



A Force Multiplier:
Support for Graduate Students and
Opportunities for Graduate Students in Canada's
College Applied Research Enterprise

Submission to the House of Commons
Standing Committee on Science and Research

July 2023



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We respectfully acknowledge that CICan's offices in Ottawa are located on the traditional and unceded territory of the Algonquin Anishinaabe Nation.

Colleges and Institutes Canada

1 Rideau Street, Suite 701
Ottawa, Ontario, Canada
K1N 8S7
Tel. 613-746-2222

collegesinstitutes.ca

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Introduction

The role of graduate students in Canadian science and research cannot be understated. Graduate students at the Master's and PhD levels, and the Postdoctoral Fellowships that sometimes follow these courses of study, are critical to advancing science across Canadian universities in a manner that encourages growth, facilitates learning, and challenges students to contribute to the work of thousands of researchers who came before them.

Canada is a world leader in discovery research, supported in large part to the efforts of graduate students. Canada's college applied research enterprise benefits strongly from the foundational knowledge generated in basic research, using it to create tangible outcomes. Canada must better explore how to link these two types of research together, driving value for the Canadian economy.

In doing so, Canada should examine how to better integrate participation by graduate students in college applied research. The inclusion of graduate students in college applied research activities can help deepen their expertise, provide valuable insight into the diversity of careers available to those seeking to make a career in the research ecosystem, and enhance the linkages between college and university research and study. Such a move would be a **force multiplier** in Canadian research.

This submission to the House of Commons Standing Committee on Science and Research presents the views of CIGan in three tranches:

1. Enhancing Government of Canada support for graduate students;
2. Exploring opportunities for graduate students and postdoctoral fellows in Canada's vibrant college applied research community; and
3. Reinforcing and recognizing the role of college students and graduates at fostering innovation in Canada.

This submission, for the Committee's study on how the Government of Canada can better support graduate students and postdoctoral fellows, follows CIGan's planned appearance on June 1st which was interrupted by parliamentary business. We are grateful for the opportunity to make a submission and would be happy to clarify or expand on any items found herein.

Recommendations

Recommendation: That the Government of Canada increase the value of graduate scholarships and fellowships (CGS and PDF) by 50%.

Recommendation: That the Government of Canada examine how the Tri-Council can better support opportunities for graduate students at college applied research centres, including through the provision of grants or incentives to facilitate cross-pollination in the research system.

Recommendation: That the Tri-Council consult with the college applied research community to examine how post-doctoral fellowships can be modified to facilitate more post-doctoral fellows at Canadian colleges.

Recommendation: That the Tri-Council review its programming with a view to fostering stronger opportunities for college-university collaborations in research.

Recommendation: That the House of Commons Standing Committee on Science and Research undertake a study on college applied research and the growth of the college applied research system, with attention to areas such as:

- (a) The college applied research workforce and student contributions;
- (b) The capacity resident in Canada's college applied research system;
- (c) How to facilitate more college-university collaboration in research;
- (d) Opportunities for university students, graduate students, and postdoctoral fellows in college applied research;
- (e) The imbalance in funding between college and university research;
- (f) How the Government of Canada can better support Canada's college applied research enterprise.

1. Enhancing Government of Canada support for graduate students and postdoctoral fellows

As indicated in the opening remarks by CIGan's Anna Toneguzzo on June 1st, CIGan is strongly supportive of improving the amounts offered to promising scholars under the Canada Graduate Scholarship and Postdoctoral Fellowships programs.

As other countries reinforce their commitment to science and research, in tandem with shifts in industrial policy to meet the challenges of our time – for example, climate change – the Government of Canada must reinvest in its core pipelines for highly-qualified personnel. The race for talent is global, not national, nor provincial.

The scholarships in question have not seen an increase in two decades, while the real value of the scholarships has decreased by half. CIGan echoes the testimony of other witnesses, such as the Support Our Science movement, in calling for a 50% increase in the value of graduate scholarships and fellowships to maintain Canada's competitiveness and to ensure graduate students can sustain themselves through rigorous courses of study.

