NSERC 2020

A STRATEGIC PLAN

NSERC
CRSNG

OUR STORY

OUR ORGANIZATION

OUR PLAN

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WORD FROM THE PRESIDENT

It has been just over a year since I began my tenure as President of the Natural Sciences and Engineering Research Council of Canada (NSERC). I set a number of tasks for myself and for NSERC. Developing and launching NSERC 2020, our strategic plan for the next five years, stood at the top of the list. During a year-long consultation, NSERC benefitted greatly from the input and perspectives of our community through 19 town halls (1,100 participants), an online survey (1,600 responses) and numerous submissions from institutions and associations.

We are at a time where an exciting, dynamic and prosperous future is possible for Canada. Science and technology can be a driving force in this narrative, but only with a clear plan and only if we fully mobilize the discovery and innovation ecosystem that exists in Canada. NSERC 2020 provides this plan. It sets out a vision for the organization: to make Canada a country of discoverers and innovators for the benefit of all Canadians. The plan provides a supporting mission: to be the focal point for discovery and innovation in natural sciences and engineering for Canada. NSERC 2020 is rooted in the rich foundation of discovery research. NSERC provides value by investing in and fuelling a brain trust focused on fundamental research to explore the unexplained and unknown. This focus ensures that Canada is producing major discoveries, world-firsts in cutting-edge, high-impact domains that will shape the world we live in.

"NSERC is rooted in the rich foundation of discovery research. It also plays a critical role in bridging the gap between discovery research and industry."

We also play a critical role in bridging the gap between discovery research and industry. Small and medium-sized enterprises (SMEs) in Canada face enormous challenges making the transition into growth companies. For SMEs, access to intellectual capital to inform and refine R&D can be a significant rate-enhancing factor in their growth. We are focused on building industry-researcher partnerships to help these companies grow. These partnerships validate and de-risk opportunities stemming from discovery research for future investment or further development via business-led R&D.

A unique feature of these partnerships is that that the information flow is bi-directional. Fundamental research informs R&D and industrial research triggers new questions to be addressed by basic research. Overall, NSERC's efforts at partnership building across the discovery and innovation ecosystem have given us the ability and the line-of-sight to build consensus, convene other partners and mobilize resources.

As we move towards 2020, there are many other strengths on which to build. Federal and provincial investments across Canada in knowledge networks, incubator and accelerator spaces, and co-location facilities have provided infrastructure for enabling innovation. Reorganization internally has erased artificial divisions between discovery and innovation programs and has given us the agility to pursue change. However, significant investment is necessary to take full advantage of this new structure. Finally, support and refinement of peer review systems have given us a highly efficient quality assurance system for NSERC investments.

NSERC 2020 outlines five clear goals that NSERC will pursue to position Canada for the future. With these goals, I feel strongly that NSERC will play an important leadership role as it works to fulfill its mandate and its vision for Canada.

