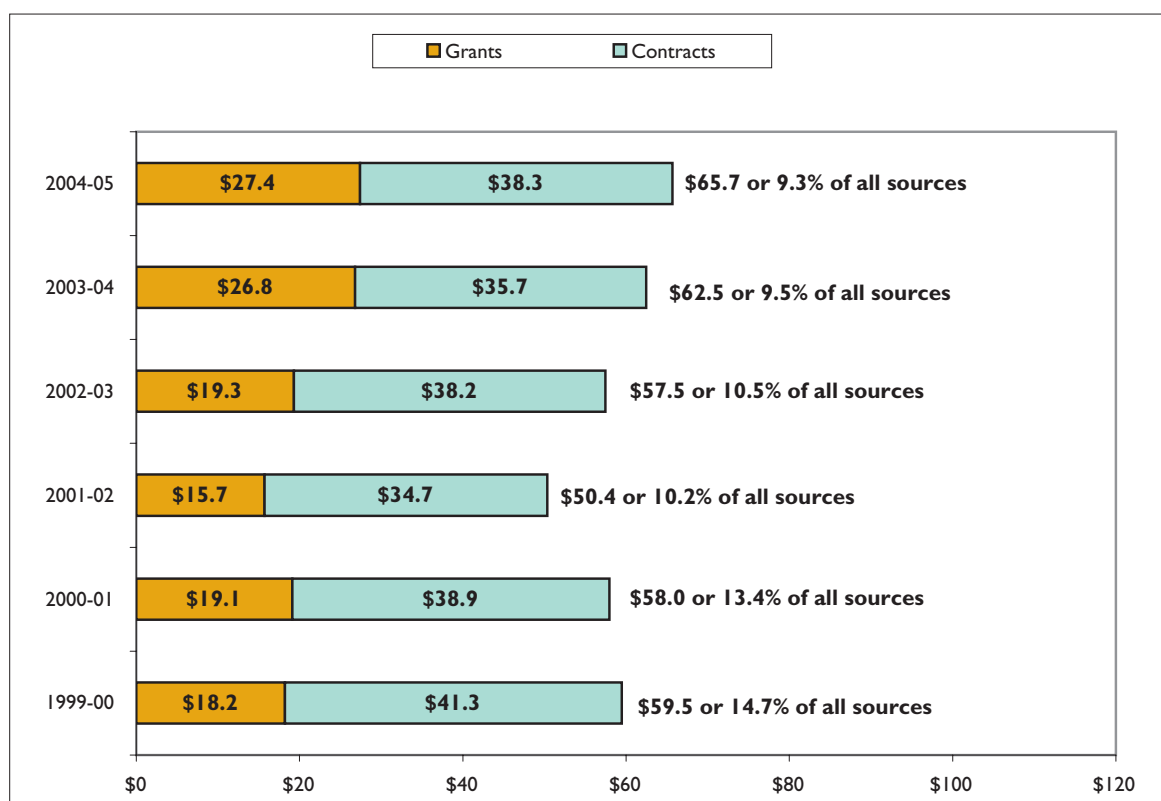
The most visible outcomes of research are often those linked with commercialization. Indeed, the increased investments in university and hospital research by both levels of government were made in the context of a clear commitment by universities to increase their commercialization of research threefold between 2002 and 2010.

To strengthen its ability to move research from the lab to society, U of T rejuvenated its research commercialization operation in 2005-06 through the creation of "Innovations at the University of Toronto", locating it at MaRS, a new \$450-million convergence centre (of which U of T is a founding partner) that fosters collaboration between the sciences, business and capital communities.

One aspect of commercialization is the willingness of industry to invest in research conducted at a university. Figure 14 illustrates the fluctuations of these investments at the University of Toronto and affiliates over the past six years. Unlike investments from the government sector, there has been no dramatic increase. As a result, when expressed as a share of total funding, we observe a progressive decline. The decline in funding in 2001-2002 was likely related to the problems experienced in the high technology sector at that time.

