

Council of Ontario Universities

Pre-Budget Submission to the House of Commons Standing Committee on Finance

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ONTARIO UNIVERSITIES – MAKING RESEARCH MATTER

EXECUTIVE SUMMARY

The Council of Ontario Universities (COU) welcomes the opportunity to provide the following submission to the Members of the House of Commons Standing Committee on Finance as they prepare their recommendations to the Minister of Finance regarding Budget 2012.

In collaboration with Ontario's publicly funded institutions, COU works to strengthen the environment essential to fostering the talent, research, and innovation that is vital to the economic and social well-being of Ontario and Canada. Ontario's universities are a critical training ground for the next generation of Canadian talent. It is estimated that in a global, knowledge-based economy, two out of three new jobs require postsecondary education¹. In 2009, Ontario universities, which collectively educate over 45% of all Canadians attending university, granted degrees to over 96,000 students. These graduates will take with them the skills, knowledge, critical thinking abilities, and experiences they need to assume leadership roles across a broad range of professions and will drive Canada's continued economic growth and social well-being.

Ontario universities are also key contributors to the Canadian research and innovation agenda, undertaking 43% of the research done by all universities in Canada. Important investments in research over the last decade have allowed Ontario universities to increase significantly their contribution to Canada's economic growth by working more collaboratively with industry to better exploit the commercial potential of research at our institutions and to find innovative solutions to tough, industry-based problems. Ontario's universities have become key contributors to our shared goal of attaining high levels of job growth and business investment to ensure shared prosperity and a high standard of living for all.

Summary of Recommendations

Ontario universities urge the Federal government to:

- work with universities and the high-speed fibre optic networks to ensure the long-term sustainability of the technological backbone that drives Canadian university research. Specifically, Ontario universities would ask that the Government of Canada renew CANARIE's mandate and support a review of the current and future operational and capital needs of HPC in Canada;
- continue to invest in its core research programmes. Specifically, Ontario universities recommend continued investment in the critical programmes funded by Canada's three federal granting councils, including the Indirect Costs Program, and a reinvestment in the Canada Foundation for Innovation; and
- create a global research fund to support international research collaboration in priority areas, enabling more students and faculty to participate in international collaborative research initiatives.

Ontario's universities would like to thank the Government of Canada for its continued investment in research and higher education. Its investment of over \$240 million made through Budget 2011 provided ongoing and important funding to train the next generation of Canadian talent. It also provided important support for research in key, globally competitive, priority areas in which Ontario researchers play a leading role.

Ontario has a long and proud history of researchers who have dedicated themselves to improving the lives of Canadians, as well as others around the world. We are proud of the role that our institutions and the Government of Canada have played in helping them to achieve this goal. We look forward to continuing our work with you over the coming year in support of a strong Canadian economic recovery and the creation of quality, sustainable jobs in Ontario.

ONTARIO UNIVERSITIES AND THE FEDERAL GOVERNMENT – THE YEAR IN REVIEW

With over 700 of the 2000 Canada Research Chairs (CRCs) across Canada calling Ontario home, the CRC programme has played a critical role in building and sustaining Ontario's research community. Last November, in partnership with the federal government, the Public Policy Forum, the Metro Toronto Convention Centre and Tourism Toronto, COU held an event to mark the ten years of impact that the CRCs have had on the economic and social well-being of Ontarians. Attended by over 1000 participants from academe, government, industry and the community sector, the event was highly successful in demonstrating the importance of the CRC programme in attracting top international talent to Canada and top Canadian talent home.

- Every 10 minutes, someone in Canada suffers a stroke. In 2010, the CRC programme attracted Dr. Guillaume Paré (CRC in Genetic and Molecular Epidemiology, McMaster University) back home to Canada from Harvard University. His research helps to explain why strokes happen, who is most at risk, and what lifestyle changes can be made to reduce the number of strokes in Canada.
- Dr. Carolyn McGregor (CRC in Health Informatics at the University of Ontario Institute of Technology) is an Australian researcher who, thanks to the CRC programme, has chosen to call Canada home. Working in partnership with IBM, her cutting edge research provides doctors and nurses with the real time information they need to save the lives of pre-mature babies in Canada and elsewhere in the world.

In June 2011, the Ontario university research community joined with the Federal Science and Technology Integration Board for a one-day Symposium on Emerging Infectious Diseases. The goals of the symposium were two-fold: to discuss and share knowledge on the latest trends and ongoing challenges in the field of emerging infectious diseases, and, more broadly, to pilot a new and innovative approach to harnessing the knowledge that has emerged from our collective investment in research to support public policy development in areas of priority for the federal government. The Symposium was well attended by experts in the field of emerging infectious diseases from both academe and government and has already drawn interest from other federal departments interested in exploring the model in other priority areas.

