



**NSERC
CRSNG**

Building a Culture of Scientific Discovery and Innovation



Natural Sciences and Engineering
Research Council of Canada

Conseil de recherches en sciences
naturelles et en génie du Canada

Canada

NSERC – BUILDING A CULTURE OF SCIENTIFIC DISCOVERY AND INNOVATION

WHO WE ARE

The Natural Sciences and Engineering Research Council (NSERC) is unique in Canada's research and innovation ecosystem. NSERC is the only Canadian agency – private or public – involved in the natural sciences and engineering that invests substantially in both discovery-driven academic research and collaborative research with industry partners and other stakeholders. NSERC investments help Canada claim world-firsts in knowledge leading from discoveries to firsts in new marketable technologies and services triggered by partnerships. These investments play a major role in developing highly qualified professionals critical to the growth of Canada's knowledge-based economy.

See Further

Our integrated approach gives NSERC unparalleled insight into research and innovation activities across numerous sectors in Canada. Many of these activities are central to addressing national and global challenges and opportunities, such as food security, clean energy, cybersecurity, and quantum technologies. We create value for Canada by investing in cutting-edge ideas, supporting emerging talent, and convening partnerships across nodes of research expertise in the public and private sectors throughout the country. NSERC is building a culture of scientific discovery and innovation in Canada and raising the level of excellence in the natural sciences and engineering.

Ensure Excellence

NSERC has a robust and well-accepted quality assurance system to ensure that research investment decisions are impartial and deliver research excellence. Panels of researchers review and evaluate research proposals submitted by their peers. Because reviewers volunteer their time, the system is also cost effective. A similar process exists when examining academic-industry research partnerships, where industry expertise is recruited to help evaluate proposals. The resulting collaborations create a second level of quality assurance and help assess, validate, and de-risk ideas, concepts, and inventions for further investment.

MEASURING NSERC'S REACH

Create Knowledge

NSERC is a \$1.1 billion investor in research and innovation each year, the biggest in Canada in the natural sciences and engineering. Of this, approximately, 69% (\$738 million) is allocated to a portfolio of discovery-based research activities. This investment fuels a powerful brain trust and delivers world-class research. And this commitment to discovery has meant that Canada not only publishes at a high rate relative to our population—0.5% of the world population producing 5% of the world's scientific publications—but also what it publishes is among the world's best. Compared to G20 countries, Canada ranks 7th when looking at the citation index of publications in the natural sciences and engineering.

Discoveries build the necessary foundation for innovation and economic growth. These discoveries arise because researchers have the freedom to explore the frontiers of knowledge and probe the unexplained and unexpected. A priority for NSERC is to encourage researchers to fully utilize this freedom and to strive to design truly audacious and ground-breaking programs of research.

Strike Partnerships with Industry

NSERC allocates approximately 31% of its annual budget (\$330 million) towards a suite of scalable and highly flexible investment programs to facilitate innovation and drive partnerships between industry and universities, colleges, and polytechnics. These programs have leveraged annual cash contributions of close to \$200 million from industry for research collaborations and created a robust base of 3,550 companies as partners. For the purposes of comparison, the NRC Industrial Research Assistance Program—a partner with NSERC in innovation—counted 2,500 companies among its client base, and Sustainable Development Technologies Canada counted approximately 300. NSERC has been able to achieve this level of success with partnerships because of our profound level of connection and engagement with Canada’s academic community. We invest in over 12,000 researchers annually working at the cutting-edge of their fields. By convening academic-industry partnerships, we provide the space and the context where ideas, needs, and challenges can receive attention, generating fresh approaches and impactful outcomes for all collaborators.

Build the Next Generation

NSERC investments, across different sectors, support substantial training of the next generation of research leaders in the public and private sectors, from the undergraduate to post-doctoral levels. On a yearly basis, NSERC supports, directly and indirectly, 30,000 students and trainees. NSERC started in 1978, and a large percentage of today’s most active and productive Canadian research professionals received their training as a result of NSERC investments. To cite one example, Commander Chris Hadfield began his remarkable career with a NSERC student fellowship.

The Discovery-Innovation Dynamic

Discovery and innovation are two mutually reinforcing and intertwined activities. Discovery-based research draws on its own unique set of questions and produces firsts in raw knowledge, new ideas, and inventions of value to innovation. Innovation, which is attuned to market needs and opportunities, establishes a new context for discovery research and helps test and realize the value of inventions. The innovation process also generates challenges that inspire further discovery research.

In a highly functioning discovery-innovation dynamic, there is a constant and seamless exchange of information and ideas. Many different players are involved and, with guidance, they act in an integrated and purposeful way. As a convener, NSERC provides the feedback loops from industry to academia to optimize technologies and to further inform future discovery and innovation.

BENEFITS FOR INDUSTRY AND INNOVATION

De-Risk R&D

One of NSERC's major contributions to innovation is to de-risk the R&D environment for the private sector, such as access to knowledge necessary for product/service innovation and to highly qualified personnel for company expansion and growth.

Highly Qualified People: The Organization for Economic Development and Cooperation (OECD) has stressed human capital as the basis of innovation, and the OECD ranks Canada #1 in the percentage of highly educated individuals in the workforce. NSERC plays a foundational role in the Canadian economy by providing support to train the next generation of numerate, technically savvy, and creative professionals. Specific to industry, 27,800 students were trained in industrial settings over the past five years, and 37% of companies report hiring a former holder of an NSERC industrial undergraduate award. Among NSERC-funded PhD graduates, 33% worked in industry as part of their degree.

Access to Knowledge: NSERC has also made major investments in knowledge transfer. In a survey of companies involved in several of NSERC's key, long-term collaborative research programs, 691 patents were initiated as a result of partnerships and 143 products were developed. Of this group, a further 65% of companies reported potential for future product development as a result of the research. Among holders of NSERC Discovery grants (university professors), 27% also hold NSERC Partnership grants. Within the engineering disciplines (e.g. materials and chemical engineering, mechanical engineering, and, electrical and computer engineering), in 2014-15, an average of 55% of Discovery grant holders held NSERC Partnership grants.