Building an ecosystem of collaboration

Connecting Canadian companies to global supply chains… developing better drugs faster… reducing healthcare costs… greening the economy…

Helping Canadians become healthier, happier and more productive.

That isn't a wish list for the future. It has been under way for 25 years, thanks to the thousands of innovators supported by the Networks of Centres of Excellence (NCE) suite of programs. In communities across Canada, they are demonstrating how networking and collaboration can generate the evidence needed to address the complex challenges of today's society.

It's smart science at work. ***And it's producing results.***

In 1989, Canada embarked on what many at the time considered a "radical" experiment: virtual teams of academics working with government, industry and communities to solve problems that mattered most to Canadians.

Led by the Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research and the Social Sciences and Humanities Research Council, the NCE pooled resources and clusters of expertise from every region to accomplish what no single group could do alone.

That pioneering model now includes four national programs: the **Networks of Centres of Excellence** (NCE) program (which includes the Knowledge Mobilization NCEs [NCE-KM] and Canada-India Research Centre of Excellence [CIRCE] initiatives), the **Business-Led NCE** (BL-NCE) program, the **Centres of Excellence for Commercialization and Research** (CECR) program, and the **Industrial Research and Development Internship** (IRDI) program. These have become the gold standards for scientific collaboration, networking, student training and knowledge translation. Canadian research and innovation will never be the same.

> I often used a phrase … 'excellence has no fixed address' … It's part of the way in which Canada works in education, health care and social programs that these kinds of collaborations in scientific research are natural, and the NCE program is the glue that binds it together.
>
> – **Dr. Arthur May**, Past President, NSERC, and founding Chair, NCE Steering Committee

Government of Canada
Networks of Centres of Excellence
Gouvernement du Canada
Réseaux de centres d'excellence
Canada

A few examples of our networks and centres in action. Learn more at **www.nce-rce.gc.ca**.

In-the-field simulations, like this one in Halifax, are helping put knowledge into practice for vulnerable youth.

A better way to help at-risk youth

Children and Youth in Challenging Contexts – CYCC (NCE-KM)

How can we help vulnerable youth feel safe in their families and communities? In 2012, the Children and Youth in Challenging Contexts network drew on evidence from researchers, practitioners, front-line service providers and communities to produce three ground-breaking reports that identify best practices and lessons learned in helping vulnerable and at-risk youth. Stakeholders then participated in a series of simulations to test the various approaches and identify what works best for their local situation. That collaborative model is now being re-packaged and taken across Canada to bridge the gap between evidence and practice to ensure youth get the help they need.

"In the field we're learning stuff every minute of every hour of every day. But we need opportunities to capture that knowledge and share it with academics and researchers. The wonderful thing about the CYCC is that it is shrinking that gap between the academic world and the front line practice world."

– **Timothy Crooks**, Executive Director, Phoenix Youth Programs, Halifax

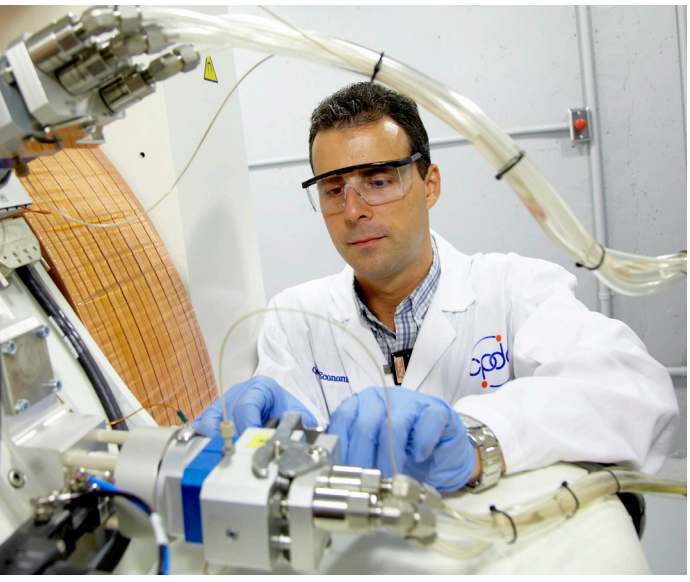
Drug could prolong life of cancer patients

Prostate Centre's Translational Research Initiative for Accelerated Discovery and Development – PC-TRIADD (CECR)

OncoGenex Pharmaceuticals could become the poster child for Canada's new approach to drug discovery. Spun-off from the Vancouver Prostate Centre in 2000, the company, along with its development partner Teva Pharmaceuticals, has demonstrated that its lead product candidate, custirsen (OGX-011), can prolong the lives of patients with advanced prostate cancer. The Prostate Centre's Translational Research Initiative for Accelerated Discovery and Development is helping OncoGenex reduce the risks and costs associated with getting the drug approved by providing critical pre-clinical development and access to a national clinical trial network. OncoGenex and Teva could apply for regulatory approval of custirsen as early as 2014.

