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• (1830)

[English]

The Chair (Hon. Kirsty Duncan (Etobicoke North, Lib.)): I call this meeting to order. We are meeting, as you know, in a web-cast session.

[Translation]

Welcome to meeting number 13 of the Standing Committee on Science and Research.

[English]

The Board of Internal Economy requires that committees adhere to the following health protocols, which are in effect until June 23, 2022.

I would like to welcome all our witnesses, and we'd like to welcome new members tonight. It's wonderful.

All individuals wishing to enter the parliamentary precinct must be fully vaccinated against COVID-19. All those attending the meeting in person must wear a mask, except for members who are at their place during proceedings. Please contact our excellent clerk for further information on preventative measures for health and safety.

As chair, I will enforce these measures, and as always, I thank you all for your co-operation.

[Translation]

Today's meeting is taking place in a hybrid format pursuant to the House order of November 25, 2021.

[English]

I'd like to outline a few rules to follow.

Interpretation services are available for this meeting. You may speak in the official language of your choice. At the bottom of your screen, you may choose to hear the floor audio, English or French.

The "raise hand" feature is on the main toolbar, should you wish to speak.

[Translation]

I remind you that all comments should be addressed through the chair.

[English]

When you're not speaking, your microphone should be muted. The committee clerk and I will maintain a speaking list for all members.

Welcome to our witnesses. This is our last meeting on top talent, research and innovation.

Tonight, appearing as an individual, we have Dr. Joel Blit, associate professor, University of Waterloo; and Dr. Jalene LaMontagne, associate professor, DePaul University. From Université de Sherbrooke, we have Dr. Jean-Pierre Perreault, vice-president, research and graduate studies; and from Wilfrid Laurier University, we have Deborah MacLatchy, president and vice-chancellor.

We welcome you all. We are thrilled that you are joining us.

Each person will have five minutes for their opening remarks. At four and a half minutes, I will hold up this card and you'll know you have 30 seconds left. We aim to be fair.

With that, we will begin with Dr. Blit.

The floor is yours for five minutes. Welcome.

• (1835)

Mr. Joel Blit (Associate Professor, University of Waterloo, As an Individual): Thank you very much, Madam Chair and committee, for the invitation to speak to you today.

I'm a professor of economics. I've been studying talent and innovation for almost two decades, and I speak to you as an individual and as a Canadian who deeply cares about our country.

If you'll allow me, I want to mostly focus on the big picture. I hope my remarks can help provide some context to discussions around science, talent and publicly funded research.

Let me start with the bad news. It's no secret that Canada has a large and growing innovation and productivity gap, though the extent of it might be surprising. Fifty years ago, we had the second-highest labour productivity among the G7. Today, we have the second-lowest, ahead only of Japan.

OECD data also shows that we are now last among G7 countries, tied with Italy, for the fewest triadic patents as a share of GDP. Other measures of innovation tell a similar story, whether it's high-tech exports, advanced manufacturing or tech start-ups.

I'm concerned, because it's only a matter of time before these deficits are reflected in the wages and standard of living of Canadians. The question is, why is our performance so poor?

Well, it's particularly puzzling if we consider that Canada has many of the building blocks necessary to be a successful innovator. The most crucial of these building blocks are precisely the things that this committee is tasked with studying: basic science, an educated workforce and public R and D.

Much of the testimony that this committee has been hearing is that Canada needs to invest more in these things. I don't disagree. These are Canada's strengths, and we need to continue to foster them, but it's important to understand that simply doubling down on our strengths is not going to address our innovation gap. This gap exists because we're failing to translate basic research and invention into valuable innovations.

An illustrative example of this is artificial intelligence. Canadian researchers—people like Geoff Hinton—developed many of the key breakthroughs in machine learning, but the commercial benefits were largely captured by foreign entities.

I teach my students to think of the innovative process as a pipeline. To get good outputs—things like new products, patents, high-tech exports, advanced manufacturing and tech start-ups—we need quality inputs, excellence in basic science, public R and D and an educated workforce, hence the importance of this committee.

However, to get good outputs, we must also fix the pipeline itself, because, frankly, it's broken. Canada's private sector is simply not capitalizing on our strengths in basic science, invention and talent. One indication of this is Canada's low levels of business R and D as a percentage of GDP, where we're last among the G7. We're also the only G7 country that has seen a decline in business R and D intensity since the start of the millennium. It seems that we invent and others commercialize our discoveries.

I want to emphasize that there's no single magic bullet to address this challenge. Our colleges and universities must put an increased focus on entrepreneurship and commercialization, and our government must emphasize firm growth, but fundamentally, tackling this challenge is going to require a holistic rethink of our innovation policy.

We must continue to invest in and improve the things we are doing well: science, public R and D and education. I'm heartened by the work of this committee, but we must also invest in and reform things like intellectual property, R and D tax credits, skilled immigration, venture capital, competition policy and others. If the goal is to build a more prosperous Canadian economy, then investments in basic science and education must be coupled with broader innovation policy reforms.

That's the main context of what I wanted to share today, but since talent is one of the key topics of interest, allow me to also share three very quick points on that front, which are based on some of my own research.

Number one, strong STEM education is key. Some of our research suggests that, not surprisingly, STEM-educated graduates

tend to disproportionately contribute to technological innovation, so the more STEM graduates we have, the better.

Number two, the brain drain is real. According to data from the World Intellectual Property Organization, Canada is the third-biggest net loser of inventors due to migration, behind only China and India, and there's a scale thing there too.

Number three, skilled immigration is no panacea. Our research suggests that our STEM-educated immigrants are not having the same impact on innovation as similar immigrants in the U.S., in part because they're not finding employment in STEM. We did, however, find some evidence that our international student immigrants are doing better, and we're launching a study to examine this further.

Thank you for the opportunity to appear before you today. I'd be happy to take any questions and expand on any of these points.

● (1840)

The Chair: Mr. Blit, thank you for your testimony. We're grateful.

We will now go to Dr. LaMontagne for five minutes, please.

Dr. Jalene LaMontagne (Associate Professor, DePaul University, As an Individual): Good evening. Thank you for the invitation to appear as a witness in front of this committee on an important topic. I'm joining you from Liverpool in the U.K., as I'm here working for the week, but I've lived in Chicago in the United States since 2011.

Today, I want to tell you about my background, the trajectory of my career that led me to be working outside of Canada, and some challenges that I see Canada facing in retaining and recruiting talent.

While I have lived outside of Canada for over a decade, I am a proud Canadian. I attended the University of Calgary, where I completed my Bachelor of Science in ecology and my Master of Science in conservation ecology. I was the first in my family to earn any university degree.

Having a passion for science and research, I continued my education and completed my Ph.D. in environmental biology and ecology at the University of Alberta, finishing in 2007. As a Ph.D. student, I held an NSERC graduate scholarship and a Killam graduate scholarship. I completed a post-doctoral fellowship that was funded by the Alberta ingenuity fund. I point out these awards not to boast, but as an indication of the investments made to support my education and training, for which I am grateful.

As an aside, I want to point out that the post-doctoral fellowship I held from 2007-09 had an annual salary of \$48,000, which is more than what an NSERC post-doctoral fellowship is currently worth, 15 years later.

In the second year of my post-doctoral position, I looked to enter the job market with the intention of applying for positions as a professor. There were very few jobs available in Canada in my field, and that year I applied for only two or three jobs. I was not successful in obtaining one of those positions, and I took an international job for one year. I then returned to Canada and again entered the job market. The second time, in 2010, there were no job postings at Canadian universities for positions that were aligned with my field of research.

In terms of my field of research, I am a population ecologist, and I study a wide variety of plant and animal species. I am interested in the patterns and drivers of fluctuations in biological populations over time and space. A large component of my research program is on the reproductive patterns of conifer tree species in the boreal forest. Their seeds are critical for forest regeneration, and patterns of seed production drive the dynamics of a suite of seed-consuming species and their predators. My research occurs across scales, from local to continental and global scales, and has implications for understanding the consequences of global change.

Coming back to my situation in the job market, since the late 1990s I had heard talk that there would be academic positions opening up soon at Canadian universities due to retirements; however, I found that those positions were not materializing. Every job I applied for in 2010-11 was in the United States, and I got a tenure-track job in the United States. I did not set out to leave Canada, but I did not have options in Canada to move forward with my career.

Leaving Canada to go work in a different country brought along challenges but also opportunities. Moving to a new system in a new country where I knew little about the National Science Foundation funding structure was a challenge. Funding rates were low, and the application procedure was very different from that at NSERC.

However, I have become quite successful in obtaining federal funding in the United States. Over the past five years, research grants that I have had a leadership role on have been funded to the total amount of approximately \$1.6 million Canadian. The investments that the National Science Foundation makes in research grants, training grants and support for long-term data collection, as well as synthesis work, provide a meaningful and broad variety of support for science and research, from which I and my research have benefited.

I maintain connections with Canada, both personally and professionally. I hold a lifetime membership in the Canadian Society for Ecology and Evolution. I care about science and research in Canada. I want my colleagues, particularly those who are early in their careers, to be able to stay, be successful and not have to leave.

The number of Ph.D.s graduating from Canadian universities has increased over time, while the availability of tenure-track faculty positions has gone down despite retirements. There is also a trend that contract teaching faculty, who do not do scientific research, are replacing many tenure-track positions.

Short-term contract faculty are cheaper to employ than tenure-track faculty, and this could be a strategy for dealing with reductions in government funding for universities. Increasing govern-

ment support for universities to ensure they have the ability to replace and increase tenure-track faculty positions is critical to retaining scientists in Canada.

I also suggest that increasing federal investments in research, including in broad-scale, long-term research infrastructure that parallels that in other countries around the world, would be a wise initiative to support research and discovery.

Thank you.

• (1845)

The Chair: Thank you, Dr. LaMontagne. We thank you for being with us, despite being in the U.K. tonight. It's a late hour for you, so thank you so very much.

We will now go to the Université de Sherbrooke and Mr. Perreault for five minutes, please.

[*Translation*]

Mr. Jean-Pierre Perreault (Vice-President, Research and Graduate Studies, Université de Sherbrooke): Good evening, Madam Chair.

Thank you for inviting me to appear before the committee today.

I could have worn several hats this evening. You've discussed the field of ribonucleic acid, or RNA. I'm a researcher specializing in RNA and a co-founder of the RiboClub, a group that, among other things, helped bring Moderna to Canada. I also could have addressed you as the president of Acfas, an organization that promotes science, research, innovation and scientific culture in the francophonie.

As vice-president for research and graduate studies at the Université de Sherbrooke, I mainly want to focus my remarks on graduate scholarships in Canada.

Canada is a modern country. Young people want to live in a knowledge-based society. To do that, we must invest in all the sciences, and I mean "all the sciences", because all of them generate innovations that provide economic and social benefits. Investment in research is the key to our present and future, but I won't dwell on that topic because I realize I'm preaching to the choir.

That being said, it's critical that we invest in the next generation of researchers. That's the key to success. Students are the first links in the research and innovation chain. They do the research work in various laboratories and join research teams across the country. They are essential to our efforts in meeting our society's major challenges.

Once they graduate, approximately 20% of them will become academic researchers, while the remaining 80% will devote their talents and ideas to developing our organizations, businesses, communities and government departments. It's important to note that all of them will find jobs and that, in practice, there will be very little unemployment in their careers. As a result, they will work and contribute to society.

We also have to ask ourselves how we attracted them to graduate studies in the past. In 2003, we offered graduate scholarships of \$17,500 a year for master's degrees and \$21,000 a year for doctorates.

Scholarships help students pay for tuition, housing and food and mainly give them the means to focus entirely on their studies. It's also important to note that the scholarships offered by Canada's three granting councils set the standard for the country. All other organizations tend toward that norm.

Incidentally, in 2003, the poverty line in Canada was \$16,000 a year. Scholarship amounts were thus slightly above the poverty line. I'm sure you can see me coming here. The cost of food and accommodation, among other things, has definitely increased, particularly as a result of the rapid inflation we've experienced in the past few months. I would remind you that scholarships are offered to our champions, the best of our education system.

The poverty line today is over \$20,000 a year. Most scholarships haven't been increased since 2003. What we are offering students now is an invitation to live below the poverty line. Does that motivate anyone to pursue an education? I doubt it. Is this really what we want for our students? I doubt that as well.

While I'm sure the salaries of our elected representatives have risen and been indexed to the cost of living over the years, the scholarships offered to our best students, the scholarship holders of our three councils, have not been indexed since 2003. And yet, when I used the Bank of Canada calculator last night to determine the increase in inflation from 2003 to 2022, the result was 44.4%. In other words, the \$17,500 scholarship in 2003 should be worth more than \$25,000 a year today.

The Bureau de coopération interuniversitaire, or BCI, which focuses on research and innovation, is a Quebec organization. BCI has suggested that, under Quebec's research and innovation investment strategy, those scholarships be increased to \$25,000 a year for master's degrees and \$35,000 a year for doctorates.

We are betraying the talent pool that will produce future innovation in this country.

Students today are increasingly forced to find jobs in order to make ends meet. In so doing, they focus less on graduate studies, thus extending the time it takes to complete their education and jeopardizing future development, research and innovation.

Thank you for your attention.

• (1850)

[*English*]

The Chair: Thank you so much, Dr. Perreault. We're really grateful you've joined us tonight.

Now we will go to the president and vice-chancellor of Wilfrid Laurier University, Dr. Deborah MacLatchy.

Welcome. The floor is yours.

Dr. Deborah MacLatchy (President and Vice-Chancellor, Wilfrid Laurier University): Thank you.

Good evening, Madam Chair, vice-chairs and honourable members of the committee. Thank you for inviting me today.

I'm speaking from the Haldimand Tract, traditional territory of the Neutral, Anishinabe and Haudenosaunee peoples. This land is part of the Dish with One Spoon treaty between the Haudenosaunee and Anishinabe peoples. Today, this gathering place is home to indigenous people from across Turtle Island. There are many contributions to knowledge and innovation that indigenous people have made and continue to make to this nation we call Canada.

Wilfrid Laurier University is a comprehensive, mid-sized university in southwestern Ontario, with campuses in Waterloo Region and Brantford. We are opening a campus in Milton in 2024, on the west side of the greater Toronto area, which will have a science, technology, engineering, arts and mathematics focus, and which will further grow our research capacity in environmental health.

In addition to being Laurier's president, I'm also a scientist with an active research lab, where I supervise undergraduate and graduate student work in the field of ecotoxicology. I am sharing my observations and recommendations from the perspectives of both an administrator and researcher/mentor.

