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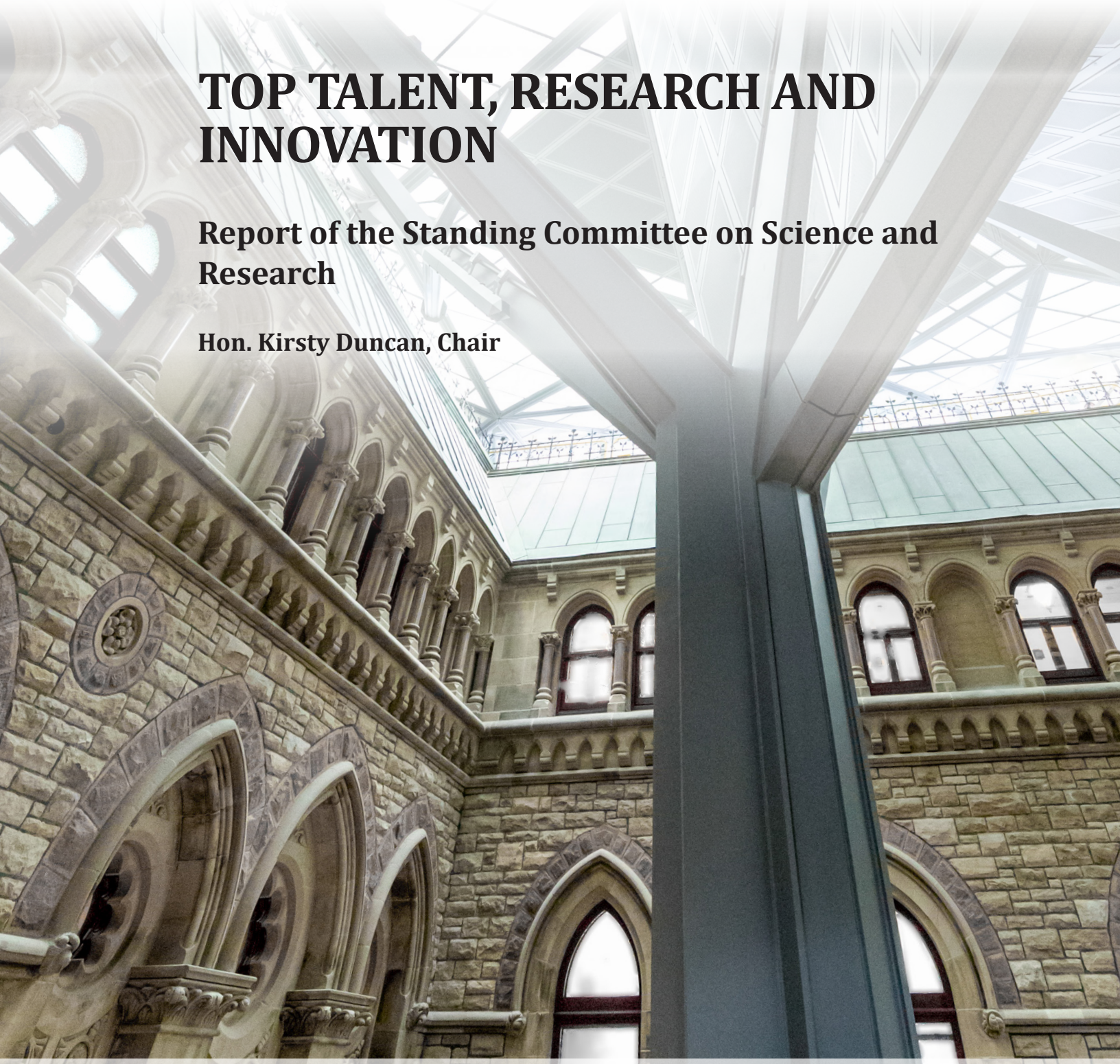
TOP TALENT, RESEARCH AND INNOVATION

Report of the Standing Committee on Science and Research

Hon. Kirsty Duncan, Chair



OCTOBER 2022
44th PARLIAMENT, 1st SESSION

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Chair

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NOTICE TO READER

Reports from committees presented to the House of Commons

Presenting a report to the House is the way a committee makes public its findings and recommendations on a particular topic. Substantive reports on a subject-matter study usually contain a synopsis of the testimony heard, the recommendations made by the committee, as well as the reasons for those recommendations.

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THE STANDING COMMITTEE ON SCIENCE AND RESEARCH

has the honour to present its

SECOND REPORT

Pursuant to its mandate under Standing Order 108(3)(i), the committee has studied top talent, research and innovation and has agreed to report the following:

TABLE OF CONTENTS

SUMMARY

As Canada faces a skilled labour shortage, post-secondary education and research institutions are confronted with strong international competition to attract and retain top talent.

The House of Commons Standing Committee on Science and Research (the Committee) decided to carry out a study on how best to attract and retain top talent at Canadian universities, colleges and trade schools, and support research and innovation.

The evidence heard by the Committee highlighted the importance of attracting and retaining talent, in terms of both the quality of scientific research in Canada and the capacity to innovate. Witnesses made a number of recommendations to the Committee to make Canada more attractive to top talent. These recommendations focused on the immigration process for top talent; the standard of living for students; the challenges facing early-career researchers; equity, diversity and inclusion; retaining talent in the regions; and the role of college-level institutions.

Based on the testimony heard, the Committee is making 13 recommendations to the government.

LIST OF RECOMMENDATIONS

As a result of their deliberations committees may make recommendations which they include in their reports for the consideration of the House of Commons or the Government. Recommendations related to this study are listed below.

TOP TALENT, RESEARCH AND INNOVATION

INTRODUCTION

On 1 February 2022, the House of Commons Standing Committee on Science and Research (the Committee) decided to undertake "a comprehensive study on how to best attract and retain top talent at Canadian universities, colleges, and trade schools, and support research and innovation."[1]

As part of this study, the Committee held four meetings between 28 April and 19 May 2022. It heard 42 witnesses and received 10 briefs. The Committee would like to thank all those who took the time to participate in its study, either by appearing as witnesses or by submitting briefs.

Further to the evidence heard, the Committee is making recommendations to the federal government about attracting and retaining top talent at Canadian universities, colleges and trade schools.

"TALENT IS THE NEW OIL"

First of all, witnesses highlighted the importance of considering how to attract and retain top talent. Whether it is for universities, colleges or trade schools, or for industry or organizations, recruiting skilled talent is essential to "generate and operationalize the knowledge required to provide innovative solutions to complex problems."[2] As Karimah Es Sabar, Board Chair of the Canadian Glycomics Network, put it, "[t]alent is the new oil."[3]

The population is aging, which means Canada is in for a demographic shock in the coming decades.[4] To be competitive in the fields of research and innovation, Canada

1 House of Commons, Standing Committee on Science and Research (SRSR), *Minutes of Proceedings*, 1 February 2022.

2 SRSR, *Evidence*, 28 April 2022, 1945 (Céline Poncelin de Raucourt, Vice-President, Teaching and Research, Université du Québec).

3 SRSR, *Evidence*, 5 May 2022, 1950 (Karimah Es Sabar, Board Chair, Canadian Glycomics Network).

4 SRSR, *Evidence*, 19 May 2022, 1850 (Deborah MacLatchy, President and Vice-Chancellor, Wilfrid Laurier University).

must attract and retain individuals who come to study and conduct research at Canadian post-secondary institutions.