B. MARIO PINTO
PRESIDENT | NSERC

OUR STORY
HOW WE CREATE VALUE

Stability
Smart Investments
Community Engagement

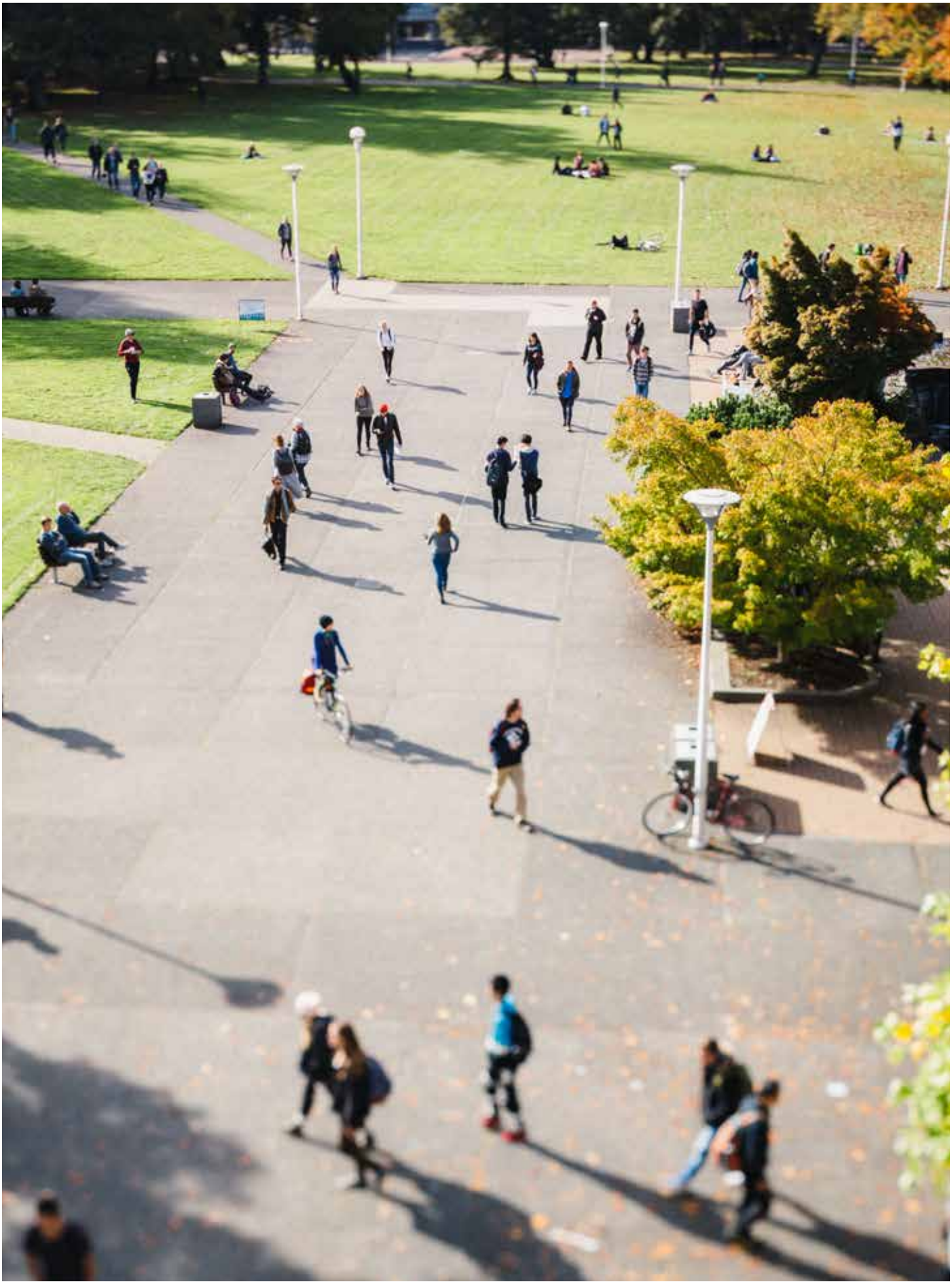
As NSERC moves towards 2020, we can enumerate a number of clear strengths and opportunities to build on.

We have built strong partnerships across the research and innovation ecosystem in Canada embracing and connecting the private sector, universities, colleges and polytechnics, government-led research labs, training partners and other non-governmental players.

The organization has a stable and effective set of investment mechanisms. Our investments are backed by a highly functional quality-control process; panels of researchers review and evaluate research proposals submitted by their peers. Because reviewers volunteer their time, the system is also cost effective.

Previous reforms to the system significantly increased the stringency and rigour of the review process as well as the way investment funds are allocated amongst the natural sciences and engineering research community in Canada. A recent international review of these programs concluded that the reforms have been a clear success.

Throughout this process and in the years since, NSERC has benefited from a profound level of engagement and connection with the research community. We continue to receive strong application pressure for investment funds and, despite a more stringent system, we have a robust pipeline of high-quality research programs being funded. Such a result is perhaps not surprising given the high-quality of research training programs in Canada that have produced a growing number of well-prepared and well-qualified applicants. The growing reality, however, is that the average Discovery grant is insufficient to support the full scale of investigation required by researchers. Scaled investments are necessary to maximize our usage of Canada's natural sciences and engineering research community.



Discovery Innovation Impact

NSERC creates value for Canada by investing in scientific[1] inquiry and discovery research. This is at the core of NSERC's mandate.

In doing so, we have established the powerful brain trust needed to fuel this country's knowledge-based economy. We invest heavily in people to ensure continuous renewal of this brain trust, which will, in turn, claim numerous world-firsts in knowledge on behalf of Canadians.