UNIVERSITY RESEARCH – THE NEXT TEN YEARS

Research Computing Infrastructure: The Backbone of Canadian Research

As with many professions, the tools of the trade used by today's researchers, in both industry and academia, have undergone a significant transformation. The processing, storage and networking capacity required to undertake cutting edge and globally competitive research now goes well beyond the capabilities of a normal desktop computer. High Performance Computing (HPC) and the high-speed fibre optic networks, such as Canada's Advanced Research and Innovation Network (CANARIE) and Ontario Research and Innovation Optical Network (ORION), which transfer the information between destinations, have, in the technological age, become as critical to our economic and social prosperity as transportation and communication networks were to the Industrial Revolution.

Without these essential pieces of research infrastructure, Canadian researchers would not be able to undertake advanced work in a variety of critical areas including the environment (climate, weather, pollution, disaster planning); health (epidemiology, drug design, genomics, population studies, imaging, physiological modeling); and media/social sciences/communication (rendering, entertainment, virtual reality, cryptography, economics).

HPC and high-speed fibre optic networks also provide a critical platform that underpins all of Canada's priority, 'big science' initiatives such as ATLAS, TRIUMF, and SNO. In addition, they offer a key recruitment tool for outstanding domestic and international faculty, graduate students, and post-doctoral students, and support research and development in key areas of economic priority such as digital media.

In addition, investment in HPC and high-speed fibre optic networks has helped ensure that Canada benefits from a world-class, comprehensive, high-performance research environment – one that is open to collaboration with business domestically and around the world.

Dr. Chris Bauch from the University of Guelph relies on HPC to undertake his work on the impact of cervical cancer screening and on models that can be used to predict the spread of the H1N1 virus.

As with all essential infrastructure, HPC and high-speed fibre optic networks require ongoing operational support, regular maintenance, and capital investment. The system has hit a critical point in its development and new capital funding is required to replace and maintain existing hardware, as well as to ensure that the system has the up-to-date technology required to remain competitive. CANARIE is in the last year of its five-year mandate and funding agreement. A renewal of its mandate in Budget 2012 is critical to its ongoing activity related to advanced research and discovery in Canada. Ontario universities are also greatly concerned about the long-term sustainability and financial viability of HPC in Canada and believe that an immediate commitment to review the current and future operational and capital needs of HPC across the country is required.

COU recommends that the Government of Canada work with universities to ensure the long-term sustainability of the technological backbone that drives Canadian university research. Specifically, Ontario would ask that the Government of Canada renew CANARIE's mandate and support a review of the current and future operational and capital needs of HPC in Canada.

Sustaining Investment in Canada's Research Capacity

Over the last decade, federal and provincial investment in Ontario's universities has transformed the size and scope of the research undertaken on our campuses and has made universities significant partners in economic growth.

First and foremost, Ontario universities provide the training ground for the next generation of innovators who will drive economic development, commercial success, and social progress in the years to come. Sustained direct and indirect federal investment in our labs and other research facilities has ensured that students have the hands on experience they need to succeed when they graduate. Continued investments, such as the Canada Foundation for Innovation's funding for the Experiential Design and Gaming Environments (EDGE) Lab at Ryerson University's Digital Media Zone, are critical to providing students with the tools and experience they need to turn their ideas into reality.

Federal investment has also allowed Ontario universities to deepen their partnerships with industry. The Science, Technology, and Innovation Council's State of the Nation report (2010) notes that companies are increasingly turning to universities and colleges to access the world-class expertise and research facilities that have resulted from a decade of investments by both federal and provincial governments. Canada's universities now conduct almost \$2 billion in contract research annually, with almost \$1 billion of that coming from the private sector.ⁱⁱ

In 1991, the University of Waterloo's Centre for the New Oxford English Dictionary (OED) digitized the New OED in partnership with Oxford University Press. The digitization of the New OED led to full-text indexing and string-search technology, as well as an important spin-off company named Open Text, a major Canadian software company.

Finally, sustained federal funding in the three federal granting councils, Natural Sciences and Engineering Research Council of Canada (NSERC), Social Sciences and Humanities Research Council (SSHRC), and the Canadian Institutes of Health Research (CIHR) have been absolutely critical to providing Ontario researchers with the resources they need to do what they do best – tackle the tough stuff.