"Having really good results with mice is encouraging, but it's often difficult to translate that success into people. It's the translation that's key, which is why you need groups like the Vancouver Prostate Centre and PC-TRIADD. They help de-risk drug development."

– **Scott Cormack**, CEO, OncoGenex Pharmaceuticals Inc.



Identifying diabetes before it progresses

Quebec Consortium for Drug Delivery – CQDM (BL-NCE)

A Montréal company is first out of the gate with a new blood test that can rapidly identify people who are pre-diabetic, allowing for more accurate tracking of disease progression and treatment monitoring. With mentoring and funding support from the Quebec Consortium for Drug Delivery, Caprion Proteomics identified biomarkers – the protein fingerprints in cells – that measure mass and function of pancreatic cells in diabetes. Diagnosing people at the pre-diabetes stage is critical for arresting or even preventing the progression of this debilitating disease, with significant savings to the health care system. Caprion has established a new diagnostic division to commercialize the technology.

"I've been in biotech for almost 20 years now. I've not run across very many programs like the CQDM, that have figured out how to bring together the biotech and pharma industry with academic researchers in a true collaborative and successful fashion. They solicit and fund projects that truly respond to industry needs."

– **Martin LeBlanc**, President and CEO, Caprion Proteomics Inc.

Saving energy and preventing floods

India-Canada Centre for Innovative Multidisciplinary Partnerships to Accelerate Transformation and Sustainability – IC-IMPACTS (CIRCE)

Pangnirtung, Nunavut is cutting energy costs and reducing its risk of flooding thanks to the engineering know-how of three University of Alberta students sent to the community in summer 2013 by Engage North, a program that links local challenges with academic experts. It was launched by the university and IC-IMPACTS, a centre that develops sustainable solutions to challenges facing partner communities in Canada and India related to drinking water, infrastructure, and health. That engineering advice led Pangnirtung to partner with a Vancouver company to install LED lights in many public buildings, and develop a plan for preventing spring flooding – technologies and approaches that can be shared with other isolated communities in Canada, India and beyond.

Pangnirtung, Nunavut

"[The students'] impact on our community was so much more than I imagined… Now, we're hearing from other municipalities around Nunavut saying 'We want to look at what happens with you and consider it for our own towns."

– **Ron Mongeau**, (former) chief administrator of Pangnirtung

Smarter Alloys co-founders Ibraheem Khan and Norman Zhou from the University of Waterloo with a simple yet very smart wire. ©AUTO21

Smart metal for lighter vehicles

AUTO21 (NCE)

A Toronto start-up is helping automakers produce lighter vehicles that meet tougher emission standards in Canada and the U.S. Founded on a discovery supported through AUTO21, Smarter Alloys has hit the market with a lightweight smart metal that replaces electric actuators – those 200 or so small motors in a vehicle that control everything from door locks to the HVAC system. Smarter Alloys elastic-like material can bend into multiple shapes and then return to its original form (similar to some eyeglass frames). The company has already secured joint development agreements with major automakers and sales with other technology sectors, including orthodontic arch wire suppliers.

"We're the only ones who have been able to develop this technology and I don't think that would have happened without AUTO21. They supported my summer work as an undergrad at University of Toronto, as well as my master's project and part of my Ph.D."

– **Dr. Ibraheem Khan**, Co-Founder, Smarter Alloys

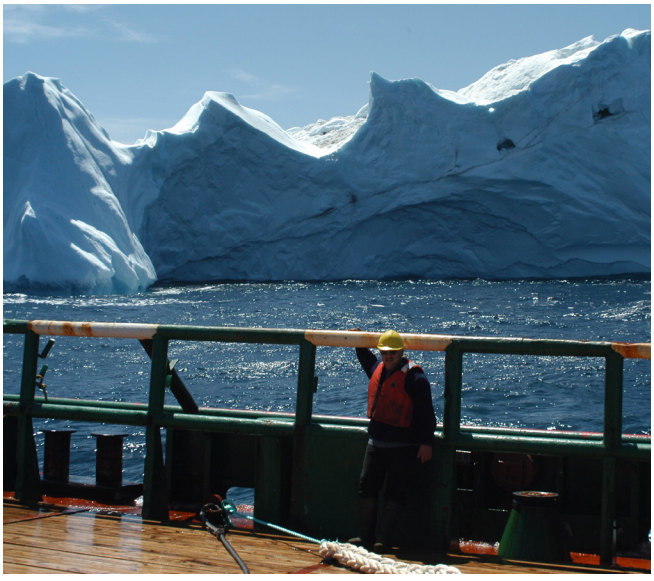
Iceberg monitoring now easier and cheaper