Many other witnesses have spoken to these realities before the Committee. To that end, the remainder of this submission focuses on CIGan's unique contributions to the Committee's discussions and study on support for graduate students.

Recommendation: That the Government of Canada increase the value of graduate scholarships and fellowships (CGS and PDF) by 50%.

2. Exploring Opportunities for Graduate Students and Postdoctoral Fellows at Canada's Colleges and Institutes

As part of our remarks, CIGan raised the possibilities offered by exploring opportunities for graduate students and postdoctoral fellows at Canada's colleges and institutes. In particular, colleges across Canada are active in applied research, with 121 eligible to receive Tri-Council funding.

In fact, in 2021-2022, colleges across Canada partnered with over 8,800 partners to work on over 8,150 applied research projects, resulting in more than 6,400 tangible innovations – new prototypes, products, services, and processes – for deployment at small and medium sized businesses and non-profit organizations throughout the country.

Applied research has become a recognized strength of Canada's college community, growing rapidly over the past twenty years to become a staple offering across Canada. As the country's most accessible

innovation network, these applied research supports take the results of important basic and discovery research and turn them into tangible outcomes – driving growth in the Canadian economy.

The involvement of graduate students and postdoctoral fellows in this work would provide access to a stimulating and impactful research environment, facilitating connections to industry while also supporting the development of tangible research skills as well as skills in client relationship management, project management, and interdisciplinary approaches to accomplish tangible outcomes. In particular, college applied research often relies on the application of knowledge from multiple disciplines, supporting well-rounded education and new skills acquisition.

Graduate Student Opportunities at Colleges

While examining opportunities for graduate students at colleges, it's important to note that graduate students are still in a course of active education accompanied by research. Some have compared graduate students to apprentices – in that they serve as both learners and practitioners in a defined pathway of study and research. Indeed, for graduate students, the cluster of knowledge and expertise in a particular program of study is critical to supporting their learning and growth.

At the same time, CIGan sees opportunities for time-limited interchanges, co-operative education opportunities, and exchanges between colleges and universities as ideal opportunities for graduate students. Given the geographic reach of college campuses, most universities will have a local college, which can provide these opportunities in a student's own community. These time-limited interchanges can provide valuable applied research capacity for colleges by enabling access to new or advanced fields of expertise in the form of graduate students, while also providing exposure to industry and community partners, and expertise from a variety of fields for the graduate student participating. Critically, such an experience would also support graduate students in deepening their own expertise. With the vast majority of applied research projects completed in under one year, time-limited interchanges for graduate students also provide a way to make a significant impact on an applied research project due to their traditionally shorter duration than often longer basic or discovery research experiments or studies.

More broadly, opportunities for college students participating in applied research to work alongside graduate students may provide encouragement to pursue advanced study, furthering the talent pipeline of highly-qualified personnel needed in Canadian science and research.

Given that about [60% of PhD graduates will go on to work outside academia](#), exposure to industry focused research in the form of college applied research would also serve as an excellent introduction to private R&D work as well as better equipping the graduate student to make industry connections, critical to transitioning from study to work.

These opportunities already happen at some institutions, in particular at some cégeps in Quebec – which has a longer history with college-level applied research. The Committee could examine this initiative along with similar models in a more focused study on college applied research.

Opportunities for Postdoctoral Fellows at Colleges

Similar opportunities abound for postdoctoral fellows and the opportunities presented by college applied research. In contrast to graduate students, postdoctoral fellows are typically engaged in mentored research that may be more suitable to taking place in diverse environments, such as college applied

research centres. Subject to field-specific norms, postdoctoral scholarship is more individual than graduate-level study, and as such can more easily be accommodated outside university environments.

Many colleges have established significant centres of expertise in key areas as well, making them ideal receptors for postdoctoral fellows. For example, the Northern Alberta Institute of Technology (NAIT) has a strong research strength in boreal forestry research, while Fleming College in Ontario specializes in water and wastewater technologies and research. The Nova Scotia Community College (NSCC) has significant research expertise in oceanography and oceans-related applied research. These are all fields ripe for postdoctoral scholarship and fellowship, with substantial clusters of expertise available to support postdoctoral training and receive the contributions of these promising researchers.

