



FOR INFORMATION — PUBLIC OPEN SESSION

TO: Academic Board

SPONSOR: Professor Vivek Goel, Vice-President, Research and Innovation,
CONTACT INFO: and Strategic Initiatives
416-978-4984, vp.research@utoronto.ca

PRESENTER: See above
CONTACT INFO:

DATE: May 21, 2020 for May 28, 2020

AGENDA ITEM: 10

ITEM IDENTIFICATION:

2019 Annual Report, Division of the Vice-President, Research & Innovation

JURISDICTIONAL INFORMATION:

The annual report for the Division of the Vice-President, Research and Innovation is considered by the Academic Board for information. (Academic Board Terms of Reference, Section 5.2.12)

GOVERNANCE PATH:

1. **Academic Board [for information] (May 28, 2020)**

PREVIOUS ACTION TAKEN:

This report is provided annually to the Academic Board.

HIGHLIGHTS:

The University of Toronto is Canada's leading research and innovation university and is recognized as one of the top universities globally. Our exceptional performance nationally and internationally in research and innovation is a reflection of the excellence of our faculty, students, postdoctoral fellows, and staff and their collaborations with leading researchers, institutions, and partners worldwide.

U of T celebrated numerous significant achievements in research and innovation in 2019, and the Vice-President, Research and Innovation portfolio is proud to support our researchers, innovators, entrepreneurs, and learners so that they have everything they need to advance understanding and solve real-world problems. Our 2019 Annual Report highlights their accomplishments and the impact of their research, as well as key performance metrics. The report also highlights the activities and service improvements we have implemented in order to support research and innovation.

The attached Executive Summary provides key highlights. Please explore 2019.research.utoronto.ca to learn more about how we continue to build a portfolio that serves a world-class institution that aspires to even higher levels of achievement.

FINANCIAL AND/OR PLANNING IMPLICATIONS:

None

RECOMMENDATION:

For information only.

DOCUMENTATION PROVIDED:

Executive Summary of 2019 Annual Report – Research and Innovation Impact, Division of the Vice-President, Research & Innovation

Link to full online report: 2019.research.utoronto.ca

U of T is the Place

Top 5

Among the Top 5 universities in the world that excel across a broad range of disciplines

#1

The most innovative university in Canada according to Reuters' annual ranking of the world's 100 most innovative universities

...to find extraordinary breadth and depth of academic excellence across U of T's three campuses and nine partner hospitals

...where our researchers and innovators are having an impact beyond the university and improving lives around the world

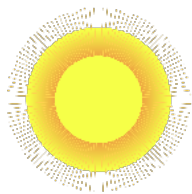
...where researchers are collaborating across disciplines on research initiatives to address today's most pressing issues

...where faculty and students are turning ideas into innovative products, services and companies

...where equity, diversity and inclusion strengthen the quality, relevance and impact of research and training

...that supports our scholars and learners to advance understanding and solve real-world problems

Leadership in Research & Innovation



U of T Rankings in Most Prominent Global Rankings Systems

World Rankings Canadian Rankings

	2019-20	
1. National Taiwan University Ranking (NTU)	4	1
2. US News Best Global Universities	18	1
3. Times Higher Education World University Rankings (THE)	18	1
4. Academic Ranking of World Universities (ARWU)	24	1
5. QS World University Rankings (QS)	29	1

First Among Canadian Universities

U of T is among the world's top research- and innovation-intensive universities and typically ranks first among Canadian universities in a broad range of disciplines

U of T Major Field Ranking Results

W = World Rankings C = Canadian Rankings



QS 2019	W	C	THE 2020	W	C
Life Sciences & Medicine	11	1	Law	10	1
Arts & Humanities	19	1	Clinical, Pre-clinical & Health	6	1
Natural Sciences	17	1	Education	14	1
Social Sciences & Management	21	1	Arts & Humanities	18	1
Engineering & Technology	22	1	Computer Science	23	1
			Psychology	22	2
			Life Sciences	24	1
			Social Sciences	26	1
			Physical Sciences	25	1
			Business & Economics	27	2
			Engineering & Technology	27	1

NTU 2019	W	C
Medicine	3	1
Social Sciences	3	1
Life Sciences	10	1
Natural Sciences	28	1
Agriculture	50	4
Engineering	60	1

Award-Winning Researchers & Innovators

Awards Leader

U of T has 6% of Canada's professorial faculty, yet our researchers amass a dominant share of prestigious Canadian and international honours.



Geoffrey Hinton
A.M. Turing Award



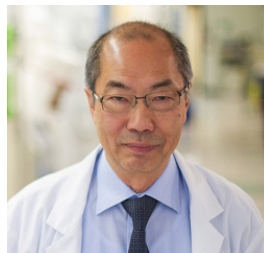
Pamela Klassen
One of eleven U of T faculty named Fellow of the Royal Society of Canada