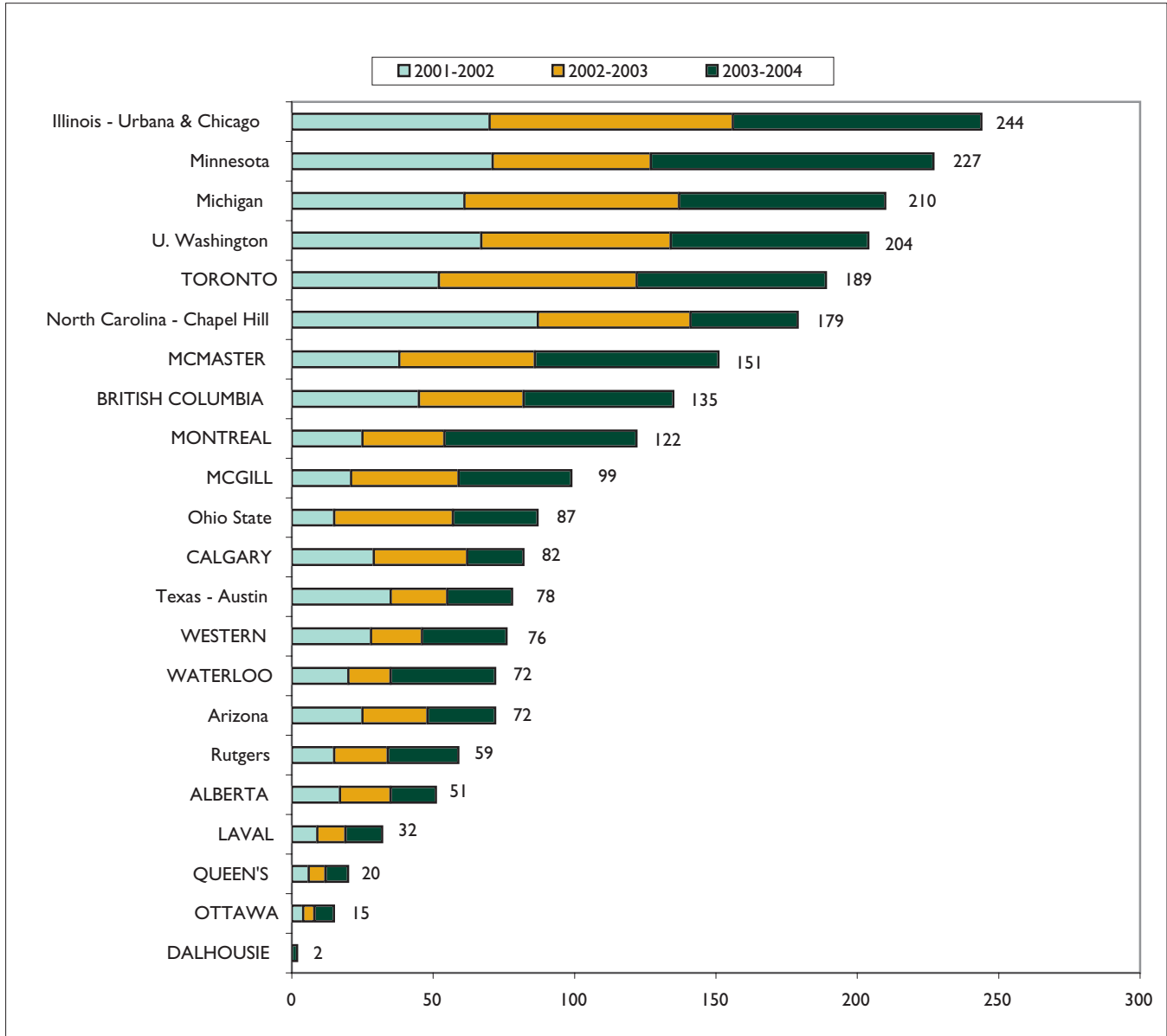
Another important aspect of commercialization is the licensing of inventions, some of which may generate commercialization revenue. The University of Toronto continues to lead Canadian universities in cumulative new licenses over the most recent three-year period. It ranks fifth among peers, as illustrated in Figure 15.

**FIGURE 14**  
**Research Funding from Industrial Sources, University of Toronto and Affiliates**  
**1999-2000 to 2004-05 (Millions CDN)**



Source: Office of the Vice-President, Research and Associate Provost

FIGURE 15  
New Licenses  
Canadian G13 and US Peer Institutions



Sources: AUTM Survey FY 2004, 2003, 2002, and supplementary data from missing U of T affiliates.

Note: G13 institutions are shown in capital letters.

University of Toronto includes all affiliated hospitals except for St. Michael's Hospital.

University of Washington includes Washington Research Foundation.

University of Ottawa includes Ottawa Heart Institute Research Corporation and Ottawa Health Research Inst. where available

Dalhousie data not available for 2001-02 and 2002-03.

Data for University of California at Berkeley only available as part of University of California system (not shown).