Recently, Laurier alumnus and CEO of Ipsos Public Affairs, Dr. Darrell Bricker, spoke to our senior leadership team about demographic trends in Canada. Canada is in for a demographic shock in the next 20 years. Our population is aging, and the proportion of working-age Canadians is declining. By the mid-2030s only 58% of our population will be of working age.

At the same time, there is a global competition for research talent. We cannot hope to be competitive in research and innovation if we do not have people from Canada and from around the world who share a passion for discovery coming to our universities to pursue advanced-level degrees and research.

I'm going to focus on student pathways in my remarks, while recognizing that programs such as the Canadian research chairs and the Canada excellence research chairs are critical to the country for retention of top talent.

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. We must leverage this desire to come to Canada by making it more accessible to international students. We can do this by streamlining study and work permits, supporting immigration and citizenship processes, and increasing funding for developing research talent.

We also have an opportunity to be best in class in expanding our research talent pathways for Canadian youth. Canada has fallen behind our competition across the global market when it comes to graduate and post-doctoral supports. Federal scholarships have not kept pace with inflation. The investments in targeted scholarships and fellowships for Black student researchers were welcome news in the federal budget, and we need further investment in Canada's scholarship programs, including those that will widen the pathway in areas of science and technology to persons with disabilities and women-identified, indigenous, 2SLGBTQIA+ and racialized persons.

We need to give Canada's youth the mentorship, resources and supports they need to pursue big, bold ideas that drive innovation and discovery. If we are serious about equity, diversity and inclusion, we need to shed the assumption that graduate students and post-doctoral fellows should be self-funding or augmenting their studies through work, family support and student loans.

It is disheartening to see promising students leave the university and research environments because of a lack of financial support, including first-generation students and those without access to generational wealth. Building subject matter knowledge and research acumen takes a significant amount of effort; when we lose these people, it wastes the human and financial resources invested.

At Laurier, we are taking steps to address these barriers. We are one of the 17 institutions in Canada that are part of the federal dimensions pilot project to collect data and analyze our systems and practices. We are taking steps to increase opportunities for careers in research, including developing mentoring programs specific to indigenous youth. However, to attract and retain the students who will drive the next period of discovery, there's a need for financial support that keeps them in the system.

In short, when there is a growing global shortage of scientific talent tied to demographic shifts in Canada and a changing global context, Canada needs to be an inclusive, welcoming and financially supportive environment to ensure research is an attractive and viable career option for trainees.

• (1855)

Thank you.

The Chair: Thank you, President MacLatchy.

I'd like to thank all of you. We're grateful for your time, your experience and your expertise. We have really committed and dedicated committee members who are eager to ask you questions.

We will begin our first round of questioning. It's for six minutes, and we will begin with Mr. Soroka.

Mr. Gerald Soroka (Yellowhead, CPC): Thank you, Madam Chair.

Thank you to all the witnesses for participating tonight.

My first question is for you, Dr. Blit. In your research paper, "Can Skilled Immigration Raise Innovation? Evidence from Canadian Cities", you highlighted in an abstract that science, engineering, technology or mathematics (STEM)-educated immigrants are employed in STEM jobs, but that this impact is limited because only a third of this population is employed in STEM jobs.

Can you please expand on this finding and why this seems to be the case, in accordance with your research?

Mr. Joel Blit: We found that, unlike in the U.S., our STEM-educated immigrants were not having as large an impact on innovation in the places they were moving to. We tried to dig a little deeper to find out why. The biggest piece of evidence we found was that, as you point out, only about a third of our STEM-educated immigrants are actually working in STEM. I think that's about half the rate in the U.S.

You asked why, and I don't have a good answer, because that was the extent of our study. I think there needs to be a follow-up study of that, but it's consistent with the story, or the cliché, that immigrant engineers are driving taxis in Toronto. Unfortunately, I can't tell you why, or not yet.

Mr. Gerald Soroka: Well, if you do find that out while we're still doing our study, we'd appreciate any more information on that as well.

Also, Dr. Blit, based on your research, you talk about the advantages and the disadvantages of the Canadian points system. With foreign credentials obtained from education systems that are different from the Canadian education system, how can we ensure balancing the integration of foreign talent into Canada while still upholding Canadian integrity and standards for research and innovation?

Mr. Joel Blit: You raise a good point. It's a challenge. On the one hand, we want to integrate and incorporate our immigrants as quickly as possible. On the other hand, in certain cases I'm sure there are questions around the quality of their education, depending on where they come from.

One thing that we mention a bit in the paper is that the immigrants who are being educated in Canada, the international student immigrants, seem to be doing quite well and seem to be having a bigger positive impact on the economy. One thing that comes out of our paper is that we might want to increase that channel of immigration. We are launching into a new study on that right now.

Mr. Gerald Soroka: That sounds interesting.

Also, Dr. Blit, you published another one on automation and re-allocation, where you stated the following:

...automation will make Canadians richer and jobs more meaningful by removing the menial tasks. It is a change that will come, and our choices are twofold: how quickly to adopt it, and what governance to put in place so that all Canadians benefit.

We have had witnesses highlight the shortage of jobs for researchers and post-doctoral graduates. How do you propose that we integrate automation through artificial intelligence and robotics while still providing opportunities for these researchers?

Mr. Joel Blit: AI robotics will not be replacing these researchers. They'll be replacing.... Actually, I should mention that this is still an open question, but they'll probably be replacing people in the middle and lower end of the skills distribution, not the researchers. As a matter of fact, it may well be that we will require even more researchers to advance the AI in robotics, especially as they become more and more prevalent and more useful in our economy.

These things are important to do, because this is how Canada is going to continue to improve productivity and improve wages for Canadians' standard of living, but it is going to have distributive impacts. Some Canadians are going to benefit. Others are going to lose out. It's also important to make sure we have a generous social safety net and we consider the distributional impacts.

• (1900)

Mr. Gerald Soroka: As well, Dr. Blit, how do you think the pandemic has negatively affected the attraction of international top talent to Canada for research and innovation? Has this since been improved following the slow recession from pandemic mandates?

Mr. Joel Blit: I don't know if I'm best placed to answer that question. The obvious answer is that when the movement of people around the world was restricted due to COVID, it became more difficult to bring in foreign talent.

Right now, I suspect that some of the other panellists would be in a better position to answer that question.

Mr. Gerald Soroka: I have one more question, then, Dr. Blit.

When you start looking at all the research you've done since 2020, how much do you think the situation has changed, or has it changed, really, in the last two years?

Mr. Joel Blit: The COVID-19 crisis presents Canada with a tremendous opportunity. As I pointed out at the beginning of my testimony, we are lagging in innovation and productivity. My research has shown that during crises is the time when there's rapid change. If you embrace change—if you embrace automation and reallocation—you can really improve your economy really quickly.

This is potentially a historic opportunity for us to do so. We just need to grab it. I'm not sure to what extent we are grabbing it right now.

Mr. Gerald Soroka: I think I'm out of time, aren't I?

The Chair: I'm afraid so.

Mr. Gerald Soroka: Thank you, Madam Chair, and thank you to the witnesses.

The Chair: Thank you.

As I said, witnesses, we're so grateful for your time. You really do have an interested committee here.

We're now going to go to Mr. McKinnon for six minutes, please.

Mr. Ron McKinnon (Coquitlam—Port Coquitlam, Lib.): Thank you, Chair.

I'm not entirely sure who to direct this question to.

All my life I've heard of the brain drain. We're losing talent and skills, particularly to the United States, but obviously elsewhere in the world as well. We're hearing it again, of course, tonight and throughout our study.

I'm wondering if it has ever been better. Is this a new problem or is it a problem that has worsened in recent years? If you have any information, was there a time in our last 50 years or so when we were doing it better? If so, what can we do to reproduce that or improve on that?

I will start with Dr. MacLatchy please.

Dr. Deborah MacLatchy: I don't have the number with me. Maybe Dr. Blit has a better lens on that. I think there have been periods of time when the federal government, for example, has put extensive resources into the system.

For example, through the early years of the Canada research chairs and other funding mechanisms, that was an opportunity for the universities to expand and recruit talent—not just to retain within Canada, but also to repatriate excellent researchers like Dr. LaMontagne and others into the system. They're still exceptionally amazing programs, but the percentage of researchers they're supporting has lessened over time. Therefore, it doesn't have the same impact as it would have had 20 years ago when those programs were first initiated.

Mr. Ron McKinnon: Thank you.

I will extend that same question to Dr. Blit, if he wouldn't mind.

Mr. Joel Blit: My apologies that I don't know the number, so I can't give you hard data on this.

My sense is that at least when it comes to academia, I think what Dr. LaMontagne was mentioning earlier was that there are more lecturer positions instead of tenure-track positions doing research. Obviously, if there are fewer research tenure-track positions, more of our graduates or Ph.D.s are going abroad or having to find work outside their preferred field or outside their preferred area.

If we want to talk more generally about the brain drain—not just researchers and professors, but more generally—again I don't have the data. The World Intellectual Property Organization, or WIPO, looks at inventors around the world—people who have invented patents. They look at what country they're from and where they are living. Canada had the biggest number of Canadians living abroad who had patented, second only to China and India. Given that China and India have a billion people plus, it is quite shocking. Imagine how many people we're losing who could be contributing to innovation.

• (1905)

Mr. Ron McKinnon: Let's build on that.

You certainly mentioned that we're losing a lot of our inventors. Much of the research that is done in Canada is not capitalized on here. The benefit goes somewhere else.

What can we do, as a government? What kinds of policies can we bring forward that will change that picture, so that we can encourage more private industry to take up some of these opportunities and advance them within our own country and for our own economy?

Mr. Joel Blit: That's a million-dollar question. It's complicated. However, let me at least share a few ideas.

The biggest challenge is at the interface of research and invention, in universities and other places and industry. It's that interface between the two; there just isn't enough communication between those two parties. A lot of the research either sits in someone's drawer or gets picked up by foreign firms or something of the sort.

One thing I've been seeing that I'm quite encouraged by is this idea that instead of creating a Canadian...like an RPA or a CARPA, try to create some kind of a system similar to what they have in Israel or Finland. We've been talking about this.

Basically, it does a few things. One is that it convenes players, university researchers and industry, around big topics, ideas and problems. This is something the government can play an important role in doing, bringing people together.

Another thing it can do related to this is to connect people. If there's a firm or business that needs expertise in AI or something like that, they often don't know where to get it. They could connect that firm with university researchers in those areas.

Lastly, it's support for R and D. I mentioned in my testimony that our firms are doing almost no R and D—very little. We're last in the G7, and going down. We can reform the SR and ED system, but we can also do some direct support of R and D.

I'm encouraged by the latest things that I'm hearing. I think we need to move more in this direction.

If I can give a final plug to the University of Waterloo, I think the University of Waterloo is doing some very excellent things in terms of entrepreneurship and commercialization. We're right now trying to ramp that up by creating an office that's going to be devoted specifically to that.

Mr. Ron McKinnon: Thank you, Doctor.

Thank you to everyone.

I had other questions, but I'm out of time.

Dr. LaMontagne, I think you'll have to wait. Thank you.

The Chair: Thank you, Mr. McKinnon.

[*Translation*]

Mr. Blanchette-Joncas, the floor is yours.

[*English*]

Maxime, we are glad you are able to join us tonight. *Bienvenue*.

[*Translation*]

Mr. Maxime Blanchette-Joncas (Rimouski-Neigette—Témiscouata—Les Basques, BQ): Madam Chair, greetings to you, my colleagues and the witnesses who are with us this evening.

My first questions are for Mr. Perreault.

Mr. Perreault, allow me to congratulate you and to applaud the outstanding work that Acfas does, including at the 89th annual conference held last week in Quebec City. I also want to acknowledge all the work that was done during that conference, where 3,500 scientific papers were presented exclusively in French. Congratulations! Lastly, I want to thank Acfas for all the work it has done for science in French both in Quebec and throughout the francophonie.

Turning to the subject of our study, which is the recruitment and retention of talent at our post-secondary institutions, you raised a concern that has also been mentioned by several other witnesses in recent meetings, the fact that the Canadian government's scholarships haven't been raised since 2003. You of course cited the example of inflation, which is quite striking.

I'd like to give you a chance to tell us more about the impact that situation has had on our universities.

Is it affecting the attraction and retention of talent at the post-graduate levels?

Mr. Jean-Pierre Perreault: The answer is relatively simple. We are betraying the next generation by offering very poor financial conditions to support students.

Fewer and fewer Canadians are choosing to study at the master's and doctoral levels. All Canadian universities are recruiting increasing numbers of students internationally, many of whom then return to their countries of origin. Since Canadians are generous, we therefore contribute to the development of research and innovation around the world.

We should begin by establishing an excellent scholarship system to ensure that study at the master's and doctoral levels is an attractive proposition. As I mentioned in my statement, all these individuals will then contribute to the Canadian economy by holding a series of positions. It's a well-known fact that the more people study at university, the less unemployment they encounter in their careers. They regenerate the economy throughout their careers, even if only as a result of their training. The talent pool is thus the starting point.

The second point to consider is that more students are being forced to take jobs because they can't make ends meet on their university scholarships alone. This takes up time that they should be spending on their studies. Students across the country now tend to take longer to complete post-secondary studies. Here too, we're doing ourselves a disservice. We should instead be encouraging them to finish their education sooner by providing proper support, as was done for our generation, so they can focus entirely on their studies while at university.

• (1910)

Mr. Maxime Blanchette-Joncas: Thank you very much, Mr. Thériault

The Bureau de coopération interuniversitaire recommends that scholarships be raised to \$25,000 at the master's level and \$35,000 at the doctoral level.

What's your opinion of the Australian model, which advocates annual indexing based on inflation?

Mr. Jean-Pierre Perreault: It's one thing to increase scholarships, but they'll have to be indexed annually based on the rate of inflation or else we'll be doing ourselves the same disservice. If scholarships had been indexed to the rate of inflation since 2003, they'd be worth \$25,000 today. We just forgot that students, like us, also had to buy butter at the grocery store and that costs had increased. That's the problem.

A system also has to be put in place to catch up and increase the number of scholarships to cover all sectors because I think all disciplines are equally important. Then scholarships will have to be indexed to the cost of living.

Mr. Maxime Blanchette-Joncas: Thank you.

You've presented a point of view that we haven't really heard so far in this committee. You said that students coming to the end of their undergraduate degree had to choose between continuing their studies at the master's level while living below the poverty line or entering the labour force, where, given the labour shortage, they can find a new job on attractive terms.

Please tell us more about this new dynamic.

Mr. Jean-Pierre Perreault: I can do better than that. The labour market is so hot right now that universities are having trouble helping students finish their undergraduate degrees and actually graduate. That's definitely the case in the information technology field. In IT, students often leave university after a year and a half because they're offered jobs at salaries of \$80,000. Consequently, when they decide to do a master's degree, they're asked, "Do you want to work 40 hours a week for \$80,000 a year or to work 60 hours a week as a graduate student living below the country's poverty line?" Those are the options they're offered.