Barbara Sherwood Lollar
Gerhard Herzberg Canada Gold Medal



Lynne Viola
Pierre Chauveau Medal, Royal Society of Canada

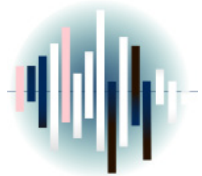


Tak Mak
Gold Leaf Prize



Jiaying Gu
One of three U of T winners of the John Charles Polanyi Prize

Research & Innovation Funding



\$1.4B

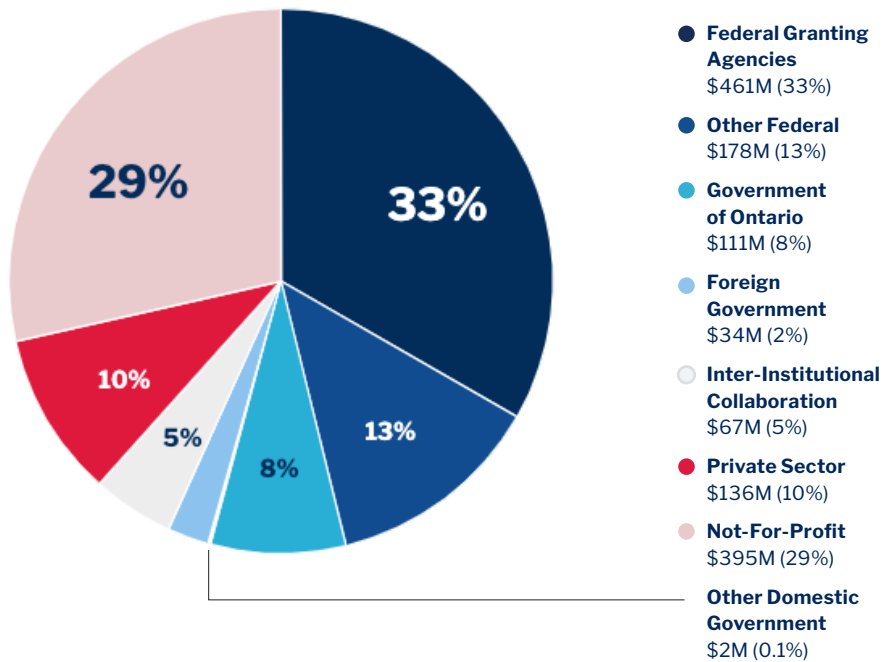
total funding across three campuses and nine partner hospitals

16%

of Canada's Tri-Agency research funding

Research Funds Awarded to U of T and Partner Hospitals by Sector (2018-19)

Total Funding = **\$1.4B**



Partnerships to Address Pressing Issues

350+

Private-sector funding partners

12%

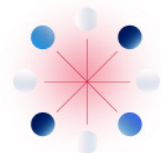
of all new SSHRC Partnership Grants funding secured by U of T



The BMO Lab for Creative Research in the Arts, Performance, Emerging Technologies and AI at U of T will explore the potential of artificial intelligence and other revolutionary technologies in a novel way.

U of T is the place where research excellence comes together in a collaborative spirit through partnerships with national and international institutions, private-sector and public-sector organizations and community programs. Our researchers capitalize on complementary expertise and resources in order to generate the knowledge and innovations needed to address pressing issues confronting Canadians and people around the world.

Serving the U of T Community



Each year the VPRI portfolio supports the U of T community by managing, negotiating and supporting the activities highlighted below

Research Funding

2,700 principal investigators	4,000 new funding applications	\$500M in funding awarded	9,000 research funds	1,000 funding sponsors	350+ private sector partners
1,900 funding programs	250+ workshops and info sessions				

Innovation & Entrepreneurship

180 invention disclosures	75 priority patent applications	35 licensing agreements & options	250 commercialization projects	300+ student-led startup teams/companies
\$150M annual startup investment	\$10M annual sales by startups			

Equity, Diversity and Inclusion

The VPRI is committed to ensuring students, postdoctoral fellows, faculty and staff work in an environment where the principles of equity, diversity and inclusion are woven into the fabric of research and innovation.

Oversight & Compliance

35 external financial audits	8,270 financial reports	1,600 human ethics protocols	850 animal ethics protocols	350 post-approval reviews
14,700 personnel trained in EH&S programs	1,100 lab safety inspections	425 worksites assessments	1,100 occupational health assessments	

2019 Research and Innovation Annual Report
2019.research.utoronto.ca

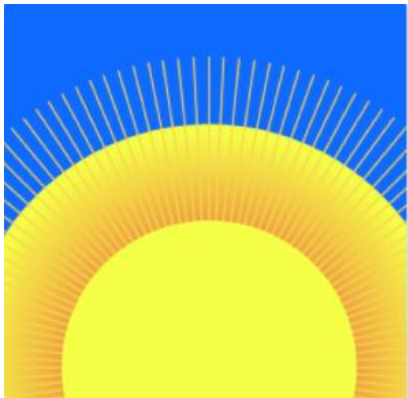
U of T is the Place

Vivek Goel
Vice-President, Research and Innovation, and Strategic Initiatives
Academic Board – 28 May 2020

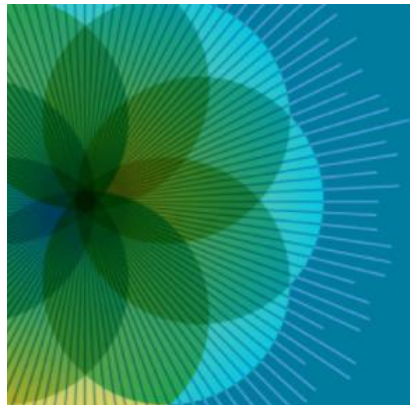
Reporting on the Strategic Research Plan 2018-2023

Each section in the 2019 annual report **responds to an objective in the Strategic Research Plan**, and we outline how we are making progress towards achieving those objectives.

Leadership in Research & Innovation



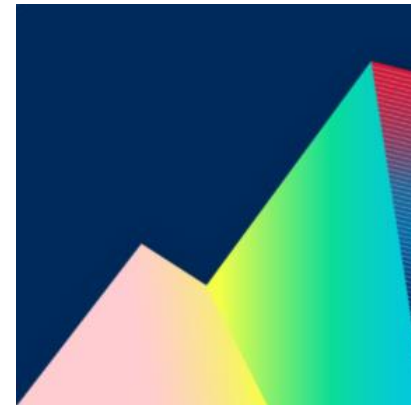
Engagement & Impact



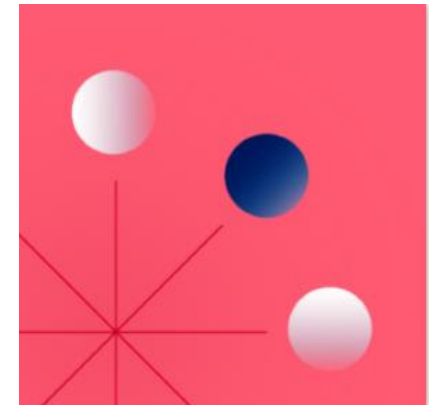
Equity, Diversity & Inclusion



Student Experience



Serving the U of T Community





Leadership in Research & Innovation

Leadership in Research & Innovation



World Rankings

Canadian Rankings

	1-10	11-20	21-30	31-40
2019-20				
1. National Taiwan University Ranking (NTU)			4	1
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5. QS World University Rankings (QS)			29	1

First Among Canadian Universities



U of T has affirmed its position as a stellar research institution across a wide range of fields.