For example, in the health care sector, Gordon McCauley, President and Chief Executive Officer of adMare BioInnovations, said that Canada is "facing a serious shortage of life sciences talent."[5] Another witness explained that the most urgent health challenges include recovery from the COVID-19 pandemic, the risk of new pandemics, climate change, complex diseases such as diabetes, and an aging population, which all require innovative solutions that could come from research.[6]

Attracting and retaining top talent at universities and post-secondary institutions is important not only for the future of research, but also for the economy as a whole. The Committee was told that approximately 80% of graduates do not pursue careers in university research.[7] However, this talent pool is a valuable resource for the Canadian economy, which is experiencing a skilled labour shortage. According to the Council of Canadian Innovators (CCI), Canada's current workforce is not positioned to meet the increased demand for skilled technology workers due to growth in the digital economy.[8]

This labour shortage is taking place in a context with strong international competition for top talent. Canada has much to offer to attract or retain the best students and scientists. According to one witness, "Canada is recognized around the world for its quality of life. Geopolitical conflicts and the global rise of governments unfriendly to academia have made Canada an increasingly attractive place for those pursuing opportunities in research and innovation."[9] However, a number of witnesses pointed out that some of Canada's most promising talents are being recruited abroad by countries that offer better grants or salaries.[10] One witness cited data from the World Intellectual

5 SRSR, *Evidence*, 19 May 2022, 1940 (Gordon McCauley, President and Chief Executive Officer, adMare BioInnovations).

6 SRSR, *Evidence*, 19 May 2022, 1940 (Catharine Whiteside, Chair, Banting Research Foundation).

7 SRSR, *Evidence*, 19 May 2022, 1845 (Jean-Pierre Perreault, Vice-President, Research and Graduate Studies, Université de Sherbrooke).

8 Council of Canadian Innovators, *CCI Talent & Skills Strategy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022, p. 5.

9 SRSR, *Evidence*, 19 May 2022, 1850 (MacLatchy).

10 See for example: SRSR, *Evidence*, 28 April 2022, 1830 (Thomas Bell, Professor, Imperial College London, As an Individual); SRSR, *Evidence*, 19 May 2022, 1940 (Whiteside); Banting Research Foundation, *Investing in Canada's Research and Innovation Talent to Secure the Future of our Health and Economy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 12 May 2022.

Property Organization, saying "Canada is the third-biggest net loser of inventors due to migration, behind only China and India."[11]

ATTRACTING AND RETAINING TOP TALENT

Witnesses informed the Committee that attracting and retaining top talent are two separate issues.[12] Generally speaking, it is more difficult and more expensive to attract foreign researchers to Canada, or to bring back researchers who left Canada, than it is to retain homegrown top talent. When he appeared before the Committee, Thomas Bell, Professor at Imperial College London, referenced several difficulties faced by researchers who would like to move to Canada:

> Moving to a new university means relearning all of the internal systems and ways of doing things, and moving countries is doubly disruptive. Scientists moving to Canada for the first time need to learn how funding and hiring works and how to attract students, and they need to build their collaboration networks from scratch. Many will have young families and would need to learn how the school system works. The cost of moving is therefore very high for a scientist, so attracting the top scientists to Canada is more difficult than retaining scientists.[13]

It is also useful to make a distinction based on the career stages of the talent Canada would like to attract and retain. Thomas Bell explained:

> [J]unior and senior scientists have different motivations. It often only takes a nudge in one direction early in the career to change an academic trajectory. Later career researchers—"proven talent"—are lower risk, but more costly to move and often have a shorter scientific career ahead of them.[14]

Furthermore, students, post-doctoral fellows, early-career researchers and later-career researchers each face different challenges. Andrea Wishart, a Ph.D. student at the University of Saskatchewan, highlighted some of these challenges, such as funding or job opportunities, by telling the Committee about her own experience.[15] These differences must be taken into account when policies are established to attract or retain talent.

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11 SRSR, *Evidence*, 19 May 2022, 1835 (Joel Blit, Associate Professor, University of Waterloo, As an Individual).

12 SRSR, *Evidence*, 28 April 2022, 1830 (Bell).

13 Ibid.

14 Ibid.

15 SRSR, *Evidence*, 5 May 2022, 1830 (Andrea Wishart, Doctoral Student, University of Saskatchewan, As an Individual).

The following sections will focus on the themes covered by witnesses: immigration issues; investment levels in research; support for students; challenges for early-career researchers; equity, diversity and inclusion; supporting talent in the regions; the role of college-level institutions; and the relationship between talent and innovation.

Immigration Challenges for Talent Coming to Canada

Students, researchers and scientists who want to come to Canada must meet immigration requirements. Several witnesses told the Committee about the difficulties associated with immigration rules and also suggested solutions.[16]

Foreign students who want to study in a Canadian post-secondary institution must first obtain an acceptance letter from that institution. Then they must obtain a study permit issued by Immigration, Refugees and Citizenship Canada (IRCC).[17] The Student Direct Stream allows students from certain countries to obtain their study permits faster.[18] Foreign students who want to study in Quebec must also obtain a Quebec acceptance certificate from the Government of Quebec.

Once they graduate, students can apply for a post-graduation work permit, which allows them to stay in Canada for up to three more years.[19]

Foreign academics or researchers who are interested in teaching or conducting research in Canada on a temporary basis must normally obtain a job offer and a work permit. In some cases, foreign academics are exempt from work permits and Employment and Social Development Canada (ESDC) labour market impact assessments. This exemption applies to research award recipients, visiting professors and post-doctoral fellows.[20]

Academics or researchers who want to immigrate to Canada permanently can apply through the Federal Skilled Worker (Express Entry) program.[21] If they have already

16 The Committee notes that the House of Commons Standing Committee on Citizenship and Immigration tabled a report in May 2022 entitled *Differential Treatment in Recruitment and Acceptance Rates of Foreign Students in Quebec and in the Rest of Canada*, Eighth Report, May 2022.

17 Government of Canada, *Study permit: Who can apply*.

18 Government of Canada, *Student Direct Stream: About the process*.

19 Government of Canada, *Work in Canada after you graduate: About the post-graduation work permit*.

20 Government of Canada, *Hire a foreign academic—Exemptions*.

21 Government of Canada, *Eligibility to apply as a Federal Skilled Worker (Express Entry)*.

worked in Canada on a temporary basis, they can also apply under the Canadian Experience Class (Express Entry) program.[22]

Some witnesses commended Canada's immigration policies, including Alice Aiken, Vice-President of Research and Innovation at Dalhousie University, who said: "We attract people to Canada because we have good immigration policies. … We are really able to attract talent from other countries and we do retain a lot of our own talent because Canada's a pretty great place to live. It's reasonably safe."[23]

However, other witnesses said that the federal government's study permit approval process should be improved.[24] Ron McKerlie, President and Chief Executive Officer of Mohawk College, said: "Timely and efficient study visa approvals, as well as ready access to work permits upon graduation, will help ensure Canada attracts the best and the brightest to our communities."[25] Martin Basiri, Chief Executive Officer and Co-founder of ApplyBoard, a company that helps students apply to study abroad, drew the Committee's attention to the need to improve the reliability and predictability of processing times for study permits.[26] He suggested using artificial intelligence to better align immigration with labour market needs.[27]

Witnesses also raised the matter of recognizing foreign credentials.[28] CCI recommended expanding the recognition of skills, credentials and training to better take into account the situation of visa applicants who are self-taught or who have pursued alternative education paths.[29]

22 Government of Canada, *Eligibility to apply for the Canadian Experience Class (Express Entry)*.

23 SRSR, *Evidence*, 28 April 2022, 2020 (Alice Aiken, Vice-President, Research and Innovation, Dalhousie University).

24 For example, SRSR, *Evidence*, 19 May 2022, 1850 (MacLatchy); SRSR, *Evidence*, 19 May 2022, 1940 (Gordon McCauley); SRSR, *Evidence*, 19 May 2022, 1950 (Michele Mosca, Professor, Institute for Quantum Computing, University of Waterloo, As an Individual).