Mr. Maxime Blanchette-Joncas: Thank you, Mr. Perreault.

Can you think of any other measures the government could take to establish positive conditions and thus attract and retain talent at educational institutions?

Mr. Jean-Pierre Perreault: I can talk about two or three elements. First of all, student support programs are essential, especial-

ly federal programs, because they are the best in Canada. They set the standard for all future organizations and foundations.

Graduate student pathways and support also need to be much more effective to help them obtain their degree quickly and they may need further guidance if they have entrepreneurial aspirations. I think that universities are beginning to do this, but there's still a lot more to be done. It would be a way of promoting innovation, which in itself would pay back any investments in scholarships.

• (1915)

The Chair: I'll have to interrupt you, Mr. Perreault.

[English]

Monsieur Blanchette-Joncas, I'm sorry. It's the worst part of this job.

We're delighted, Mr. Bachrach, that you can join us tonight. We thank you for joining us.

You have six minutes, please.

Mr. Taylor Bachrach (Skeena—Bulkley Valley, NDP): Thank you so much, Madam Chair.

I'm delighted to be here on behalf of my wonderful colleague, Mr. Cannings, who's an actual scientist and would probably be much better suited to this discussion than I am, but I'm going to do my very best.

It is an interesting conversation. I've appreciated all of the insights that our witnesses have shared with us so far.

I'd like to start with Dr. LaMontagne and pick up on some of these questions around support for graduate students. This was brought to my attention in an article in *The Globe and Mail* from May 12, regarding scholarship amounts in Canada for science graduates. I'll read the first sentence. Some of the witnesses are probably familiar with the article. It says, "Federal scholarships intended to support some of Canada's most accomplished graduate students in science have become so devalued by inflation that those who receive them are effectively earning below the poverty line absent any additional means of income, a coalition of senior researchers has warned." Obviously, they're looking to the government to increase these scholarships.

Dr. LaMontagne, as someone who's worked in both Canadian and American universities, can you talk a bit about how the low value of these scholarships and the fact that they haven't gone up in 19 years impact graduate students, and how things might differ between Canada and the United States?

Dr. Jalene LaMontagne: Sure. I'll start with a bit of my experience.

When I started my Ph.D., back in 2001, I got a mortgage in Edmonton based on my salary as a graduate student. I don't think that's happening anymore. I'll say that to start.

The difference between Canada and the U.S. is that there are different opportunities for researchers to fund graduate students. For instance, in the United States, when I apply for a grant, I can put a graduate student on that grant and it would pay them a salary and would pay their tuition. I don't think those same opportunities exist in Canada, and that's a function of the difference in the granting system and the opportunity for individual researchers in the U.S. system to have many different grants to fund many different projects at the same time.

I don't want to say that everything is better in the U.S. with the money that graduate students are getting. In some universities, students are getting quite a lot, but there are still issues with students being at the poverty line.

Mr. Taylor Bachrach: What percentage of graduate students would you say are able to live on the scholarship or grant money that they secure, versus having to work a second or third job?

I think Mr. Perreault touched on this and talked a bit about how working additional jobs takes away from their ability to focus on the reason they're at the university. Some may be waiting tables in the evening or may have to travel to a work site so they can earn enough money to put food on the table.

How many students would you say are in that position, relatively speaking?

Dr. Jalene LaMontagne: I don't have specific numbers on that, but it's definitely an issue. In some schools and some systems, graduate students may get paid during the academic year but then not during the summer, and that's going to influence their ability to do research. When you're making money below the poverty line, you have to have another job in order to put food on the table and do everything you need to do.

I don't have numbers, but maybe someone else does.

Mr. Taylor Bachrach: I wonder if Dr. MacLatchy might have a sense of that, as the president of Wilfrid Laurier University.

Do you have a sense of what proportion of graduate students are working additional jobs in order to make ends meet?

Dr. Deborah MacLatchy: I would venture to say that almost all of them are, and some of them are doing work that's very complementary to their studies. For example, they are teaching assistants in undergraduate labs, so they're enhancing their professional skill development and teaching skills. Those are great opportunities, but more and more students, even ones on the best federal scholarships, are also taking part-time jobs as servers in restaurants and other types of positions, because of costs.

I think the other critical thing to consider here is that not only are the students living below the poverty line, but they're also paying tuition to the institution, which, depending on the institution, is going to be \$6,000, \$7,000 or \$10,000-plus that you have to take off the top of those scholarships. What is left is then what they have to pay for rent and food. One thing that most Canadian universities don't do is tuition remissions for graduate students, so I think that's also a really important concern.

Very often I have students ask me if they can take on an additional TA job or something like that. As their supervisor, I don't want to

say no, even though I know it's going to take away from their research activities. I also understand that they need to pay their bills. As students get older and become post-docs, there's also a greater chance that they're thinking about starting families and doing other things that really have to be taken into consideration as well.

• (1920)

The Chair: Dr. MacLatchy, I'm sorry to interrupt.

Mr. Bachrach, once again, we're delighted you could join us.

We're now going to go to the second round of questions. This one is for five minutes, and we begin with Mr. Williams.

Mr. Ryan Williams (Bay of Quinte, CPC): Thank you very much, Madam Chair, and thank you very much to our witnesses.

Our chair knows too well that we have so many great questions and we only have a bit of time, but I'm happy for my colleagues who have asked some great questions.

Dr. Blit, I am going to start with you. That was a fantastic discussion. I think you had some great examples. You say we can keep students from STEM, but we're losing STEM students, so I'm going to talk about retention.

I know there's no silver bullet for fixing these innovation problems, as you've mentioned, so what is step one to keeping students specifically in STEM, as you've mentioned, in Canada?

Mr. Joel Blit: If the question is how to keep STEM-educated students from leaving Canada, obviously one key is to have good-paying jobs in the STEM sector in Canada, and I think the government can control that only so much.

One change that has come with COVID-19 is that we've all learned to work remotely, and I think a lot of firms have now decided that you can have research teams that have people all over the world. What that means is that potentially a lot of our students who were moving, maybe, to Silicon Valley, Boston or anywhere else may end up staying in Canada and working remotely for these multinationals.

Of course, that's kind of a two-edged sword, because, if you think about our small firms that are trying to hire STEM-educated graduates, they're now competing with all these multinationals that are setting up these remote working situations. I think there has been a paradigm shift because of this shift to remote work.

Another thing has happened. I have friends who are CEOs of tech firms, and they are starting to hire. Their employees asked if they could start working remotely. They were all Canadian, and they said yes, and within six months they realized they were paying these guys three times what they would be paying someone in India, Brazil, Russia or wherever you want, so they're starting to hire from abroad now because everyone is working remotely. There has been a very strong paradigm shift here.

I'll just add one last thing. If we can keep students, graduates in STEM, in Canada for three or four years after they graduate, then I think they will probably stay long term, because, by that time, they've probably settled down and maybe they're starting to have kids. Really it's a matter of how we can keep them around for three or four years, and I think we could get creative. Right now tuition's very high. What if anyone who stays for four years gets a complete refund or a half refund of their tuition? You know, these are just crazy ideas, but....

Mr. Ryan Williams: I love your idea about creating big ideas. Are you familiar with the U.S. Department of Energy's earthshots program? They're looking at big ideas. They're putting a lot of money behind solving those with specific targets that they want to hit. For all the U.S. energy, it's going to be geothermal and solar and wind.

We have different kinds of challenges here in Canada, and we talk about genomics and glycomics. There are a lot of different things that we're excelling on. Looking at your idea from Israel and Finland, are they doing some of that? Is that a direction you think we should be taking for more of that commercialization?

• (1925)

Mr. Joel Blit: I always worry a bit about government or bureaucrats, or anyone really—myself—picking winners. It's always hard to know what the next big thing is going to be. I think there probably is a limited role for that, but we don't want to put all our eggs into that basket.

The other thing is, if we're picking super high-risk things, one out of 10 will succeed. We're a relatively small country compared to the U.S. and we can place only so many bets, so we might get very little out of that. I—

Mr. Ryan Williams: I'm sorry, I have only limited time.

This is my last question.

Our college system seems to be.... You said there's IP that's put in a drawer. I think we've seen that the IP generated...80% of IP in Canada is through institutions, but it's hard to find that next bridge to commercialization. The college system seems to engage in commercialization with projects already from the private sector.

Do you think we should be looking at more of that angle with our institutions, and then finding ways to bridge that IP?

Mr. Joel Blit: Absolutely. I think we need to find ways to do that with all of our institutions.

Another model, by the way, is the Waterloo model, where the inventor or the researcher owns the IP. That seems to explain part of the success in this region. If you own it, you have much more incentive to commercialize it than if the benefit goes to someone else.

Mr. Ryan Williams: I agree with that too. Thank you so much.

The Chair: Thank you, Mr. Williams.

To our witnesses, I really hope you can see the interest you have from this committee.

We're now going to go to Mr. Collins for five minutes, please.

Mr. Chad Collins (Hamilton East—Stoney Creek, Lib.): Thanks, Madam Chair.

I have one quick question for Dr. MacLatchy, and then I'm going to cede the rest of my time to my colleague, Mr. Morrice.

Through you to Dr. MacLatchy, we've had only a couple of students appear in front of the committee as witnesses, and their testimony focused around the obvious, in terms of tuition fees, student loans and bursaries. Some of these are cross-jurisdictional issues that we share with the provinces.

What are you hearing from your students as it relates to financial support? What would be the top priority, from a recommendation standpoint and from a funding perspective? I was hoping you could share with us what you're hearing from students at your institution.

Dr. Deborah MacLatchy: It is very much what the other speakers have spoken about, which is increasing the dollar value of the scholarships. These scholarships go to our best students, and I think that's a real opportunity. I also think that the number of scholarships has stagnated as well, so it's increasing the numbers.

Tied to that is looking at what additional programs can do to make sure we're getting the widest pool of students, to have access to these students. That includes students who are first-gen students from equity-deserving groups, who need additional supports to see science, technology and innovation as opportunities for them, because they may have had less exposure and fewer opportunities.

Mr. Mike Morrice (Kitchener Centre, GP): Thanks so much, Mr. Collins, for your kindness here, and thank you, Madam Chair. Thanks to all the witnesses as well.

I will admit that I'm particularly proud tonight to see two different witnesses from Waterloo Region, Dr. Blit and Dr. MacLatchy.

I'm hoping I might have time for two questions for Dr. MacLatchy. The first builds on the ones from Mr. Bachrach earlier.

Dr. MacLatchy, I appreciate that you spoke about students who don't have access to generational wealth. I will admit, as a Laurier grad, how helpful it was that my parents were able to help, despite also being in co-op, and how significant that was in helping me get through my undergraduate time there.

You mentioned the need for graduate and post-graduate supports.

Can you share, maybe in a minute or so, some more specifics on the kinds of graduate and post-graduate supports you think the students you mentioned earlier need the most?

• (1930)

Dr. Deborah MacLatchy: Yes. I'm actually going to use an undergraduate example.

As part of the NSERC program right now, there are undergraduate awards to support students during summer terms. There is a specific subgroup of that, which is focused on indigenous students. One thing we know about science and technology is that students who get access to research opportunities—especially during their undergraduate studies—are more likely to go on and choose graduate programs—master's and Ph.D. programs.

That kind of very special targeted scholarship for indigenous students is great for researchers and it's great for students. It allows them mentorship and the opportunities to undertake research and get that research bug going, which is really absolutely critical. More programs like this that target.... I know the government has the new scholarships targeted for Black Canadians. Again, I think that is a really strategic way to go to support students who we know are equity deserving and under-represented.

Mr. Mike Morrice: Thanks, Dr. MacLatchy. I hope the committee will take that under advisement.

I have a last question. The grad students' association at Laurier has called out one of their core needs, and it is with respect to the cost of housing. Recognizing how that's gone through the roof across Waterloo Region and across the country, I wonder if you could speak to that so this committee could maybe keep in mind how, if we're thinking about keeping the best talent in Canada, we also need to address the cost of housing.

The Chair: Mr. Morrice, I'm sorry. I hate to do this. Since you're out of time, perhaps you'd like to ask Dr. MacLatchy if she might like to table that.

Mr. Taylor Bachrach: I'll give her time to answer in my time when it comes up.

The Chair: I'm afraid that this will be the end of the panel.

Would you like to ask?

Mr. Mike Morrice: Yes.

Dr. MacLatchy, if you wouldn't mind sharing that in written material afterwards, it sounds like that's the only way the committee can accept it.

Thanks, Mr. Bachrach, for your attempt.

The Chair: Thank you for your kindness.

As you see, this is a very collegial committee.

It's my job to say thank you to all of you. I hope you've had a good experience. It's wonderful to see parliamentarians able to meet with the research community.

Dr. Blit and Dr. LaMontagne, we wish you good luck with your research.

Dr. MacLatchy and Dr. Perreault, we will be watching your institutions.

We thank you for being with us tonight. Thank you for your expertise and your experience, and for being so gracious.

- (1930) _____ (Pause) _____
- (1935)

The Chair: Good evening. We're delighted to welcome our next panel tonight.

We have, from adMare BioInnovations, Mr. Gordon McCauley, president and chief executive officer, and Dr. Youssef Bennani, chief scientific officer, and from the Banting Research Foundation, Dr. Catharine Whiteside, who is the chair.

To our witnesses, we want to welcome you. We're delighted that you can have a conversation with us tonight. We look forward to hearing your expertise.

Each group will be given five minutes. After four and a half minutes, I will hold up a yellow card, which will tell you that you have 30 seconds left. We aim to be fair.

We will begin with adMare BioInnovations.

Welcome. The floor is yours.

Mr. Gordon McCauley (President and Chief Executive Officer, adMare BioInnovations): Thank you very much. I'm happy to be here this evening with my colleague, Dr. Youssef Bennani.

We're here because Canada has an extraordinary research enterprise that punches well above its weight when measured against our competitors around the world. We're only now just beginning to build a sustainable life sciences industry. We, adMare, exist to do just that, so we play a leadership role in building companies, building ecosystems and building talent. We build companies by finding compelling science in typically Canadian academic settings and bringing it into our own labs to build investable companies.

Our team has a tremendous track record of doing this. We've helped build 27 companies that have attracted 1.4 billion dollars' worth of real risk capital, which are worth about \$3 billion today, and which employ about 1,000 Canadians.

We build ecosystems, both physically and virtually. Our innovation centres in Montreal and Vancouver are home to 40 emerging companies employing about 500 Canadians, and our adMare community digital ecosystem is home to about 1,500 active members.