## NEXT GENERATION

### Highly Qualified Personnel

Research, scholarship and the generation of new knowledge and understanding create unique opportunities to mentor the great minds of tomorrow. This mentorship is particularly intensive in the case of doctoral stream graduate students and postdoctoral fellows. In 2005, the University conferred degrees to 1,922 in the former group, and was engaged in training 1,424 in the latter. In addition, 1,951 degrees were conferred to students in

professional master's programs. The breakdowns between the four School of Graduate Studies divisions are shown in Table 3.

Eleven per cent of students who graduated in 2005 were international students, made up of 7 per cent in the professional masters programs, 11 per cent in the doctoral stream masters programs, and 19 per cent in the doctoral programs.

**TABLE 3**  
Breakdown of Highly Qualified Personnel  
University of Toronto and Affiliates, 2005

	Graduated in 2005				At U of T in 2005
	Doctoral Stream			Professional Stream Masters	Postdoctoral Fellows
	Masters Programs	Doctoral Programs	Total Doctoral Stream		
<b>Humanities</b>	243	110	353	44	20
<b>Social Sciences</b>	310	221	531	1,278	26
<b>Physical Sciences</b>	382	152	534	177	287
<b>Life Sciences</b>	309	195	504	452	1,091
<b>TOTAL</b>	1,244	678	1,922	1,951	1,424

Not shown: count of students who earned graduate level diplomas or certificates.  
Sources: Planning & Budget Office, and School of Graduate Studies.



