

Written Submission for the Pre-Budget Consultations
in Advance of the 2025 Federal Budget

By:



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Endorsed by :

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Recommendations

- **Recommendation #1:** That the government accelerate the timetable laid out in Budget 2024 for increased investment in the NSERC's Discovery Grant program to ensure fair funding for all graduate students and postdoctoral fellows.
- **Recommendation #2:** The government should adopt a more strategic approach to managing core national research facilities, such as [TRIUMF](#), the [Canadian Light Source](#) (CLS), the [MacDonald Institute](#) and [SNOLAB](#). By implementing a lifecycle approach, we can enhance the effectiveness of these facilities, recognizing their pivotal role as national assets. This strategy will not only support Canada's scientific enterprise but also enable our scientists to expand their leadership on the global stage.

About Us

Research and development in physics at universities, research centers, and companies are vital for economic growth and societal advancement. As the foundational science behind much of today's technology, physics drives innovation, spurs the creation of new industries, and enhances existing ones. This leads to job creation, increased productivity, and overall economic prosperity. Technologies emerging from physics research, such as medical imaging devices and renewable energy solutions, provide tangible benefits for public health and environmental sustainability.

Investing in physics research also strengthens Canada's global competitiveness by cultivating a highly skilled workforce and attracting high-tech industries. For example, advancements in quantum science and technologies have the potential to transform computing, telecommunications, cybersecurity, and sensing capabilities, setting the stage for future technological breakthroughs. Most students funded through NSERC scholarship programs and the NSERC Discovery Grant program become the core workforce for these burgeoning industries.

Despite these benefits, Canada faces a well-documented productivity gap, largely attributed to insufficient investment in research and development. Challenges such as a shortage of highly qualified personnel who remain in Canada and the underfunding of discovery science need urgent attention. By increasing investment in physics research, Canada can bridge this productivity gap, drive economic growth, and significantly improve the quality of life for its citizens.

Incorporated in 1945 and representing 1,700 members, the Canadian Association of Physicists/Association canadienne des physiciens et physiciennes is a national network of physicists working in educational, industrial, and academic settings from coast to coast to coast. The CAP strives to unleash the full potential of physics and physicists for the benefit of Canada and the world.

Recommendation #1: That the government accelerate the timetable laid out in Budget 2024 for increased investment in the NSERC's Discovery Grant program to ensure fair funding for all graduate students and postdoctoral fellows.

Rationale

Budget 2024 included significant investments to help address long-standing challenges within Canada's research ecosystem; these commitments were critical to Canada's long-term success and have laid the groundwork for further excellence to come. Of note, Budget 2024 included substantial increases in scholarships and fellowships for graduate students and postdoctoral

fellows, underscoring the government's commitment to nurturing future scientific leaders crucial to Canada's economic and innovation strategies.

However, the disparity remains stark between these increases and funding for researcher-led grants, which form the primary financial support for the majority of graduate students and postdocs (>80%). Not only is funding for investigator-initiated research stagnant, it is actually losing ground when inflation and population growth is taken into account. The majority of NSERC DG funds flow directly to students. Currently, researchers do not have sufficient funds to increase student support to cover inflation and cost of living increases, and funding levels are in no way close to covering the gap between current stipends and the new standards set in Budget 2024. The sharp inequity between students supported directly by scholarships and those supported by researcher-led grants goes beyond undermining morale. It has the potential to destabilize the entire Canadian research training ecosystem by setting expectations for support that just are not possible for the majority of trainees.

These expectations are extremely reasonable. Our students are struggling with high inflation and high costs of living (particularly housing) and most saw no improvement in their situation from Budget 2024. Campus surveys show that food insecurity has almost doubled (to 28%) from 2021 to 2023.¹ To make ends meet, graduate students are taking part-time jobs, which leaves less time for their research where they are working to push the boundaries of their discipline. Student CAP members have made it very clear that the current situation is not tenable. At an Open Forum held at our Annual Congress, we heard:

"My rent is \$1000, and I receive \$1200 monthly. So, I have to work part-time on the side to afford food."

"Living in a major city makes it impossible for students to survive. People just do not understand how housing crises affect us. We have to live 5-6 students together to be able to afford the rent. These living conditions are not healthy."

In addition to making sure our students can pay their bills, higher support is required for the recruitment of undergraduates into graduate programs and to ensure that we don't lose students to other countries. While Canada ranks highest amongst G7 countries in percentage of the population that has achieved tertiary education, we are ranked last when it comes to holders of advanced degrees (Masters or higher).² Among OECD countries, Canada ranks 28th in graduate degree attainment.³ These HQP are the foundation for driving innovation across all areas of the Canadian economy.

Budget 2024 did recognize the important need to increase investments into researcher-led programs to support HQP and promised a \$1.8B boost to tri-council core research grant funding

1 Queen's University [2023 Shift Survey Report](#)

2 Educational attainment, at least Master's or equivalent, [The World Bank](#)

3 Dr. Gail Murphy; <https://www.ourcommons.ca/DocumentViewer/en/44-1/SRSR/meeting-7/evidence>

over five years. However, the phased implementation delays the majority of the investment until after 2026-27. Swift action is imperative to rectify the imbalance between classes of graduate students and ensure all students have a supportive academic environment. Such funding fosters a fertile ground for new discoveries critical to Canada's competitiveness in global innovation. The longer the gap exists, the more students from lower-income households will be left behind. We strongly recommend that the current timeframe be accelerated so that the investments can flow immediately to students and postdoctoral fellows. They cannot wait until 2026 (or later).