Discoveries build the foundation for innovation and economic growth and demonstrate research excellence. These discoveries arise because researchers have the freedom to explore the frontiers of knowledge, to probe the unexplained and unexpected. A priority for NSERC is to encourage researchers to fully utilize this freedom to be bold in their investigations and to continue to raise the level of research enabled by our discovery programs. Enhancing discovery research also demands the responsibility to be aware of global challenges and societal needs and the willingness to be influenced by each. For NSERC, we consider that research excellence involves taking an integrated view of knowledge creation and knowledge mobilization. Using this approach, we can be discoverers and innovators. It is not a case of either-or. For Canada to command influence in the global knowledge-based economy we must succeed at both.

Discovery and innovation, in fact, are two beads on the same looped string. Each one informs and propels the other. Being strong at innovation also boosts discovery. Accordingly, NSERC has made significant investments in tools to build two-way connections between this brain trust and industry. We have demonstrated considerable effectiveness in working with the private sector and our partnerships have, in effect, created a second level of quality assurance. The collaboration with knowledge users such as companies has provided the ability to effectively assess, validate and de-risk ideas, concepts and inventions for further investment.

1

This document makes numerous references to "science". As an investment agency focused on discovery and innovation, we will achieve the best outcomes if we are guided by a pluralistic, inclusive perspective of science. Science embraces all of the terms found under the commonly used acronym, STEM – science, technology, engineering and mathematics.

