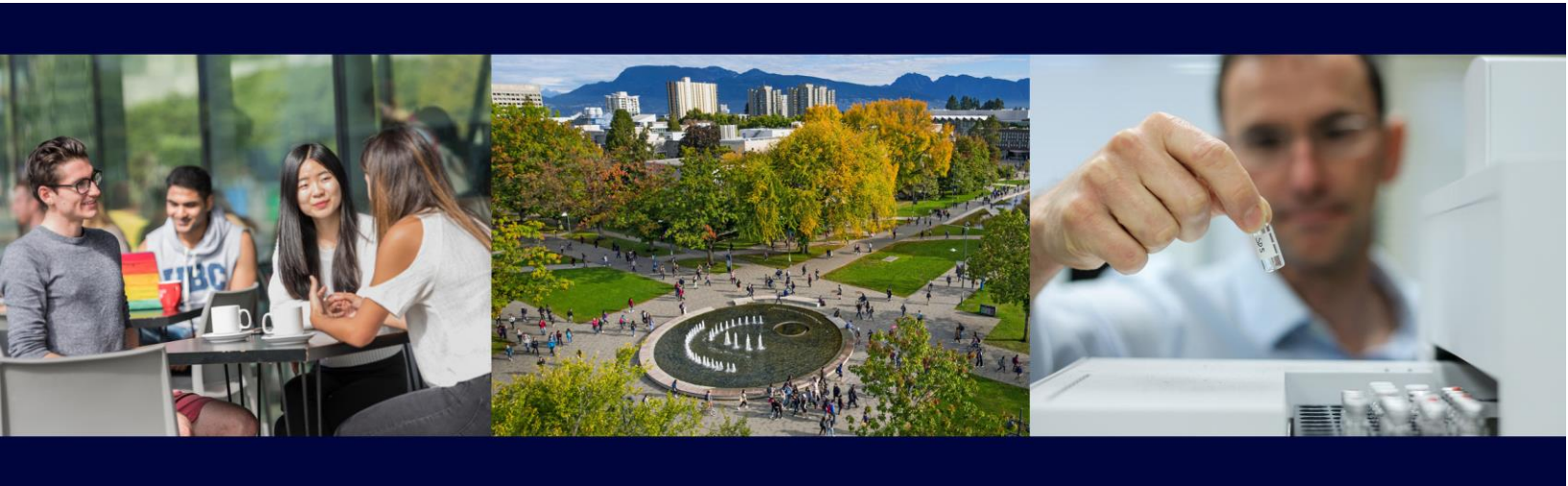




THE UNIVERSITY OF BRITISH COLUMBIA

## Submission to the House of Commons Standing Committee on Finance



4 August 2017

The University of British Columbia

## Introduction

The University of British Columbia is grateful for the Standing Committee on Finance's invitation to participate in its pre-budget consultations in advance of the 2018 budget. Responding to the committee's focus for this year's consultation, this submission makes recommendations to improve Canada's productivity and global economic competitiveness by investing in research, education and innovation.

Research and education pursued at UBC, and institutions across Canada, provide a foundation for innovation and help build a highly skilled and adaptable workforce—key ingredients for boosting Canada's long-term productivity and competitiveness. Government investments in a skilled labour force and R&D are widely recognized as fundamental to improving productivity. There are well-established links between spending in these areas and national levels of productivity. In its *Future of Productivity* report, the OECD argues that “public investment in basic research is required to support the continued emergence of breakthrough innovations, but both governments and the private sector are investing less in basic research,” and, further, that countries need “investments in R&D, skills, organisational know-how (i.e. managerial quality) and other forms of knowledge-based capital to enable economies to absorb, adapt and reap the full benefits of new technologies.”<sup>1</sup> Research and a highly educated workforce are, therefore, central to a productivity-focused policy agenda.

The Government of Canada has taken bold steps to create a more innovative economy and to raise the skill level of the Canadian workforce even further. Budget 2017 launched the *Innovation and Skills Plan*, including the Innovation Superclusters Initiative, investments in clean technology and artificial intelligence, streamlined innovation supports for Canadian companies, and new measures on workforce upskilling and educational affordability. The government also acknowledged the vital role of academic research in building a more inclusive and innovative economy by increasing the budget for the research granting councils in Budget 2016 and by launching Canada's Fundamental Science Review to guide future actions.