Most pertinent to this discussion is the work we do in building talent. We do this through the adMare Academy, which has five key programs that actively and successfully build the talent that we see is needed in the Canadian life sciences industry. The executive institute is focused on a 10-month gender-balanced program to build the leadership talent required. Our adMare BioInnovations scientist program is focused on the front end, post-doctoral and master's students, and helping them to apply their expertise in a commercial setting. We have a fellowship program for post-doctoral students and a co-op program for undergrads. Finally, the Canadian Alliance for Skills and Training in Life Sciences, or CASTL, provides the global gold standard in biomanufacturing training.

We are very proud of these programs, and we know they work. Ninety-five per cent of the more than 500 alumni of the adMare Academy work in the Canadian life sciences industry today.

• (1940)

[*Translation*]

These programs are being developed as a result of the recent record levels of investment from Canada's private sector. We are talking about literally billions of dollars invested over the past few years. And we mustn't forget record investment levels in public policy, from many different standpoints. These major capital investments represent significant job opportunities for Canadians.

[*English*]

Serious investment also means that Canada is facing a serious shortage of life sciences talent to drive that growth. Our friends at BioTalent Canada tell us that during the pandemic, this industry added 8,500 jobs in 2020 and is poised to have 214,000 over the next few years. We doubt that the committee needs reminding that these are high-value, high-paying, sustained jobs, situated at the heart of the economy of the future.

What should we do to help encourage this growth and seize this opportunity? We'd like to suggest five areas of focus.

First, just look around our facilities in Montreal or Vancouver and you will know that Canada is a highly sought-after destination for highly trained international students and seasoned experts. We need to continue the programs to attract these students and experts. We know they're working, including through the express entry program. We can improve them, for sure, but we need more of these students.

Second, tuition subsidies to students and wage subsidies to employers will go a long way toward ensuring the rapid uptake of our existing programs to meet existing demand.

[*Translation*]

Thirdly, internships, like those in our postdoctoral and co-op programs, are very effective at contributing to student employment, and they need strong support and encouragement.

[*English*]

Fourth, our universities and colleges do outstanding jobs, and we should ensure that their work and the work of supportive organizations like the tri-council are fully supported.

Fifth, scale is incredibly important. Our global competition is much larger. We cannot afford to take a piecemeal approach across the country. The data show that piecemeal efforts have not worked in the past, and our pan-Canadian effort clearly does.

Many of these jobs cannot be done remotely, because they're in laboratories, but surely the pandemic has shown us that we can do this effectively where remote work is possible. Therefore, ensuring that Canadians have the tools and infrastructure to do this work from anywhere is critical.

We thank you for the invitation and for the ongoing public policy support of our work. We'd be delighted to answer questions, if necessary.

The Chair: Thank you so much, Mr. McCauley. We appreciate your being here.

I'm going to go to the Banting Research Foundation, with Dr. Whiteside. Our third guest has joined us, but we'll give our guest a second.

Dr. Whiteside, the floor is yours for five minutes. Welcome.

Dr. Catharine Whiteside (Chair, Banting Research Foundation): Madam Chair and members of the standing committee, thank you for this opportunity to be a witness for this very important topic of talent, research and innovation, which directly aligns with the core mission of our foundation.

Since 1925, our not-for-profit national foundation has identified early-career researchers in health and biomedicine across Canada within the first three years of their first faculty appointment, to support their bold ideas and help launch their careers. To date, we've funded over 1,300 young health and biomedical researchers in all fields, ranging from biomedical engineering to public health—tallying \$8.6 million—at universities across Canada, through our annual discovery awards program. Our alumni, including such luminaries as Janet Rossant and Henry Friesen, have gone on to secure major research funding and make outstanding discoveries. They have emerged as Canada's leaders in biomedical science.

I have the privilege of chairing this foundation and wish to share with you our concern about the gap in federal support for our young research talent in health and biomedicine research in Canada, as well as our recommendations to address this gap.

Canada faces significant health challenges that impact individuals, our health care systems and our economy. Our most urgent health challenges include recovery from the COVID-19 pandemic and the potential next pandemic, climate change, complex diseases such as diabetes, and an aging population. Successfully addressing these challenges to ensure a healthy population and economy requires investing in the people who will generate innovative solutions, driven in large part by the biomedical academic research community.

Our federal government has invested in the training of graduate students and post-doctoral fellows, whose bold ideas are often the most innovative within this community. I'm quite aware of the advocacy for increased funding for this group. However, relative to peer countries, including the U.K., Australia, Germany and, importantly, the United States, Canada is underinvesting in science—specifically in early-career researchers in health and biomedicine who have been hired as assistant professors within the first five years of their academic careers.

Unlike other countries, our federal granting agencies do not provide many early-career researchers with competitive funding that would be sufficient to attract our best and brightest post-doctoral fellows to Canadian research faculty positions. The CIHR discontinued its early-career research award program in 2014. A review of the CIHR Banting post-doctoral fellows since 2014 indicates that 35% were recruited to a faculty position outside of Canada, which represents a significant loss of top discovery talent.

This is just the tip of the iceberg. For decade after decade, we have been losing many of our most talented researchers, who have been scooped up elsewhere because Canada cannot compete with the initial salary and research funding offered by other countries. Our Banting discovery awardees, many of whom have trained abroad in some of the most prestigious research centres across the globe, indicate that although they accepted a faculty position in Canada having rejected more lucrative offers from elsewhere, they know many Canadian colleagues who accepted these offers, which are mostly in the United States.

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. It is particularly difficult for women and those who may be struggling with financial debt—some from lower socio-economic backgrounds—after many long years of training.

This raises the issue of equity, diversity and inclusion within our young research talent pool, particularly when we know that the research necessary to address our health inequalities in Canada, such as indigenous people's health challenges, must engage investigators from our diverse communities with lived experiential knowledge.

Therefore, underinvesting in early-career researchers negatively impacts population health, health care resiliency, the competitiveness of the Canadian economy and, ultimately, our ability to effectively attract and retain the talent we need for innovation and its implementation.

• (1945)

Our foundation, along with the Dr. Charles H. Best Foundation, has developed a proposal for a \$100-million federal investment over the next 10 years for the recruitment and retention of investigators in health and biomedicine within the first five years of their initial faculty appointments. We have presented this proposal to 26 federal decision-makers and—

• (1950)

The Chair: Dr. Whiteside, I hate to interrupt, especially as you're getting to—

Dr. Catharine Whiteside: I'm finished. I'll just say that our proposal has received a very positive response.

Thank you.

The Chair: I'm sure the members will want to follow up and hear more of what you have to say. Thank you for that.

The last witness we're going to hear from in this panel is Dr. Mosca, who is a professor with the Institute for Quantum Computing at the University of Waterloo.

The floor is yours for five minutes. Welcome.

Dr. Michele Mosca (Professor, Institute for Quantum Computing, University of Waterloo, As an Individual): Thank you, Madam Chair and members of the committee.

[*Translation*]

Thank you for inviting me to appear before the committee.

[*English*]

I'm a very grateful beneficiary of the Canadian education system. I was fortunate to study at Oxford. I returned to Waterloo in 1999 as a faculty member to start a quantum computing group within its cryptography centre. I grew this group, and in 2002, we founded the Institute for Quantum Computing. I've helped recruit dozens of the world's top quantum computing researchers as faculty and post-docs, and set up programs that have trained thousands of the top quantum researchers around the world.

While I was setting up this group at Waterloo, I also joined the effort to help found the Perimeter Institute. A decade or so later, it was already ranked among the top theoretical physics centres worldwide. Over a decade ago, I started focusing my energies more on seizing the opportunities we'd been creating, raising awareness about IP protection and management among academics in my field, reaching out to industry on how to protect against quantum-enabled cyber-attacks, and so on. I started my own company. I helped others start their companies, and I started, with others, a quantum industry consortium to help translate research opportunity into economic success for Canada.

Now, to the point of this committee, in short, to attract and retain the best talent, we need to offer people the opportunity to achieve their potential. That's why I left Oxford to return to Waterloo. Waterloo was the perfect place to drive this vision for a world-leading quantum centre at the time, with a very supportive ecosystem that I was joining. There may have been comparable places, but there was no better place.

One of the biggest challenges that we have in translating this opportunity that we create into actual economic prosperity and impact for Canadians is that we are late adopters of this innovation. We keep creating these world-changing opportunities, and then we watch them evaporate in the endgame. We need to tackle that head-on and aggressively. I know we've tried. We've been trying for a long time. We just need to do better.

I have four recommendations.

The first one is to keep supporting what we're good at. We're amazing at creating these opportunities. We do great fundamental research and applied research, great training, start-ups, and incubators. There's room for improvement. We've been hearing about ways we can improve our fundamental research capacity, and of course we should try, but we actually do have a long track record of creating amazing, world-changing opportunities. The next few recommendations are focused on what we can do to better seize those opportunities to retain the talent that we have and attract new talent.

The second recommendation is to stop scoring in our own net. I'll give some examples. The first one is immigration. Just a few weeks ago, a star post-doc in cybersecurity in my group was waiting endlessly for her work permit to be renewed. In the meantime, she was unable to leave Canada, so ultimately she resigned. Europe was certainly happy to have her back. We can give you countless examples of this, and not just recently but over many years.

Another example of own goals is when we set up what at the surface looks like equal collaborations with like-minded partners, but their programs are really optimized for commercialization. Government money flows to companies and they engage our academics, but then we show up and the instruments we bring to the table are really optimized for academic research—which is great for academic research, but there's a mismatch. At the end of the day, we're really risking doing free R and D for others to commercialize. We should not take a knife to a gunfight in these sorts of situations.

The third recommendation is to take a “use it or lose it” approach to the innovation opportunities. We often ask how to keep it here, or how to stop it from leaving. Use it or you're going to lose it. We need to get better at being early adopters again. Jim Collins at Stanford says that great companies fire lots of bullets, and that informs when and where to launch cannonballs. When it comes to disruptive technologies, like quantum, government departments in critical sectors of our economy need to be experimenting early to understand the impact of these technologies on their sectors. Knowing how disruptive tech is going to impact critical sectors of our economy cannot be done with a wait-and-see approach. There's just too much at stake. We need, very importantly, to engage first-in-class Canadian companies whenever possible. That will help us attract and retain first-rate talent.

● (1955)

My final recommendation is that, in a prioritized and principled way, we need to set up a broad team Canada approach to owning the podium in areas we decide are critical for Canada and its strong values to prosper. This involves a mandate for the different elements of the Canadian government, industry, and academia to work together with support from the highest levels of all these sectors—whether it's being a leader in cybersecurity or quantum computing,

or whatever we decide—so that we can identify when the existing structures are an obstacle to collective goals and figure out how to get the puck in the net.

[*Translation*]

Thank you for your attention.

[*English*]

Thank you for your important work on this committee.

The Chair: Thank you so much, Dr. Mosca.

I'd like to thank all of our witnesses. Thank you for coming and having a conversation with us tonight, and thank you for sharing your expertise, your ideas, and where the challenges are. We have a very interested committee. They want to ask you questions, so we'll go to questions now.

The first round is for six minutes, and we begin with Mr. Tochor.

The floor is yours.

Mr. Corey Tochor (Saskatoon—University, CPC): Thank you, Madam Chair, and thank you to our witnesses tonight.

Thank you, Dr. Mosca. I have some questions for you, because we heard from the Perimeter Institute last week and I was very interested in how they are approaching things. You are along the same lines, stressing the importance of being a disruptive technology out there. I do appreciate some of your comments, but I just want you to unpack a couple of them.

One is about bringing a knife to a gunfight. Is that strictly just on funding from the federal government?

Dr. Michele Mosca: There, I was referring to when we're bringing in.... We basically brought in NSERC, which is amazing. I think they do phenomenal work, but they can't send money to a company. They were doing their job. This is in no way whatsoever a criticism of NSERC. They're being matched up with Innovate UK. I'd rather be a company in the U.K. for this program than a company in Canada.

Innovate UK sent money to a company, which subcontracted to universities there. We were funding academics. Our companies had to do the in-kind work and give extra cash to the academics. That's great for certain things, but not when the U.K. side or the EU side has the ability.... Actually, in the U.K., they had to send the money to a company. They were laser-focused on commercialization. We wanted to be, but we didn't have the instruments to do that.

Mr. Corey Tochor: Right. Just on that program, it's like we're Boy Scouts here, in Canada. We do all this research, and then our lunch gets stolen and we're like, "We don't have any jobs." Where the commercialization of the products, which is very frustrating as a taxpayer and as a Canadian, most wouldn't understand that....

You talked about the visas, and how we just lost a student. We had an instance in my riding in Saskatchewan, Saskatoon—University, where they were having some immigration troubles. You said that this has been going on for years. Is there not a 1-800 number that we could set up especially for creative geniuses we need to stay in Canada and do the research? I'm not sure who represents your area, but if you brought that example to your local MP, did they not try to pick up the phone and help?

Dr. Michele Mosca: We have done that over the years and it has helped. Several years ago, there was a person who couldn't bring his wife over, and that was obviously really hard on him. Sometimes it is escalated to that point, but for these cases.... We tried hard. There isn't an easy 1-800 number for doing this, in general.

Mr. Corey Tochor: Would you recommend that we have something like that for fast-tracking visas, or resolving or appealing problems that arise from that?

Dr. Michele Mosca: I think that for these super niche areas where.... We need to think of these as the Toronto Raptors or the Toronto Blue Jays—

Mr. Corey Tochor: It's a competition.

Dr. Michele Mosca: It's really hard. There are so few of them. We're working so hard to get them here. I sympathize with all the challenges Immigration and Citizenship Canada has to deal with. I'm not throwing stones there, but we just need to figure out how to escalate. We're very cognizant of that, so we don't go calling our MP every time something isn't going our way—

• (2000)

Mr. Corey Tochor: I would recommend you do that, though.

Dr. Michele Mosca: We need a better process for that. PRs are taking forever.

Mr. Corey Tochor: Whenever it's about escalating so that you don't lose top talent, I would escalate that to your member of Parliament right away. They're getting paid to do a job, so hopefully they can resolve this. I do like your approach to this as team Canada. We are in a competition. The race is out there and I don't know if Canada is winning this. I do feel that you need to do that whenever it does occur.

Can you unpack a little bit about "use it or lose it"? Are you talking about government supporting and purchasing technology from these start-ups? Is that where that was coming from?

Dr. Michele Mosca: Yes, exactly. We can't say, "We're not going to buy your stuff and we're not going to invest in your companies, but please don't leave Canada." That's not going to work.

