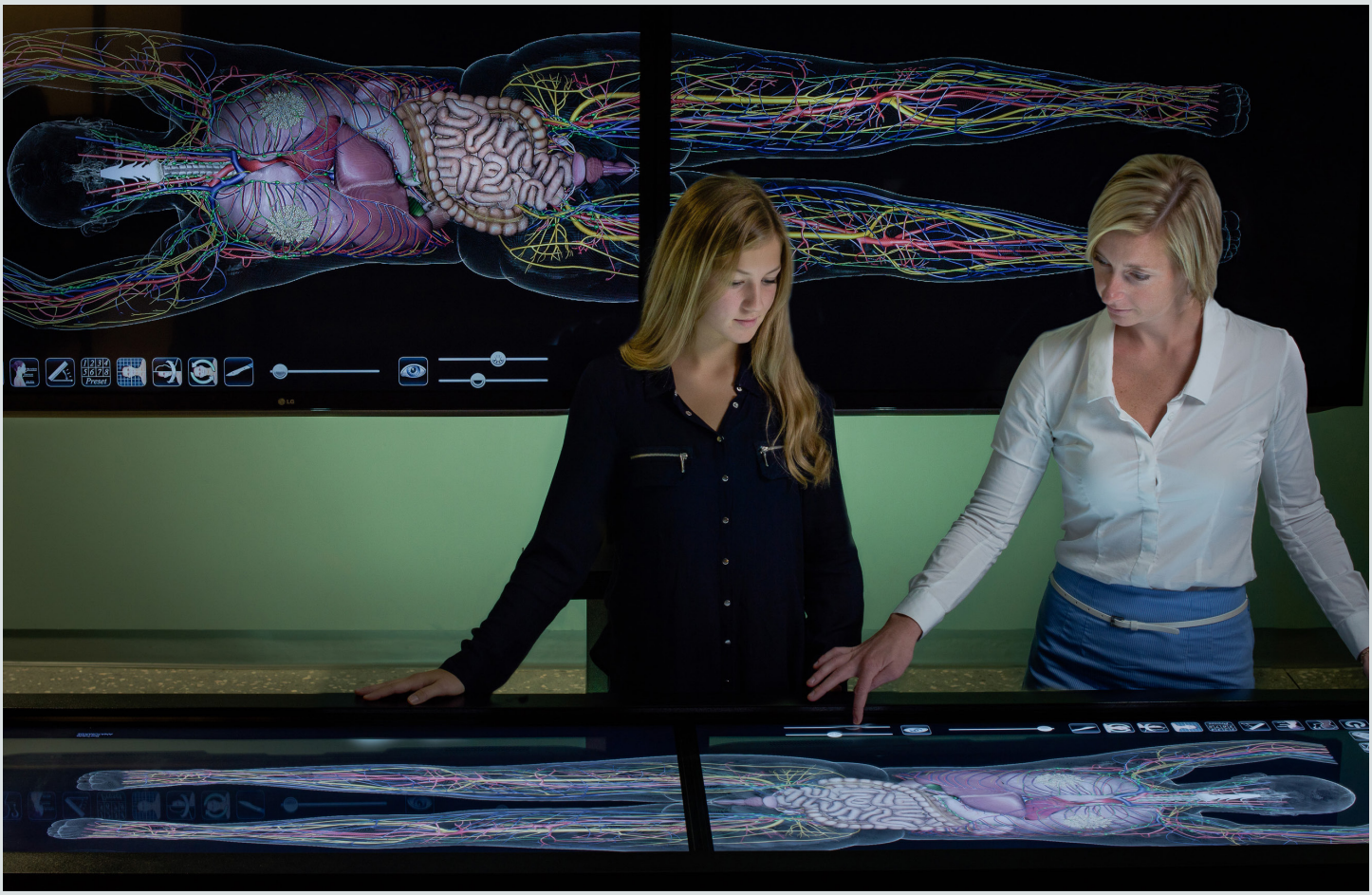
Universities Canada's response to the Government of Canada's Review of

Federal support for fundamental science

Universities Canada.

September 2016



Introduction: Mobilizing people and ideas

Universities Canada welcomes the Government of Canada's review of federal support for fundamental science as a tremendous opportunity to assess the strengths of our research ecosystem and to identify where greater supports and new orientations will enable Canada – and Canadians – to thrive in our increasingly complex and interconnected world.