25 SRSR, *Evidence*, 5 May 2022, 1840 (Ron McKerlie, President and Chief Executive Officer, Mohawk College).

26 SRSR, *Evidence*, 5 May 2022, 2035 (Martin Basiri, Chief Executive Officer and Co-founder, ApplyBoard).

27 Ibid., 2050.

28 For example, SRSR, *Evidence*, 28 April 2022, 2015 (Aiken); SRSR, *Evidence*, 19 May 2022, 1855 (Blit).

29 SRSR, *Evidence*, 5 May 2022, 1850 (Nicholas Schiavo, Director, Federal Affairs, Council of Canadian Innovators); and Council of Canadian Innovators, *CCI Talent & Skills Strategy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022, p. 14.

The Committee also heard that foreign students who completed their studies in Canada should have better access to work permits.[30] Denise Amyot, speaking on behalf of Colleges and Institutes Canada, said that the government should develop "permanent residency streams for international students graduating from colleges and develop a national employment pipeline for skilled newcomers."[31] CCI proposed implementing a concierge service for businesses and immigrants to make it easier for talented candidates to obtain permanent residency as part of the Global Talent Stream of the Temporary Foreign Worker Program.[32]

To attract digital talent, CCI recommended piloting a High Potential Tech Visa, which would not require having a job offer in hand.[33] CCI also recommended developing a Digital Nomad Strategy "to make our country a destination for these [remote] workers."[34]

Therefore, the Committee recommends:

Recommendation 1

That the Government of Canada make the process for international students applying for study permits more transparent, and that it reduce application processing delays.

Recommendation 2

That the Government of Canada improve access to work permits and strengthen and shorten pathways to permanent residency for foreign students who obtained postsecondary degrees in Canada.

Overall Investment in Research

According to multiple witnesses, in order to attract the best scientists, the primary focus should be the teaching and research environment. In Thomas Bell's view, "top scientists

30 SRSR, *Evidence*, 5 May 2022, 1840 (McKerlie).

31 SRSR, *Evidence*, 19 May 2022, 2035 (Denise Amyot, President and Chief Executive Officer, Colleges and Institutes Canada).

32 Council of Canadian Innovators, *CCI Talent & Skills Strategy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022, p. 13.

33 Ibid., p. 9.

34 Ibid., p. 11.

are attracted by top science, and the rest … is window dressing."[35] As such, Canada's best strategy for attracting and retaining top talent is to create an environment conducive to scientific research and innovation. Two witnesses quoted the famous movie line, "if you build it, then they will come."[36] Investing in the research environment can create a positive feedback loop "where strength builds on strength, and the best scientists come because the best scientists are already there."[37] As another witness put it, "brilliant people want to work with other brilliant people."[38]

The Canada Research Chairs Program and the Canada Excellence Research Chairs Program were applauded by various witnesses.[39] These two programs, which were launched in 2000 and 2008, respectively, seek to attract and retain the most accomplished minds within Canadian post-secondary institutions.

However, despite these success stories, a number of shortcomings were identified in how research is funded overall. Some witnesses pointed a finger at the level of investment in research and development (R and D) in Canada.[40] According to statistics from the Organisation for Economic Co-operation and Development (OECD), as cited by Karimah Es Sabar, Canada's investment in R and D as a percentage of gross domestic product (GDP) was 1.7% in 2020, falling below the OECD average of 2.7%.[41]

Similarly, the Committee was told it is necessary to support basic research, fund the granting councils—that is, the Social Sciences and Humanities Research Council (SSHRC), the Natural Sciences and Engineering Research Council of Canada (NSERC), and the Canadian Institutes of Health Research (CIHR)—and invest in research infrastructure,

35 SRSR, *Evidence*, 28 April 2022, 1830 (Bell).

36 Ibid.; SRSR, *Evidence*, 28 April 2022, 1940 (Aiken).

37 SRSR, *Evidence*, 28 April 2022, 1830 (Bell).

38 SRSR, *Evidence*, 12 May 2022, 1845 (Robert Myers, Director, Perimeter Institute for Theoretical Physics).

39 SRSR, *Evidence*, 28 April 2022, 1940 (Aiken); SRSR, *Evidence*, 19 May 2022, 1850 (MacLatchy); SRSR, *Evidence*, 19 May 2022, 2015 (Whiteside).

40 SRSR, *Evidence*, 28 April 2022, 1940 (Aiken); SRSR, *Evidence*, 5 May 2022, 1950 (Es Sabar); SRSR, *Evidence*, 12 May 2022, 1935 (Kevin Smith, President and Chief Executive Officer, University Health Network, As an Individual); SRSR, *Evidence*, 19 May 2022, 1835 (Blit).

41 SRSR, *Evidence*, 5 May 2022, 1950 (Es Sabar), Organisation for Economic Co-operation and Development (OECD), *Gross domestic spending on R&D*, OECD Data, Database, accessed on 30 June 2022.

including cyberinfrastructure.[42] These recommendations echoed observations that were made as part of the Committee's previous study on successes, challenges and opportunities for science in Canada.[43]

With regard to talent in particular, witnesses emphasized the importance of training. Kevin Smith, President and Chief Executive Officer of the University Health Network, said: "Research should include pedagogical or educational research, an incredibly important part of the future of Canada's training programs."[44] In the area of bioscience and biomanufacturing, BioCanRx, which is a company bringing together a network of scientists, clinicians and cancer stakeholders, stressed the importance of having "the right supports and ecosystem conditions throughout both education programs curriculum and subsequent training."[45] BioCanRx recommended allocating more funding to innovative training programs, such as internships at highly specialized biomanufacturing sites.[46]

Also on the topic of training, another witness raised the issue of public support for post-secondary institutions. While this is primarily an area of provincial jurisdiction, David Wolfe, Professor and Co-Director of the Innovation Policy Lab at the University of Toronto's Munk School of Global Affairs and Public Policy, pointed out that the federal government already provides indirect support for post-secondary education through existing social transfers paid to the provinces and territories.[47]

Similar to Recommendation 5 in its report on the successes, challenges and opportunities for science in Canada,[48] the Committee recommends:

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42 For example, SRSR, *Evidence*, 12 May 2022, 1830 (David Robinson, Executive Director, Canadian Association of University Teachers); SRSR, *Evidence*, 19 May 2022, 1840 (Jalene LaMontagne, Associate Professor, DePaul University, As an Individual); SRSR, *Evidence*, 19 May 2022, 1940 (Gordon McCauley); SRSR, *Evidence*, 12 May 2022, 1955 (Smith); Research Canada: An Alliance for Health Discovery, *Submission to the Standing Committee on Science and Research—Study on Top Talent, Research and Innovation*, May 2022.

43 House of Commons, SRSR, *Successes, Challenges and Opportunities for Science in Canada*, First Report, June 2022.

44 SRSR, *Evidence*, 12 May 2022, 1935 (Smith).

45 BioCanRx, *Submission to the Standing Committee on Science and Research—Study on Top Talent, Research and Innovation*, 26 May 2022, p. 1.

46 Ibid., p. 2.

47 SRSR, *Evidence*, 28 April 2022, 1920 (David Wolfe, Professor and Co-Director, Innovation Policy Lab, Munk School of Global Affairs and Public Policy, University of Toronto, As an Individual).

48 House of Commons, SRSR, *Successes, Challenges and Opportunities for Science in Canada*, First Report, June 2022.

Recommendation 3

That the Government of Canada review and increase its investments in fundamental research through increases to the budgets of the three granting councils: the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research.

Scholarships, Fellowships and the Standard of Living for Students

The topic of the standard of living for students was brought up by various witnesses, including several representatives of student organizations.