I think there's really value added to engaging them, because, with something really disruptive, you need to be ready or you'll be caught off guard. Do we know how quantum can impact our energy sector? Not really. Do we know if it's going to affect our health sector? Not really. Nobody knows perfectly, but we need to at least be.... We don't have to outrun the bear, but we'd better know more than anyone else about how it's going to impact the critical sectors of our economy.

Mr. Corey Tochor: This means being faster than the U.K., as much as they are a good Commonwealth friend.

Dr. Michele Mosca: Yes.

Mr. Corey Tochor: You talked about the U.K. and some of their funding that goes directly to companies. What other programs are they doing that they do better than us? How are they structuring their supports?

Dr. Michele Mosca: I'm not saying that everyone else does a great job and we're terrible. The U.K. are our friends.

I was just at the White House at a meeting discussing collaboration with other like-minded nations in this space. We do need a common quantum market, because we can't just build companies that serve only the Canadian market. They've built companies that only serve the U.K. market, so we have to find a nice balance.

They have these sorts of clusters—I forget what they call them now—in areas of focus that bring together industry and academia. They're not moon shots, but they're kind of like a mini moon shot, where it's really a collaborative effort toward a common goal. I think these kinds of program-level initiatives attempt to do these things coherently, and I think there are obviously some important lessons to be learned there—

The Chair: Dr. Mosca, I'm sorry to interrupt. The six minutes are up.

I think it's worth underlining what Mr. Tochor said, that MPs do exist to help with immigration. It's important that the research community know that.

Thank you very much, Mr. Tochor.

Now we will go to Mr. Collins for six minutes.

Mr. Chad Collins: Thanks, Madam Chair.

I'll start with Mr. McCauley. In one of his first points, he talked about the immigration issue. He referenced that Canada is a destination for international students. I think our open and transparent immigration policies have benefited Canada over the last number of decades, in contrast with some of the policies we've seen adopted by the former U.S. administration, which put barriers up for people who wanted to travel to the United States, and they experienced a brain drain because of that for the four years when it occurred. We were the beneficiaries of that.

I think it's very important, because of the comments we've received tonight and from other witnesses, that we emphasize that we have an immigration system that works, although there certainly have been some hoops and hurdles recently.

I want to ask Mr. McCauley from adMare if he is experiencing some of those same issues that Dr. Mosca referenced earlier and elaborated on. Is it becoming a barrier, or is it more of a nuisance? Maybe I can put it that way.

Mr. Gordon McCauley: I think it's certainly the case that we are seeing some of those. I would call them more of a nuisance than roadblocks. There are challenges in working through some of the visa situations. I can think anecdotally, like Dr. Mosca, of an example that we have right now of trying to work through the visa situation with one of our key employees.

To your question, I would say it's more of a nuisance. Again, like Dr. Mosca, we tend to be advocating pretty aggressively on behalf of our colleagues.

• (2005)

Mr. Chad Collins: Thanks, Mr. McCauley.

A subsequent question is along the lines of equity, diversity and inclusion. There are three witnesses tonight who've referenced that. That hasn't been a common theme with some of the past witnesses, so I was very happy, Mr. McCauley, to hear you reference your gender-balanced program. I'm just wondering if you could elaborate on that program or others that you have that seek to improve the EDI subject at adMare.

Mr. Gordon McCauley: We're very proud of the program, specifically the executive institute. Candidly, this industry has a lot of work to do in identifying and promoting talent from gender equity-seeking groups. We deliberately said with that program that it would be fifty-fifty men and women and it would broadly reflect the diversity of Canada. I'm really proud of the work that my colleagues have done in that regard, because they have worked very hard to find and promote those equity-seeking candidates, and it has worked very well.

I'd also say that we do the same thing in other programs, such as the bioinnovation scientist program, which looks more at entry-level scientists and equally supports candidates from equity-seeking groups. We're very proud of that work. I think we have a lot of work to do, and there are specific equity-seeking groups for whom it is particularly difficult. It's just going to be harder work, but we're totally committed to doing it.

Mr. Chad Collins: Thanks for that.

Switching gears, Dr. Whiteside, you also referenced EDI. I believe it is one of the recommendations that you provided to us. Is it part of the \$100-million investment over 10 years? Did you raise it in the context of seeking financial support for it or in the context of advising that it is a priority for the foundation?

Dr. Catharine Whiteside: Well, it's certainly a priority for our foundation, and yes, it is certainly part of our recommendation for a new early-career investigator program. It's absolutely crucial that we take into consideration the barriers that are currently in existence.

The good news is that our institutions are really beginning to address this very aggressively. I think we're in a great position to make new investments now that will improve the recruitment of women and equity-seeking groups and also provide them with mentorship. One of the key success factors is to provide mentorship at every level, starting through graduate training and post-doctoral training. In particular, early-career investigators have a long row to hoe in their first five years. Being able to provide more direct mentorship deliberately and across the country in this particular group will, I think, help to address the EDI issues as well.

Mr. Chad Collins: Thanks, Dr. Whiteside.

I have less than a minute left. Could I ask you to elaborate on your recommendations for the federal granting agencies? You did raise that in your opening, but it was a very brief reference. Could you provide some meat on the bone as it relates to what you're suggesting occur as part of this study in relation to the federal granting agencies?

Dr. Catharine Whiteside: Yes. Very specifically, I think early-career investigators should be offered the opportunity for a higher rate of funding through increased funding overall for researcher-led programs. CIHR is a great example. Last year, only 20% of early-career investigators received grants, and they had to compete against more senior investigators, who had a higher rate of funding, at about 23%. It's still very low, but I think the early-career investigators really need to be looked at independently.

The Chair: Thank you so much, Mr. Collins.

Again, we really appreciate all of you coming here and sharing your expertise.

[*Translation*]

Mr. Blanchette-Joncas, you now have the floor for six minutes.

Mr. Maxime Blanchette-Joncas: Thank you, Madam Chair.

I'd like to acknowledge the witnesses joining us this evening.

My question is for Mr. McCauley, of the AdMare BioInnovations organization.

Mr. McCauley, in the early 2000s, Montreal was a hub for the global pharmaceuticals industry. But then the lack of federal government support led to the massive departure of many major players in that ecosystem.

What, in your opinion, was the impact of this wave of departures on the retention of researchers and on pharmaceutical expertise in Quebec and Canada?

• (2010)

[English]

Mr. Gordon McCauley: It was without question a very challenging time in the early 2000s, as global pharmaceutical companies restructured their research enterprise. A number of organizations, like one of our predecessor organizations, grew out of that. We took over and acquired the research hub of a global player in Ville Saint-Laurent, and we have turned it into a vibrant innovation centre in Canada.

It is actually very exciting to see the kind of growth and development in Canada, and the attitudinal shift of researchers and entrepreneurs in Canada to build here the companies that can grow and scale here to be globally competitive. When we first started out, let's say five years ago, one of the things that distinguished Canada relative to our competitors globally was that we were the only advanced pharma market in the world without a domestic research-based anchor company by the classic definition. We find ourselves today with certainly two anchor companies by that definition and probably, depending on whom you want to ask, 10 to 12 putative anchor companies.

I'm very excited about the growth that's happening in this space. There is lots more to do, but I think Canada is absolutely poised to lead the world in this regard.

[Translation]

Mr. Maxime Blanchette-Joncas: Thank you, Mr. McCauley.

That's definitely good news.

Moderna recently announced that it would be locating a facility in Montreal and that it would be producing up to 100 million doses of its vaccine per year. That's very good news in terms of attracting, developing and keeping talent in Quebec.

What measures should the federal government be taking to make sure that this is only the first of many good news stories?

Mr. Gordon McCauley: There are quite a few extraordinary examples.

[English]

If you look at AbCellera in Vancouver, Precision NanoSystems in Vancouver, Biovectra in Atlantic Canada, J & J, and a number of other major pharma companies, I think we've seen an extraordinary resurgence.

Let's be honest. We learned some lessons through the pandemic about the need to maintain and build this infrastructure in Canada. I find it very exciting to see companies.... The Moderna example that you cited is just the latest of a number that have come. I think the data points to a very strong picture for the ecosystem.

Again, the challenge now is not to sit back and congratulate ourselves, but continue to do the work that's necessary to build the ecosystem in Quebec and across Canada.

[Translation]

Mr. Maxime Blanchette-Joncas: Thank you, Mr. McCauley.

We have definitely learned from the pandemic.

Canada is the only G7 country not to have produced a COVID-19 vaccine. What we are talking about here is infrastructure. The entire pharmaceutical ecosystem has been building infrastructure since the early 2000s.

Are there other mistakes we've made that should be avoided in future?

[English]

Mr. Gordon McCauley: I can't resist pointing out how exciting it is that virtually every vaccine in the world has Canadian research based in it. Certainly when you look at the lipid nanoparticle technology that is centred in British Columbia with Dr. Pieter Cullis and others, it's very exciting for all of us in the field to see that technology coming to the fore in vaccines—for virtually every vaccine in the world. I think we've seen other manufacturing advances that are quite helpful as well.

There is a lot more work to do. We would be making a mistake to rest on this progress. We need to make sure that we continue to build the manufacturing infrastructure and continue to build the industry.

Again, relative to the work of this committee, I am really interested in encouraging public policy-makers to focus on the talent that we need to respond to those jobs. We've seen from third party measures, like the BioTalent study that I referenced, that there is a significant opportunity for the attraction and growth of talent in this space. We need to make sure that we continue to support that effort.

• (2015)

[Translation]

Mr. Maxime Blanchette-Joncas: Thank you, Mr. McCauley.

I have a question for Dr. Whiteside now.

Dr. Whiteside, do you feel that the federal government is doing enough in 2022 to support its leading researchers?

[English]

Dr. Catharine Whiteside: Certainly programs like the Canada research chairs and the Canada excellence research chairs have been terrific. I'm a former dean of medicine at the University of Toronto. These programs have really been the lifeblood for recruiting and sustaining some of our most excellent scientists and researchers.

However, it's still not enough. I think if you look at the per capita funding—

The Chair: Dr. Whiteside, I'm sorry to do this.

Dr. Catharine Whiteside: We're out of time. I know.

The Chair: It's the worst part of this job.

Monsieur Blanchette-Joncas, go ahead.

[*Translation*]

Mr. Maxime Blanchette-Joncas: Madam Chair, I'd like to ask Dr. Whiteside to give us an answer in writing.

[*English*]

Dr. Catharine Whiteside: I'd be pleased to do so. Thank you.

The Chair: Thank you very much.

We will go on to Mr. Bachrach for six minutes.

Mr. Taylor Bachrach: Thank you, Madam Chair.

Perhaps I'll give the first 30 seconds or minute of my time back to Dr. Whiteside, if she'd like to finish her response to my colleague.

Dr. Catharine Whiteside: Thank you.

My experience is that these programs, which have been excellent, have really been subsumed mostly within the budgets of the departments and the faculties. In other words, they've just become part of base.

I think that if we want to really stimulate the recruitment of new talent along the lines of what Mr. McCauley has suggested, we need new funding. This funding should be competitive and it should be for the best and the brightest. It should be really competitive with organizations like the Wellcome trust in the U.K. and Howard Hughes in the U.S. I think that's really where we need to go.

Mr. Taylor Bachrach: Thank you, Dr. Whiteside.

I'm going to ask you another question on a somewhat related topic. I asked a previous witness about this letter that was released by a group of 270 university professors, including two Nobel laureates and 37 recipients of the Order of Canada, calling on the government to increase federal scholarships, both for graduate students and for post-graduate students.

I note in your testimony that your organization, the Banting Research Foundation, has proposed a \$100-million federal investment, specifically, I believe, toward researchers in the health and biomedical sciences field.

There is only so much federal funding. If there were \$100 million, it seems like there is another proposal, to increase graduate scholarships in general. Would that achieve a similar end to what you're proposing with this \$100-million fund, or is much more money needed across the ecosystem in general? I don't know if that question is clear.

Dr. Catharine Whiteside: Let me say that the increased support for graduate students and post-doctoral fellows is absolutely crucial. The percentage of graduate students and post-doctoral fellows funded through those federal funds, though, is quite small. The vast majority of funding for graduate students and post-doctoral fellows comes from the universities, hospital-based research institutes and

the granting sources to researchers' supervisors, and quite a bit of that is TA support—teaching assistant support—as you heard in the last session. I couldn't agree more that the value of the graduate student and post-doctoral fellowship awards should be on par with inflation, and I strongly support that.

Nevertheless, the \$100-million investment in new recruits is different. This is for faculty positions, in the first five years of an assistant professor's career, so it is along those lines, the same pathway, but it would enable us to take those post-doctoral fellows who are really the most innovative and who are really going to support our best research in Canada and recruit them with the type of funding that is competitive internationally.

My recommendation is that both are required.

● (2020)

Mr. Taylor Bachrach: Thank you so much for explaining the distinction there. I think that's really valuable information.

We heard from a previous witness about the shift in universities away from tenure-track faculty towards more sessional lecturers, part-time contracts and that sort of thing, and that the percentage of university budgets dedicated to tenure-track professors has decreased over time as universities focus on other priorities.

I'm not sure if you're in a position to comment on that and how that contributes to the overall trend we're seeing around retaining and attracting top talent in these fields, but perhaps you could offer your thoughts.

Dr. Catharine Whiteside: I think university budgets are of considerable importance in terms of where their budget comes from. It is true that in most universities across Canada the amount of base budget to support tenured faculty is fairly flat, if not even in decline. That puts a lot of onus on the universities, and I'll mention the hospital-based research institutes, many of which do not have tenured faculty. This requires new lines of revenue. It's always a balance, and I would say that bringing more external funding, in a competitive way, for top-ranked talent—in this case, researchers—to support tenure-track positions would be a great investment.

Enabling universities to have that kind of salary support and initial funding.... All the universities in Canada today are struggling with that. Again, I think it would be strategic. It should be aligned, in my view, with some of the key priorities that the federal government sees as their areas of innovation, and I believe it can really be a great opportunity today in Canada.

The Chair: Thank you very much, Mr. Bachrach.

Thank you to the witnesses.

We're now going to go to the second round for this panel.

We start with Mr. Soroka, for five minutes, please.

Mr. Gerald Soroka: Thank you, Madam Chair, and to all of the witnesses for coming this evening.

We're going to start with Dr. Mosca.

You mentioned your colleague who resigned due to a faulty immigration system. How do you think the Canadian immigration point system can be further improved to be more inclusive of foreign credentials with regard to innovation and retaining people with the education to spearhead our innovation?

Dr. Michele Mosca: That wasn't the issue in her case. To be clear, I think it was just a backlog issue. Her scores were off the charts. Actually, we don't know what the issue was. I think it was purely a backlog issue.