Major Field Ranking Results

W = World Rankings C = Canadian Rankings

1-10 11-20 21-30 31+

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An Innovation and Entrepreneurship Powerhouse



U of T faculty and students are turning ideas into innovative products, services and companies.

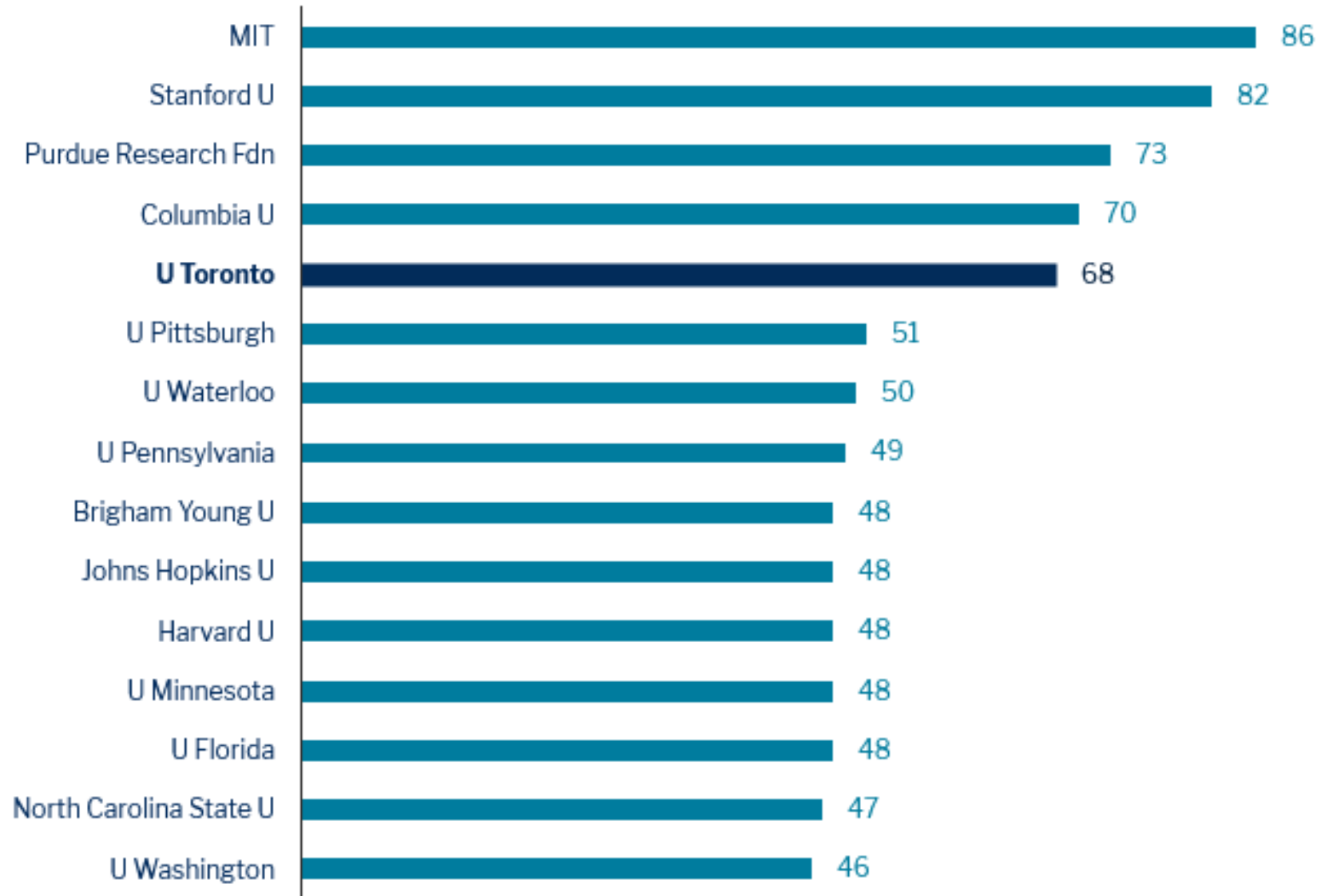
In 2019:

- U of T Entrepreneurship ranked among the **Top university-managed business incubators in the world**, according to UBI Global.
- U of T has risen to 27th **Most Innovative University in the World** according to Reuters Top 100 and remains 1st in Canada.