The Quebec Student Union (QSU) criticized the underfunding of student scholarship programs by the three federal granting councils.[49] The QSU explained in its brief that, due to cuts to the federal granting councils' budgets between 2011 and 2015, and despite government investments announced since then, the percentage of the granting councils' budget allocated to scholarship and fellowship programs has decreased in the last decade: it dropped from 13.3% to 8.3% at NSERC, from 16.9% to 13.0% at SSHRC, and from 6.3% to 5.5% at CIHR.[50] The QSU and the Canadian Alliance of Student Associations estimate that the accumulated gap in funding for student grants since 2011 is $120 million.[51] They recommended that funding for student scholarship programs be increased by $120 million and that the importance of student scholarships be re-established within the overall envelope of the three granting councils.[52]

Various witnesses argued that the amount, length and number of scholarships for master's, doctoral and post-doctoral programs were insufficient.

49 SRSR, *Evidence*, 28 April 2022, 1835 (Jonathan Desroches, President, Quebec Student Union).

50 Quebec Student Union, *Brief submitted to the Standing Committee on Science and Research*, May 2022.

51 Ibid.; and SRSR, *Evidence*, 12 May 2022, 1940 (Christian Fotang, Chair of the Board of Directors, Canadian Alliance of Student Associations).

52 Ibid.

Regarding scholarship amounts, the Committee was told that award values paid out by the granting councils have barely changed in about 20 years.[53]

Danika Goosney, appearing on behalf of NSERC, said that the granting councils are aware of this issue. She said that "the reason this situation hasn't been redressed over time is that there has been a constant re-evaluation of the balance between the number of awards we offer and their monetary value. It's a zero-sum game."[54]

Several witnesses shared their personal stories to show the Committee how far Canadian scholarships and fellowships fall short in comparison with certain other countries. Shaun Khoo, a post-doctoral fellow at the Université de Montréal, gave the following example:

> Canadian postdoc pay is so low that I earned more as an Australian Ph.D. student with some casual teaching roles than I did in Canada. On top of that, every year Canada gave me a pay cut in real terms because my Canadian postdoc salary wasn't indexed for inflation, nor did it rise with experience.[55]

Compounding the problem, the award values offered by the granting councils set the bar for student compensation in Canada through research stipends from other sources.[56]

Many witnesses criticized the fact that awards are not indexed to inflation.[57] As Danika Goosney explained, "NSERC's doctoral award has remained almost constant at $21,000 per year since 2004. Considering a mean inflation rate during this period of 1.85%, this means the effective award value has dropped by 42%."[58]

This drop in effective award value has led to a lower standard of living for students. Jean-Pierre Perreault, appearing on behalf of the Université de Sherbrooke, pointed out

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53 For example, SRSR, *Evidence*, 5 May 2022, 1935 (Shaun Khoo, Postdoctoral Fellow, Université de Montréal, As an Individual); SRSR, *Evidence*, 5 May 2022, 1830 (Wishart); SRSR, *Evidence*, 12 May 2022, 1945 (Danika Goosney, Vice-President, Research Grants and Scholarships Directorate, Natural Sciences and Engineering Research Council); Ottawa Science Policy Network, *A Student Perspective on Graduate Student Funding in Canada*, Brief submitted to the House of Commons Standing Committee on Science and Research, June 2022.

54 SRSR, *Evidence*, 12 May 2022, 2010 (Goosney).

55 SRSR, *Evidence*, 5 May 2022, 1935 (Khoo).

56 SRSR, *Evidence*, 19 May 2022, 1845 (Perreault); SRSR, *Evidence*, 12 May 2022, 1945 (Goosney).

57 For example, SRSR, *Evidence*, 28 April 2022, 2045 (Edris Madadian, Chair, Canadian Association of Postdoctoral Scholars); SRSR, *Evidence*, 12 May 2022, 1905 (Robinson); SRSR, *Evidence*, 19 May 2022, 1850 (MacLatchy); SRSR, *Evidence*, 19 May 2022, 2015 (Whiteside).

58 SRSR, *Evidence*, 12 May 2022, 1945 (Goosney).

that some scholarship amounts offered by the three granting councils, such as graduate scholarships, would now put those students below the poverty line.[59]

Christian Fotang, representing the Canadian Alliance of Student Associations, highlighted how this financial precarity affects students' mental health:

> Affordability plays a huge role in the mental health aspect for students. It's enough that they're worrying about their courses, or being lonely or overwhelmed, but part of that feeling of being overwhelmed comes from not knowing where they're going to get the money to pay for their tuition, to pay for their rent and to pay for their groceries.[60]

Financial difficulties can push some promising talents to leave their studies. According to the preliminary findings of a study conducted by the Ottawa Science Policy Network, "32% of graduate students have considered dropping out of their program due to financial concern."[61]

The QSU pointed out that the problem is not only the scholarship amounts, but also their duration: "Master's scholarships are currently granted for one year and doctoral awards for three years, whereas a master's degree generally takes at least two years to complete and a doctorate four."[62] This increases the likelihood that students will have to find other sources of funding, or drop out before they graduate.

Lastly, some witnesses shared the view that the granting councils do not award enough scholarships. Many promising students do not pursue their studies because of a lack of financial support.[63] Sarah Laframboise, President of the Ottawa Science Policy Network, said: "Only 33% of graduate students are actually supported directly through tri-council awards from one of the three federal granting agencies. The rest are supported indirectly through stipends provided from their supervisors' research grants or departments."[64] The QSU and the Ottawa Science Policy Network both suggested decreasing the amount of the elite scholarships, such as the Vanier graduate scholarship

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59 SRSR, *Evidence*, 19 May 2022, 1845 (Perreault).

60 SRSR, *Evidence*, 12 May 2022, 2005 (Fotang).

61 Ottawa Science Policy Network, *A Student Perspective on Graduate Student Funding in Canada*, Brief submitted to the House of Commons Standing Committee on Science and Research, June 2022.

62 SRSR, *Evidence*, 28 April 2022, 1835 (Desroches).

63 Ibid., 1905; SRSR, *Evidence*, 19 May 2022, 2045 (Edward McCauley, President and Vice-Chancellor, University of Calgary).

64 SRSR, *Evidence*, 5 May 2022, 2045 (Sarah Laframboise, Student in Biochemistry, University of Ottawa, President of the Ottawa Science Policy Network, Institute for Science, Society and Policy).

and the Banting post-doctoral fellowship, and using the corresponding money to either increase the value or increase the number of base awards.[65]

To ensure that the student experience is better taken into account, a number of witnesses suggested including student representatives on the governing councils of the three granting councils.[66]

As a result, the Committee echoes Recommendation 7 from its report on successes, challenges and opportunities for science in Canada,[67] and recommends:

Recommendation 4

That the Government of Canada increase the number of scholarships and fellowships to graduate students and post-doctoral researchers, increase their value by 25% to reflect increases in cost of living since their last adjustment in 2003 and index the amount to the consumer price index.

Recommendation 5

That the Government of Canada consider other compensation mechanisms for students to attract and retain top talent, such as tuition cost coverage and increased employment opportunities for both international students on student visas and students receiving federal grants.

Recommendation 6

That the Government of Canada amend the *Natural Sciences and Engineering Research Council Act*, the *Social Sciences and Humanities Research Council Act* and the *Canadian Institutes of Health Research Act* to include student representatives on the governing councils of these three institutions.

65 SRSR, *Evidence*, 28 April 2022, 1925 (Desroches); and Ottawa Science Policy Network, *A Student Perspective on Graduate Student Funding in Canada*, Brief submitted to the House of Commons Standing Committee on Science and Research, June 2022.

66 SRSR, *Evidence*, 28 April 2022, 1915 (Desroches); Paul Dufour, *The Policy Needs Shaping Science within Parliament*, Brief submitted to the House of Commons Standing Committee on Science and Research, May 2022.