I'm very sympathetic to all of the challenges they've been under with Afghanistan, Ukraine, COVID and everything. With regard to the point system, I don't know. It's changed a lot since my parents came here 50 years ago. My dad was a cabinet-maker and didn't have a problem getting in because we needed cabinet-makers.

I'm not sure how well aligned the current system is with our economic needs across the spectrum, whether it's high-end or just specifically skilled labourers. I'm guessing that there's room for improvement there too, but I'm not so familiar with the system now.

Mr. Gerald Soroka: Thank you for that.

I was concerned when you said you really don't know what the problem was other than the backlog. I guess the concern for me is how we improve this if it's not working effectively.

Dr. Michele Mosca: It's a bit of a black-box mystery. She tried very hard to find out, and she sought a lot of help. It was really hard to get colour into what was going on, other than, "You're in the queue and please be patient."

• (2025)

Mr. Gerald Soroka: Thank you for that.

Dr. Whiteside, the Banting Research Foundation introduced a strategy in their annual report for 2021 by creating an opportunity for a sustainable Discovery Award program. What barriers do you face in implementing the strategy, and how can it be better supported?

Dr. Catharine Whiteside: The key barrier for us is really funding. We're a relatively small foundation, and we are able to provide a limited number of pilot and feasibility awards each year. To give you an example, we usually have around 60 applicants. These are individuals in their first three years of an assistant professor position, and we're able to fund anywhere between six and eight of them.

Last year was a bumper year. We were able to fund 12, because we've been building our strategy around stakeholder sponsors. These are, again, amazing investigators. To a person, they have said to us that if they had an opportunity to compete for salary support and better funding when they first came on, within the first few years they could have accelerated programs, realized their bold ideas much more quickly and been able to provide better impact with regard to their research.

This is really an issue of funding.

Mr. Gerald Soroka: My question is also this. When you're dealing with the marginalized communities as well, how are you able to help them? Because funding is such an issue, is that another area where it's lacking quite a bit?

Dr. Catharine Whiteside: Absolutely. I really applaud the federal government for some of their directed support now for the Black community and for indigenous. That's definitely on the right track, and we need more.

We need to understand how to most strategically deploy those funds, again working with universities and working even earlier, for instance, summer programs for high schools, to really get that pipeline built in terms of capacity. Again, all of these programs could be working together and could be networked across Canada in a way that I think could really build this capacity and address these matters.

Mr. Gerald Soroka: How is that possible that I'm almost out of time, Madam Chair?

The Chair: You have 25 seconds, my friend.

Mr. Gerald Soroka: Dr. Whiteside, just quickly, we've heard from other researchers or witnesses on how women have been disproportionately disadvantaged with scientific research. Could you provide any information on that quickly, or please have it in writing to us for the future as well?

Dr. Catharine Whiteside: I can—

The Chair: As much as I know the committee wants to hear this, I think it's going to have to be in writing unless someone else picks this up.

Thank you, Mr. Soroka.

With that we will go to Monsieur Lauzon.

Mr. Stéphane Lauzon (Argenteuil—La Petite-Nation, Lib.): These are some great questions.

I just wanted to come to you with the same question but more specifically for women researchers in their early career. Can you talk to us about parental leave and how they manage their pregnancy during their research? I think they now get 12 months across granting agencies. Can you talk to us about that?

Dr. Catharine Whiteside: Yes, the granting agencies really have very good parental leave plans and policies, as do the universities generally in Canada. In fact, in that case we do much better than the U.S. I really feel that the policies that are in place today are reasonably fair.

I think, though, that the issue is much deeper. I know the honourable Kirsty Duncan is an expert in this, and I've heard her speak about it.

Really, there are still biases in the system with regard to hiring and promotion. I think that's really where we need much more support for educating our colleagues and really putting in place the necessary checks and balances in the context of both hiring and promoting within academia, particularly in the research areas where often there's a male dominance, shall I say. We still see this in engineering and computer science, in the STEM areas, and we really need to be promoting women and equity groups within these areas to cash in on the great talent we have in Canada.

• (2030)

Mr. Stéphane Lauzon: Thank you for the very complete answer.

[Translation]

What I know about the Banting Research Foundation is that it played a truly historic role in terms of scientific discoveries following the discovery of insulin. I myself am diabetic, and my daughter is too.

[English]

I am type 2. My daughter is type 1. It's genetic and we have to live with that. I just wanted to thank you for that research, but I want to come back to the study.

[Translation]

In your 2021 report, Quebec accounted for approximately 23% of the population, but for 35% of your award winners. You also said that Ontario represented 38.8% of the population, but 43% of recipients. Representation among the provinces is very lopsided.

Is this great disparity between the numbers of awards a reflection of provinces where there are more rural regions compared to those with bigger cities?

[English]

Dr. Catharine Whiteside: Just to be clear, you're talking about the Banting Research Foundation Discovery Award program.

Mr. Stéphane Lauzon: Yes, that's it.

Dr. Catharine Whiteside: The distribution of awards is based strictly on the applicants we receive. One of our issues is that for many years, until just recently, we were only accepting applications in English, so that could have been a detriment to early-career investigators.

We have supported investigators from over 30 different institutions across Canada. On a per cent basis in terms of population, I would say we're doing reasonably well in terms of distribution.

There was the language issue, which we have now fixed, and we can accept applications and review in both languages. Also, I would say that Quebec is much better at supporting their early-career investigators than the other provinces. You have a long-standing granting agency that has been quite supportive, and that may also be part of the equation here. I don't think I can be more specific, but we certainly welcome applications from Quebec.

Mr. Stéphane Lauzon: Thanks for the answer.

[Translation]

I'm returning to Mr. McCauley.

Mr. McCauley, on May 5, we heard from a witness whose company really made me think of your organization. This was Mr. Martin Basiri, of ApplyBoard, one of Canada's fastest-growing companies.

[English]

The Chair: Monsieur Lauzon, I regret doing this to you, but perhaps you might ask the witnesses if they'd like to table a written response. I'm sorry.

Mr. Stéphane Lauzon: Yes, okay. I finished my time. I thought I had 15 minutes today.

The Chair: Would you like to ask them if they would like to table a written response?

Mr. Stéphane Lauzon: That's okay. I don't have time to ask my question, but I think I will send in my question.

The Chair: Thank you, Monsieur Lauzon.

To all of you, thank you for being so gracious. Thank you for having a conversation. We're really starting a conversation in this country between parliamentarians and researchers. We're so grateful for your expertise. You can see you have a really interested committee. We thank you for tonight and hope you'll want to come back.

We are suspended.

• (2030)

(Pause)

• (2035)

The Chair: Dear colleagues, I welcome you all back for the third panel of this evening.

To our witnesses, we welcome you. We're delighted you can join us.

We have returning, from Colleges and Institutes Canada, president and chief executive officer Denise Amyot. Welcome.

Returning from Genome Canada—and we're delighted to have you coming back—is Dr. Robert Annan, who's the president and chief executive officer, and Pari Johnston, vice-president of policy and public affairs. Welcome. It's nice to have you.

From the University of Calgary, we welcome president and vice-chancellor Edward McCauley. Welcome. We're grateful for your expertise tonight.

Each group will be given five minutes. At the four-and-a-half minute mark I will hold up a card, so you know there are 30 seconds left. We aim to be fair and we can't wait to hear from you.

We will begin with Colleges and Institutes Canada.

Ms. Amyot, the floor is yours.

Ms. Denise Amyot (President and Chief Executive Officer, Colleges and Institutes Canada): Good evening. I'm speaking from the traditional and unceded territory of the Algonquin Anishinabe nation. I am pleased to be here again on behalf of our 142 publicly supported colleges, CEGEPs, institutes and polytechnics.

Colleges and institutes are driven by demand. They anticipate the needs of our economy, and then train, upskill or re-skill thinkers and doers. They are vital to making Canada future-proof.

Colleges and institutes ensure that Canadians are ready for any and all challenges that could arise in six months, a year, two weeks, 10 years or 20 years. Right now, that includes programs in, for example, biotechnology, cybersecurity and artificial intelligence, to name a few. We offer them in nearly 700 locations across the country.

[Translation]

Our members are agile and can adapt to fill gaps, meet changing labour market needs such as the worker shortage in the health care sector, and provide training for sustainable jobs in a carbon-neutral economy. This unique approach by the colleges in terms of applied research enables employers, particularly small- and medium-sized enterprises, SMEs, to get in touch with researchers and students to improve or develop new products, processes and services. This provides a source of highly skilled workers and helps to keep talent in the communities.

• (2040)

[English]

Guess what. College-based, business-led applied research and the talent pipeline it provides is growing. In two years, we saw a 42% increase from private sector investment in applied research, and now, for each federal dollar, there is a dollar from the private sector and a 45% increase in students participating in applied research.

This is some of the latest data from our applied research survey that we will be submitting to the committee, and it points to growth in all directions: more projects, more partnerships, more solutions, more students and more dollars.

The success paints a picture of what applied research already offers Canada's innovation ecosystem and what we can still achieve if we think more strategically about investment. This is why we are making the following recommendations.

One is to make permanent the temporary funding the college sector received for two years to support applied research.

Two is to expand SME participation in the R and D ecosystem by investing \$40 million per year in business innovation engagement services located in colleges, institutes and polytechnics.

Three is to boost Canada's talent pool through the development and implementation of permanent residency streams for international students graduating from colleges and develop a national employment pipeline for skilled newcomers.

Four is that this committee dedicate a study specifically to applied research and how we can scale this approach to maximize its potential for our economy. Why? Because of the immense potential

that applied research presents for talent development and innovation in Canada.

[Translation]

Through applied research, our system provides a pipeline of talent to local communities across the country. It's a tried and true Canadian solution for untapped potential.

Our sector is ready to build on this success. We want to do more, but we need more support to do so.

Thank you.

[English]

Meegwetch.

The Chair: Thank you so much, Ms. Amyot. We're delighted to see you tonight.

We will now go to Genome Canada. I think Dr. Annan is speaking or sharing time.

The floor is yours for five minutes. Welcome.

Dr. Robert Annan (President and Chief Executive Officer, Genome Canada): Thank you, Madam Chair.

Good evening, everyone. I'm joining you today from Ottawa on the unceded traditional land of the Algonquin Anishinabe people.

It's a real pleasure to be back again at committee, along with my colleague Pari Johnston, to discuss this important topic. It's one that we think about all the time at Genome Canada.

We're a national not-for-profit organization that invests in genomics talent, research and innovation to develop and deploy solutions to Canada's major challenges in health, climate action and food security. We work with a pan-Canadian network of six regional Genome centres to align academic institutions, hospitals, government and industry in shared large-scale research projects that are the foundation of life science innovation. Genome Canada has a 20-year track record of investing in Canada's researchers and trainees in genomics and related biosciences.

As a brief reminder, genomics describes the science of genetic information, the digital code at the foundation of all life sciences. It is the language of living systems and underscores everything from vaccine development to cancer treatments and from agriculture to environmental monitoring.

We're very proud of the role we've played in laying the foundation for amazing Canadian research, treatments and technologies in life sciences that have been deployed both before and during COVID and that will continue to support important work in future health innovation, food security and climate action.

Indeed, the tools and technologies being developed today will change our world during the next 20 years in the same way the digital revolution changed our world during the last 20. At the same time, we also need to ensure we're training the future innovators, researchers and workers. We need to ensure that we have just as many young people being trained in the biological code as we have in the digital code. It is they who will drive innovation in health care, agriculture and agri-food and sustainable biomanufacturing.

At Genome Canada, we take training seriously. Since 2000, we have supported almost 6,000 trainees through our research programs. Those early trainees have become the backbone of Canada's genomics ecosystem: our researchers, our technicians and our entrepreneurs.

Our research projects are not confined to university labs. We support applied research involving an end-user, industry or otherwise, so that students learn how to translate ideas into impact. We're proud that our projects have spun out more than 100 start-up companies, many of which were started by or with the trainees working on them, but we need more people trained—or retrained—in this area in order to meet tomorrow's demand, and that's what we are working on.

As I said, we take talent seriously at Genome Canada. We refer to our strategy around talent as the three I's.

First, we are increasingly intentional. We have a proud history of supporting students. Traditionally, we let this flow organically from our research strategy, but today we are intentional in developing a talent strategy linked to deriving specific outcomes. We're talking directly with industry and other end-users to understand their needs and opportunities, and we're including specific initiatives for capacity building and training into our research opportunities with ecosystem partners such as adMare.

Second, we believe talent must be interdisciplinary. At Genome Canada, we employ a challenge-driven approach to address big issues. All of our projects involve interdisciplinary teams of researchers, including social scientists. Genomics involves cutting-edge technology, but effective implementation requires understanding its economic, environmental, ethical, legal and social implications—how genomics works in society. We fund research and trainees in all of these areas and work with ecosystem partners like Mitacs to support opportunities to match research skills with work-integrated learning.

Third, we believe talent must be inclusive. Historically, the research community has not supported a diverse and representative population of trainees. This limits our pool of ideas and narrows the scope of potential innovation. We must diversify the pipeline of talent in Canada and ensure that students from a diverse set of backgrounds are able to contribute to advancing this work. This includes developing new models for engaging with trainees from indigenous backgrounds. Supporting their leadership will be essential for us to redress the inequities and injustices that have been done to first nations, Inuit and Métis people in Canada, particularly in medicine and genetic research.

We're proud to support the summer internship program for indigenous peoples in genomics, SING Canada. Led out of the Uni-

versity of Alberta, it is designed to build indigenous capacity and genomics literacy among undergraduate and graduate students and post-doctoral and community fellows from first nations, Inuit and Métis communities across Canada.

In conclusion, it is clear that Canada needs a life sciences skills strategy as part of its research and innovation imperative. We have enormous needs and opportunities as the life science revolution proceeds.

• (2045)

We are proud to support foundational training in genomics, the digital code of biology, and are keen to work with this committee and other across Canada to ensure that we're equipped for today's challenges and tomorrow's opportunities. There remains so much to do.

Thank you.

The Chair: Thank you so very much, Dr. Annan.

We will now go to Dr. McCauley, president of the University of Calgary.

We welcome you tonight. The floor is yours.

[*Translation*]

Dr. Edward McCauley (President and Vice-Chancellor, University of Calgary): Thank you.

I'm pleased to have this opportunity to speak to this House of Commons committee this evening.

[*English*]

Ms. Duncan, it's great to see you again.

The University of Calgary is a place to start something—a new research project, a new business, a new movement to improve the world—but at the heart of anything new are the people who start it, our talent. That is why I'm so pleased to be with you today to talk about the role our federal government can play in fostering talent retention, research and innovation.