Research produces knowledge that enhances Canada's society and economy. By contributing to better health outcomes, a cleaner environment or effective integration of newcomers, Canada's universities are helping build a thriving and just society through the mobilization of people and ideas.

Fundamental science is inclusive of *all* disciplines, spanning the natural sciences, engineering, health sciences, social sciences, arts, humanities and design. Research across these fields produces knowledge that improves Canadians' quality of life and contributes to the public good at home and abroad. Through support across disciplines, Canada's universities will help build an inclusive, innovative and prosperous Canada – and world.

This review offers an opportunity for Canada to be ambitious: to address the funding gap and enhance our competitive position for global research excellence; to build on existing strengths to boost Canada's global scientific leadership; and to enable Canada's researchers to partner with the best minds around the world.

To achieve these goals, Universities Canada makes the following recommendations to the science review panel:

Mobilizing discovery and ideas:

- Position Canada to be a globally competitive research leader and regain third position in the OECD for higher education expenditures on research and development (HERD) as a percentage of GDP by making transformative investments in discovery research through the federal research granting councils.
- Maximize universities' impact as drivers of innovation by supporting the full costs of university research.
- Strengthen Canada's capacity to innovate, compete and prosper by providing sustained and predictable annual funding to the Canada Foundation for Innovation to support its current suite of programs, and by mandating the CFI to lead the development and implementation of a national strategy for big science.
- Remedy gaps in Canada's research ecosystem through new support mechanisms to promote and enable greater cross-border and cross-disciplinary collaboration.
- Enhance effectiveness and impact by achieving greater alignment and coordination among the granting councils.

Mobilizing talent:

- Enable Canada's universities to attract, retain and mobilize the world's top researchers through smart immigration policies and practices.
- Advance equity goals at all levels and in all disciplines of our research ecosystem through measures to increase the participation of women, Indigenous scholars and other underrepresented groups.
- Mobilize emerging talent by supporting early-career researchers through granting council funding.

The changing global research landscape: Opportunities for Canada

Canada's universities are known for conducting world-class research. Globally, we punch well above our weight in output: we rank sixth in terms of average citation levels across all fields among the top scientific countries and produce four per cent of the world's scientific papers despite representing only one percent of the world's population.[1] Canada's universities are also a powerhouse of research and development activities, performing 40 per cent of the nation's total R&D, valued at $13 billion each year.[2]

However, the social, economic, technological and health challenges facing Canada and the world are increasingly global in nature. No one discipline or country can solve the challenges that stem from an increasingly interconnected global economy and population on their own. Canadian researchers must be well-positioned to work with partners in other countries to provide rapid responses to pressing global issues, while also engaging in long-term research to address societal challenges that affect us all. We must equip Canada's universities – and their talented researchers and students – with the necessary resources to be able to adapt and thrive given the dynamic nature of contemporary research.

Along with the science review, the federal Advisory Council on Economic Growth and the Innovation Agenda – when taken together – provide a significant opportunity to set an ambitious and integrated agenda for Canada's inclusive, innovative and prosperous future. Please note our submissions to the Innovation consultations and to the House of Commons Standing Committee on Finance.

Canada's universities are committed partners in advancing this bold agenda for Canada. Working in partnership with government, private and community sector leaders, and other educational organizations, we aspire to:

- Help address the grand challenges facing our country and the world, such as climate change, reconciliation, inequality and poverty;
- Serve as engines of growth and innovation in our communities, conducting research that can be leveraged for long-term prosperity, social cohesion and job creation;
- Ensure 100 per cent of Canadian undergraduate students have the opportunity to pursue a work-integrated learning experience before they graduate, including co-ops, internships and research opportunities;
- Enable all Canadian university students to develop intercultural skills and a global mindset before they graduate; and
- Significantly reduce the gap between the university participation rate of Indigenous and non-Indigenous Canadians and build the capacity of Indigenous faculty and researchers.

"Don't look at Canada as it is today but as it will be tomorrow, and at what it will take to maintain your achievements and values in a completely different environment."