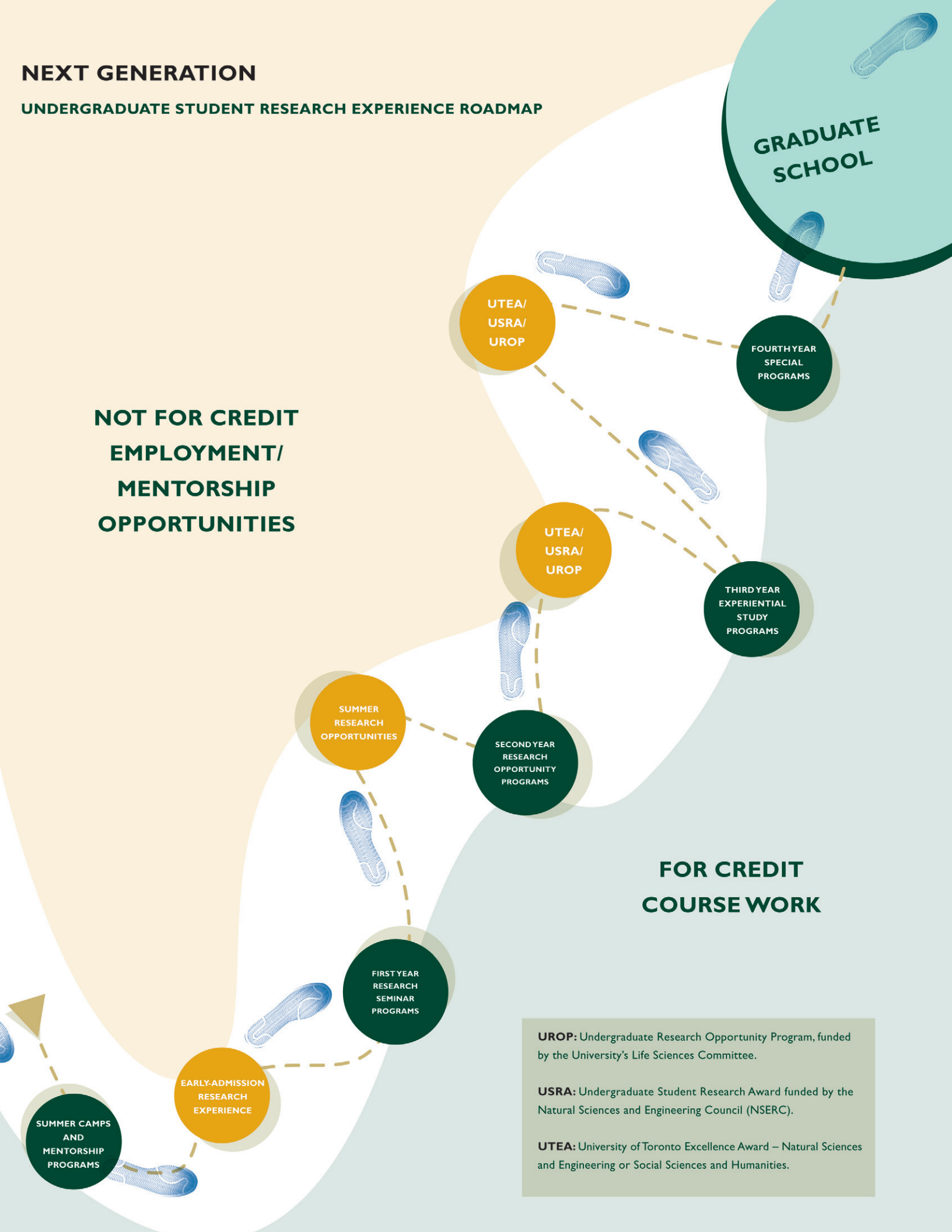
# NEXT GENERATION

## UNDERGRADUATE STUDENT RESEARCH EXPERIENCE ROADMAP

NOT FOR CREDIT  
EMPLOYMENT/  
MENTORSHIP  
OPPORTUNITIES

FOR CREDIT  
COURSE WORK

GRADUATE  
SCHOOL



UTEA/  
USRA/  
UROP

FOURTH YEAR  
SPECIAL  
PROGRAMS

UTEA/  
USRA/  
UROP

THIRD YEAR  
EXPERIENTIAL  
STUDY  
PROGRAMS

SUMMER  
RESEARCH  
OPPORTUNITIES

SECOND YEAR  
RESEARCH  
OPPORTUNITY  
PROGRAMS

FIRST YEAR  
RESEARCH  
SEMINAR  
PROGRAMS

EARLY-ADMISSION  
RESEARCH  
EXPERIENCE

SUMMER CAMPS  
AND  
MENTORSHIP  
PROGRAMS

**UROP:** Undergraduate Research Opportunity Program, funded by the University's Life Sciences Committee.

**USRA:** Undergraduate Student Research Award funded by the Natural Sciences and Engineering Council (NSERC).

**UTEA:** University of Toronto Excellence Award – Natural Sciences and Engineering or Social Sciences and Humanities.

## NEXT GENERATION

### Undergraduate Student Research Experience as Paid Employment

This year, we have, for the first time, quantified the number of undergraduate students who have benefited from research experiences at the University of Toronto and affiliates. In many cases, these experiences represented summer studentships awarded on a competitive basis. Examples include the Undergraduate Student Research Award program funded by the Natural Sciences and Engineering Council (NSERC), which provided 304 opportunities; the Undergraduate Research Opportunity Program, funded by the University's Life Sciences Committee, which provided 130 opportunities; and the University of Toronto Excellence Awards (UTEA), which provided 25 opportunities in the Natural Sciences and Engineering and 10 in the Social Sciences and Humanities. We are very pleased to report that in our current fiscal year, 2006-07, we were able to increase the UTEA opportunities to 71 and 28 respectively.

At our affiliated hospitals, 473 undergraduate students participated in summer research projects. An additional 674 undergraduate students contributed to research projects and were supported through faculty members' operating grants from funding agencies including the federal granting councils, the Networks of Centres of Excellence, the Ontario Centres of Excellence, and the National Institutes of Health. A further 410 opportunities were made possible through sources such as trust funds and donations.

In total, more than 2,000 undergraduate students have taken part in these research experiences. The University is working with its partners to increase the number of opportunities provided in future years and we expect these efforts to be reflected in future annual reports.

### Undergraduate Student Research Experience Roadmap

In addition to the intensive research training received by graduate students and postdoctoral fellows, the University of Toronto is increasingly committed to making research experiences available to undergraduate students.

The Undergraduate Student Research Experience Roadmap is a comprehensive plan designed to engage undergraduate students in research experiences that progress, like stepping stones, from to 1st year research seminars, to 4th year special projects, and from courses

taken for credit to paid employment on research projects.

The entrance to the Roadmap is made up of primary and secondary school summer camps, mentorship programs, and other youth outreach initiatives, while its exit is graduate school for those students who will have developed a deep interest in research. The second stepping stone, the Early Admission Research Experience, does not yet exist. We are planning to develop this program in 2006-07.