New Start-ups Created



New companies created at US & Canadian universities (2015-16 to 2017-18)



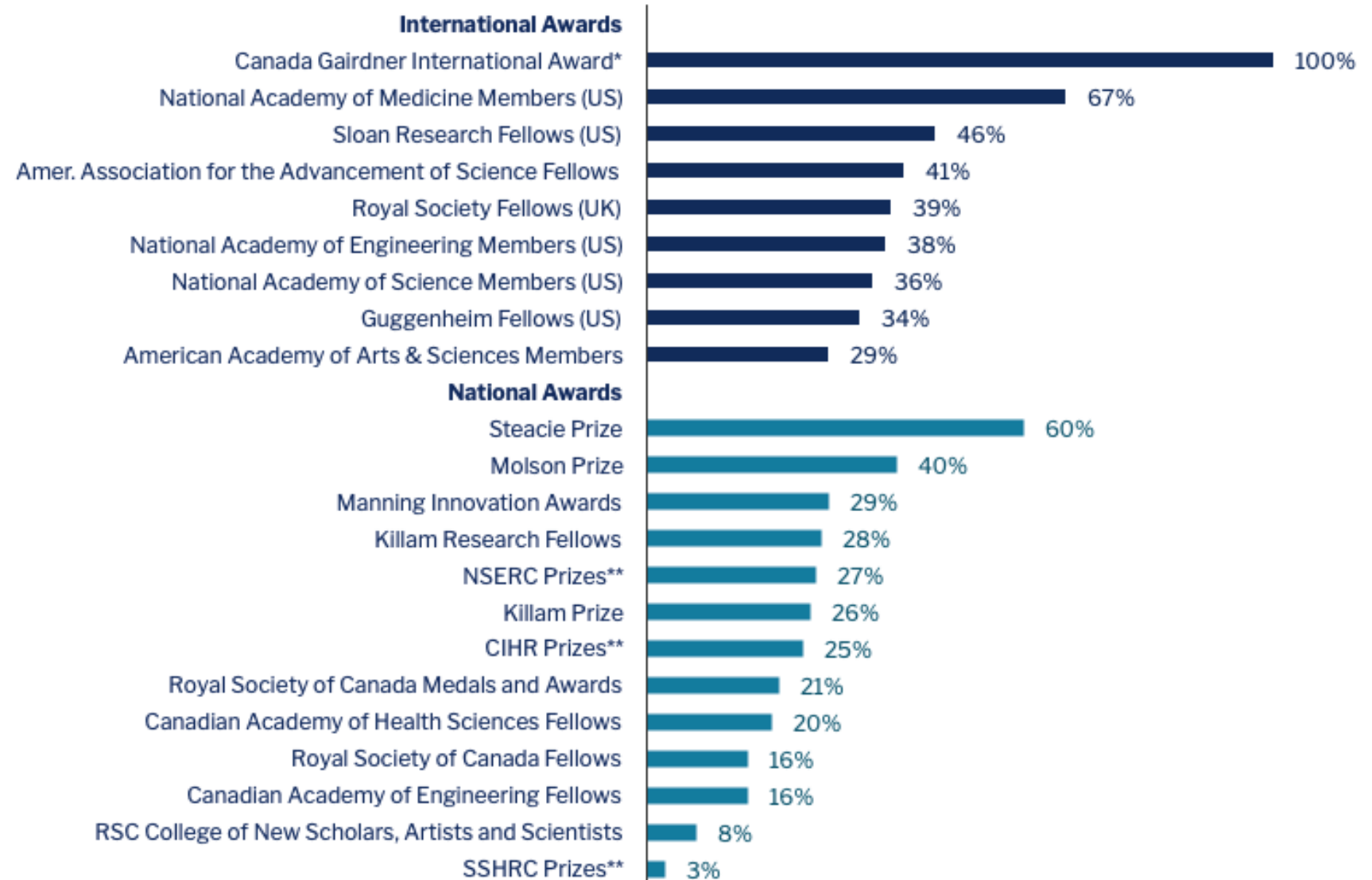
Data derived from [AUTM's annual Licensing Activity Survey](#)

Major Awards and Honours



U of T has 6% of Canada's professorial faculty, yet our researchers amass a dominant share of prestigious Canadian and international honours.

Major Awards & Honours U of T Market Share Among Canadian Universities (2010-2019)



CRCs

315

Largest allocation of CRCs
in the country



U of T is the place for finding **extraordinary breadth of academic excellence** across our three campuses and nine partner hospitals.



Marzyeh Ghassemi

CRC in Machine Learning for Health, cross-appointed to the Departments of Computer Science and Medicine



Jonathan Kelly

CRC in Collaborative Robotics, Institute for Aerospace Studies



Vincent Kuuire

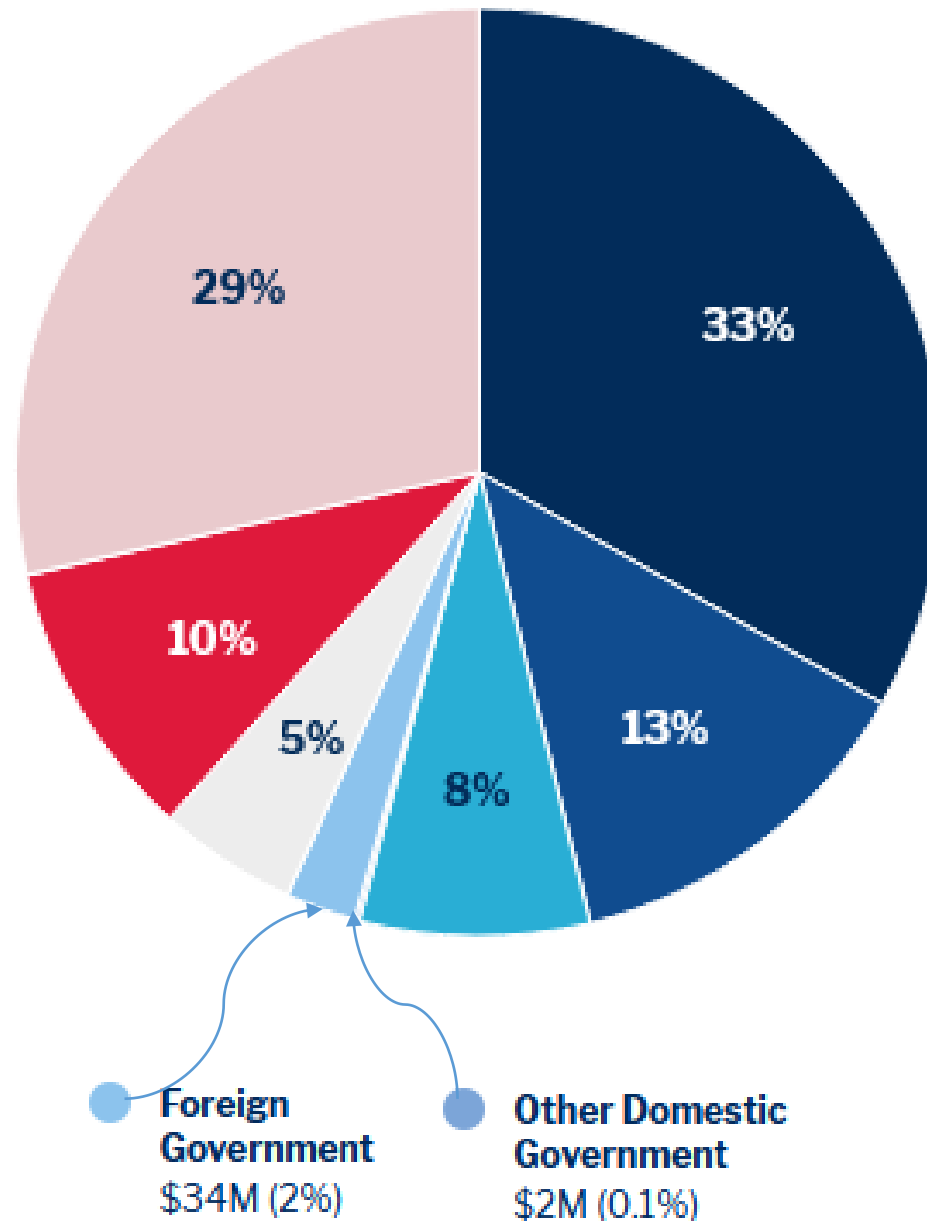
CRC in Immigrant Well-being and Global Health, University of Toronto Mississauga