Manuel Trajtenberg, former chair of Israel's Planning and Budgeting Committee of the Council for Higher Education, at Universities Canada's Innovation Policy Dialogue

[1] Council of Canadian Academies, State of Science and Technology of Canada, 2012

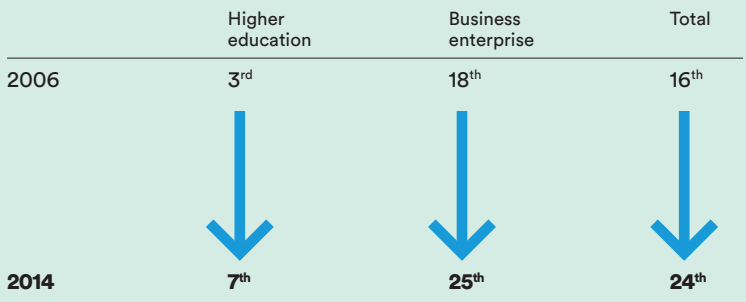
[2] Statistics Canada, Gross Domestic Expenditures on Research and Development in Canada, 2015

Mobilizing ideas: Supporting an effective and globally competitive research ecosystem

Over the last 20 years, Canada has made remarkable strides in expanding access to higher education, creating a new generation of world-class researchers and developing state-of-the-art research facilities. Investments from the past two decades are now bearing fruit and Canada is globally competitive in a diverse range of research areas. For example, the Council of Canadian Academies found that Canada excels globally in research in clinical medicine, historical studies, information and communication technologies, physics and astronomy, psychology and cognitive sciences, and visual and performing arts.[3] Moreover, Canadian researchers were awarded 24 major international scientific prizes in 2015 alone.

However, the pace of federal investments has slowed considerably over the past decade and Canada has not kept up with other nations' growth levels. Between 2006 and 2014, Canadian higher education expenditures on R&D as a percentage of GDP (or HERD) fell from third to seventh among OECD nations. Canadian business investment in R&D also declined from 18th to 25th during this period.[4]

Eroding competitive advantage in R&D investment
R&D expenditures by sector as a share of Gross Domestic Product (GDP), 2006 & 2014



Research Intensity measures from the OECD Main Science and Technology Indicators (2006, 2014)

From butterfly wings to anti-counterfeit technology: Partnering to commercialize materials science research

University researchers at Simon Fraser's 4D LABS have developed a new nanotechnology, by studying the tiny holes on a butterfly's wings, which can be used to produce images that can't be copied or scanned, making it an ideal anti-counterfeiting security technology. This technology was most recently used as a security feature on tickets for the Union of European Football Associations, and has lead to the creation of a company that now works with a number of central banks to provide enhanced security to currency.

"Breakthroughs happen when brilliant minds are given the freedom to probe the nooks and crannies of reality – when exceptional people ask fundamental questions about the deepest problems and make extraordinary discoveries that benefit us all."

Bill Downe, chief executive officer of BMO Financial Group, *The Globe and Mail*

[3] Council of Canadian Academies, State of Science and Technology of Canada, 2012

[4] OECD, Main Science and Technology Indicators

Investing in discovery research

Canada's universities make essential contributions to our national innovation system, from conducting discovery-driven research to partnering with industry to develop new and improved ways to manufacture products, develop resources and deliver services. Universities are key economic drivers of regional and national prosperity. University researchers collaborate on more than $1 billion worth of research with community and non-profit community groups every year and conduct almost $1 billion worth of research in collaboration with the private sector annually[5], providing the "intellectual raw material" that drives innovation and builds prosperity.

A foundational element of our successful research system is significant and sustained investment for all fields of research in the natural sciences, engineering, health sciences, social sciences, arts, humanities and design. Support across these fields is essential to maintaining a robust and healthy research ecosystem. In particular, considering that over half of Canada's postsecondary students and full-time faculty work in the social sciences and humanities, yet they receive only 15 per cent of federal grant dollars, significant growth in investment for these disciplines is needed to address Canada's grand challenges.[6]

- **To strengthen our global research excellence and return Canada to globally competitive funding levels, Universities Canada recommends transformative investment in discovery research through the federal granting councils.**

The key challenge in our ecosystem is a funding gap. Sustained new investments must be made; other changes may be useful, but are simply tinkering at the margins. Setting an objective of returning to third place in competitive funding levels (HERD) will be a signal – in Canada and internationally – that Canada is serious about the research and innovation enterprise and will better use the capacity of Canada's researchers and universities to achieve their full potential.

Global lessons:

Strong national investments in discovery research

From 2010 to mid-2017, the French government is investing $70 billion CAD into the Investments for the Future Program (PIA), which includes significant support to research, higher education and training through excellence initiatives, cutting-edge infrastructure and programs designed to promote multidisciplinary projects and partnerships with the private sector, along with other industrial sector and digital economy investments. The fund operates with the understanding that strategies to foster innovation, economic growth and job creation must be built from a platform of research excellence.