Leading Operational Observations and Knowledge for the North – LOOKNorth (CECR)

Drill rigs and transport vessels are among those that rely on satellite-based monitoring of ice conditions at sea. LOOKNorth, in collaboration with St. John's NL R&D corporation C-CORE, has developed a new tool for detecting icebergs and understanding regional ice conditions. Altimeter Ice Detection (AID) uses widely available, low-cost, current and archived radar altimeter data, enabling cost-effective monitoring over very large areas and reliable historical research over long periods. In 2013 for example, C-CORE used altimeter data to help the British Antarctic Survey understand iceberg conditions in an oil exploration area off the Falkland Islands.

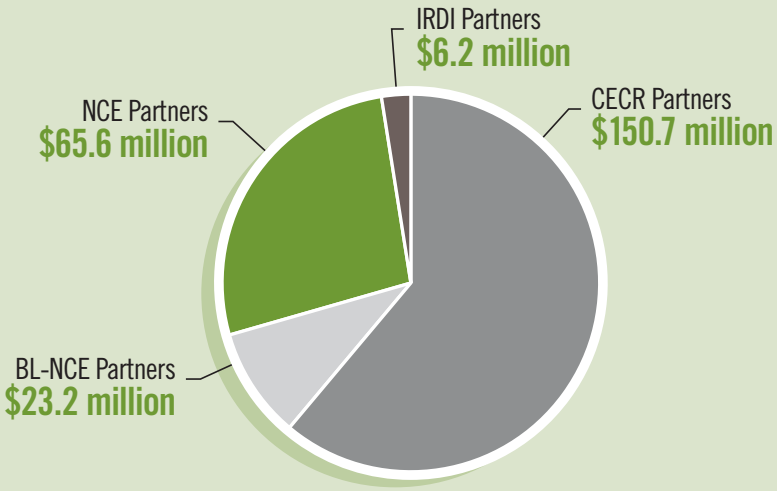
"The advantage of altimeter data is that we can analyze its extensive global archive spanning several decades and use current altimeters to view large areas, identifying targets to examine more closely with the synthetic aperture radar (SAR). This gives clients a very reliable historical record and savings of up to 90% for current monitoring."

– **Desmond Power**, VP Remote Sensing, C-CORE



LEVERAGING PARTNER INVESTMENTS

Partner contributions across all NCE programs grew to **more than $245 million** in 2012–13. These investments were leveraged by expenditures from NCE grants of about $150 million.



Contributions from CECR partners include **$4 million from Merck Canada** for an initiative to identify, develop and commercialize healthcare technologies in collaboration with the Institute for Research in Immunology and Cancer – Commercialization, MaRS Innovation and the Centre for Drug Research and Development.

PUTTING KNOWLEDGE INTO PRACTICE

2,841 SCIENTIFIC PEER REVIEWED ARTICLES

Articles published in 2012–13 on NCE-supported research included **an award-winning** paper by Peter Zandstra about a technology that promises to rapidly and cost-effectively expand the number of stem cells given to patients undergoing transplants.

Precision Molecular Design Corporation's breakthrough metal deposition technology will enable "greener" production of smaller and faster microchips for the semiconductor industry. The Toronto-based company is GreenCentre Canada's third spinoff company.

398 NEW COMPANIES LAUNCHED

TRAINING A HIGHLY SKILLED WORKFORCE

University of Alberta engineering student Stephen Dwyer worked with BMI Technologies to improve and automate technology for monitoring large vehicle fleets, through one of **814 IRDI internships** awarded in 2012–13. IRDI interns helped tackle R&D issues at **412 Canadian companies**.

814 IRDI internships at
412 Canadian companies

ATTRACTING THE BEST PARTNERS

2,077 NCE PARTNER ORGANIZATIONS
772 *from* **INDUSTRY**

The Canadian Arthritis Patient Alliance (CAPA) is one of **2,077 NCE partner organizations**. CAPA is a key element of the Canadian Arthritis Network's policy to integrate end users of research in setting research priorities, guiding projects and working on the front-lines to put results into practice.

The major players in Canada's aviation supply chain are among the **51 BL-NCE industry partners and 34 universities** collaborating with Business-Led NCEs. They help the Green Aviation Research and Development Network target challenges in the innovation supply chain through prototyping, testing and demonstration of industrial research conducted by industries, universities and research institutes.

Visit **www.nce-rce.gc.ca** to read more about the impacts of the NCE's programs and see a complete list of funded networks and centres.