Research & Innovation Funding



\$1.4B

total funding across three campuses and nine partner hospitals



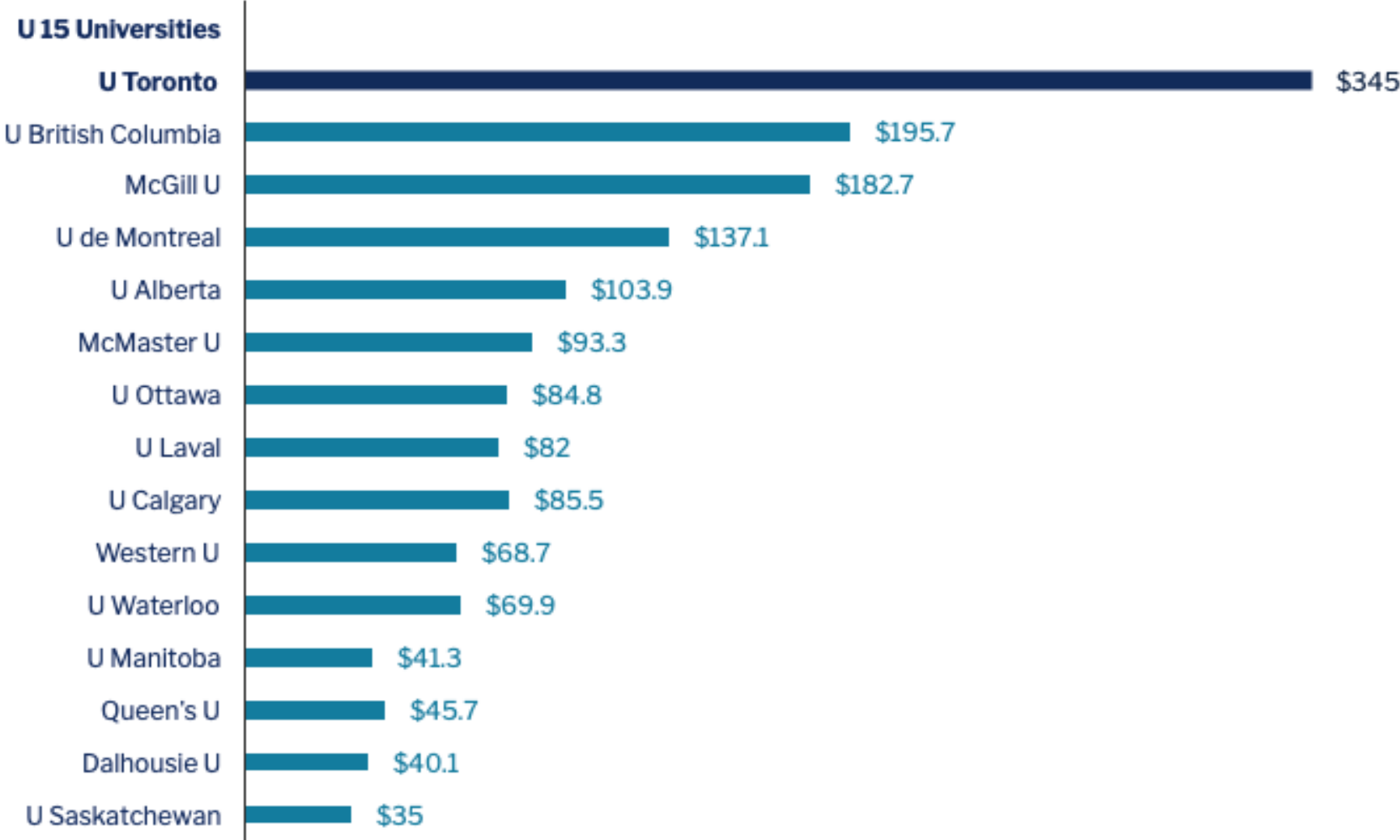
- **Federal Granting Agencies**
\$461M (33%)
- **Other Federal**
\$178M (13%)
- **Government of Ontario**
\$111M (8%)
- **Inter-Institutional Collaboration**
\$67M (5%)
- **Private Sector**
\$136M (10%)
- **Not-for-Profit**
\$395M (29%)