"A big part of developing know-how is creating a workforce that includes people who can research not only the science of things, but the science of people and peoples; their needs, motivations, fears, limits and potential."

Stephen Toope, former president of UBC, current president of the Federation for the Humanities and Social Sciences and director of the University of Toronto's Munk School of Global Affairs, and incoming vice-chancellor of the University of Cambridge.

[5] Statistics Canada, Gross Domestic Expenditures on Research and Development in Canada, 2015

[6] Statistics Canada, University and College Academic Staff System (UCASS) and Statistics Canada, Postsecondary Student Information System

Supporting the full costs of research

Canada's universities make critical contributions to our economic growth and social progress. To provide these vital benefits, universities must develop and maintain the full range of supports that global research excellence requires. Many of these supports, including laboratories, libraries, custodial services, security, utilities and administrative and support staff, cannot be directly allocated to the budget of any specific research project, leading them to be referred to as indirect costs. These indirect costs are real expenses that significantly impact scientific output and must be covered by a university to provide a viable environment for its researchers.

In the 2014 evaluation of the federal Indirect Cost Program, it was noted that indirect costs in Canada represented 40 to 60 per cent of the federal grant-supported research.[7] However, in 2016, the ICP (now Research Support Fund) only funded institutions at an average of 21.4 per cent of their actual expenses with some institutions receiving less than 18 per cent of their costs.[8] Institutions must absorb the remainder of the costs at the expense of supporting other activities, such as support for early-career researchers or maintaining or upgrading other research and teaching facilities.

- **Universities Canada recommends that to achieve transformational research breakthroughs, funding must cover the full costs of research, including indirect costs.**

Previous governments have been reluctant to address the issue – and the problem has worsened. Some have suggested new formulas to address disbursement of the existing funds, when the critical shortfall is in the amount of available funding.

Sustaining world-class research infrastructure

The Canada Foundation for Innovation is a vital element of the Canadian research funding ecosystem. Since its creation in 1997, it has fulfilled a critical role that falls outside the tri-agencies' mandate: to ensure universities across the country have access to state-of-the-art research facilities and equipment in order to pursue world-class science.

However, the CFI lacks a regular funding envelope, preventing the organization – along with the universities and researchers it serves – from being able to undertake long-term infrastructure planning. A commitment to Canadian science and innovation requires a stable domestic funder of world-class research infrastructure that complements and is coordinated with tri-council research funding.

- **Universities Canada recommends sustained, predictable, multi-year funding for the Canada Foundation for Innovation to support its current suite of programs.**

The Research Support Fund: Opportunities lost

The November 2005 Economic and Fiscal Update proposed by the federal government was to provide almost $1.2 billion in additional funding over five years for the Indirect Cost program (bringing indirect payments to institutions to a minimum of 40 per cent). Had this payment level been honoured and continued, Canada's universities would have received an additional $2.7 billion dollars to support the unfunded costs of research undertaken over the last decade.

The Canada Foundation for Innovation: Transforming Canada's research landscape

From 1997 to 2015 more than $6.6 billion in support was provided to 9,111 projects at 145 institutions across Canada.[9] Of this funding, 77 per cent was allocated towards research infrastructure, with the remaining 21 per cent towards operations and maintenance costs.[10] The CFI continues to have a transformative impact on the Canadian research landscape from providing state-of-the-art infrastructure to attract international research collaborations, to its contribution to the development of world-class expertise in communities across the country and the support it provides to private-sector innovation and commercialization. These contributions have established Canada as a home to world-class facilities and world-leading research.

[7] Goss Gilroy Inc., Tenth-year Evaluation of the Indirect Costs Program, 2014

[8] Universities Canada calculation

[9] The CFI, Report on Results 2015, September 2016

[10] The CFI, Usage of CFI-funded infrastructure, July 2015

Advancing a roadmap for big science

The Government of Canada has made important investments into world-class research facilities for big science in astronomy, health, physics, ocean and Arctic research in recent decades. While these initiatives have had a strong impact on the development of Canada's research efforts, the current landscape for investments in large-scale research infrastructure entails a multi-funder system that is decentralized and largely ad-hoc. We need a national policy framework to consider, evaluate and oversee these activities. The CFI is well placed to take a leadership role given its experience in administering evidence-based decisions on project funding and in ensuring appropriate oversight on project governance, management and operations.