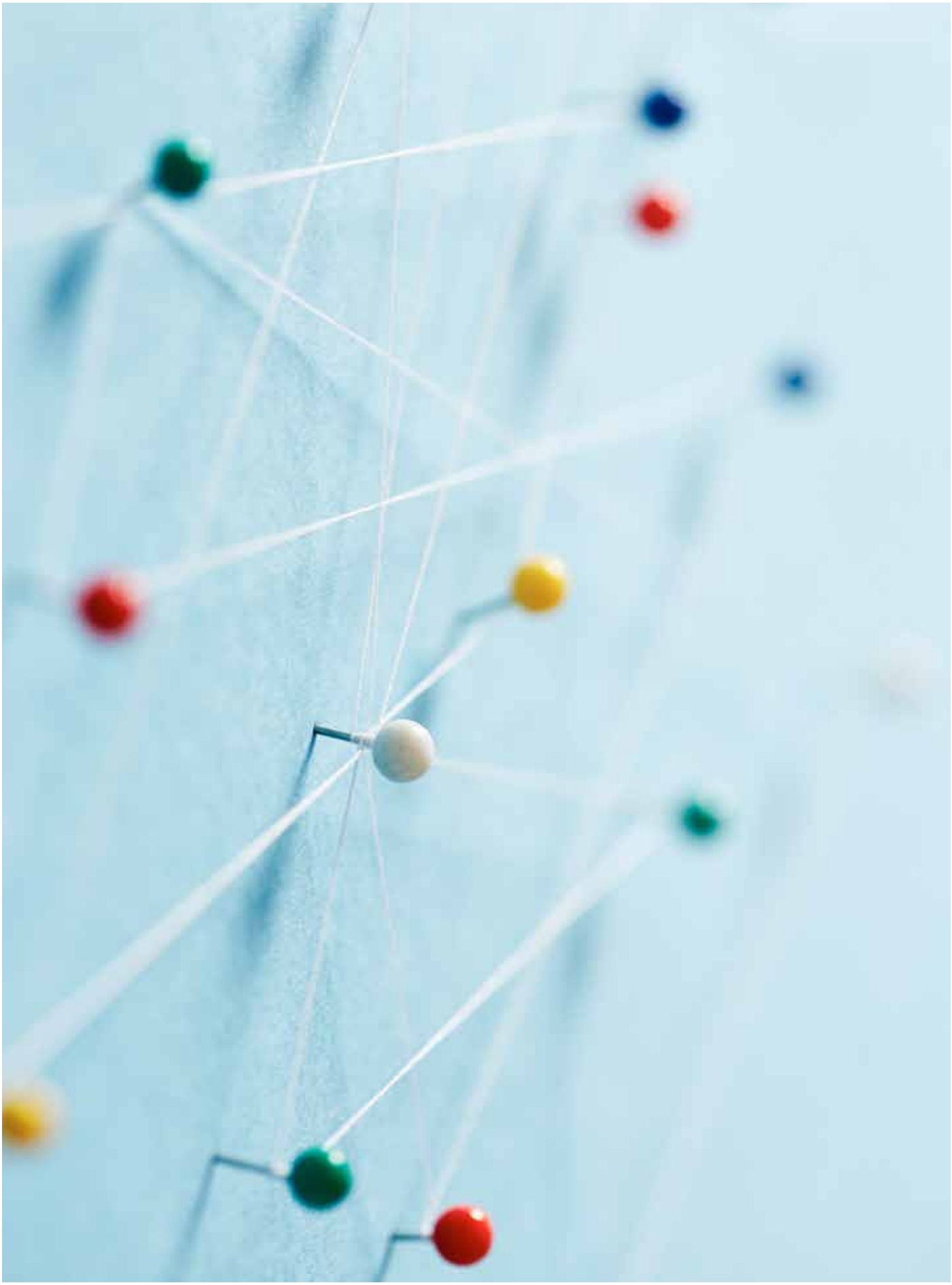

40X/0.65
Ph2 DL
WD 0.65
40X
100X/1
10X/0.2
Ph1 DL

Convener
Mobilizer
Advisor

By investing in discovery research, creating productive partnerships with industry and providing strong support for student training in research at all levels, NSERC has a unique perspective, a line-of-sight into the entire research enterprise.

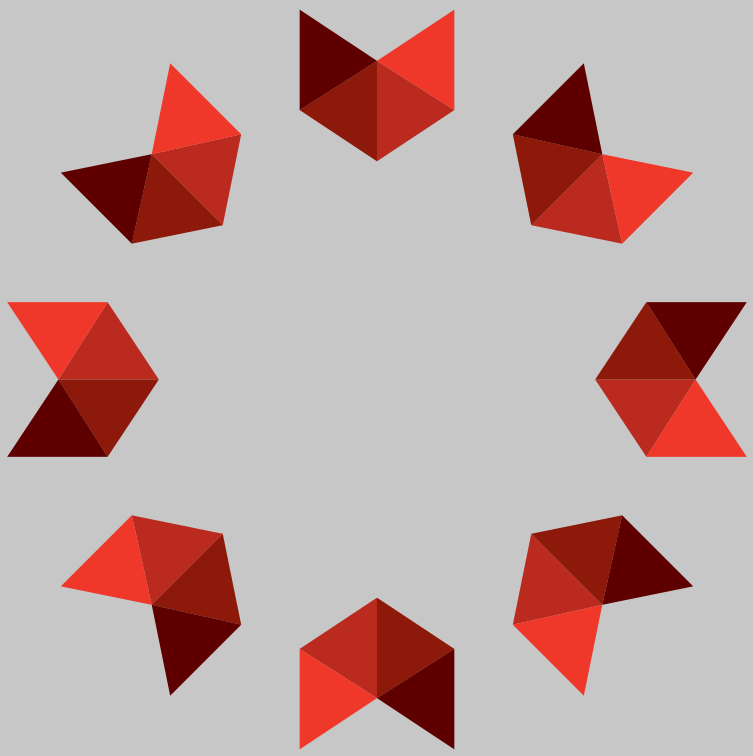
We create value by convening stakeholders, building consensus and mobilizing resources in the natural sciences and engineering in Canada and providing informed opinion to policy and decision makers on science-based issues. Internally, we have worked to make NSERC an agile and responsive organization by dismantling artificial barriers between discovery and innovation targets and streamlining programs.

NSERC 2020 focuses on what we can do to expand on those activities where we create value – creating a foundation of discovery and strategic industrial partnerships. It builds on the assessment of trends, gaps, and opportunities in the research ecosystem. It seeks to maximize the efficacy and extend the reach of existing tools, while also taking advantage of new modalities. With the new strategic plan, NSERC 2020, we can contribute to positive change.



OUR ORGANIZATION

WHAT DRIVES US



VISION

To make Canada a country of discoverers & innovators for the benefit of all Canadians.

MISSION

We are the focal point for discovery and innovation in natural sciences and engineering for Canada.