Postdoctoral fellowships usually involve the provision of space for mentored research and advanced training in a particular field in exchange for teaching, supervisory, or service-related contributions from the postdoctoral fellow. In the college applied research context, the contribution of the fellow could take the form of leading and providing input to college applied research projects. This would align well with the goal of postdoctoral scholarship, which is often aimed at improving readiness for industry or further academic research environments. Involvement and contribution to college applied research would equip a postdoctoral fellow with strong industry connections and significant exposure to the world of industry-led applied research and industrial research more broadly.

The Tri-Council would be wise to further examine opportunities for postdoctoral fellowships at Canadian colleges and applied research centres, especially as PhD graduates increasingly move into industry roles. More generally, facilitating cross-pollination between university and college environments among high quality researchers would strengthen Canada's post-secondary system's contribution of strong, well-rounded highly-qualified personnel, while broader collaboration can support sounder and more applicable research, increasing the reach and impact of post-secondary research across the country.

As a final note, the Tri-Council has a key role to play in fostering and incentivizing college-university collaborations on research. Many Tri-Council programs, such as the Alliance Grants program, still prohibit college-led applications. In fact, just 1.1% of Alliance Grant applications and funded projects since the Grant's inception have included a college researcher as a partner. It is critical that the Tri-Council review its programming to identify barriers to college inclusion and participation, which would unlock and allow stronger college-university research collaborations, supporting students and enhancing research outcomes.

Recommendation: That the Government of Canada examine how the Tri-Council can better support opportunities for graduate students at college applied research centres, including through the provision of grants or incentives to facilitate cross-pollination in the research system.

Recommendation: That the Tri-Council consult with the college applied research community to examine how post-doctoral fellowships can be modified to facilitate more post-doctoral fellows at Canadian colleges.

Recommendation: That the Tri-Council review its programming with a view to fostering stronger opportunities for college-university collaborations in research.

3. Reinforcing and recognizing the role of college students and graduates at fostering innovation in Canada.

In addition to almost 280,000 graduate students across Canada, college students and college graduates also play a key role in fostering innovation and supporting research, nationally. In fact, in 2021-2022 over 27,000 students at Canadian colleges contributed to their institutions' applied research. These students support applied research project management, design prototypes, test proofs of concept, and support industry- and community-focused applied research – building their skills and making strong connections to external partners who may offer employment or other opportunities.

Many of these students go on to continue in research, and colleges are increasingly hiring students postgraduation as Research Associates or in similar roles as full-time staff. As the college applied research system matures, focused study on the growth and status of the Canadian college applied research enterprise would be a worthwhile focus for the Standing Committee on Science and Research. Canada's college applied research system is internationally-recognized for its strength and rapid growth, and the Government of Canada would benefit from a holistic examination of the system in terms of the support it needs to grow and drive outcomes for the Canadian economy and Canadian society.

Recommendation: That the House of Commons Standing Committee on Science and Research undertake a study on college applied research and the growth of the college applied research system, with attention to areas such as:

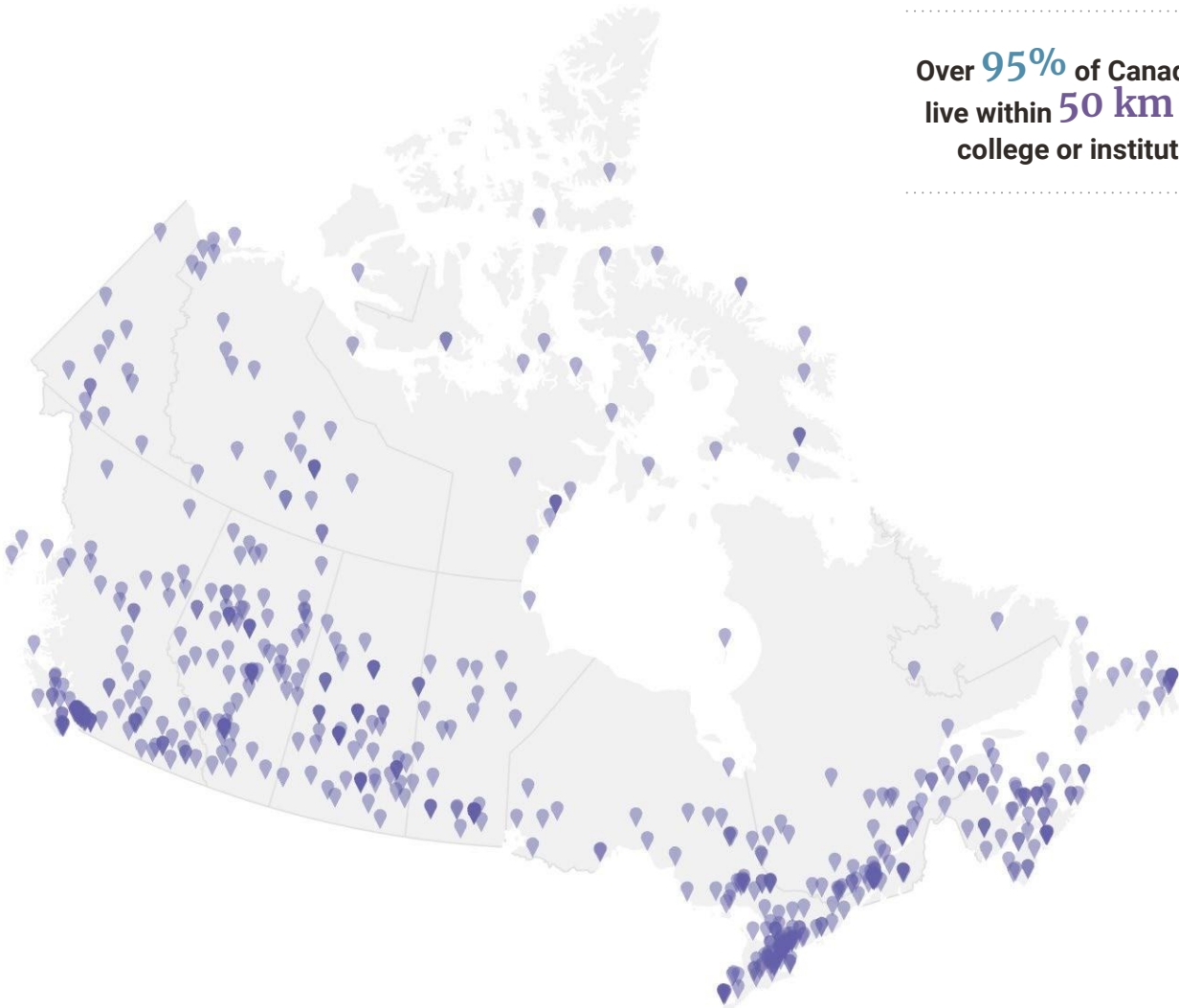
- (a) The college applied research workforce and student contributions;
- (b) The capacity resident in Canada's college applied research system;
- (c) How to facilitate more college-university collaboration in research;
- (d) Opportunities for university students, graduate students, and postdoctoral fellows in college applied research;
- (e) The imbalance in funding between college and university research;
- (f) How the Government of Canada can better support Canada's college applied research enterprise.

Conclusion

Canada is a world leader in fundamental research, and it is essential that we remain so to anchor our prosperity moving forward. However, we must improve our ability to leverage and capture the value of our ideas. This requires us not only to fund our young researchers, but to surround them with opportunities to take their genius and make something of it.

CICan reiterates its support for remedying the amounts offered to promising graduate students across Canada. More broadly, the Government of Canada should re-evaluate how it can better support crosspollination between college and university research, including through focused incentives and supports for hosting graduate students and postdoctoral fellows at Canadian college applied research centres. Finally, the Standing Committee on Science and Research is ideally placed to undertake a study on the growth of the Canadian college applied research enterprise and to make recommendations for how we can further grow this system of industry- and community-focused research supports.

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