A big science roadmap will enable Canada to strategically coordinate large-scale science activity across the country and present the Canadian and international research community with a forward-looking plan. A Canadian roadmap should be elaborated with the engagement of key stakeholders from across the research system and incorporate a number of principles, including:

- the importance of merit and peer review in decision-making;
- support for the full costs of construction, operation and maintenance, capital upgrades and decommissioning plans over the duration of a facility;
- consideration of the needs of diverse disciplines and research communities with different levels of resources, needs and priorities.

- **Universities Canada recommends that a big science framework be developed and implemented by the CFI in consultation with key stakeholders from across the research system – especially universities that house big science facilities on their campuses.**

Coordinating a digital research infrastructure strategy

A strong national research ecosystem also requires a coordinated digital research infrastructure strategy. Canada's current DRI system is complex and fragmented, due in part to a diffuse delivery system with unaligned funding structures, and a lack of coherent system-wide planning.

For Canada's universities to be globally competitive and for graduates to develop the necessary digital skills, Canada needs to develop a DRI strategy that is data-centric; restructures and streamlines the DRI delivery system; and is based on a governance structure focused on collective and coordinated action. This will need to include alignment and cohesion among a broad spectrum of players, and policy and planning for the overall digital research environment system.

- **Universities Canada supports the Government of Canada's efforts to address the DRI needs of the research community across Canada, and is an active participant of the Leadership Council for Digital Infrastructure working to inform the government's strategy.**

Global lessons:
Predictable and sustainable research infrastructure funding

In countries such as the United States and the United Kingdom, research infrastructure is funded through sustained funding envelopes administered by national agencies. This stability affords researchers greater flexibility in planning long-term infrastructure strategies.

Global lessons:
Developing a national strategy for big science

A 2014 report on enhancing the U.K.'s big science impact agenda found that a distinct aspect of successful big science was its connection to domestic large-scale infrastructure. Available facilities and infrastructure greatly influenced the roll-out of big science initiatives, highlighting the natural connection between domestic infrastructure decisions and national big science development.[11]

Australia's National Collaborative Research Infrastructure Strategy is the result of a 2004 task force on national research infrastructure. The task force identified the need for a collaborative, rather than competitive approach to planning medium to large research infrastructure investments in Australia. Since 2004, through a series of roadmaps for infrastructure investments, the Australian Government has invested $3 billion to deliver world-class research infrastructure. Going forward, the Government's National Innovation and Science Agenda is allocating $1.5 billion over 10 years to NCRIS.

[11] Department for Business Innovation & Skills, Innovation from big science: Enhancing big science impact agenda, March 2014

Creating new mechanisms to advance global research partnerships

Researchers around the world must work together to provide rapid responses to pressing global issues, while also engaging in longer-term research to address societal challenges that affect us all. This was the consensus of heads of research funding agencies from around the world at a roundtable organized by Universities Canada and the Canada Foundation for Innovation during the 2016 American Association for the Advancement of Science conference.

The world wants to partner with Canada, and our researchers co-publish with thousands of institutions in more than 180 countries around the world.[12] Yet, we could do more. Canada lacks a dedicated, robust and flexible mechanism to respond effectively to other countries' interest in research collaboration and to advance our own strategic priorities. For example, the largest research funding program in the world, the European Union's *Horizon 2020*, has named Canada as a target partner for several research areas and has backed this commitment with funding. Other countries, including Israel, Germany, France, India, Brazil, China and Mexico have all also signaled concrete interest in increased strategic collaboration with Canadian researchers. To our detriment, we have not been able to respond.

- **Universities Canada recommends the creation of a new, nimble international research collaboration tri-agency fund to bolster Canada's position as a partner of choice for research collaboration while supporting our researchers' ability to respond to global opportunities.**

Such a fund should enable researchers to respond to timely and urgent international research opportunities that align with Canada's domestic and international priorities. It should also support Canadian involvement in projects with other national/regional agencies (such as *Horizon 2020*), and support pre-research activities (i.e. workshops, dissemination events, conferences, researcher travel grants) to develop collaborative international projects. Such a new global research fund will also enable Canadian researchers to work more closely with experts from around the world and enhance early-career mobility.

Global lessons:
Increasing international rapid response opportunities for Canadians

The U.S.'s National Science Foundation employs a special 'RAPID response' funding mechanism designed for proposals having a severe urgency with regard to the availability of data, facilities or specialized equipment, including quick-response research on natural disasters. The NSF will support collaborative projects with other countries through this initiative but will only fund the American portion of the collaboration.