I believe there are three things our federal government could do to really make a difference. First, increase support to top students. Second, invest more in the federal research chairs program. Third, expand targeted federal investments for innovation supports for universities to catalyze private sector collaboration.

I want to explain why these investments are so important through an example. For many years, the University of Calgary has been growing its expertise in quantum science. Quantum science isn't just fascinating research; it has real-life application for Canadians and is expected to contribute \$142 billion in revenues and 229,000 jobs by 2040. The jobs are across all sectors—health, finance, agriculture, energy, transportation and logistics.

In 2021 the University of Calgary successfully attracted a global computer giant, Mphasis, to establish its Canadian headquarters in Calgary. Mphasis decided to partner with the University of Calgary for three reasons—first, our excellence in quantum research; second, our ability to generate job-ready talent; and third, the potential to be part of a quantum ecosystem with post-secondaries and quantum company start-ups. As part of the deal, Mphasis will immediately create 1,000 jobs in Calgary and invest in 1,000 work-integrated learning opportunities for students.

In short, this is exactly what universities across Canada can and should be doing to attract and retain talent, both researchers and students. The challenge is that for every one Mphasis, there are many more that could happen if we made bigger and better investments in retaining research and student talent and if universities had the resources to create and pursue these kinds of partnerships in a systematic way.

How, then, do we make more success stories like Mphasis happen with universities across the country? First, the federal government can invest to improve the recruitment and retention of top graduate students and trainees. Companies like Mphasis are looking for access to top talent. They're looking for universities and colleges to provide it. Research universities create a great student experience, and 94% of University of Calgary undergraduate students get jobs within six months of graduation. We're great at creating talent, but as a country we need more of it. To do that, we need to expand the number of tri-agency training awards to ensure that top talent doesn't leave Canada and we need to increase the value of these awards to make them competitive.

We can also do better at attracting top international students and post-docs to come to Canada. Investments to increase the number and value of awards such as the Vanier graduate scholarships and the Banting post-doctoral fellowships would support both domestic talent retention and international talent recruitment, with significant long-term benefits for Canada's innovation and productivity.

Second, Canada needs to improve federal funding programs to attract research talent. Mphasis partnered with the University of Calgary because we had some of the world's top researchers, but we need to be able to keep developing and retaining those researchers. The Canada research chairs program is a key program for post-secondary institutions in attracting and retaining top talent. The prestige of a CRC is attractive, but the funding levels have not changed in many years, making them less effective as a talent attraction tool.

The Canada excellence research chairs also attract top talent. CRCs and CERCs have far-reaching impacts. They attract high-quality trainees, undergraduate and graduate students and post-docs to contribute to Canada's talent pool. Additional investments to grow the number of CRCs and CERCs and increase the value of

CRCs would support talent attraction and retention. Imagine if we created new funding streams for early career researchers that would renew and refresh university faculty with world-leading researchers.

Finally, Canada needs a coordinated strategic approach to driving partnerships, innovation and commercialization between Canada's universities and the private sector to attract top talent involvement. Canada was able to build a great partnership with Mphasis. The University of Calgary is number one in Canada for start-up creation, and has created a rich innovation ecosystem that supports industry collaboration, new entrepreneurial ventures and bringing research to market, but we can't scale this kind of potential without support, and neither can other universities across the country. Unlike other jurisdictions around the world, Canada does not have a coordinated national approach to stimulating and supporting university partnerships with industry.

Additional targeted funding in federal investments for proven innovation supports for universities would help to expand the breadth and depth of partnership, thereby engaging more researchers, students and industries. In short, these investments would make success stories like Mphasis the norm.

• (2050)

The competitiveness of Canada's economy and our future prosperity depend on retaining top talent and translating research into commercial opportunities. Strategic investments in Canada's universities will attract and retain world-class researchers with wide-scale benefits for Canadian businesses and society. Talent is the magnet that Canada can use to attract global investment and companies. I think that's what we all want.

Thank you for your attention.

[*Translation*]

Thank you for the opportunity to present my ideas today.

[*English*]

The Chair: Thank you so much, President McCauley.

Again, I want to thank all of you. We're really starting a conversation in Canada between the research community and parliamentarians, so we thank you for your expertise, your experience and your knowledge.

Now our committee, a very committed and dedicated committee, wants to ask you questions. Tonight we begin with six-minute rounds, and we begin with Ms. Gladu.

The floor is yours.

• (2055)

Ms. Marilyn Gladu (Sarnia—Lambton, CPC): Thank you, Chair.

Thank you to all the witnesses for being here tonight. We definitely value your work and your input into our study.

I'm going to start with Genome Canada.

There's a very specific talent you're looking for. How do we develop a genomics talent strategy for Canada?

Dr. Robert Annan: Thank you for the question, Ms. Gladu.

I think it starts really with a foundation and having a strong foundational ecosystem. That includes, certainly, strong support for education in the K-12 system, which I know is not the purview of this committee, including opportunities through things like Let's Talk Science to engage young people from a diverse set of backgrounds in science and research. Then, of course, we have undergraduate education. We have college education. Then we really do need to see support in labs through fundamental kinds of research support more broadly.

From there, students get the opportunities to build more specific skill sets. That's really where we come in. We work with students, as I said, from a variety of backgrounds. Genomics involves a range of skills, backgrounds and technologies, everything from computer science to engineering to all the social sciences I talked about. Really, a lot of people come in from different places, but you also have a lot of needs. We certainly found during the COVID pandemic that a lot of our shortages were in areas involving medical technicians, for instance. Therefore, we do need a broad cross-sectoral focus that includes higher education in the colleges, universities and advanced research labs right across the country. Then we need to target initiatives such as those we do, for instance, at Genome Canada.

Ms. Marilyn Gladu: Could you talk a little bit about some of the best practices you have to attract and retain the talent you have?

Dr. Robert Annan: Sure. I might actually ask my colleague, Pari Johnston, to step in here. Pari is our vice-president of policy and public affairs, and she's really been doing a lot of great work on talent and skills for us.

Pari, maybe I'll ask you to take the floor.

Ms. Pari Johnston (Vice-President, Policy and Public Affairs, Genome Canada): Sure. Thank you, Rob.

Thank you, Ms. Gladu, for the question. It's really a pleasure to be here at the committee tonight to talk about such a mission-critical initiative for Canada.

With respect to, in our space, strategies for attracting and retaining talent and what some of the best practices are, as Rob mentioned in his remarks, we have a track record of supporting over 6,000 trainees since Genome Canada's founding. One of the critical

pieces of success that's really worked in our space is that we engage in partnered research. This means that we're very focused on working with end-users, including industry and other partners, to define their needs right at the outset of the initiatives. That leads then to building up receptor capacity for those students to then go on to be hired.

In fact, in our initiatives we have seen two-thirds of the students who have been out working on our genomics application partnership programs go on to be hired by the very projects on which they worked, so we're building receptor capacity, thanks to the partnered approach we take.

We also are very supportive, through our research programs, in our salaries and stipends for trainees, with 70% of our research programs going to supporting research trainees and researchers. Like the granting councils, we base our investments on important benefits for those students. Our salaries for trainees are indexed to inflation, so they grow with inflationary increases. We also provide parental or maternal benefits as well for those students, similar to those provided by the granting councils.

The final thing I'll say with respect to good practice is what Rob alluded to with respect to inclusive genomics. We're very conscious of the fact that we need to do more to ensure a diverse pipeline into our research programs. We recently implemented a strategy for inclusion, accessibility, diversity and equity to ensure that we're building, through intentional program design, a more systemic change to our policies and programs to promote fairer access and also to ensure that we're fully supporting the range of talent in genomics.

Those are some of the best practices that we are trying to ensure that we build and maintain in order to build the genomics pipeline in Canada.

• (2100)

Ms. Marilyn Gladu: Excellent. Thank you.

I have a question for Dr. McCauley. You talked about the tri-agency research training award. What value would be a competitive value for that?

Dr. Edward McCauley: The great thing about these training awards through the tri-council is that those are opportunities available to students from all across the country, so it really is providing stimulus to enable students to train throughout the regions. I would hate to put a dollar value on it, but what would be good is to look at living wages and how they compare across the country, and then adjust the level of the associated scholarships.

Ms. Marilyn Gladu: Very good.

Ms. Amyot, colleges are fundamental to creating the talent that we are going to need. There was a comment earlier about medical technologists, and I know we are facing a crisis in this area. I wonder if you could talk about that resource, and maybe some of the others that are getting scarce. How can colleges best play a part to help, and what can we do as a federal government to help you do that?

Ms. Denise Amyot: You are perfectly right that it is a big issue. All the health sectors, including technicians and technologists, are in need right now. Whether it is radiotherapists or radiologists, it is an issue. What we do, of course, is we train—

The Chair: Ms. Amyot, I am so sorry to interrupt. It is the worst part of this. We have these wonderful people.

Ms. Denise Amyot: I'll send you the answer.

The Chair: Ms. Gladu would like that, yes. Thank you so much.

With that, we will go to Mr. Chahal for six minutes, please.

Mr. George Chahal (Calgary Skyview, Lib.): Thank you to all the presenters for your testimony this evening.

It's probably no surprise that I'm going to start with Dr. McCauley from the University of Calgary. I'm from the city of Calgary and an alumnus of the university.

We heard Dr. Mosca talk earlier about the need for collaboration. Dr. McCauley, you actually answered a number of my questions in your opening remarks, but I do want to dive a little deeper.

How does the University of Calgary land with such a great opportunity to collaborate with an international company to bring 1,000 jobs and a centre of excellence to your university? How do you do that, and what's the opportunity for future innovation in that space.

Dr. Edward McCauley: The first prerequisite for attracting investment from around the world is talent. We've been very fortunate, as I mentioned, and the federal government has provided incredible supports for helping the University of Calgary to create that talent. Companies have choices in where to go all over the world. They want to go where the talent exists. In that, we're really fortunate.

The second thing is that we have very clear rules of engagement with industries. Our faculty and students want to engage. We have a very clear and simple IP policy that is inventor-owned. We try to reduce all those barriers that might come up in terms of thinking about a partnership.

It really is talent and clear rules of engagement. What we're missing perhaps from the federal government, as I alluded to, is an incentive structure to directly support universities in order to engage in those partnerships, but also clear incentive structures for industries to actually locate in Canada.

Mr. George Chahal: That's exactly where I wanted to go. What can government do to help support? You talked about a coordinated strategic approach and specific scaling support. What does that look like? Could you please provide us with some more information on that?

Dr. Edward McCauley: At the University of Calgary, we've created a quite remarkable entrepreneurial structure. Ideas come up

and are picked up by different organizations, and in large part our community, through CDL-Rockies and other supports, actually helps to drive company creation. As I mentioned, we're number one in the country right now in terms of company creation, with community support.

If we wanted to scale that to a much larger scale, we might want to look to other jurisdictions, such as the U.K. and Germany, where the governments actually provide support. With a critical set of feedback and constraints, governments directly support the universities in order to build out those partnerships, because that's the important funding that universities need to actually do that. As well, there are incentives for those industries in terms of taxation incentives or in terms of employment credits to actually locate in the country.

• (2105)

Mr. George Chahal: Congratulations to you, the university and Mphasis for bringing 1,000 jobs to our local economy—they were much needed—and for developing the talent and attracting great opportunities from abroad.

How does diversity and multiculturalism impact your ability to attract companies from India and globally to Calgary, and other international students and researchers?

Dr. Edward McCauley: Thank you.

Calgary is, fortunately, one of Canada's most diverse cities. We have a variety of communities that willingly open their arms to welcome students, scholars and faculty members from across the world. We're really fortunate in that.

The Canada research chair program that I mentioned earlier is one of those avenues that give universities the ability to recruit from around the world. CRCs and the expansion of the CRC program, which the government has discussed, really help universities to meet their equity, diversity and inclusion targets.

I've worked with MP Duncan on a variety of these in the past, including piloting the dimensions program here at the University of Calgary. We have actually met our requirements for the equity and diversity targets set by the CRC program in 2019 and we will meet them for 2022. This is a program the federal government supports, and we can use it to enhance EDI in attracting diverse scholars.

Mr. George Chahal: Thank you.

I will move over to Genome Canada.

You mentioned the need for a life sciences skills strategy. Could you talk further about what a national strategy would look like?

Dr. Robert Annan: Thanks.

I think the life sciences strategy is crucial right now, just because of global competitiveness when it comes to attracting talent. It's no secret that COVID caught everybody a little flat-footed, and suddenly everybody was trying to ramp up everything from testing to therapeutic development to vaccine production and so on. That led to the massive shortages that both Ms. Gladu and Ms. Amyot mentioned in their remarks.

I think step one is recognizing that this is urgent. Step two is taking stock across the country and talking to our companies, public health agencies, hospitals and others to get a sense of where the pressure points and bottlenecks are, not just today but looking down the road five or 10 years. Use that as a basis to work with the ecosystem of institutions as well as funders to help to make sure we're building a pipeline to satisfy those needs.

Mr. George Chahal: Thank you.

The Chair: Thank you, Mr. Chahal. We're glad that you could join us tonight.

[*Translation*]

Mr. Blanchette-Joncas, you now have the floor for six minutes.

Mr. Maxime Blanchette-Joncas: Thank you very much, Madam Chair.

I'd like to thank the witnesses who are joining us during the third hour of this meeting.

My first questions are for Ms. Amyot, of Colleges and Institutes Canada.

Ms. Amyot, what role do you believe CEGEPs and colleges are playing to attract and retain talent locally, particularly in rural communities?

Ms. Denise Amyot: That's a very good question.

Not long ago, Statistics Canada published data on women in rural communities. I'd be glad to send this information to you.

The data showed that women in rural communities are less likely to enter postsecondary education, and that when they do, it's mainly at the college level. That's important to us, because we are accessible; we are everywhere. As I mentioned, we have 700 campuses across Canada, with 95% of Canadians living less than 50 km away from one of our campuses, and 86% of indigenous people also within 50 km from one of our campuses.

When people study in their home region, they generally remain there to work afterwards. We train students in accordance with workforce requirements. That means that people will be able to work in their own community.

• (2110)

Mr. Maxime Blanchette-Joncas: Thank you very much, Ms. Amyot.

How would you describe the difference between talent developed at CEGEPs and talent developed at universities?

Ms. Denise Amyot: Our organization was established 52 years ago to serve communities across Canada, in accordance with labour market needs. Our organization is therefore very young.

When our organization was created, it was taken for granted that students placement would be within a six month period. It was also important to make sure that employers were involved in developing the program of studies and that students would be able to have internships.

For our organization, internships are definitely a requirement. In fact, the vast majority—98%—of our 10,000 programs make an internship mandatory for graduation.

Those are the major features of colleges.