The release of the Science Review panel's report, *Investing in Canada's Future: Strengthening the Foundations of Canadian Research* (2017) marks a pivotal juncture for research and innovation in Canada. The report provides a clear roadmap for Canada to achieve global leadership in research and discovery. Never before have the Canadian public, the federal government and Canada's scientific community been presented with such a thoroughly researched and deeply considered set of recommendations to guide decision-making on science policy, programs and funding.

The Science Review makes it clear that Canada's research enterprise is fundamental to the nation's current and future prosperity. It argues that in order for Canada to remain a nation that can lead the world in the production of new knowledge, the federal government must improve governance and coordination across the national research system and re-invest in the core of Canada's science and research enterprise. While the report identifies alarming trends in the funding and governance of Canadian research, Canada nonetheless starts this proposed reinvigoration from a strong position: Canada's community of academic researchers produce some of the most impactful research in the world and our populace is among the most highly educated. These are perhaps our nation's greatest assets—the collective intellect and ability of Canadian society.

To truly capitalize on these strengths, Canada's researchers need to be given the tools and the freedom to pursue answers to the questions that matter most to them in their fields of inquiry.

Investigator-led inquiry has, for centuries, served as the basis for social and technological advancement. Curious and motivated researchers have created the very foundations for new technologies across all

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<sup>1</sup> “The Future of Productivity”, Joint Economics Department and the Directorate for Science, Technology and Innovation Policy Note. OECD. July 2015.

industry sectors. Electricity, the communications and the computing revolutions, transportation, the processing of natural resources, and the creation of new materials are all built upon decades and even centuries of accumulated knowledge. Similarly, advances in human health and medicine are based in large part on academic research, while the academy has been central in advancing civil and political rights and in forming and maintaining pluralistic, democratic societies.

While future revolutions, be they in medicine, clean energy, artificial intelligence or socio-political structures, are nearly impossible to predict, it is clear that the ‘miracle machine’ of scholarly inquiry<sup>2</sup> will continue to drive human advancement and prosperity.

With its global scientific leadership faltering, Canada is at a pivotal moment—we must choose to lead in expanding the horizons of human knowledge and, in turn, capture the benefits of discovery. The Government of Canada must recognize the national importance of the roadmap laid out by the Science Review. UBC recommends that Budget 2018 set Canada on a path for the type of sustained global leadership in research that will support productivity, competitiveness and prosperity.

While the Science Review report provides a comprehensive roadmap that should be implemented in its entirety, the areas requiring most urgent attention are:

1. Increase base funding for investigator-led research across Canada’s research granting councils and strengthen governance procedures and coordination accordingly.
2. Regularize research infrastructure funding under the Canada Foundation for Innovation, enabling it to support necessary research facilities and equipment at levels that are in step with granting council and other research funding bodies’ programs.
3. Improve equity and diversity among researchers across disciplines, including by developing and harmonizing best practices across the granting agencies.

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<sup>2</sup> “America’s ‘Miracle Machine’ is in desperate need of, well, a miracle.” *The Washington Post*. Eric S. Lander (President, MIT Broad Institute) and Eric E. Schmidt (Executive Chairman – Alphabet, parent company to Google), May 5, 2017.

## Recommendation #1

### Increase base funding for investigator-led research across Canada's research granting councils and strengthen governance procedures and coordination.

Canada is by no means a laggard in international scientific excellence. Canadian researchers' publications are cited at a rate 43 per cent higher than the global average and their collective scholarly output puts Canada consistently in the top six in the world in measures of research impact.

The Science Review, however, paints a concerning picture of the trajectory and current status of R&D funding in Canada. Canada's gross domestic spending on R&D has declined over the past 15 years, and, at 1.61 per cent of GDP, is now below the average and median of the 37 OECD countries. The impacts on Canada's research capacity are real; funding levels per researcher declined by nearly 30 per cent between 2009/10 and 2015/16, with funding for investigator-led and fundamental research impacted most heavily.

Other governments have recently made significant new investments in research and innovation. For example, the United Kingdom is increasing annual research funding by an additional £2 billion (CDN \$3.5 billion), their largest increase since 1979,<sup>3</sup> while China plans to more than triple basic science funding from \$10 billion in 2015 to \$35.5 billion in 2020 as part of a much larger expansion of the nation's R&D capacity.<sup>4</sup>

UBC encourages the government to heed the Science Review's recommendation to increase base funding for investigator-led research by \$485 million. This figure is roughly equal to 0.15 per cent of the \$317 billion of federal spending set out in Budget 2016, while spending on science and innovation as a whole currently represents 1.1% of federal spending. Increases for the granting councils' core research programs should be coupled with at least proportional increases to the Research Support Fund to help address major shortfalls in funding the full costs of research.