"[International research collaboration] also creates its own climate of opportunities where researchers come into contact with each other, where they get to know different methodologies and approaches, and where they enjoy the freedom to try new ideas which may sound unconvincing to others, but which leads to major new insights and innovations."

Peter Strohschneider, president of the DFG (Deutsche Forschungsgemeinschaft, German research funding organization), at Universities Canada's Innovation Policy Dialogue

[12] Universities Canada, Canada's Universities in the World: AUCC Internationalization Survey, 2014

Supporting research collaboration at the intersection and frontiers of disciplines

Many of the most pressing challenges facing our country and world, such as climate change, infectious diseases, reconciliation and addressing poverty and inequality, ask questions that fall in the gaps between funding agencies' purviews. Currently, there are significant barriers facing Canadian researchers wanting to engage in multi-disciplinary research initiatives, both small and large-scale. As the Global Research Council's 2016 'principles on inter-disciplinarity' highlight, granting councils have a critical role in creating funding, policy and programming environments that promote the growth of multidisciplinary teams and enable joint initiatives across traditional funding agency divides.

- **Universities Canada recommends additional support be provided for multi-disciplinary research to enable Canadian researchers to work in partnership across disciplines on pressing global challenges.**

Different approaches could be considered to achieve this objective. For example, greater support for multidisciplinary research within existing council programs or a new tri-agency shared fund for multidisciplinary research projects.

Within these multidisciplinary approaches, particular support is needed to ensure perspectives from the social sciences and humanities are brought to bear on our greatest challenges. In helping us understand one another better and to design more effective institutions and equitable policies, their contributions are vital.

With respect to peer review, new approaches are also needed to develop a cohort of peers able to assess multidisciplinary research beyond the confines of established disciplinary norms.

Enhancing alignment across the granting councils

To address grand challenges at home and abroad, and facilitate multidisciplinary research while remaining coordinated and aligned with respect to social priorities, Canada's federal granting councils, and the Canada Foundation for Innovation, must work more closely together.

- **Universities Canada recommends that the granting councils be encouraged to achieve greater alignment and coordination, particularly with respect to supporting and evaluating multidisciplinary research, supporting international collaboration and ensuring council programming is linked with research infrastructure/operating costs.**

Helping integrate young Syrian refugees: Social science research in real time with real impact

Dalhousie professors have established a cross-Canada research coalition to examine the integration of Syrian refugee children in the country – responding to government priorities. These researchers are now also partnering with counterparts in Germany – another major resettlement country – to share knowledge and best practices, and develop evidence-based resettlement supports. The burgeoning multidisciplinary and international partnership offers a chance for researchers in the two countries to develop collaborative projects and initiatives as their countries work to meet the needs of the thousands of newly arrived young people. The proposal went from idea to reality in 10 weeks, and now involves more than 80 partners in Canada.

Global lessons:
Growing support for multi-disciplinary and internationally collaborative research

In 2015, the U.K. government proposed enhanced investments for more collaborative forms of research with $2.18 billion CAD for a new five year 'Global Challenges Research Fund' and the creation of a unique envelope for multi-disciplinary science that will be administered through the Research Councils and national academics.

In June 2016, the German federal and state governments agreed on an 'Excellence Strategy' which included $560 million CAD to fund major inter-disciplinary research projects in internationally competitive fields to become 'Clusters of Excellence.' Funding is set to begin January 1, 2019.

Mobilizing talent: leveraging our greatest asset

To maintain and develop excellent research, Canada must advance a talent agenda that supports and leverages our greatest asset: people. Through the training of our new generation of researchers, Canada's universities harness the creative capacity of Canadians and develop knowledge that advances the frontier of knowledge. To further this role, we recommend the following measures:

Adopting smart immigration policies

Canada's universities play a critical role in attracting top researchers to our communities, directly strengthening our research capacity, our international research connections and our innovative potential.

Universities also draw some of the best and brightest international students, who contribute over $10 billion to the Canadian economy each year.[13] Many of these students would like to remain after their studies, transitioning into productive members of the Canadian labour force with valuable people-to-people ties that assist in trade linkages, foreign direct investment and private sector partnerships.

We need smart immigration policies and best-in-class processes to position Canada as a global magnet for this top talent.