67 House of Commons, SRSR, *Successes, Challenges and Opportunities for Science in Canada*, First Report, June 2022.

Employment Opportunities and Uncertainty for Early-Career Researchers

Many witness statements focused on the unique situation of early-career researchers. The transition years between being a student and being a professional researcher mark a turning point in a scientist's career. Catharine Whiteside, appearing on behalf of the Banting Research Federation, explained the situation as follows:

> The first five years are the most difficult for early-career researchers, who must juggle setting up their independent research programs, acquiring competitive grant funding, establishing new families and dealing with a university teaching load. For MDs, there are new clinical care responsibilities.[68]

As regards attracting and retaining top talent, these early years are also decisive, insomuch as "it becomes more difficult to move over time."[69]

Andrea Wishart helped shed light on the difficult decisions researchers might have to make at this stage in their life:

> [After completing their Ph.D.,] the researcher has spent years paying ever-rising tuition with stipends that have remained stagnant for years. Those are years of not being able to build savings that make a relatively low-paying post-doctoral position less attractive. … This alone can make the lure of well-funded post-docs or more competitive industrial salaries outside of Canada an undeniable option[.][70]

Witnesses identified low pay and ambiguous job classification as being key problems faced by post-doctoral fellows in Canada.

As mentioned above, the salary for post-doctoral fellows is lower in Canada than in other countries, such as the United States or Australia.[71] Furthermore, post-doctoral fellowships in Canada are not indexed to inflation.[72]

With regard to the classification of post-doctoral fellows, the Committee was told that there is no standardized definition of a post-doctoral fellow across Canada:

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68 SRSR, *Evidence*, 19 May 2022, 1940 (Whiteside).

69 SRSR, *Evidence*, 28 April 2022, 1830 (Bell).

70 SRSR, *Evidence*, 5 May 2022, 1830 (Wishart).

71 SRSR, *Evidence*, 28 April 2022, 2040 (Madadian).

72 Ibid., 2045; SRSR, *Evidence*, 12 May 2022, 1905 (Robinson); SRSR, *Evidence*, 19 May 2022, 1910 (Perreault).

> [T]here are universities in Quebec that define post-docs as "students." There are universities in Quebec that call them "faculty." In B.C. it is the same thing. Some universities call them "faculty," but still they are not getting the benefits that faculty get. Some of them are called "staff." Some of them are even classified as part of the administration.[73]

As a result, some post-doctoral fellows have trouble accessing provincial and federal benefits. For example, 18% of post-doctoral fellows are not eligible for provincial health insurance plans.[74] This uncertainty can also affect the immigration process for foreign post-doctoral fellows recruited to Canada.[75] The Canadian Association of Postdoctoral Scholars recommends harmonizing legislation applicable to post-doctorate fellows at the federal level in such sectors as immigration, employment and taxation.[76] The Committee notes that the *Budget Implementation Act, 2022, No. 1*, which received Royal Assent on 23 June 2022, adds post-doctoral fellowship income to the definition of "earned income" for Registered Retirement Savings Plan (RRSP) purposes.[77]

Moving from a post-doctoral fellowship to a permanent position at a university is also challenging. A witness quoted a Council of Canadian Academies report, stating that "[t]he number of PhD graduates in Canada is growing while the number of open tenure-track positions is stagnant or declining."[78] In this context, the vast majority of Ph.D.s do not find permanent jobs in academia.[79] Jalene LaMontagne, Associate Professor at DePaul University, recommended that federal support for universities be increased so more tenure-track positions can be created.[80]

David Robinson, representing the Canadian Association of University Teachers (CAUT), spoke about a growing trend for post-secondary institutions to offer precarious contract

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73 SRSR, *Evidence*, 28 April 2022, 2050 (Madadian).

74 Ibid., 2040.

75 Ibid.

76 Ibid.

77 *Budget Implementation Act, 2022, No. 1,* S.C. 2022, c. 10, s. 15.

78 Ottawa Science Policy Network (brief); SRSR, *Evidence*, 19 May 2022, 1840 (LaMontagne); Council of Canadian Academies, *Degrees of Success: The Expert Panel on the Labour Market Transition of PhD Graduates*, 2021, p. xvii.

79 SRSR, *Evidence*, 5 May 2022, 1935 (Khoo).

80 SRSR, *Evidence*, 19 May 2022, 1840 (LaMontagne).

positions. According to CAUT, more than one third of academic staff are employed on short-term teaching-only contracts.[81]

This trend raises a number of concerns. First, contract academic staff often have to take on high course loads to make a living.[82] Second, when they are given teaching-only contracts, many early-career researchers are unable to pursue their research. According to David Robinson, without tenure or a tenure-track appointment, it is difficult, if not impossible, for contract academic staff to secure research grants from the federal granting councils.[83] It is absolutely critical for early-career researchers to get their first post-doctorate grant.[84] When tenure-track positions become available, contract teaching staff are at a disadvantage, because they have not been as active in research.[85] According to Statistics Canada data referenced by the Banting Research Foundation in a brief submitted to the Committee, it now takes an average of 5.5 years to achieve tenure among university academics in Canada, which is an increase of nearly a year over the average in 1990–1991.[86] CAUT sees it as wasted potential: "this is like leaving a treasure buried in the ground."[87]

In the health and biomedical sector, the Banting Research Foundation recommended creating a new program for early-career research within CIHR. It would include salary, grant-in-aid and mentorship, and would focus on Canada's most urgent health and economic challenges.[88] The Foundation also recommended increasing overall funding to CIHR for investigator-led grant-in-aid to achieve a success rate of 30% to 40% for early-career researchers.[89] CIHR said in its brief that it has "committed to equalizing applicant

81 SRSR, *Evidence*, 12 May 2022, 1830 (Robinson).

82 Ibid., 1915.

83 Ibid., 1830.

84 Ibid., 1915.

85 Ibid., 1905.

86 Statistics Canada, *Number and salaries of full-time teaching staff at Canadian universities (final), 2020/2021*, The Daily, 13 December 2021; Banting Research Foundation, *Investing in Canada's Research and Innovation Talent to Secure the Future of our Health and Economy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 12 May 2022.

87 SRSR, *Evidence*, 12 May 2022, 1905 (Robinson).

88 Banting Research Foundation, *Investing in Canada's Research and Innovation Talent to Secure the Future of our Health and Economy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 12 May 2022, p. 6.

89 Ibid.

success rates for [early-career researchers], ensuring a dedicated source of support for this critical cohort of young researchers," through its flagship Project Grant program.[90]

Therefore, the Committee recommends:

Recommendation 7

That the Government of Canada harmonize legislation applicable to post-doctoral fellows at the federal level in the areas of immigration, employment and taxation.

Recommendation 8

That the Government of Canada, in cooperation with the provinces and territories, consider ways to encourage post-secondary institutions to create more tenured positions.

Recommendation 9

That the Government of Canada develop a new research funding program specifically for early-career researchers administered by the granting councils.

Equity, Diversity and Inclusion

As a number of witnesses pointed out, the difficulties faced by early-career researchers are accentuated for women, people from disadvantaged backgrounds, members of a visible minority group and Indigenous people.[91] Therefore, efforts to promote equity, diversity and inclusion have an important role to play in ensuring that talented candidates are not left by the wayside.

According to the Banting Research Foundation, "[t]he causes for the under-representation of women in academia include individual career choices, difficulty in balancing work and family care giving responsibilities, and structural inequities in the academic tenure process."[92] For example, when Andrea Wishart appeared before the

90 Canadian Institutes of Health Research, *Written Submission to the House of Commons Standing Committee on Science and Research—Study on Top Talent, Research and Innovation*, 2022, p. 2.