We back bold, high-impact ideas. Supported by a robust system of quality assurance, we give researchers the freedom to aim high and explore the frontiers of science and engineering to produce world-firsts in knowledge.

We invest in the future. We invest in people. We provide students at all levels the chance to gain valuable hands-on research experience as they build the foundation for science-based careers.

We connect communities. We establish relationships between sectors and across borders, we build consensus, and we deliver informed opinion that responds to economic and societal needs.

VALUES

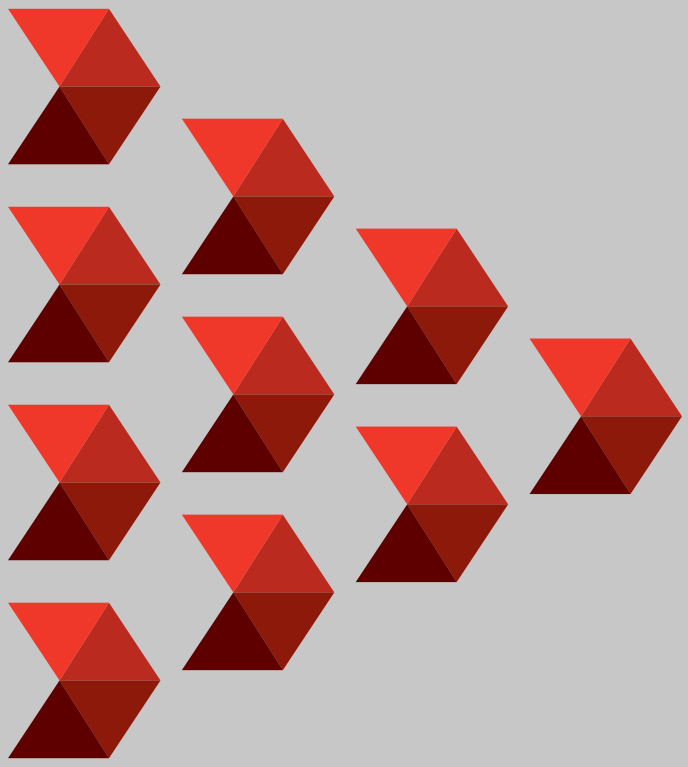
Excellence, leadership, research results.

We are committed to global excellence and leadership in discovery and innovation. Canadian researchers and innovators can be the best in the world. In keeping with that potential, we will ensure that our investments are consistent with the highest standards of excellence, based on rigorous, transparent, and competitive merit review.

We are committed to research results for Canadians. We believe in the critically important role that science, technology, and innovation will play in Canada's future prosperity. We invest in researchers and innovators to generate socio-economic results that will be of benefit to Canadians today and in the future.

We are committed to organizational excellence. We strive to be an agile, adaptive, and service-oriented agency. We are committed to streamlined program delivery through open communications and partnerships with researchers, institutions, and industry. We value and respect diversity and the contributions of others. We conduct our work with transparency.

OUR PLAN
HOW WE WILL GET TO 2020



By

FOSTERING A SCIENCE AND ENGINEERING CULTURE IN CANADA

Popular accounts of scientific breakthroughs are often punctuated by a clear, bright shout: eureka!

Without a doubt, discoveries can sometimes seem like purely spontaneous and serendipitous events. The underlying reality, however, suggests that for every breakthrough there is a highly skilled, analytical, and observant scientist who recognizes when a fluke or random event might just signal something more meaningful.

Promoting science and understanding how scientific inquiry works are critical to the creation of a vibrant science culture in Canada. To ensure that Canadians continue to create a highly skilled workforce, to generate new knowledge globally, and to accelerate the development of knowledge-based industries, we must cultivate a science culture in this country.

Efforts to raise awareness and interest in science and engineering need to focus on young people and give them the foundation for the knowledge-based jobs of the future. Likewise, curious and engaged Canadians, including policy and decision makers, can benefit from greater understanding of the societal and economic role of science and technology in the world.

GOAL

Make science and engineering mainstream. Increase interest, awareness, and appreciation of science as a way of experiencing, understanding, and enriching the world.

STRATEGY

Take a national leadership role and provide a focal point for science promotion efforts in Canada.