This recommendation supports the critical conditions for success required of Canada's support for its research and innovation ecosystem that are necessary to make us competitive on the global stage. These objectives are outlined in the *Report of the Advisory Panel of the Federal Research Support System*:¹

- supporting and retaining Canada's top research talent, and
- building a research enterprise that fosters discovery of new knowledge.

These steps are crucial for Canada to compete for talent and to develop the ideas needed as we face tough challenges such as climate change, health emergencies, and cybersecurity. Our recommendations support Recommendations 5, 6 and 9 from the recent *Report of the Advisory Panel of the Federal Research Support System*⁴, which in turn is supported by *Successes, Challenges and Opportunities for Science in Canada*⁵ (Recommendations 2, 5, 7, and 8), *Top Talent, Research and Innovation*⁶ (Recommendations 3, 4, and 5), and *Investing in Canada's Future – Strengthening the Foundations of Canadian Research*⁷ (Recommendation 6.1).

The core grant programming of the Tri-Council agencies (such as the NSERC Discovery Grant program) is basically the only source of funds for investigator-initiated, rather than mission-driven, research in Canada. Funding of investigator-initiated research allows scientists to explore new ideas and leads to new breakthroughs. There are many examples of investigator-initiated physics discoveries resulting in innovative technologies, economic impacts and benefits to individuals. For example, Canadian Nobel Laureate Donna Strickland, while a postdoctoral fellow, discovered chirped pulse amplification, which resulted in short pulse lasers used in applications ranging from improved eye surgeries to manufacturing of glass for cell phone screens.⁸ In another instance, NSERC Discovery program funding led to groundbreaking advancements in laser-welding technology, attracting substantial investments in Canadian R&D and facilitating exports to electric vehicle manufacturers worldwide.⁹ It is often difficult to

⁴ [Report of the Advisory Panel of the Federal Research Support System](#), 2023

⁵ [Successes, Challenges and Opportunities for Science in Canada](#), The Standing Committee on Science and Research, June 2022

⁶ [Top Talent, Research and Innovation](#), The Standing Committee on Science and Research, October 2022

⁷ [Investing in Canada's Future – Strengthening the Foundations of Canadian Research](#), The Advisory Panel for the Review of Federal Support for Fundamental Science, 2017

⁸ For examples of Canadian discoveries, inventions and achievements, see Exhibit 2.1 in Ref. 7.

⁹ [How Kingston's IPG Photonics Merged Healthcare and Industrial Tech to Improve Manufacturing Processes](#)

predict where early-stage research will lead, so it is important to support a broad network of researchers to keep the pipeline of new ideas, trainees and innovation flowing.

Recommendation #2: The government should adopt a more strategic approach to managing core national research facilities, such as [TRIUMF](#), the [Canadian Light Source](#) (CLS), the [MacDonald Institute](#) and [SNOLAB](#). By implementing a lifecycle approach, we can enhance the effectiveness of these facilities, recognizing their pivotal role as national assets. This strategy will not only support Canada's scientific enterprise but also enable our scientists to expand their leadership on the global stage.

Rationale

Recommendation #2 advises the government to consult with MRFs and other stakeholders to develop new strategic approaches to national research facilities, emphasizing a lifecycle funding model to enhance their effectiveness as critical national assets supporting Canada's scientific enterprise and economic development.

Research infrastructure forms the essential second pillar in our pursuit of research and innovation excellence, significantly impacting the success of our students and postdoctoral fellows by providing them with cutting-edge tools. We endorse Recommendation 10 from the *Report of the Advisory Panel on the Federal Research Support System*, which calls for a strategic overhaul in managing Major Research Facilities (MRFs). This approach includes adequately funding MRFs across their entire lifecycle—from planning and construction to operation, staffing, maintenance, and decommissioning—recognizing their long-term value as national infrastructure. Furthermore, it advocates prioritizing MRF investments through a comprehensive research infrastructure road-mapping exercise, ensuring alignment with Canada's broader science, research, and innovation priorities. This strategy, led by a preexisting organization like CFI, would promote transparency and engagement with stakeholders, including the research community, provinces, territories, and industry, to maximize scientific merit, performance, and strategic alignment with national interests, economic benefits, and societal impacts. It emphasizes maintaining a cohesive portfolio of diverse and complementary MRFs, incorporating provincial contributions to strengthen Canada's research landscape. These facilities should be treated as national assets and core infrastructure, not projects.

Summary

Budget 2024 marked a significant step forward in addressing critical challenges within Canada's research landscape, particularly in enhancing support for graduate students and postdoctoral fellows. However, the sharp disparity between these enhancements and stagnant funding for researcher-led grants exacerbates financial hardships, undermining the ability of students to meet basic living expenses. This situation not only compromises their academic pursuits but also threatens Canada's ability to attract and retain top research talent needed for innovation across all sectors.

The commitment to boost tri-council core research grant funding, including the NSERC Discovery Grant program, by \$1.8B over five years is a positive step, yet the phased implementation delays substantial benefits until after 2026-27, posing immediate challenges. Accelerating this timeline is crucial to ensuring equitable support for all students, enabling them to focus fully on their research and academic growth without financial strain, and to retain them in Canada.

Complementing these investments, Canada must move forward into recognizing Major Research Facilities as national assets that not only provide essential tools for students and researchers to advance the Canadian science agenda but are also funded and operated holistically using a lifecycle approach.

These recommendations align with the imperative outlined in various reports advocating for robust research funding to support Canada's competitiveness, help us close the productivity gap, and foster discovery in critical areas such as climate resilience, information technology, and cybersecurity. Urgent action is needed to bridge funding gaps and provide a supportive environment where all researchers can thrive and contribute to Canada's economic productivity and scientific excellence on the global stage.