- **Universities Canada recommends reducing unnecessary barriers to bringing top research talent into the country, such as simplifying the process for temporary work permits under the International Mobility Program and Temporary Foreign Worker Program, and eliminating the LMIA requirement in the Express Entry points system.**
- **We recommend that Canada sets the bold policy objective of becoming the fastest in the world for international student visa processing.**

Building an equitable academy

As we strive to have an academic workforce that reflects the diversity of Canada's population, women, Indigenous peoples, visible minorities and people with disabilities continue to be under-represented within university faculty, staff and student populations.

For example, the chart on the next page illustrates that while women are over-represented within the undergraduate population, they represent slightly more than a quarter of full professors and a fifth of university presidents.

Global lessons:

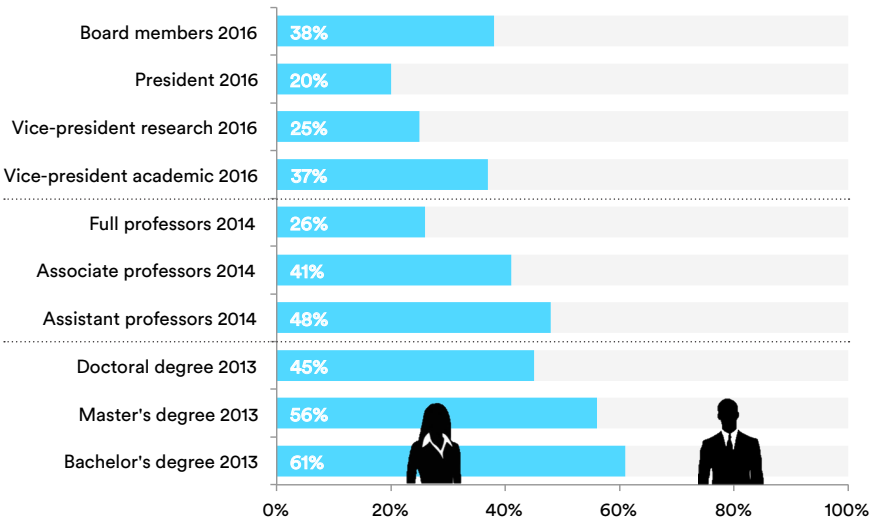
Trends in inter-agency harmonization and coordination

The Danish Research Council organized an international evaluation panel to examine its Danish Council for Independent Research. A key finding of the panel's report was that the communication between its five funding agencies should be improved, including expanding the recently-created 'matrix committee' designed to evaluate inter-disciplinary proposals. It noted that further steps should include a more extensive agency use of review panels with multidisciplinary representation.

[13] Global Affairs Canada, 2016

This is the ungrouped slide

Percentage of women in Canadian universities [14]

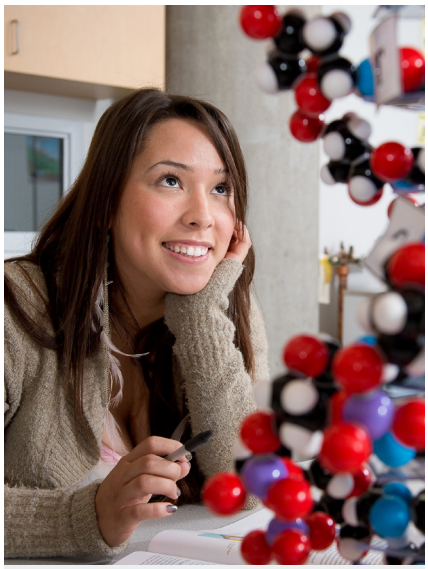


Canada's universities have adopted a number of initiatives to advance equitable representation among students, faculty and staff, including research chairs. However, there are opportunities to scale-up existing efforts to make further progress.

Universities Canada is developing strategic options for how we, as a membership association, can contribute to institutional efforts to advance equity in Canadian academia. Discussions between the Natural Sciences and Engineering Research Council and Universities Canada have also been initiated to raise the profile of these issues at the Gender Summit in 2017.

- **To leverage these actions, Universities Canada recommends that a new tri-council funding program across all disciplines be designed to address diversity issues within the Canadian academy.**

This program should build on a body of evidence about what programs provide real change in advancing underrepresented groups, and could be similar to the National Science Foundation's ADVANCE program in the United States that aims to increase the representation and advancement of women in academic science and engineering careers. As of 2014, ADVANCE had awarded more than 297 grants to 200 institutions for a total of about $215 million US in funding, which universities have used to launch large-scale institutional change projects as well as specific strategies including data collection, mentoring for department chairs and strategies aimed at re-shaping the work climate for women.