Also, when we conduct research, we do so with due regard to the problems being faced by industry or non-government organizations. We help them find solutions to their problems. Moreover, the industries we collaborate with retain intellectual property on their work. That's what makes us so different from other institutions.

I'll stop there, given the short time remaining to me, but I could provide you with other examples.

Mr. Maxime Blanchette-Joncas: Thank you, Ms. Amyot.

What specific measures could be introduced to attract and retain more students to CEGEPs and colleges?

Ms. Denise Amyot: First of all, it would be important for things like international student study permits to be approved more quickly.

During the pandemic, less than half the normal number of study permits were approved. And yet, at the time we are talking about, we had 40% more applications than we had been receiving before the pandemic. In addition, the number of applications from students in Thailand, the Philippines and Vietnam, among others, doubled.

Sadly, we learned that there was a major backlog at the time in processing study permit applications. Many students usually arrive in the spring, but that was not the case this year owing to these backlogs. At the moment, 140,000 applications are awaiting processing. We can't have that many applications on hold if we want students to be able to come here and study in September.

It would also be important for students to have access to financial support so that they could continue their education and have paid internships. During the pandemic, there were fewer internships available. It was therefore more difficult for students to find one. However, the government took one positive step. It made postsecondary institutions eligible for the Federal Internship for Newcomers Program. This initiative greatly facilitated the internship process and was very helpful to postsecondary institutions.

Those are just a few examples to give you a better idea of our circumstances.

Mr. Maxime Blanchette-Joncas: Based on your experience, could you explain how CEGEPs, colleges and universities could work together to make the most of their respective expertise?

Ms. Denise Amyot: Do you mean in any field of study?

Mr. Maxime Blanchette-Joncas: Yes, that's right.

Ms. Denise Amyot: It would mean working closely together. When we develop programs, we do so in terms of community needs. We get industry involved in developing study programs and we work with the universities on applied research and other areas. That's interesting, because increasingly, students are coming...

The Chair: Ms. Amyot, I apologize for interrupting.

[English]

It really is an awful part of this.

Thank you to you both.

[Translation]

Ms. Denise Amyot: I'll send Mr. Blanchette-Joncas some additional information about this.

[English]

The Chair: Now we'll go to Mr. Bachrach for six minutes, please.

• (2115)

Mr. Taylor Bachrach: Thank you, Madam Chair.

Ms. Amyot, I will stick with you for my first questions. I'm keen to pick up on a theme that we've heard a bit about this evening, which is the idea of the government focusing its investment in certain areas where there are unique challenges facing society and where it can maximize the value of its investment in innovation and applied research.

I noticed your SDG brooch and thought perhaps I would ask you specifically about the climate solution space and whether the federal government is currently investing in colleges and institutes and applied research in that space. What does that look like and what is the potential? What changes need to be made so that Canada is doing what it needs to do to invest in talent and applied research specifically in the climate solution space?

Ms. Denise Amyot: I will be pleased to share with you a report we have tabled with the government on net-zero climate so that you can see a number of aspects. It could be, for example, in training or applied research or in ensuring that the different entities, the different colleges across the country, can talk to each other, do even better and share best practices.

I have examples of projects that have been done on climate change and climate mitigation. I would be pleased to share those with you, but we could do way more. I gave you statistics with respect to the results we have obtained. Nobody else can say that for each dollar, they get another dollar.

I don't believe we should focus on only some aspects, because this country is big, and we need to ensure that we also look at what the specific needs are. For example, in the Atlantic, there may be needs with respect to the ocean and water management, but in the Prairies it may be something with respect to smart farming and net

zero. We may have a big topic, but we need to take into consideration the different needs of the country to ensure that we serve all Canadians.

Mr. Taylor Bachrach: Thank you, Ms. Amyot.

Picking up on another theme we've talked a bit about, which is barriers to students who are seeking opportunities at institutions like the ones you represent, we talked about barriers faced by graduate and post-graduate researchers as a result of scholarships not keeping up with inflation. A lot of students live in poverty and have to obtain employment outside their field of research.

Speaking specifically about colleges and institutes, what are the barriers you see students facing as they come into your institutions?

Ms. Denise Amyot: Some of the barriers are with respect to mental health, definitely. It is a big issue. Some of the barriers are financial. We are often the first door for students at the college level, because they are the first ones to go to post-secondary education, or we are the last door because they have tried many others, and we need to have access to wraparound services. Our classes have only 30 people in them, but some of the students we have need a lot of support. They had support at the elementary and high school levels, but when they arrive at the post-secondary level, it's harder to get access to all those wraparound services.

One of the things we have observed in the last 15 years—and I have a great slide I will be pleased to share with you—is that at the post-secondary level, we have seen diminishing public funding across the country. This is a big barrier, because it means that we cannot offer all the services we should be able to offer to students. We need to ensure that we have a robust public education system in Canada.

Mr. Taylor Bachrach: Finally, Ms. Amyot, when it comes to diversity and inclusion, are you seeing that the students coming to the institutions you represent reflect the goals of diversity and inclusion? Do diverse populations have the supports they need? Is there something specific there around offering supports?

• (2120)

Ms. Denise Amyot: Yes, absolutely. Students who are diverse also need support from a mental health perspective. They have financial barriers also, so they are not different.

We have signed the 50-30 challenge that the Government of Canada has put forward. In fact, we were one of the first signatories. Now we have been given the task of sharing with the business sector the guide that will be produced by KPMG for the Government of Canada on EDI.

I'll just give you a statistic that is very interesting from a gender perspective. At the president level—and this gives you a very good indication—38% of the presidents in our system are women, so we're very pleased about that.

The Chair: Ms. Amyot—

Ms. Denise Amyot: Of course, we would prefer it to be 50%, but we're making progress.

The Chair: Ms. Amyot, would you like to table those statistics with the committee?

Ms. Denise Amyot: Yes, absolutely.

The Chair: Thank you so very much. I know people are tired. I hope these wonderful witnesses are bearing with us.

We're going to now go to a second round. It's a five-minute round, and we're going to go to Mr. Williams, please.

Mr. Ryan Williams: Thank you very much, Madam Chair, and through you, I'll continue with Ms. Amyot.

To continue on the conversation, with only 2% of tri-agency funding, colleges have produced significant and rapid results to benefit communities and businesses across the country.

Can you specify how much more funding colleges need to build on this, and how these funds should be allocated between project support, operational support, etc.?

Ms. Denise Amyot: That is a fabulous question. Thank you very much, Mr. Williams.

In fact what we need, as I said in my recommendation, is to ensure that the \$40 million we got be given on a permanent basis. It was given as additional money, but just for two years. We need to ensure that it is every year. We also need to add \$40 million to ensure that we can engage even more.

We do a project—and all of the funding we have is project-based—and what happens sometimes is that the company would like a bit more help, but no, you have to move to the next project, because you don't have funding anymore. We could help them more with the marketing. We could help them with looking at what the different uses of the product could be, and partnering maybe with someone else who has something that could be useful to add to this product.

There's a lot of support that could be offered, but we don't have access to this operational funding. When we were created, we, the faculty, were there to teach. It was not to do research. We have incredible faculty who can do the research, but we don't have that support to be able to provide even better services.

Because we are across the country, imagine the powerhouse of what it could offer to this country, from a productivity point of view, an innovations point of view and a commercialization point of view. I really think—

Mr. Ryan Williams: Madam Amyot, I'm so sorry to interrupt you. We only have so many minutes.

I think I heard that you have 8,000 research partnerships producing over 5,500 products at our colleges. Do you know the economic value of that per year?

Ms. Denise Amyot: I wish I could have the money to do such a study. Unfortunately, I don't. I know that one of my colleagues has done it, and it's just amazing.

I'll give you one example. Earlier, we were talking about jobs created in Calgary. There's a college in Shawinigan, Cégep de Shawinigan. It's very tiny. There are 1,100 students there. They have amazing research capacity. They have 45 full-time researchers there, and they were able to attract a company that has created 300 jobs because of the type of applied research they were doing. This gives you an idea of the economic impact that those can have.

I have other stories of companies that were going to close because their product was not in demand anymore or it was not popular. They approached the college. Guess what? Now they are producing a lot of products that are on the market, and not only in Canada but around the world.

● (2125)

Mr. Ryan Williams: Ms. Amyot, who owns the IP that you develop through your systems?

Ms. Denise Amyot: The company owns the IP. That's what is so special about colleges in Canada.

Mr. Ryan Williams: Thank you so much.

Mr. McCauley, I think what you're doing in Calgary is also incredible. Can you explain a little bit more about inventor-owned IP policy? What does that entail?

Dr. Edward McCauley: Our IP policy is very similar to that of many other universities across the country, where it's the creator who owns the IP.

As the IP is being commercialized, there's a negotiation that takes place, in some cases between the university and the inventor, for a share of that IP. We have very, very simple procedures at the University of Calgary for how that is done, and that creates very clear procedures. Companies, for example, in CDL-Rockies, which are part of that, have put up their hands and said that the University of Calgary is investable because of clear IP and clear procedures around the IP commercialization.

Mr. Ryan Williams: I wish I had two more hours, but thank you.

Madam Chair, it's off to you.

The Chair: Thank you, Mr. Williams. You are always on the mark. We're so grateful to everyone.

We'll go for the last five minutes to Ms. Diab, please.

Ms. Lena Metlege Diab (Halifax West, Lib.): Thank you very much, Madam Chair, and thank you very much to all our presenters this evening.

I have a question for Genome Canada, and whichever one of you would like to answer it can feel free.

I was quite intrigued, actually, by your opening remarks. You talked about shared research projects, health, climate action, food insecurity and the fact that you've supported 6,000 trainees. I think I wrote that down here.

Can you speak to me a bit more about that and the biological code, as you called it? I found that very interesting, rather than the digital code. I'd be very interested, as I'm sure the committee would be, to hear a bit more on that perspective.

Dr. Robert Annan: Sure. Thank you, Ms. Diab. I'll say a few words about that.

We work very closely with research institutions such as, for instance, Dalhousie University in Halifax and our partners at Genome Atlantic, which are funded by the provincial government in Nova Scotia, to build projects that are going to involve the university, hospitals and often companies.

For instance, we have a phenomenal project out of the pediatric hospital affiliated with Dalhousie, the IWK, that's looking at rare genetic diseases. It's part of a network we call the "all for one" network, which is linked to pediatric hospitals across the country. It has phenomenal researchers and includes a wonderful node at the University of Calgary that President McCauley knows about. They're working very closely together, and they train students who are doing genetic analysis and bioinformatics and are working in the clinic to help families with kids who have rare diseases get faster diagnostics and better care. That's a really close partnership that involves the Government of Nova Scotia as the health care system, the university, the hospital and trainees.

At the same time, with our partners at Genome Atlantic, we work with a number of small companies in Nova Scotia on helping build out new industrial products. For instance, in aquaculture, when it comes to mussels, oysters and the changing climate, we have work that goes on to help breeding systems so that breeding stocks will be adaptable to the changing temperature of our oceans. That's with the small local businesses based out of Nova Scotia. In those cases, the students are the ones actually doing that work, working between the companies and the university.

It's really about these big partnership models. Whether it's in agriculture, aquaculture or health, we are always driving towards a real impact like that.

• (2130)

Ms. Lena Metlege Diab: That's really fantastic.

We've talked a lot in these studies about the different partnerships, and tonight I think we even talked about those between universities and colleges. Again, here, it's about governments and different levels of government, but also hospitals and the private sector. I guess I picked a good question, because I am a Nova Scotian and I'm familiar with some of this.

I'd like to turn to the University of Calgary, followed by Madame Amyot.

Can you talk to us a bit about the partnerships that you've established between colleges and universities? How can we strengthen those partnerships? What can we as a federal government do to help you strengthen partnerships between the different educational

sectors, but also with the private sector and other players in the economy?

Dr. Edward McCauley: Thanks. I can give you two examples.

One example is work-integrated learning. Instead of each institution in the city of Calgary doing its own thing, we created what we call the Calgary consortium, which includes SAIT polytechnic, Mount Royal University, St. Mary's and Alberta University of the Arts, as a collective to work with industry in the city to provide work-integrated learning opportunities for our students.

Rather than going in as one, we went in as a whole to attract federal dollars. In fact, federal dollars helped to support that consortium, so thank you. I think it's a really good opportunity.

The second example is that we were awarded a Canada first research excellence fund grant, as Madam Chair is well aware, in energy transition. The University of Calgary partnered with SAIT. I think it was the only university in the country to partner with a polytechnic on the Canada first research excellence fund. We established SAIT labs at the University of Calgary and labs at SAIT for ideas coming out of the University of Calgary to scale and prototype in the applied area.

The Chair: Thank you very much, Ms. Diab, and thank you, Dr. McCauley.

It's my turn to say thank you. Thank you for being part of this initial conversation between the research community and parliamentarians. Thank you for your expertise. Thank you for being champions in your institutions and organizations. We look forward to learning more from you. Thank you for your time. We will say goodnight to you.

To this committee, who worked so hard, we have five minutes of business.

First of all, thank you all. You are just a tremendous group of people.

We have now finished the four meetings we agreed to have on top talent. Our analysts are hoping we could give them drafting instructions. Would the committee agree to issue the analysts the same drafting instructions, in a different motion, as the previous study? They would then draft a report including recommendations drawn from testimony.

Go ahead, Mr. McKinnon.

Mr. Ron McKinnon: That's a great idea.

The Chair: Thank you, Mr. McKinnon.

Go ahead, Ms. Gladu.

Ms. Marilyn Gladu: Yes, absolutely. The analysts did such an amazing job on the last report that I would be happy to have them take a crack at it, and then we can certainly give some consideration to any additions that we would want to make after the fact.

The other thing I would recommend is that if we're going to add committee business at the last minute—it seems like the committee is always going overtime—it might be prudent to plan 45 minutes for each panel session.

The Chair: That is a very excellent recommendation, Ms. Gladu.

Would everyone be comfortable with that? Hands up if they agree.

Some hon. members: Agreed.

The Chair: It looks like we have a majority.

To our wonderful analysts, we can do that, then, the same as last time.

I have one last piece, dear friends. Ms. Gladu, I take your excellent recommendation to heart. Thank you very much.

We've been given the go-ahead in order to provide a detailed budget for travel. Our excellent clerk has distributed a budget. First of all, is there agreement with the budget?

Yes, it looks like we have agreement. Excellent.

• (2135)

There's one last thing we need to pass, and I think there have been discussions among the parties. We need to have the exact dates to make sure it's a very accurate budget when we go to the Liaison Committee.

Does October 9-15 still work for everybody? Yes, it looks like there's agreement around the table.

With that, dear friends, thank you very much. The meeting is adjourned.

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