91 SRSR, *Evidence*, 19 May 2022, 1940 (Whiteside); Banting Research Foundation, *Investing in Canada's Research and Innovation Talent to Secure the Future of our Health and Economy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 12 May 2022.

92 Banting Research Foundation, *Investing in Canada's Research and Innovation Talent to Secure the Future of our Health and Economy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 12 May 2022, p. 4.

Committee, she explained that she had to consider whether she could have a family while also pursuing a career in science.[93] The challenges that women face "are compounded when other identities such as race, sexual identity, and disability are considered."[94]

Students who are Black, Indigenous or people of colour (BIPOC), as well as students from low-income families and students living with disabilities, are disproportionately affected by the rising cost of post-secondary education.[95] They are also "limited in their ability to access role models and mentors, making it difficult for people from underrepresented groups to choose and succeed in fields leading to research careers,"[96] which is another barrier. The Research Canada brief also pointed out that the "systemic barriers and discrimination that Indigenous researchers face as a result of Canada's long history of colonization are even greater."[97]

The Banting Research Foundation summarized the negative effects as follows:

> When the scientific workforce is not representative of society, it has negative effects not only for the under-represented groups but for science itself. Some topics, such as gendered and racialized social inequities become systematically less studied affecting society at large.[98]

A number of existing initiatives and programs supporting equity, diversity and inclusion were mentioned by witnesses.

Some witnesses applauded measures in Budget 2022, such as the $40.9 million in funding over five years, starting in 2022–2023, and then $9.7 million in ongoing funding to the granting councils to support "targeted scholarships and fellowships for promising

93 SRSR, *Evidence*, 5 May 2022, 1830 (Wishart).

94 Banting Research Foundation, *Investing in Canada's Research and Innovation Talent to Secure the Future of our Health and Economy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 12 May 2022, p. 4.

95 Research Canada: An Alliance for Health Discovery, *Submission to the Standing Committee on Science and Research—Study on Top Talent, Research and Innovation*, May 2022.

96 Ibid., p. 3.

97 Ibid.

98 Banting Research Foundation, *Investing in Canada's Research and Innovation Talent to Secure the Future of our Health and Economy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 12 May 2022, p. 4; Diego Kozlowski et al., "Intersectional inequalities in science," *Proceedings of the National Academy of Sciences*, Vol. 119, No. 2, 2022.

Black student researchers."[99] The Committee also heard about equity, diversity and inclusion requirements for the Canada Excellence Research Chairs and Canada Research Chairs programs.[100] Witnesses also mentioned the Dimensions program supported by the three granting councils, which encourages post-secondary institutions to establish a charter on equity, diversity and inclusion.[101]

As regards Indigenous students and researchers, some witnesses emphasized the importance of giving them support. For example, Christian Fotang, of the Canadian Alliance of Student Associations, mentioned transition programs in place at the University of Alberta to support Indigenous students who move to the city, and Deborah MacLatchy, representing Wilfrid Laurier University, gave the example of mentoring programs specific to Indigenous students.[102] Meanwhile, CIHR mentioned its Network Environments for Indigenous Health Research (NEIHR) Program.[103]

The Arctic Research Foundation recommended that the government "[i]nclude Northern post-secondary institutions and other Northern and Indigenous research organizations in federal research funding opportunities" and "[p]romote and increase Northern and Indigenous research leadership and capacity through funding."[104]

Therefore, the Committee recommends:

Recommendation 10

That the Government of Canada continue, expand, and assess its efforts to break down barriers and advance equity, diversity and inclusion in the field of scientific research.

99 SRSR, *Evidence*, 12 May 2022, 1950 (Goosney); SRSR, *Evidence*, 28 April 2022, 2010 (Shiri Marom Breznitz, Associate Professor, Munk School of Global Affairs and Public Policy, As an Individual); Government of Canada, *Budget 2022: A Plan to Grow Our Economy and Make Life More Affordable*.

100 SRSR, *Evidence*, 28 April 2022, 2045 (Madadian).

101 SRSR, *Evidence*, 19 May 2022, 1850 (MacLatchy).

102 Ibid.; and SRSR, *Evidence*, 12 May 2022, 2025 (Fotang).

103 Canadian Institutes of Health Research, *Written Submission to the House of Commons Standing Committee on Science and Research—Study on Top Talent, Research and Innovation*, 2022.

104 Arctic Research Foundation, *Submission to the House of Commons Standing Committee on Science and Research—Study on Top Talent, Research, and Innovation*, May 2022, p. 3.

Talent in the Regions

Witnesses also pointed out the importance of not overlooking talent from regions outside large cities.

As Céline Poncelin de Raucourt said, speaking on behalf of the Université du Québec, "Canada has an enormous pool of resources within its borders, one in which it can choose to invest."[105] In terms of talent, some of these resources are located outside major city centres. Universities and post-secondary institutions in the regions have an important role to play in terms of retaining talent.

These institutions, including small ones, have unique characteristics. They often have strong ties to the area. The research being done "is embodied in critical scientific themes for the communities that constitute Canada."[106] Researchers at various Université du Québec locations have developed expertise in "coastal erosion and climate change, suicide prevention in northern communities, artificial intelligence in the mining sector, the development of wood products, Indigenous knowledge and rural health care."[107]

Having education and research institutions in these communities also makes post-secondary studies more accessible to local students. Some young people, especially those whose parents did not attend college or university, do not pursue post-secondary education because the location is too far away.[108] According to an internal study at the Université du Québec, "nearly 30% of students say they would never have gone to university if there hadn't been one nearby."[109]

Universities also play a role in retaining local talent: according to the Université du Québec, between 80% and 95% of registered nurses who study at the universities in Trois-Rivières, Rimouski and Abitibi-Témiscamingue stay in the area to work after they finish their studies.[110] Ron McKerlie wants to see programs that "support small and medium-sized enterprises in hiring learners as they study, and then keep them employed as the company innovates and builds capacity"[111] in order to encourage local talent to

105 SRSR, *Evidence*, 28 April 2022, 1945 (Poncelin de Raucourt).

106 Ibid.

107 Ibid.

108 Ibid., 1950.

109 Ibid., 2005.

110 Ibid.

111 SRSR, *Evidence*, 5 May 2022, 1845 (McKerlie).

stay in the area. He also proposed that the government could "subsidize tuition for domestic students with the proviso that they stay and work locally or at least in Canada."[112]

However, multiple witnesses noted an imbalance in the funding allocated by the granting councils. According to Céline Poncelin de Raucourt, "year after year, barely 10% of Canadian researchers receive between 50% and 80% of public research funding, depending on the field,"[113] and "[s]ome 15 Canadian universities receive 72% of public research funding."[114] With the bulk of public funding concentrated in the hands of so few, smaller institutions lose out. The same witness explained that a 2017 study showed that 56% of students attend universities that receive only one quarter of research funding.[115]

Echoing Recommendation 12 of its report on successes, challenges and opportunities for science in Canada,[116] the Committee recommends:

Recommendation 11

That the Government of Canada review the criteria for securing federal research funding, and remedy any disproportionality based on regionality.

The Role of Colleges and Institutes

Colleges, CEGEPs, institutes and polytechnics also have a role to play in attracting and retaining top talent.

