



Canadian Association
of Physicists

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**A Pre-Budget Submission from the Canadian Association of Physicists
to the HOUSE OF COMMONS STANDING COMMITTEE on FINANCE**

Executive Summary:

The House of Commons Standing Committee on Finance is seeking expert consultation as it develops its economic strategy for 2018. The Committee has asked Canadians what federal measures should be adopted to help Canadians and Canadian businesses be more productive and competitive. The Canadian Association of Physicists (CAP), as the voice of physics in our country, recommends one measure that is timely and critical.

Recommendation: Implement the funding increase recommendations put forward by the Advisory Panel on Federal Support for Fundamental Science in their final report (the Naylor Report¹); i.e. increase the funding to the four main research funding agencies from \$3.5B to \$4.8B per year ramped up over four years. This represents an increase of \$386M in the first year, ramping up to \$701M in the second year and then \$1.137B and \$1.308B in years three and four.

Who We Are: The CAP, with 1700 members, is Canada's national association for physicists working in industry, academia and government across all subdisciplines of physics. The CAP strives to unleash the full potential of physics and physicists for the benefit of Canada. The CAP is recognized and respected for its science and technology expertise, and has testified at House of Commons Committees, including the Standing Committee on Industry, Science and Technology for a study on the "State of Disruptive Technologies" on June 9, 2015.

We look forward to working with your Committee to help grow Canada's economy through judicious infusions of funding for science education and training.

Background:

In a June 2017 press release, the House of Commons Standing Committee on Finance asked Canadians for input about what federal measures would help (1) **Canadians** to be more productive,

¹ The full Naylor report can be found online at
[http://www.sciencereview.ca/eic/site/059.nsf/vwapi/ScienceReview_April2017.pdf/\\$file/ScienceReview_April2017.pdf](http://www.sciencereview.ca/eic/site/059.nsf/vwapi/ScienceReview_April2017.pdf/$file/ScienceReview_April2017.pdf)

and (2) **Canadian businesses** be more productive and competitive. The CAP recognizes that both of these questions will be addressed if the federal government substantially increases Canada's investments in its intellectual infrastructure. Canada's international competitiveness and capacity for sustained innovation depend on balanced support of research, including discovery-driven fundamental research. Fundamental research is critical for Canada to compete in identifying and developing technologies that are transformative, the so-called "disruptive technologies."

In June 2016, the Government of Canada announced the appointment of an Advisory Panel on Federal Support for Fundamental Science. Headed by David Naylor of the University of Toronto, the Panel included university and funding agency administrators, industry leaders, and Canada's most recent Nobel Laureate, physicist Art McDonald of Queen's University. Its mandate was to undertake "a review of the federal system of supports for extramural research."

The Panel's report, released in April 2017, documents Canada's declining support of fundamental research, defines the real needs in this area, and outlines a concrete path forward to meet that need. Over the past 15 years Canada's research funding as a percentage of GDP has declined from 2% to 1.6% while that of virtually all other major nations grew. We have now fallen out of the top 30 nations in research spending and are considerably below the OECD average of 2.38%. Furthermore, there has been a shift away from the pursuit of independent research, with a 35% drop in available real resources per researcher.

The CAP strongly recommends that the financial plan outlined in the Naylor report (see excerpt below) be implemented. We make this statement in parallel with many other Canadian organizations including the Partnership Group for Science and Engineering (PAGSE), the Canadian Consortium for Research (CCR), and the Association of Canadian Early Career Health Researchers (ACECHR). Implementing the Naylor Report recommendations will increase support for research that will attract and retain Canada's best talent and will have positive impacts in Canada. This will develop a strong base that is essential for building a resilient and innovative workforce that will help drive Canada's entrepreneurs, businesses, and international collaborations.

Fundamentally, investing in our intellectual infrastructure means training our best and brightest to master and develop cutting edge technologies and to learn how to attack and solve new problems. This will only occur if funding for fundamental research, including funding to train the next generation, is substantially increased. These highly qualified personnel will take what they have learned into Canadian businesses. Only through those people, trained at the frontiers of knowledge and driven to solve new problems, can Canadian businesses become truly innovative, more productive, and more competitive.

All applied research depends on fundamental research. If Canada is to remain a competitive and prosperous nation in the 21st century, it is essential that the government pay heed to the Naylor Panel's recommendations. In particular, the Panel recommends a 30% increase in investigator-led research funding to redress the imbalance caused by favouring "priority-driven targeted research"

over the past decade. Still others address training: neither the value nor the number of graduate scholarships has increased in the last decade despite greatly increased enrolments. In all, the report recommends an increase in funding to the four main research funding agencies from \$3.5B to \$4.8B per year.

The Government has repeatedly stated that it wants data to inform its policy decisions. This Panel, commissioned by the Federal Government, has now supplied the data.

Excerpt from page 154 “Investing in Canada’s Future: Strengthening the Foundations of Canadian Research” Canada’s Fundamental Science Review, 2017. (Naylor Report)

Exhibit 7.5: A Four-year Plan to Renew Canadian Research (\$ Millions)

	Year 1	Year 2	Year 3	Year 4
Investigator-led Direct Project Funding ^a	135	270	405	405
Specialized Direct Project Funding ^b	20	40	60	80
Total Direct Project Funding	155	310	465	485
Operating Funds for Major Research Facilities ^c	35	35	35	35
Operating Funds for Small Capital Projects ^d	30	30	30	30
Scholarships and Fellowships ^e	35	70	105	140
Research Chairs for Excellent Scholars and Scientists ^f	35	140	140	140
Facilities and Administration Costs (Research Support Fund) ^g	96	206	362	478
Total	386	791	1,137	1,308

^a Recommendation 6.1. The Panel recommends an increase of \$485 million in investigator-led direct project funding phased in over four years.

^b Recommendation 6.1 and recommendations 6.4, 6.5, 6.6, and 6.7. The Panel recommends that \$80 million of the increase for investigator-led research be earmarked for international collaborations, multidisciplinary work, high risk, high reward projects, and research in response to fast breaking issues or crises, phased in over four years.

^c Recommendation 6.10. The Panel recommends that \$35 million a year in funding be provided for CFI to change the sharing ratio for operating costs for MRFs from the current 40:60 to 60:40.

^d Recommendation 6.11. The Panel recommends that \$30 million a year in funding be provided for CFI to increase the operating support available to the recipients of small capital awards.

^e Recommendation 7.1. The Panel recommends that funding be provided to reinvigorate and harmonize scholarships and fellowship programs at a cost of \$140 million per year, phased in over four years.

^f Recommendation 7.2. The Panel recommends the CRC program be renewed at a cost of \$140 million per year, phased in over two years.

^g Recommendation 7.3. The Panel recommends that funding be provided to move the coverage of facilities and administration costs by the RSF on a trajectory from the current level of 21 per cent to 40 per cent, over four years. Exhibit 7.4 shows a full breakdown of RSF options and trajectories.

Recommendation: Implement the funding increase recommendations put forward by the Advisory Panel on Federal Support for Fundamental Science in their final report (the Naylor Report); i.e. increase the funding to the four main research funding agencies from \$3.5B to \$4.8B per year ramped up over four years. This represents an increase of \$386M in the first year, ramping up to \$701M in the second year and then \$1.137B and \$1.308B in years three and four.