OUTCOME

The creation of a robust culture in Canada that values science and engineering.

SUPPORTING ACTIONS

NSERC will explore mechanisms and approaches to:

— Engage a wider range of partners to deliver youth outreach and public engagement activities.

— Mobilize and empower our research community to demonstrate the value and impact of its work to a broad audience.

— Recognize and reward science promotion, outreach and mentoring activities during the assessment of research grant and scholarship/fellowship applications.

— Raise awareness of science and engineering and combat negative stereotypes, particularly among young people and underrepresented groups.

— Undertake communications activities to demystify science and engineering aimed at the general public and decision makers.

By

LAUNCHING THE NEW GENERATION

The past 15 years have seen an explosion of creative new development programs, used to train future researchers.

Often, these approaches stress interdisciplinarity, experiential learning, international experience and exposure to entrepreneurial culture. NSERC has developed high-impact training initiatives such as CREATE, which have complemented programs developed by partners such as Mitacs, and network opportunities through the Strategic Partnership Grants for Networks, Discovery Frontiers Program, and Networks of Centres of Excellence.

We now have a clearly identifiable cohort of early-career scientists with tremendous potential: the leaders of tomorrow. They represent a new generation of research-motivated individuals: creative, team spirited, socially minded and entrepreneurial champions of open science who think globally.

They are well trained and prepared to make their mark, but they are stalled by the lack of opportunities and resources to make meaningful independent contributions to science. This represents a major threat to the future of the research enterprise in Canada. They need the means, the independence and the flexibility to create their own place in research-intensive and innovative work settings.

GOAL

Mobilize Canada's future brain trust. Enable early-career scientists to launch independent research careers.

STRATEGY

Review NSERC's entire range of investment tools with a view to providing more dedicated support to early-career researchers.

OUTCOME

More opportunities for early-career researchers to advance their careers and gain employment in research-intensive jobs in the university setting and in industry.

SUPPORTING ACTION

NSERC will explore mechanisms and approaches to:

— Support the launch of independent research careers for young investigators in academia and in industry.

By

BUILDING A DIVERSIFIED AND COMPETITIVE RESEARCH BASE

In the competitive and fast-moving space of research, it has been widely recognized that revolutionary, textbook-changing science will take place at the interface between disciplines.

Breakthrough science will also occur in response to emerging needs and opportunities. It takes vision to forecast where these possibilities will occur and to develop the ability to mobilize many different partners to pursue them. Diversity increases our power of sight by providing multiple points of view.

Diversity lets participants challenge each other to produce the best course of action. Diversity increases our ability to successfully navigate cultural differences that can often create roadblocks to progress.

The ability to build a diversified and high-quality research base across regions, institutions, disciplines, populations, and sectors is central to research excellence and will allow Canada to be more competitive.

Women continue to be underrepresented in the physical sciences, engineering, mathematics and computer science. Failing to fully engage women means we are not taking advantage of 50 per cent of the population. Likewise, it is imperative to do more to engage Canada's fastest-growing and youngest population, Aboriginal Canadians, in the research enterprise.

GOAL

Stimulate breakthrough research and research excellence. Build, mobilize and connect expertise across populations, institutions, disciplines, regions and sectors.

STRATEGY

Provide the support and flexibility required for researchers to pursue scholarly, scientific and engaging inquiry that will promote a dynamic, diversified and interdisciplinary research enterprise in Canada.

OUTCOME

A world-class, dynamic, diverse and interdisciplinary research enterprise in Canada.

SUPPORTING ACTIONS

NSERC will explore mechanisms and approaches to:

- Enhance opportunities for discovery research.
- Support women, First Nations, Inuit and Métis in the establishment of their research careers.
- Provide more opportunities for interdisciplinary research.
- Ensure that our existing mechanisms provide maximal opportunities for different institutions or underrepresented groups adversely affected by non-linear career paths.
- Create incentives for college-university collaborations.

By

STRENGTHENING THE DYNAMIC BETWEEN DISCOVERY AND INNOVATION

Canada has a global reputation for producing landmark discovery research.

With just 0.5 per cent of the world's population, Canada generates five per cent of scholarly publications, many of them high impact. NSERC builds value for Canada by investing in discovery-based researchers. In contrast, Canada's reputation lags when it comes to innovation. A successful and vibrant research enterprise should succeed at both.