The Committee's earlier study on successes, challenges and opportunities for science in Canada highlighted the contribution of these institutions.[117] Research conducted at colleges, CEGEPs and institutes often has a different focus than research conducted at universities. College-level research is most often applied research, carried out in

112 Ibid., 1925.

113 SRSR, *Evidence*, 28 April 2022, 1945 (Poncelin de Raucourt).

114 Ibid., 1950.

115 Ibid., 2005.

116 House of Commons, SRSR, *Successes, Challenges and Opportunities for Science in Canada*, First Report, June 2022.

117 Ibid.

partnership with local businesses or industry. Ron McKerlie described this model to the Committee as follows:

> Community and industry partners engage our college for workforce development needs, rapid training and our ability to quickly address challenges that are limiting their productivity. We provide students with essential experience, in partnership with researchers, to develop and deploy customized innovations that increase efficiency and give organizations a competitive advantage.[118]

According to figures from Polytechnics Canada, "last year, polytechnics conducted more than 3,700 applied research projects with 2,600 industry partners. More than 23,000 students contributed to these projects, which included the development of more than 3,300 prototypes."[119]

Colleges, CEGEPs, institutes and polytechnics also play a key role in training skilled workers.[120] According to Sarah Watts-Rynard, Chief Executive Officer at Polytechnics Canada, the 13 members of her organization collectively provide training to more than 370,000 students each year.[121] Some of these skilled workers are recruited by companies that have established applied-research partnerships with college-level institutions.[122] Denise Amyot gave the example of the CEGEP de Shawinigan and its team of 45 researchers: the applied research they were doing attracted a company that created 300 jobs.[123] Since colleges and technical institutes rely heavily on demand, they train talent based on labour market needs.[124]

As Sarah Watts-Rynard explained, it can be difficult for these institutions to attract top talent in research, because research carried out by teaching staff at a college level "is not built into the formula of an instructor's time; it is absolutely extracurricular."[125] Furthermore, less than 5% of all federal investments in post-secondary research are allocated to the college sector.[126]

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118 SRSR, *Evidence*, 5 May 2022, 1840 (McKerlie).

119 SRSR, *Evidence*, 12 May 2022, 1840 (Sarah Watts-Rynard, Chief Executive Officer, Polytechnics Canada).

120 SRSR, *Evidence*, 28 April 2022, 1840 (Wolfe).

121 SRSR, *Evidence*, 12 May 2022, 1840 (Watts-Rynard).

122 SRSR, *Evidence*, 5 May 2022, 1840 (McKerlie).

123 SRSR, *Evidence*, 19 May 2022, 2120 (Amyot).

124 Ibid., 2035.

125 SRSR, *Evidence*, 12 May 2022, 1840 (Watts-Rynard).

126 Ibid.

Federal funding mechanisms, such as the Canada Research Chairs and the Canada Excellence Research Chairs programs, put college-level institutions at a disadvantage. One of the evaluation criteria is based on whether the institution has received funding from the three granting councils in the past. However, the calculation does not include funding allocated through the College and Community Innovation program, which is the primary source of federal college research funding.[127] Polytechnics Canada recommended reviewing these funding mechanisms to establish a better balance.[128] It also suggested that the application review committees that allocate federal funding should have "people who have a solid understanding of polytechnic and college applied research."[129]

Mohawk College also recommended considering new funding programs where it is possible to apply year-round, which would ensure that colleges could submit research project proposals in partnership with the private sector without having to wait for the next funding cycle to begin.[130]

Colleges and Institutes Canada recommended that the government "expand SME [small and medium-sized enterprises] participation in the R and D ecosystem by investing $40 million per year in business innovation engagement services located in colleges, institutes and polytechnics."[131]

As a result, the Committee recommends:

Recommendation 12

That the granting councils review the research funding mechanisms to better fund applied research in colleges, CEGEPs and polytechnics in Canada.

From Talent to Innovation

Investments in talent at universities and post-secondary institutions are also investments in the skilled workers and entrepreneurs of tomorrow.

127 Ibid.

128 Ibid.

129 Ibid.

130 SRSR, *Evidence*, 5 May 2022, 1845 (McKerlie).

131 SRSR, *Evidence*, 19 May 2022, 2035 (Amyot).

As multiple witnesses pointed out, Canada is facing a skilled labour crisis. Nicholas Schiavo, a representative of the Council of Canadian Innovators, cited data from the Information and Communications Technology Council showing that, by 2025, Canada's digital firms will employ 2.26 million Canadians, or 11% of all employment in the country, meaning an additional 250,000 jobs will need to be created over the next three years.[132] Canada's scale-up companies are eager to create new jobs, but they face a serious labour shortage.[133] This shortage is affecting many fields. For example, representatives of The Endometriosis Network Canada explained that "there is a crisis in endometriosis care … with significant gaps in our biomedical, clinical and health system services."[134]

There is also competition for top talent in Canada. The Committee heard that many highly qualified workers are being recruited by foreign multinationals that are "setting up research operations in high-technology centres across the country, such as Vancouver, Montreal and Toronto."[135] With the rise of remote work, geography is no longer as important, so Canadian talent is also working in Canada for foreign companies.[136] In addition to the increased competition for top talent, these trends could leave Canada doing R and D without reaping any of the benefits.[137]

The testimony showed that special attention needs to be paid to the relationship between post-secondary institutions and industry. The government has a role to play in nurturing that relationship.

David Wolfe testified that university interaction with industry needs to be looked at as part of a continuum, with collaboration on basic fundamental research at one end and innovation stemming from applied research at the other.[138] Universities and colleges play different roles in supporting innovation. Shiri M. Breznitz, an associate professor at the Munk School of Global Affairs and Public Policy, noted that it can be expensive for small and medium-sized enterprises to partner with universities. The federal

132 SRSR, *Evidence*, 5 May 2022, 1835 (Schiavo); Maryna Ivus, Akshay Kotak, Information and Communications Technology Council, *Onwards and Upwards: Digital Talent Outlook 2025*, September 2021.

133 SRSR, *Evidence*, 5 May 2022, 1835 (Schiavo); SRSR, *Evidence*, 28 April 2022, 1840 (Wolfe).

134 SRSR, *Evidence*, 5 May 2022, 1940 (Philippa Bridge-Cook, Chair, The Endometriosis Network Canada).

135 SRSR, *Evidence*, 28 April 2022, 1845 (Wolfe).

136 SRSR, *Evidence*, 5 May 2022, 1835 (Schiavo).

137 SRSR, *Evidence*, 19 May 2022, 1950 (Mosca).

138 SRSR, *Evidence*, 28 April 2022, 1915 (Wolfe).

government could develop mechanisms to help small and medium-sized enterprises that are interested in participating in large research projects.[139]

The Committee heard about several examples of partnerships between academia and industry. Edward McCauley, President and Vice-Chancellor of the University of Calgary, explained how the university successfully attracted the computer company Mphasis to Calgary. The company will "create 1,000 jobs in Calgary and invest in 1,000 work-integrated learning opportunities for students."[140]

Robert Myers told the Committee about the Perimeter Institute for Theoretical Physics' strategy for attracting top talent. This research centre emphasizes researchers' working conditions: "no teaching requirements, a collaborative atmosphere, freedom from the publish-or-perish treadmill, great administrative services and the flexibility to capitalize on new research opportunities."[141]

Gordon McCauley described the efforts that adMare BioInnovations is making to build companies and build talent, including through programs offered by the adMare Academy for students and executives.[142]

In the field of glycomics, GlycoNet was created in 2015 through the Networks of Centres of Excellence program. Representatives told the Committee that this glycomics network "has mobilized over 175 research groups across Canada and 160 partners from academia and industry to advance glycomics research and commercialization."[143] GlycoNet has been able to provide training opportunities in glycomics for more than 500 students.[144]

A number of witnesses stressed the importance of the transition from the classroom to the workplace and recommended supporting experiential learning opportunities, such as internships.[145] For instance, the CCI suggested incentivizing post-secondary institutions to extend the duration of co-op placements.[146] Denise Amyot pointed out

139 SRSR, *Evidence*, 28 April 2022, 2020 (Breznitz).

140 SRSR, *Evidence*, 19 May 2022, 2045 (Edward McCauley).

141 SRSR, *Evidence*, 12 May 2022, 1845 (Myers).

142 SRSR, *Evidence*, 19 May 2022, 1940 (Gordon McCauley).

143 SRSR, *Evidence*, 5 May 2022, 1945 (Elizabeth Nanak, Chief Executive Officer, Canadian Glycomics Network).

144 Ibid.

145 SRSR, *Evidence*, 5 May 2022, 1845 (McKerlie); Council of Canadian Innovators, *CCI Talent & Skills Strategy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022.