[14] Universities Canada's lists of staff at member institutions (2016); National Faculty Data Pool (2014); and Statistics Canada, Postsecondary Student Information System (2013)

Supporting Indigenous scholars

The Indigenous community in Canada is young, full of potential and growing quickly, but also faces significant barriers to joining and succeeding in Canada's research enterprise. Only 11 per cent of Indigenous people aged 25 to 34 in Canada have a university degree, compared to 33 per cent of non-Indigenous Canadians in the same age group.[15] If we consider graduate attainment rates alone, these numbers are much lower with only 1.4 percent of Indigenous people having a graduate degree.[16]

Investment and support are needed to increase Indigenous student access to undergraduate, graduate and postgraduate studies. These graduates will become the next generation of Indigenous leaders, including a new cohort of Indigenous researchers and faculty. Education plays a vital role in the reconciliation process with this new cohort of Indigenous researchers, faculty and graduate students helping ensure the places they work and study are reflective of their cultures and peoples.

- **Universities Canada recommends enhanced support through the federal granting councils to enable more Indigenous students to pursue graduate and postgraduate studies.**

Incorporating the unique perspective of Indigenous scholars in research will also require granting councils to facilitate ongoing partnerships with Indigenous communities and seek to incorporate insights from traditional forms of knowledge. The Social Sciences and Humanities Research Council has made important strides in this respect, such as with its Indigenous protocol.

Developing promising new research careers

Utilizing the potential of Canada's newly trained PhDs is an important factor in developing a strong research ecosystem. As significant numbers of faculty members past 65 are not retiring, it is sometimes difficult for institutions to hire young faculty.[17] The number of assistant professors in Canada has been declining steadily since 2007.[18] The pipeline for research talent is cut short when PhDs and postdocs cannot get their first appointment and are unable to access granting council funding.

- **Universities Canada recommends additional support be provided for early-career researchers as part of enhanced investment for discovery research through the granting councils.**

Measures that enable recent PhDs and postdocs to be hired in their early post-graduation years, with guarantee of funding upon completion by universities, would enable Canada to address diversity goals and mobilize emerging but underutilized talent. Past models worth considering in this respect include the Women's Faculty Awards and University Research Fellows.

"The next scientific revolution will be driven by scientists who have a multidisciplinary view of science, the opportunity to take risks, the infrastructure to work, and the freedom to think."

Amir Naiberg, president, Yeda Research and Development Company, Weizmann Institute of Science, Israel, at Universities Canada's Innovation Policy Dialogue

[15] Statistics Canada, National Household Survey, 2011

[16] Idem

[17] Statistics Canada, University and College Academic Staff System (UCASS) and National Faculty Data Pool

[18] Idem

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A vision for the future of Canadian research

The federal review of fundamental research provides a tremendous opportunity to develop a bold and ambitious strategy for Canada. By recognizing our assets and leveraging our current strengths, Canada can bolster its capacity for global leadership and excellence in a wide range of research fields.

To achieve this vision, we must invest in and mobilize Canada's people and ideas.

An innovative, inclusive and prosperous Canada depends on a dynamic and excellent research ecosystem. Supporting this will require transformative investments in the federal granting council programs with the goal of returning Canada to third place in global HERD intensity rankings.

We must also recognize the unique impact of the CFI to our national research efforts and provide sustainable, predictable long-term funding for research infrastructure.

Given the changing realities of our globalized and interconnected world, Canada must develop a supportive toolkit of policies and processes combined with dedicated funding envelopes to enable researchers to be both multidisciplinary and international in their research. The federal granting councils must have well-aligned approaches and flexible policies that facilitate and support such integrative and collaborative research efforts.

To continue to attract and support the talented researchers on Canada's university campuses, we must adopt supportive and complementary immigration policies, put in place mechanisms to spur real change with respect to equity goals, and enable underutilized early-career researchers to find routes towards promising careers in the academy.

As centres of learning, discovery and community engagement, Canada's universities are dedicated to their role in conducting research that can be leveraged for long-term prosperity, social cohesion and job creation.

Universities Canada is committed to working with the government to help build a balanced, productive, well-supported world-class research ecosystem. We share the government's ambitious vision of optimizing our fundamental science ecosystem to mobilize people and ideas to benefit all Canadians.