- **Foreign Government**
\$34M (2%)
- **Other Domestic Government**
\$2M (0.1%)

Tri-Agency Funding



16.3%
of the country's
Tri-Agency
funding
(2018-19)



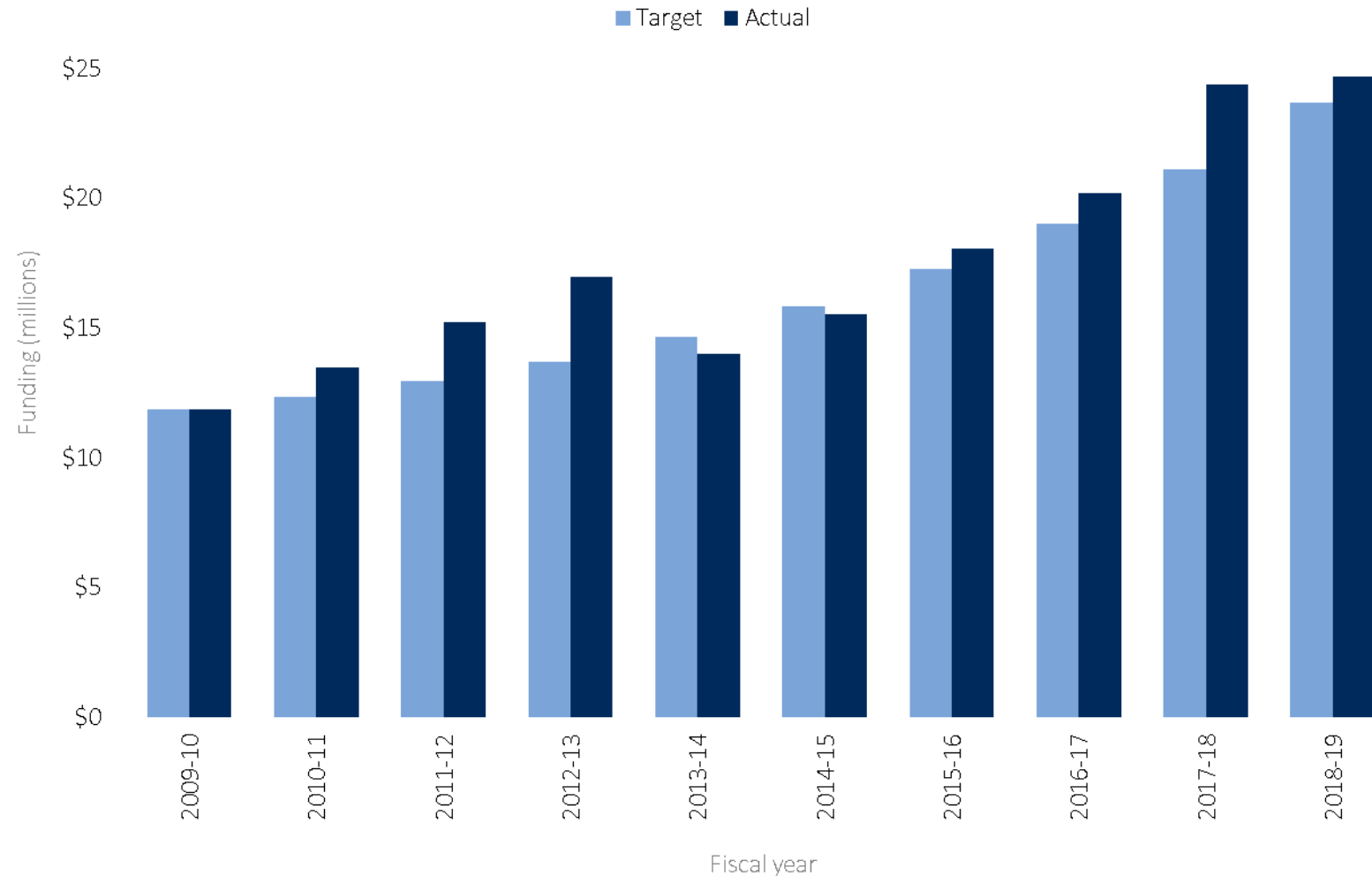
(Funding in \$Millions)

Industry Funding



Partnership Funding More than Doubled from 2009-2019

Target and Actual Increases in Private Sector Funding to U of T (Excluding Partner Hospitals) over Ten Years



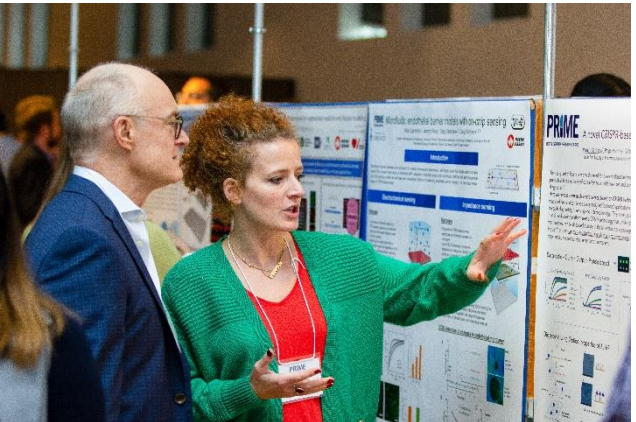
Institutional Strategic Initiatives

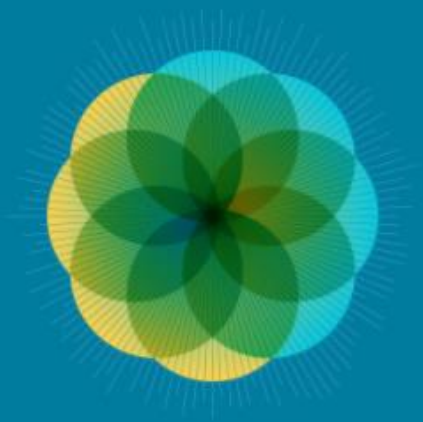


The challenges we face don't fall into one category. Neither does our research.