Professor Chul Park at the University of Toronto has established a pan-Canadian network of 23 researchers to develop innovative plastic materials for sectors ranging from automotive and aerospace to construction and communications. Thanks to NSERC's support, the network and its 20 industrial partners will provide dozens of students with exposure to real-world engineering challenges of direct relevance to Canadian manufacturers.

Researchers at Ontario universities ask big questions and find big answers; they provide road maps ahead and solutions to society and industry's most intractable problems. The three federal granting councils are at the core of this activity. They are the lifeblood of university research, providing the foundational base required to ensure the ongoing health and stability of our work. Their programmes allow students and faculty to build relationships with industry and community, to explore new avenues of thought and discovery, and to develop solutions to the most pressing and difficult issues we face as Canadians. Ontario universities appreciate the new investments in the granting councils that have been made in recent budgets and would encourage the Government of Canada to continue its investment in this area in Budget 2012.

Researchers require more than just human brainpower to do their jobs; they also require state-of-the-art equipment and facilities. Growing and maintaining federal support for programmes such as the Indirect Costs Programme, which provides funding for key research supports such as the maintenance of libraries, laboratories or research networking spaces, or the technical support required for an institution's website or library computer system, is absolutely vital to advancing Canada's innovation agenda.

So too is the funding provided through the Canada Foundation for Innovation (CFI). Over the past decade, CFI has provided essential investment in research infrastructure that is critical to the work undertaken by Ontario researchers. From 2005/06 to 2010/11, CFI infrastructure awards averaged approximately 19% of funding to the three federal granting councils. Between 2010-11 and 2013-14, this ratio of investment is expected to fall to 6% (this figure excludes the Major Sciences Initiative, which, by its nature, will be unevenly distributed among universities), which contrasts with competitor jurisdictions such as the United States where approximately 24% of the National Science Foundation's budget is devoted to research infrastructure. CFI provides the infrastructure required to keep our labs up-to-date and productive. It also keeps our research internationally competitive and provides important infrastructure that may be used to attract and support university-industry collaboration. Ontario universities would encourage the Government of Canada to include a reinvestment in CFI in Budget 2012 to ensure that it maintains its ability to support a highly competitive and world-class research environment in Canada.

COU recommends that the Government of Canada continue to invest in its core research programmes. Specifically, it recommends continued investment in the critical programs funded by Canada's three federal granting councils, including the Indirect Costs Program, and a reinvestment in the Canada Foundation for Innovation.

Bringing the World to Canada's Door

With the move to a global knowledge-based economy, where small, local ripples are having worldwide effects, it is now more important than ever that our next generation of employees be able to play effectively on the international stage. With over 30,000 international students, Ontario's universities are attracting the world to Canada. These students enrich our campuses, provide domestic students with a

global experience, and boost international research collaborations, all of which contribute to Canada's global competitiveness and to the success of Canadians abroad.

Ontario's universities are also home to a large number of international faculty who have significant, global, research collaborations. These collaborations can be important generators of jobs and economic growth. The economic and social opportunities that they provide for Canada are significant. The granting councils currently provide support for international collaboration. However, funding is limited in scope and often fully committed, resulting in lost opportunities. Flexible, nimble, and responsive funds that allow researchers to address priorities and to develop research collaborations as they emerge would provide an important tool to helping Canada remain globally competitive.

COU recommends that the Government of Canada create a global research fund to support international research collaboration in priority areas, enabling more students and faculty to participate in international collaborative research initiatives.

THE ONGOING COMMITMENT OF ONTARIO'S UNIVERSITIES

In these times of severe economic restraint, Ontario's universities recognize the importance of harnessing the collective creativity and ingenuity of Canadians and of maximizing the potential of all investments. To this end, Ontario universities believe they have important contributions to make and are committed to:

- continuing to provide a critical and responsive training ground for the talent and leaders of tomorrow;
- expanding opportunities for working collaboratively with industry and other community partners to achieve strong economic and social outcomes; and
- proactively seeking opportunities to leverage the knowledge that has emerged from our collective investment in research to support public policy development in areas of priority for the federal government.

¹ Bergeron L.P., Dunn K., Lapointe M., Roth W., & Tremblay-Côté N., **Looking Ahead: A 10-Year Outlook for the Canadian Labour Market 2006-2015**. Human Resources and Social Development Canada, Strategic Policy Research Directorate. SP-615-10-06-E (Ottawa 2006) 2.

ⁱⁱ Statistics Canada, Survey of Intellectual Property Commercialization in the Higher Education Sector, 2008. The Impact Group, Knowledge Transfer Through Research Contracting, June 2010. AUCC, Submission to the Expert Review Panel on Research and Development, 2.