There is a dynamic interchange between discovery and innovation. Discovery sets the foundation for innovation, but when innovation is unleashed it often triggers unanticipated results and fundamental new questions to be answered. Building on strong discovery investments and successful industry partnership programs (NSERC works with over 3,500 industrial partners), we see significant potential to transform the discovery-innovation dynamic.

We can work with federal partners as a convener to create a better interface to connect academia to industry and raise the level of engagement in innovation.

We can help motivated researchers move forward with inventions that surface from discovery research by taking advantage of previous investments in innovation enablers–incubators, accelerator programs and entrepreneurship programs.

We can add value to discoveries and de-risk them for future investment. With these approaches, we can increase the range and, ultimately, the longevity and productivity of researcher-industry interactions. At the same time, we are committed to ensuring that, when it comes to discovery research, researchers continue to aim high, looking as far ahead as possible and pushing the frontiers of knowledge.

GOAL

Transform the dynamic between discovery and innovation. Deepen the interactions between colleges and universities, the private sector, governments and civil society.

STRATEGY

Mobilize the research enterprise in natural sciences and engineering. Build on established mechanisms and convene strategic partners.

OUTCOME

A new generation of highly skilled scientists and engineers who understand the dynamic interplay between discovery and innovation and who can work simultaneously in both states with ease.

SUPPORTING ACTIONS

NSERC will explore mechanisms and approaches to:

- Enhance opportunities for discovery research.
- Provide opportunities for entrepreneurial faculty to work more closely with companies.
- Provide opportunities for entrepreneurs to work more closely with universities.
- Support industry professionals who wish to work at Canadian universities and colleges.
- Provide students with relevant industry experience and help them develop entrepreneurial skills.
- Enhance NSERC's regional office capacity to accelerate industry-academic connections taking into account regional priorities.

By

GOING GLOBAL

Canada's research reputation commands respect globally.

Our research reputation has created access to global knowledge and global resources. Top Canadian researchers represent the country in important international research consortia. In Canada, 50 per cent of the scholarly literature produced by Canadian researchers has an international co-author. Despite these positive indicators, significant gaps remain in Canada's global presence.

At present, the vast majority of knowledge remains outside our influence. We simply don't produce enough of it and lack a comprehensive and strategic network of connections to knowledge sources. Moving toward 2020, we need new and targeted efforts for Canada to go global in science and technology through major bi-lateral and multi-lateral research agreements with international agencies in areas of mutual strength. Such partnerships will be more scalable and focused than the informal researcher-researcher relationships which, at present, fill most of Canada's international footprint. They will provide a deeper, more comprehensive transfer of knowledge, science culture, entrepreneurial culture, working methods, and general know-how unique to research and innovation in different countries. Such partnerships will allow Canada to reduce our current knowledge deficit.

Going global involves making international linkages the norm in each and every sector of Canada's research ecosystem. Going global will create new two-way connections for Canadian research to help draw international talent to Canada and to encourage mobility of Canadian students abroad. These international ambassadors will be the network builders of the future. Going global also involves the responsibility to help solve shared global challenges such as energy, water quality and food security.

GOAL

Secure Canada's access to global scientific and engineering knowledge and expertise and increase participation in international research endeavours.

STRATEGY

Work with domestic and international partners to leverage Canadian research strengths in areas of national importance in order to gain access and contribute to world-class scientific and engineering knowledge, talent and expertise.

OUTCOMES

- Recognition of Canada's significant contributions to the world in both discovery and innovation.
- Wider and stronger participation in strategic international research networks.
- Increased foreign investment in Canada's R&D-intensive companies.

SUPPORTING ACTIONS

NSERC will explore mechanisms and approaches to:

- Expand international training and research partnerships mechanisms, including the participation of Canadian students abroad.
- Support collaborative research addressing national and global challenges in sectors where Canada faces knowledge deficits.
- Build relationships with selected agencies worldwide to ensure we exploit opportunities for strategic international collaborations in research and innovation.
- Ensure that this country is well represented in the leadership of key international initiatives, including research consortia whose work is focused on Canadian priority areas.
- Work with other partners to get participation of multinationals and international businesses in sector-level academic-industry research collaborations for the benefit of Canada.

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