## SOCIAL IMPACT

One of the important outputs of research is beneficial impacts on society, whether in Canada or around the world. These may take the form of improvements in health, child care, education, human rights, transportation, safety, etc. and often start with policy changes. A very large number of faculty members and, by extension, the students they supervise, take part in exchanges with policy-makers on how to improve our society based on insights gained through their research. These exchanges can be informal or confidential, or appear in the public domain as books and articles, including those aimed at non-specialists, reports, expert commentaries, interviews, membership on commissions and task forces. Beyond counts of publications and citations in peer-reviewed journals, little has been done so far to quantify these activities and more importantly their potential for societal impact.

A starting point may be media coverage analysis reports like the ones published quarterly by Cormex Research comparing

six research-intensive universities in Canada. Although the primary goal is to assess public relations impacts, such as rating news stories from favourable to unfavourable, or estimating the equivalent advertising value of the coverage, one aspect is an analysis of media exposure of individual faculty members. The University of Toronto typically leads in numbers of professors in the top thirty. Nevertheless, this kind of study doesn't differentiate between exposure relating to internal university policy or to new knowledge or understanding, and whether there is genuine potential for societal impact in the latter two.

Despite the apparent intractability of the social impacts of research, we intend to explore new ways to assess this output over the coming year.

Listed below are just a few of the many examples of the ways in which University of Toronto researchers have an impact on society.

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**Monica Boyd** of the Department of Sociology has spent 30 years studying the causes and consequences of groups who are socially vulnerable. As the Canada Research Chair in the Social and Ethical Context of Health, she is working on a comprehensive overview of the vulnerability risks of immigrants in Canada. Other projects have dealt with language training for immigrants and the social and economic well-being of foreign-born senior citizens.

**Cindy-Lee Dennis** of the Faculty of Nursing is spearheading an Ontario-wide effort to combat post-partum depression by conducting a trial on the effectiveness of telephone-based, mother-to-mother support. She will screen 20,000 new mothers as part of this study and health planners will be able to implement the intervention in their own jurisdictions. She is also conducting a longitudinal study on why immigrant mothers are more susceptible to post-partum depression than their Canadian-born counterparts.

**Mohammad Fadel** of the Faculty of Law studies Islamic law using methods traditionally applied to secular legal systems. This approach removes the discussion of Islamic law from the narrow theological religious values of Islam and places it in the realm of

comparative legal studies. His research provides a framework within which citizens and policymakers in liberal democracies can discuss issues involving Islamic law without becoming entangled in the theological views of individual citizens.

**Alana Johns** of the Department of Linguistics, is trying to save Inuktitut, the ancient language of the Inuit people, which is threatened across the Arctic. In addition to launching a U of T course in the language, she is working on a project to document and explain grammatical differences across Inuktitut's various dialects and a dictionary of the Utkuksalingmiutut dialect.

**Faye Mishna** of the Faculty of Social Work is undertaking a comprehensive research program on cyberabuse and online bullying. Together with colleagues she will survey and interview students, parents, teachers and administrators. The research program has attracted support from the Toronto Police Service and Kids Help Phone. The researchers will provide strategic advice and policy direction for intervention and prevention.

