

[Back to Article](#)

Cuts and short-term thinking pose threat to Canadian scientific research

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Canadian Association of Physicists

Many Canadians use canola oil in daily cooking as an alternative to olive and vegetable oils, not realizing that canola is a triumph of Canadian research. Canola may now be Canada's most valuable crop, contributing \$15 billion each year to the economy. The success of canola can be traced back to the 1950s and '60s, when researchers from the [National Research Council \(NRC\)](#) played a leading role in developing a more nutritious variety of a plant then used mainly for industrial lubrication, known as rapeseed.

Over nearly 100 years, the NRC has developed into one of Canada's most important government research institutions. It has, for example, made major contributions to the development of several medical diagnostic techniques, the world's first practical electric wheelchair, the first artificial cardiac pacemaker, the first effective vaccine against infant meningitis, the crash position indicator, the Canadarm, anti-counterfeit money technology and computer animation technology.

As Canadians, we enjoy many advances in our health, well-being and prosperity that have resulted, in part, from many years of research. Canadians should rightly take pride in our research endeavours, knowing that we and our children will benefit from advances we make today.

While the value of research is not in question, the role of government in research and innovation is. Debates on this topic have been sparked by cutbacks to research funding programs and multiple rounds of layoffs of government researchers this year, including most recently about 30 researchers at the NRC in late October.

One reason government needs its own research capacity is to be able to respond as needs arise. For example, when Severe Acute Respiratory Syndrome (SARS) broke out in Toronto in 2003, researchers from NRC and other government organizations helped to understand this virus and develop measures to fight against it.

Now, the government is turning to the NRC to play a major role in solving a perpetual national challenge, that is, the low levels of research in the private sector. NRC is being transformed to focus on responding to the research needs of the private sector, which is typically focused on the short term.

Performing short-term research in partnership with business has value and often generates incremental economic benefits. Yet if this had been the sole mandate of NRC in the 1950s, we might not have canola today. Canola resulted from a long-term research program that built on a foundation of scientific expertise within NRC and other government organizations.

Research capacity often takes many years to develop and caution is needed to ensure that important capabilities are not lost to Canada in the restructuring of NRC.

NRC's capabilities are built on a foundation of people performing both short- and long-term research. Long-term research at NRC generates knowledge that may lead to game-changing technological advances in the future. For example, NRC scientists are making breakthroughs in observing and controlling chemical reactions, building knowledge and technologies that may lead to super high-resolution microscopes that aid surgeons to perform delicate operations that can't be done today, or to quantum computers that enhance security of information, or to applications we can't even imagine today.

Research at NRC also informs sound public policy, such as developing building codes or testing innovative materials to determine suitability under the code. NRC scientists are responsible for developing and maintaining measurement standards used to accredit industrial products. NRC scientists observe oceans to monitor pollution and the effects of a changing climate.



An Alberta farmer is shown harvesting his canola crop. Canola may be Canada's most valuable crop, contributing \$15 billion each year to the economy. (Aug. 29, 2002)

ADRIAN WYLD/CANADIAN PRESS

NRC also operates shared research facilities that are used by many universities across Canada, as well as by other government labs and industry. Hundreds of researchers each year use the Canadian Neutron Beam Centre and the [National Ultrahigh-Field NMR Facility for Solids](#) to study many kinds of materials, which has led, for example, to greater safety and reliability of airplanes, cars and nuclear power reactors.

The 600-member Canadian astronomical community relies on the NRC to facilitate access to internationally shared telescopes, which includes working with Canadian businesses to develop cutting edge technologies needed for these "big science" facilities — technologies that are then frequently commercialized for other applications. Astronomy is one of Canada's top performing areas of research, according to a recent assessment of Canadian science, which would not be the case without the roles that NRC plays.

The above examples illustrate NRC's capabilities that are at risk (long-term research, research that informs sound public policy, and shared research facilities) if NRC is mandated to only do research for which businesses are willing to pay.

Whether or not NRC can effectively maintain all these important functions while meeting its new mandate is open to debate. The independent panel that reviewed federal research spending in 2011 argued that NRC needs to focus. It asked that great care be taken in the restructuring of NRC so that Canada would not lose any of the value in its other activities. It recommended spinning these activities out of NRC instead of eliminating them.

NRC's vital capabilities must be preserved. Otherwise, Canada risks shutting the door on the next Canola, that is, the next great Canadian research success.

*The **Canadian Association of Physicists** is the national organization representing Canadian physicists in all sectors, including universities, government laboratories, and the private sector.*