146 Council of Canadian Innovators, *CCI Talent & Skills Strategy*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022, p. 17.

that 98% of the programs offered by the members of Colleges and Institutes Canada include a mandatory internship.[147] Genome Canada highlighted its own practices in this area, such as its support for SING Canada, the summer internship program for Indigenous peoples in genomics led out of the University of Alberta.[148] Several witnesses also mentioned the important work being done by Mitacs.[149]

Mitacs is a not-for-profit organization that supports R and D in Canada by promoting collaboration between post-secondary institutions and the private sector by funding paid internships with businesses, post-doctoral fellowships and professional development training.[150] Mitacs also brings international students to Canada. According to the Chief Executive Officer of Mitacs, 75% of international students who get Mitacs internships stay in Canada after getting their degree.[151]

The Committee also heard testimony about entrepreneurship. Shiri M. Breznitz highlighted the importance of entrepreneurship education and the role of international education in entrepreneurship, noting that "a combination of entrepreneurship education from different organizations such as government agencies, incubators, accelerators and universities promotes the establishment of high technology firms."[152] In addition, her research has shown that, "irrespective of their country of origin, students who have earned any foreign degree—this includes not only non-Canadian students who come to Canada, but Canadians who pursue higher education outside Canada—are more likely to become entrepreneurs."[153]

In light of this testimony, the Committee recommends:

147 SRSR, *Evidence*, 19 May 2022, 2110 (Amyot).

148 SRSR, *Evidence*, 19 May 2022, 2040 (Robert Annan, President and Chief Executive Officer, Genome Canada).

149 SRSR, *Evidence*, 5 May 2022, 1830 (Wishart); SRSR, *Evidence*, 5 May 2022, 2040 (Paul Dufour, Senior Fellow, Institute for Science, Society and Policy); SRSR, *Evidence*, 12 May 2022, 2025 (Fotang); SRSR, *Evidence*, 19 May 2022, 2040 (Annan).

150 SRSR, *Evidence*, 5 May 2022, 2045 (John Hepburn, Chief Executive Officer, Mitacs).

151 Ibid.

152 SRSR, *Evidence*, 28 April 2022, 1935 (Breznitz).

153 Ibid.

Recommendation 13

That the federal government consider ways to encourage student training through experiential learning opportunities and work placements by providing appropriate funding programs.

APPENDIX A
LIST OF WITNESSES

The following table lists the witnesses who appeared before the committee at its meetings related to this report. Transcripts of all public meetings related to this report are available on the committee's webpage for this study.

Organizations and Individuals	Date	Meeting
As an individual	2022/04/28	10
Thomas Bell, Professor Imperial College London		
Shiri Marom Breznitz, Associate Professor Munk School of Global Affairs and Public Policy		
David Wolfe, Professor and Co-Director Innovation Policy Lab, Munk School of Global Affairs and Public Policy, University of Toronto		
Canadian Association of Postdoctoral Scholars	2022/04/28	10
Edris Madadian, Chair		
Dalhousie University	2022/04/28	10
Alice Aiken, Vice-President Research and Innovation		
Quebec Student Union	2022/04/28	10
Jonathan Desroches, President		
Université du Québec	2022/04/28	10
Etienne Carbonneau, Executive Advisor Governmental Relations		
Céline Poncelin de Raucourt, Vice-President Teaching and Research		
ApplyBoard	2022/05/05	11
Martin Basiri, Chief Executive Officer and Co-founder		
As an individual	2022/05/05	11
Shaun Khoo, Postdoctoral Fellow Université de Montréal		
Andrea Wishart, Doctoral Student University of Saskatchewan		

Organizations and Individuals	Date	Meeting
Canadian Glycomics Network	2022/05/05	11
Karimah Es Sabar, Board Chair		
Elizabeth Nanak, Chief Executive Officer		
Warren Wakarchuk, Scientific Director		
Council of Canadian Innovators	2022/05/05	11
Benjamin Bergen, President		
Nicholas Schiavo, Director Federal Affairs		
Institute for Science, Society and Policy	2022/05/05	11
Paul Dufour, Senior Fellow		
Sarah Laframboise, Student in Biochemistry University of Ottawa, President of the Ottawa Science Policy Network		
Mitacs	2022/05/05	11
John Hepburn, Chief Executive Officer		
Mohawk College	2022/05/05	11
Ron McKerlie, President and Chief Executive Officer		
The Endometriosis Network Canada	2022/05/05	11
Philippa Bridge-Cook, Chair		
Mathew Leonardi, Member		
As an individual	2022/05/12	12
Kevin Smith, President and Chief Executive Officer University Health Network		
Canadian Alliance of Student Associations	2022/05/12	12
Christian Fotang, Chair of the Board of Directors		
Canadian Association of University Teachers	2022/05/12	12
David Robinson, Executive Director		
Natural Sciences and Engineering Research Council	2022/05/12	12
Alejandro Adem, President		
Danika Goosney, Vice-President Research Grants and Scholarships Directorate		
Perimeter Institute for Theoretical Physics	2022/05/12	12
Robert Myers, Director		

Organizations and Individuals	Date	Meeting
Polytechnics Canada	2022/05/12	12
Devon Blaskevitch, Policy Analyst		
Sarah Watts-Rynard, Chief Executive Officer		
AdMare BioInnovations	2022/05/19	13
Youssef Bennani, Chief Scientific Officer		
Gordon McCauley, President and Chief Executive Officer		
As an individual	2022/05/19	13
Joel Blit, Associate Professor University of Waterloo		
Jalene LaMontagne, Associate Professor DePaul University		
Michele Mosca, Professor, Institute for Quantum Computing University of Waterloo		
Banting Research Foundation	2022/05/19	13
Catharine Whiteside, Chair		
Colleges and Institutes Canada	2022/05/19	13
Denise Amyot, President and Chief Executive Officer		
Genome Canada	2022/05/19	13
Robert Annan, President and Chief Executive Officer		
Pari Johnston, Vice-President Policy and Public Affairs		
Université de Sherbrooke	2022/05/19	13
Jean-Pierre Perreault, Vice-President Research and Graduate Studies		
University of Calgary	2022/05/19	13
Edward McCauley, President and Vice-Chancellor		
Wilfrid Laurier University	2022/05/19	13
Deborah MacLatchy, President and Vice-Chancellor		

APPENDIX B
LIST OF BRIEFS

The following is an alphabetical list of organizations and individuals who submitted briefs to the committee related to this report. For more information, please consult the committee's webpage for this study.

Arctic Research Foundation

Banting Research Foundation

Bernatchez, Louis

BioCanRx

Canada's national platform for genome sequencing and analysis

Canadian Institutes of Health Research

Institute for Science, Society and Policy

Johnson, Marc

Laframboise, Sarah

Otto, Sarah

Polytechnics Canada

Quebec Student Union

Research Canada: An Alliance for Health Discovery

REQUEST FOR GOVERNMENT RESPONSE

Pursuant to Standing Order 109, the committee requests that the government table a comprehensive response to this Report.

A copy of the relevant *Minutes of Proceedings* (Meetings Nos. 10 to 13, 17 and 19) is tabled.

Respectfully submitted,

Hon. Kirsty Duncan, P.C., M.P.
Chair