**Daniel Trefler** of the Rotman School of Management is a member of the Ontario Task Force on Competitiveness,

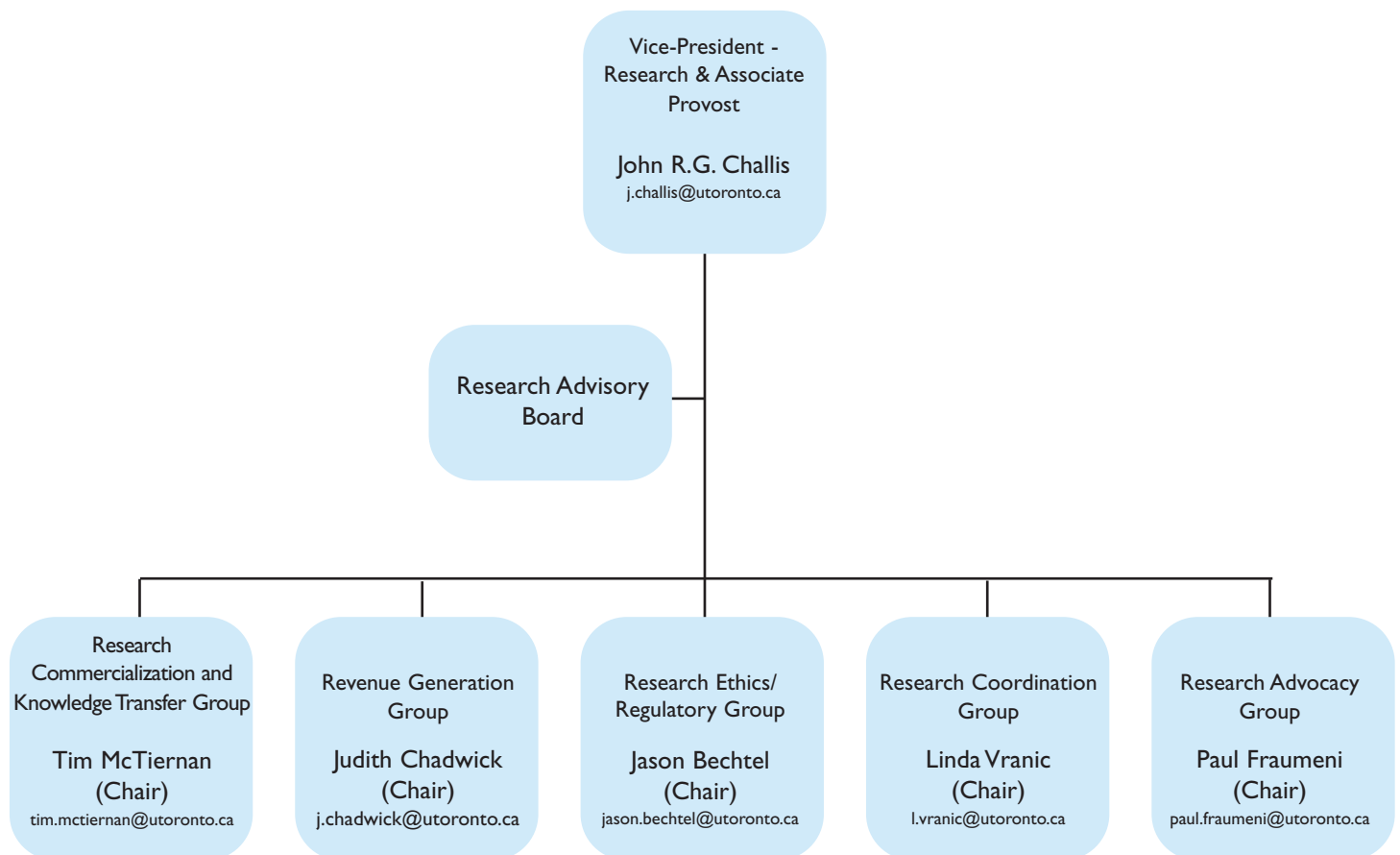
Productivity and Economic Progress. He researches how Canada's institutions affect its competitiveness and in turn, how international competition affects institutions.

**Kathi Wilson**, a geographer at UTM, is studying the links between neighbourhoods and health in Mississauga. In addition to conducting surveys, interviews and focus

groups, her team at the Cities Health and Neighbourhood Geomatics Laboratory uses Global Positioning Systems and cameras to monitor air quality and to inventory neighbourhood amenities like clinics. Agencies such as hospitals and school boards have been able to shape the research questions, so that the results will address the issues they face.

## APPENDIX A

### Cross-functional groups in the Office of the Vice-President, Research & Associate Provost



## GLOSSARY OF ABBREVIATIONS

AAU	Association of American Universities
CIHR	Canadian Institutes of Health Research
CFI	Canada Foundation for Innovation
CRC	Canada Research Chairs
G13	Group of 13 Canadian Universities (Alberta, UBC, Calgary, Dalhousie, Laval, McGill, McMaster, Montreal, Ottawa, Queen's, Toronto, Waterloo, Western)
GC	Genome Canada
GRIP	Government Research Infrastructure Programs
ISI	Institute for Scientific Information
NCE	Networks of Centres of Excellence
NIH	National Institutes of Health
NSERC	Natural Sciences and Engineering Research Council of Canada
OGI	Ontario Genomics Institute
OIT	Ontario Innovation Trust
ORDCF	Ontario Research & Development Challenge Fund
ORF	Ontario Research Fund
PREA	Premier's Research Excellence Awards
RAB	Research Advisory Board
RAP	Office of the Vice-President, Research & Associate Provost
SSHRC	Social Sciences & Humanities Research Council of Canada
UTM	University of Toronto at Mississauga
UROP	Undergraduate Research Opportunity Program
USRA	Undergraduate Student Research Award
UTEA NSE	University of Toronto Excellence Award - Natural Sciences and Engineering
UTEA SSH	University of Toronto Excellence Award - Social Sciences and Humanities
UTSC	University of Toronto at Scarborough

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