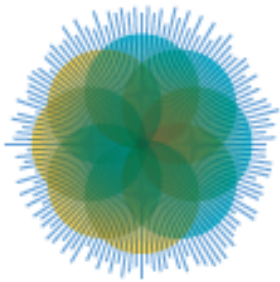
Schwartz Reisman Institute for Technology & Society; PRiME; Medicine by Design.





Engagement and Impact

U of T in the City



More than
200

U of T faculty members are engaged in a wide variety of cities-focused research and teaching

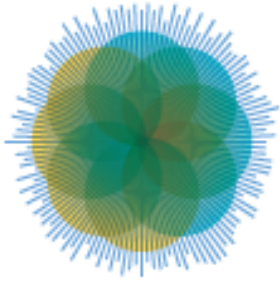
U of T researchers are having an impact beyond the university.

In 2019:

- U of T's School of Cities established the **Community-Builders Fellowships** and partnered with the United Way to develop neighbourhood change in the Toronto region.
- U of T student researchers helped to **make Toronto more sustainable, equitable and accessible.**
- U of T experts at **Collision Conference.**
- U of T scholars at **CRAM.**



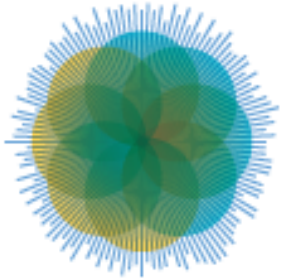
Partnering with Communities



U of T is the place for community engagement and impact.

- In 2019, the VPRI announced the awards for the inaugural Community Partnership Research Program competition.
- The successful applications included projects focused on Indigenous research, HIV prevention and rehabilitation, sports engagement and youth housing.
- Additional funding was awarded to support emerging sustainability partnerships in collaboration with UTM.
- We have recently launched another Community Partnership Research Program competition and created an additional program to support the development of Indigenous research partnerships.

President's Impact Awards & President's Impact Academy



Celebrate and honour faculty members whose research has led to **significant impact beyond academia.**

2020 Award Winners:

- Audrey Macklin (Law)
- Tom Chau (Applied Science & Engineering)
- Barbara Fallon (Social Work)
- Stephen Hwang (Medicine)
- Anna Shternshis (Arts and Science)



Audrey Macklin
Law

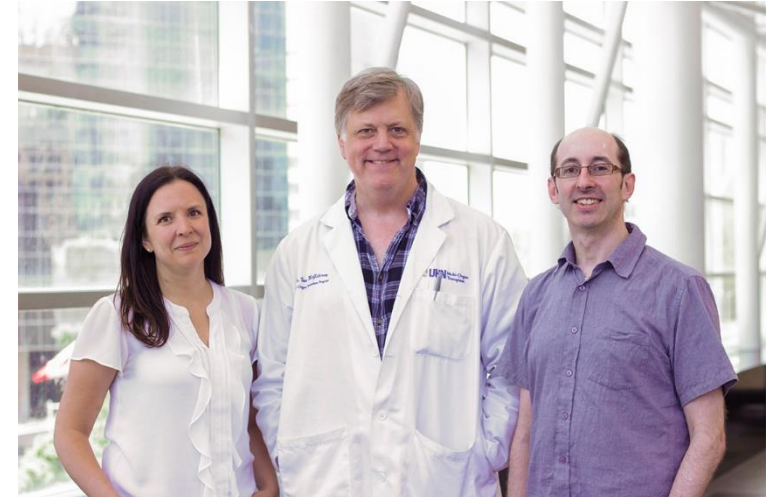


Tom Chau
Applied Science &
Engineering

National and International Collaborations



U of T researchers lead CIFAR interdisciplinary research programs



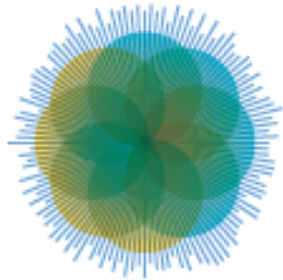
Collaborating to map the human liver



Behavioural economics research partnership



Location-based storytelling app 'Hidden Florence'



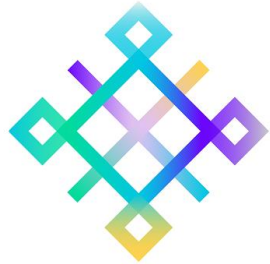
12%

of all new SSHRC Partnership Grants funding secured by U of T



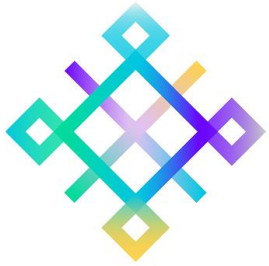
Equity, Diversity and Inclusion

Equity, Diversity and Inclusion in Research and Innovation



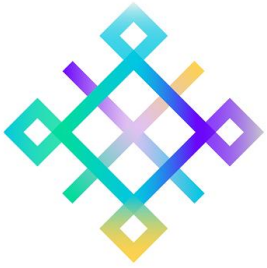
- A commitment to equality, diversity and inclusion is central to U of T's public mission.
- U of T supports the federal government's new EDI initiative. In 2019, U of T **signed onto the Dimensions Charters** as one of 23 affiliated institutions.
- **Committee on Equity, Diversity and Inclusion in Research and Innovation:** In 2019, the Committee held its inaugural meeting.
- **Indigenous Research Action:** In 2019, Professor Suzanne Stewart was appointed as the Academic Advisor on Indigenous Research.

