Written Submission for Pre-Budget Consultations

in Advance of the 2026 Budget

By:

Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Recommendation #1: To secure Canada's future prosperity and sovereignty, we urge the government to make significant investments in the research and development ecosystem. This includes accelerating growth in critical technology sectors—such as clean energy, AI, quantum computing, and advanced biosensing—and bolstering the foundational science that fuels this innovation pipeline. A strategic increase in funding is essential to attract and retain top talent, drive economic competitiveness, and ensure Canada is a leader, not a follower, on the global stage.

Recommendation #2: That the government accelerate the timetable laid out in Budget 2024 for increased investment in the Tri-council agencies' core grant programming to ensure the younger generation has access to affordable education and Canada's workforce has the access to the highly skilled workers needed for expanding the innovation economy and increasing productivity.

About Us

Physics research and development in universities, research centres, and companies are essential for economic growth and societal advancement. It drives technological innovation, creating new industries and improving existing ones, leading to job creation, increased productivity, and economic prosperity. Technologies developed through physics research, such as medical imaging devices and renewable energy technologies, directly benefit public health and environmental sustainability. Moreover, investments in physics research enhance Canada's competitiveness in global markets by training a skilled workforce and attracting high-tech industries. For example, quantum science and technologies, with their potential for revolutionizing computing, communication, and sensing capabilities, are poised to shape the next generation of technological advancements. Overall, physics research not only expands scientific knowledge but also plays a critical role in driving economic development and improving quality of life for citizens nationwide.

Incorporated in 1945 and currently representing over 1,700 individual members, 60 physics departments and 7 world-leading national research institutions, the Canadian Association of Physicists (CAP)/Association canadienne des physiciens et physiciennes is a national network of physicists and physics students 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: To secure Canada's future prosperity and sovereignty, we urge the government to make significant investments in the research and development ecosystem. This includes accelerating growth in critical technology sectors—such as clean energy, AI, quantum computing, and advanced biosensing—and bolstering the foundational science that fuels this innovation pipeline. A strategic investment is essential to attract and retain top talent, drive economic competitiveness, and ensure Canada is a leader, not a follower, on the global stage.

Rationale

1. Powering the Industries of the Future

Technology sectors such as clean energy, AI, quantum computing, advanced materials and biosensing are where the global economy is heading. Canada's existing strength in these areas is a direct result of past commitments to scientific research.

- **From Lab to Market:** Technologies like quantum computers, new clean energy materials, and advanced medical sensors are not arbitrary pursuits; they are the direct application of decades of discovery in the physical and life sciences.

- **A Competitive Edge:** Strategic government investment acts as a catalyst, helping to translate Canada's research advantages into market-ready technologies, new companies, and the high-value jobs that will define 21st-century prosperity.

2. Underpinning National Sovereignty and Security

In an interconnected world, a nation's security and autonomy are increasingly tied to its technological capabilities.

- **Technological Independence:** Developing sovereign capacity in areas like secure communications, artificial intelligence, advanced materials, and domestic health diagnostics is critical. It ensures Canada is not dependent on other nations for technologies essential to our security and the well-being of our citizens.

- **Owning Our Future:** By fostering a complete R&D ecosystem, we ensure that the intellectual property generated from Canadian research remains in Canada, forming the basis of new domestic industries and long-term wealth creation.

The government's newly announced "Bureau of Research, Engineering, and Advanced Leadership in Innovation and Science" signals recognition of the importance of cutting-edge research in frontier technologies and that the government needs to take a lead role in its support. The new Bureau is an exciting new opportunity that could directly serve this recommendation, but should not come at the expense of current programs, particularly foundational science.

3. The Critical Role of Foundational Science

Breakthrough innovations rarely come from simply trying to improve existing products. They are born from the curiosity-driven work of foundational science.

- **The Innovation Pipeline:** Foundational research is the headwater of the innovation river. Without new fundamental discoveries, the pipeline of ideas that leads to new technologies will eventually run dry. For example, the entire digital economy—from the computer chip to the internet—was built on a foundation of early 20th-century research into the fundamental nature of electrons and materials. GPS, which benefits Canadians every day (e.g., transportation, personal safety, defence), would be off by km in accuracy if we did not have a sophisticated understanding of gravity, time dilation, and general relativity.

- **A Long-Term Strategy:** Investing in foundational science is the ultimate long-term strategy. While industry is well-suited to focus on near-term development, government has a unique and critical role in supporting the long-range, exploratory research that produces the paradigm-shifting discoveries that no single company can risk on its own.

4. Winning the Global Competition for Talent

The most valuable resource in a knowledge economy is its people. Top researchers, innovators, and students are globally mobile and will choose to work where they see the greatest opportunity and support.

- **A Signal of Ambition:** Robust and sustained R&D funding is the clearest signal that Canada is a serious player on the global stage. It is essential for attracting world-class talent and—just as importantly—for retaining the brilliant minds that graduate from our own universities.

- **Training Canada's Problem-Solvers:** University research grants are the primary engine for training the next generation of innovators. These programs cultivate the advanced analytical and problem-solving skills that are in high demand across all sectors of the economy, from tech and manufacturing to finance and public policy.

Recommendation #2: That the government accelerate the timetable laid out in Budget 2024 for increased investment in the Tri-council agencies' core grant programming to ensure the younger generation has access to affordable education and Canada's workforce has the access to the highly skilled workers needed for expanding the innovation economy and increasing productivity.