Alongside reinvestment in Canada's research granting councils, UBC supports the Science Review recommendations to strengthen the overall stewardship of the federal research ecosystem. Establishing a four-agency coordinating board will improve coordination and collaboration between SSHRC, NSERC, CIHR and CFI, and address challenges in international collaboration, team-based and interdisciplinary research, and funding for major science initiatives.

As well as allowing Canada to maintain and improve its position as a global leader in research, a significant increase to the federal granting agencies' budgets will help to counteract inequities in success rates and grant size between researchers across different disciplines and career stages, benefiting early- and mid-career researchers in particular. Some of these imbalances can be addressed through improved governance and coordination across the Canadian research ecosystem, but these must be coupled with increased funding in order to best support the next generation of Canadian researchers.

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<sup>3</sup> Government of the UK: Prime Minister's speech to the Confederation of British Industry (CBI), Nov. 21, 2016.

<sup>4</sup> "Five-year plan boosts basic research funding," Hoa Xin. *Science*. March 25, 2016.

## Recommendation #2

**Regularize research infrastructure funding under the Canada Foundation for Innovation, enabling it to support necessary research facilities and equipment at levels that are in step with granting council and other research funding bodies' programs.**

Canada's researchers need state-of-the-art equipment and infrastructure to carry out work that pushes the frontiers of knowledge, and funding from the Canada Foundation for Innovation has been instrumental in giving researchers the physical tools they need. UBC is grateful for the government's commitments to this agency—the CFI has been able to provide more than \$6.8 billion for Canadian research infrastructure at universities across Canada over the last two decades.

Support from the CFI is vital to much of the world-leading research taking place in Canada. Yet, the CFI has typically been funded on an ad-hoc basis, leading to inconsistent and uncertain funding levels from year to year and hampering long-term planning of research projects and institutional infrastructure. To adequately support Canadian research endeavours, the CFI must have stable, predictable, multi-year funding.

UBC recommends formalizing and regularizing the CFI budget, providing the organization with a sustained and predictable budget in step with granting council and other funding bodies' programs. The Science Review recommends capital and infrastructure operating funding remain approximately consistent with present average levels of annual spending by the CFI, while adding new funding for major research facilities and small capital projects. This would provide the CFI, individual researchers and many of Canada's major research facilities with the certainty necessary to plan effectively for the future.

## Recommendation #3

**Improve equity and diversity across disciplines by developing and harmonizing best practices across the granting agencies.**

Investments in research are also investments in a talented workforce. If Canada wants to lead the world in discovery and innovation, we must also significantly expand and deepen our talent pool. This includes improving equity and diversity among researchers in all disciplines and at all levels.

The skills gained through conducting university-based research at any level are highly valued by employers. A 2016 report from the Business Council of Canada shows that hiring managers value collaboration and teamwork skills above all other attributes for entry-level candidates, closely followed by communication and problem solving skills.<sup>5</sup> Around 40 per cent of UBC PhD students who graduated between 2005 and 2013 now work outside academia, in the private, public or not-for-profit sectors,<sup>6</sup> demonstrating the value of the skills gained through a research-intensive education. Supporting students and researchers—regardless of their gender, ethnicity, religion, or socioeconomic background—to develop the skills necessary to succeed in the Canadian workforce is, in addition to enacting the values that Canadians and the government have committed to, an essential part of creating and maintaining a knowledge-intensive and innovation-based economy in Canada.

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<sup>5</sup> "Developing Canada's future workforce: a survey of large private-sector employers". Business Council of Canada. March 2016.

<sup>6</sup> UBC PhD Career Outcome Survey 2016.

The Science Review recommends several ways the granting councils can support a more diverse and equitable research environment. For example, granting councils should work to eliminate inconsistencies in parental leave policy and definitions that can hinder the career progress of women in academia. The science review report also recommends ways to remove conscious and unconscious bias from the peer review process, including training of reviewers, increasing diversity on review panels, and collection and dissemination of data.

Research institutions share responsibility for promoting equity and diversity in Canada's research ecosystem through their own hiring and recognition practices. Stricter accountability requirements, such as those introduced by Minister Kirsty Duncan in response to poor diversity performance in federal research chairs programs, show government is willing to take action on these issues.

Ensuring diversity and equity in Canada's academy will not only improve its performance, but also create role models, mentors and a more encouraging environment for current students and young people contemplating university education and research-intensive careers.