CRC Federal Targets for U of T 2017-2019



- U of T is surpassing the Canada Research Chairs equity targets for all four federally designated groups.
- Achieved the national target of 32% for women. **U of T is at 40%.**
- Achieved the national target of 15% for visible minorities. **U of T is at 23%.**
- Achieved the national target of 4% for persons with disabilities. **U of T is at 5%.**
- Achieved the national target of 1% for Indigenous peoples. **U of T is at 3%.**

Responding to EDRI Working Group Recommendations



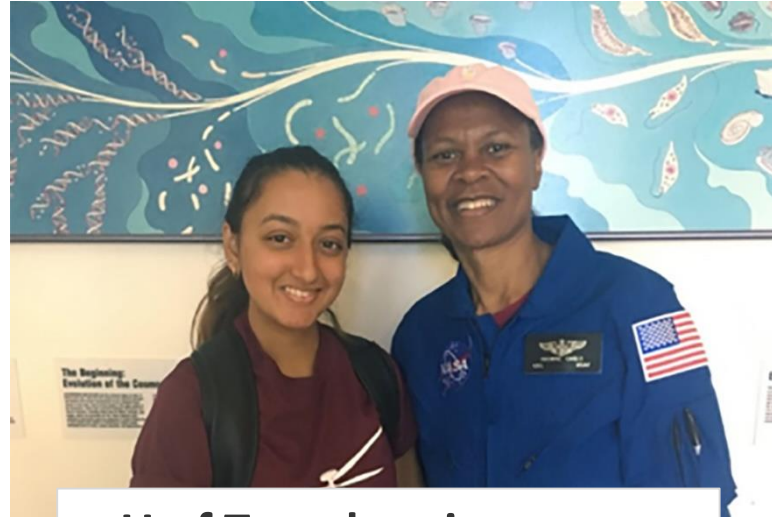
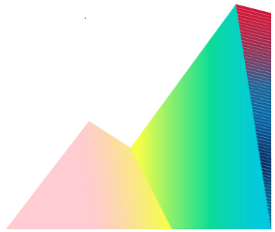
In 2019:

- VPRI organized and hosted two workshops:
'EDI in Research Teams and HQP Training'
'Diversity in Research Design'.
- VPRI and the Toronto Academic Health Science Network Research Committee co-organized a workshop — 'Putting Equity, Diversity and Inclusion into Practice'.
- VPRI created an internal funding program for community-based research ([recommendation #37](#)); the first recipients of the Connaught Fund Community Partnership Research Program were [announced](#).
- VPRI continues to [integrate EDI considerations into the administration and adjudication of internal funding programs](#).



Student Experience

Student Research



U of T student interns at NASA Ames Res Centre



UTM students present at Intl. Astronautical Congress



U of T students work with Amnesty International

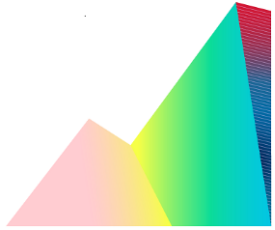


U of T grads in world's largest refugee settlement

\$1.2M

from Connaught
Fund for Graduate
Scholarships

Student Entrepreneurship



87

companies have entered the UTEST program since 2012. They have raised \$100M in 2019 alone.

SoluSave, STP Sports, Circular Toys: U of T's first-ever Sustainability Innovation Prize



Undu
world's thinnest pain-mitigating wearable hot water bottle





Serving the U of T Community

Serving the U of T Community

Each year VPRI manages, negotiates and supports a large research and innovation enterprise at U of T.

And offers 250+ workshops and info session to support these activities.

Research Funding

2,700

principal investigators

4,000

new funding applications

\$500M

in funding awarded

9,000

research funds

1,000

sponsors

350+

private sector partners

1,900

funding programs

Innovation & Entrepreneurship

180

invention disclosures

75

priority patent applications

35

licensing and option agreements

250

commercialization projects

300+

student-led startup teams/companies

\$150M

annual startup investment

\$10M

annual sales by startups

Oversight and Compliance

35

external audits

8,270

financial reports

1,600

human ethics protocols

850

animal ethics protocols

150

post - approval reviews

200

lab assessments for animals

14,700

personnel trained in EH&S programs

1,100

lab safety inspections

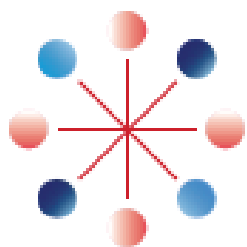
425

worksite assessments

1,100

occupational health assessments

Research & Innovation Landscape



4,000

new funding applications approved

2,450

Ethics protocols reviewed

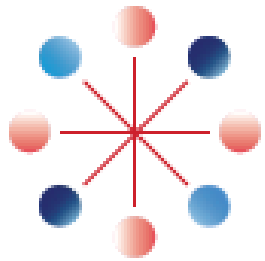
250

commercialization projects managed

In 2019:

- Implemented new, Principles-Based Tri-Agency Guide on Financial Administration.
- VPRI organized a collaborative workshop with the Centre for Community Partnerships to explore tools and resources to design and evaluate community-based research.
- U of T checklist to spot deceptive publishers and "predatory" journals.
- U of T – SOSICIP: "first-in-Canada" industry-led AI innovation platform.

Community Service Innovations



Project RAISE – Expansion of My Research Applications (MRA) to include non-funded research agreements, e.g., confidential disclosures, material and data-transfer agreements.

The **Strengthening Administration of Research (STAR) program** hosted its fifth annual **STAR conference, Navigate and Network**, attended by over 200 members of the U of T research and innovation community. The importance of EDI in research and innovation was included as a session at the Conference.

New Research and Innovation Website.

Online, searchable **Honours and Awards Database.**

Research & Innovation Support

Researcher-centred, practical, and focused on supporting researchers, innovators and divisional research offices.

Centre for Research Support and Innovation (CRIS)



- Events & Calendar
- Research Roundup
- Spotlight
- Resource Hub

<https://cris.utoronto.ca>