Rationale

Budget 2024 included significant progress in addressing a long-standing challenge within Canada's research ecosystem. It reversed two decades of stagnation by substantially increasing Tri-council 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 stagnant funding for researcher-led grants, which form **the primary financial support for most graduate students and postdocs** (>80%). These highly-qualified personnel (HQP) are needed to **drive innovation across all areas of the Canadian economy**. Researchers do not have sufficient funds to increase HQP support by amounts sufficient to cover inflation and cost of living increases. The sharp inequity between students supported directly by Tri-council scholarships and those supported by researcher-led grants goes beyond undermining morale. It has the potential to destabilise 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. Campus surveys show that food insecurity has almost doubled (to 28%) from 2021 to 2023.[1] To try to make ends meet, graduate students are taking part-time jobs, which limits their time available for research where they are working to push the boundaries of their discipline. As summarized by Ms. Sarah Laframboise, former Executive Director of Support Our Science,

> *"These students are young adults, typically between the ages of 20 and 30, who care about things like housing, savings and starting a family. Currently, an average student in Canada makes $19,000 at the master's level and $21,000 at the Ph.D. level. After paying tuition and compulsory fees, this leaves a master's student with about $10,000 and a Ph.D. student with only $12,000 to live off of for the rest of the*

[1] Queen's University 2023 Shift Survey Report, https://www.queensu.ca/campuswellnessproject/queens-shift-project/shift-survey/survey-reports

year. This is hardly enough to pay rent in most major cities in Canada, let alone other necessities like food, transportation or hydro."[2]

Student CAP members have made it very clear that the current situation is not tenable. At an Open Forum held at a recent Annual Congress, one student said:

"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, increased support is required so that we can recruit undergraduates into graduate programs and ensure that we don't lose them to other countries. While Canada ranks highest amongst G7 countries in percentage of the population that has achieved tertiary education, it is last in percentage that have earned an advanced degree,[3] and ranks 28th in the OECD in graduate degree attainment.[4] Advanced degrees provide our students with the skills they need to drive innovation in the technology sectors so important to Canada.

Budget 2024 made important commitments to increase investments into researcher-led programs to support HQP through a $1.8B boost to Tri-council core research grant funding over five years. However, the phased implementation delayed the majority of the investment until after 2026-27. Swift action is imperative to rectify this imbalance and ensure all students have a supportive academic environment. We strongly recommend that the current timeframe be accelerated so that the investments can flow immediately to students and postdoctoral fellows.

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 conditions 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*[5], which in turn is supported by *Successes, Challenges and Opportunities for Science in Canada*[6] (Recommendations 2, 5, 7, and 8), *Top*

---

[2] S. J. Laframboise, https://www.ourcommons.ca/DocumentViewer/en/44-1/SRSR/meeting-11/evidence

[3] Educational attainment, at least Master's or equivalent, The World Bank, https://data.worldbank.org/indicator/SE.TER.CUAT.MS.MA.ZS

[4] Dr. Gail Murphy; https://www.ourcommons.ca/DocumentViewer/en/44-1/SRSR/meeting-7/evidence

[5] *Report of the Advisory Panel of the Federal Research Support System,* 2023, https://ised-isde.canada.ca/site/panel-federal-research-support/en/report-advisory-panel-federal-research-support-system

[6] *Successes, Challenges and Opportunities for Science in Canada,* The Standing Committee on Science and Research, June 2022, https://www.ourcommons.ca/DocumentViewer/en/44-1/SRSR/report-1/

Talent, Research and Innovation[7] (Recommendations 3, 4, and 5), and *Investing in Canada's Future – Strengthening the Foundations of Canadian Research*[8] (Recommendation 6.1).

The core grant programming of the Tri-Council agencies is the primary 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 impacts on 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.[9] In another instance, research funded through the NSERC Discovery program led to groundbreaking advancements in laser weld monitoring technology, attracting substantial investments in Canadian R&D and facilitating exports to electric vehicle manufacturers worldwide.[10] It is often difficult to predict where early-stage research will lead and thus it is important to support a broad network of researchers to keep the pipeline of new ideas, trainees and innovation flowing.

Summary

The two recommendations presented in this submission are inextricably linked. One cannot exist without the other. To build the productive, innovative, and sovereign Canada we envision, we must invest simultaneously in the two most critical components of our national R&D ecosystem: our ideas and our people.

Investing in the technologies of the future is essential, but this ambition can only be realized if we have the talent to drive it. Right now, that talent pipeline is at risk. Canada's graduate students and postdoctoral scholars—the very individuals who will power our future in AI, quantum, and clean energy—are struggling. The delayed implementation of Tri-council funding is not just a line item in a budget; it is a direct threat to our ability to retain our brightest minds and compete on the global stage.

We urge the government to seize the opportunity in Budget 2026 to take decisive action. By accelerating the promised funding for our research talent and strategically investing in the full spectrum of research and development, we can reverse the brain drain, secure our economic future, and reaffirm Canada's sovereignty and role as a global leader in science and innovation.

---

[7] *Top Talent, Research and Innovation*, The Standing Committee on Science and Research, October 2022, https://www.ourcommons.ca/DocumentViewer/en/44-1/SRSR/report-2/

[8] *Investing in Canada's Future – Strengthening the Foundations of Canadian Research*, The Advisory Panel for the Review of Federal Support for Fundamental Science, 2017, https://ised-isde.canada.ca/site/canada-fundamental-science-review/sites/default/files/attachments/2022/ScienceReview_April2017.pdf

[9] For a further sampling of Canadian discoveries, inventions and achievements see Exhibit 2.1 in Ref. 4.

[10] https://www.oc-innovation.ca/success-stories/how-kingstons-ipg-photonics-merged-healthcare-and-industrial-tech-to-improve-manufacturing-processes/