

OF R&D EXCELLENCE



BUILDING ON 25 YEARS OF R&D EXCELLENCE



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A message from the granting agency Presidents

Canada has a formidable history of producing world-class research. Twenty-five years ago, that tradition of excellence provided the foundation for the Natural Sciences and Engineering Research Council, the Canadian Institutes of Health Research and the Social Sciences and Humanities Research Council, working with Industry Canada, to launch a bold initiative called the Networks of Centres of Excellence (NCE).

NCE PROGRAM ACRONYMS

BL-NCE	Business-Led Networks of Centres of Excellence	IRDI	Industrial R&D Internship
CECR	Centres of Excellence for Commercialization and Research	NCE	Networks of Centres of Excellence
CIRCE	Canada India Research Centre of Excellence	NCE-KM	Knowledge Mobilization Networks of Centres of Excellence

he network model was ground-breaking. It enabled the three agencies to expand how they support research, commercialization, knowledge translation and end-user engagement. At the time, academics were just beginning to work across disciplines and with end users such as companies, hospitals, communities, families and others who apply this knowledge to make Canada healthier, wealthier and more inclusive.

Today, with critical support from the Government of Canada and other public and private sector partners, the NCEs have been instrumental in molding a collaborative research culture across the full spectrum of disciplines, across sectors, across Canada and with key international players. They have brought together the critical mass of resources and expertise needed to address challenges that matter to Canadians. By working together, they are accomplishing what no single group could do alone.

The NCE has evolved to span the continuum from idea to implementation, including the addition of Knowledge Mobilization NCEs, Centres of Excellence for Commercialization and Research, Business-Led NCEs and Industrial R&D Internships. These initiatives have built on the successful NCE model that mobilizes large-scale, multi-disciplinary collaborative research in Canada and with international partners.



Alain Beaudet President, CIHR



Chad GaffieldPresident,
SSHRC



Janet WaldenChief Operating Officer,
NSERC

Collaboration and convergence are defining features of 21st century research. New fields are emerging from the cross-fertilization of discoveries, ideas, tools and knowledge, changing the landscape of research and opening new opportunities to address the complex challenges of our modern world.

This report provides a window into how the NCE is accomplishing this. Inside you will find case studies of centres and networks that exemplify the partnership approaches, governance structures, business models and best practices that are producing results.

More than 25 years ago, leaders from academia, industry and government came together to develop a made-in-Canada solution to Canadian challenges. That model has now become a gold standard for 21st century research. The legacy of this network model will be felt for decades to come.



"We've changed the culture. There's no going back."

 Linda Wilhelm, Co-chair, Consumer Advisory Council, Canadian Arthritis Network





At a glance

Business-Led NCE:

Quebec Consortium for Drug Discovery - CQDM

Headquarters:

Montréal, Quebec

President and CEO:

Diane Gosselin **Board Chair:**

Léon Gosselin. Co-founder.

Axcan Pharma

NCE funding: \$20,847,181 (2009–17)

Partner contributions

as of March 31, 2013:

\$29.584.636

CASE STUDY

Open innovation, creative partnerships and profitable collaborations

THE BUSINESS CHALLENGE

The high risks and escalating costs of drug development have made it difficult for early-stage biotech companies to attract financing. Those that succeed often have to relinquish too much equity; those that don't may move out of Canada or close up shop. These challenges, combined with imminent patent cliffs, have triggered a major restructuring of the global pharmaceutical industry as companies race to decrease risk and become more capital efficient.

THE OPPORTUNITIES FOR CANADIAN COMPANIES

Canada is well positioned to grow our biotech sector and help big pharma revitalize its product pipelines at the same time. That's because Canada has developed proven investment models that reduce risk through open innovation and collaborative R&D with young biotech companies, academia and public bodies. This allows biotech companies to move beyond a fee-for-service model, retain equity and ownership of their intellectual property, and grow their operations in Canada.

WHAT CODM IS DOING RIGHT

The network is a non-profit organization sponsored by seven leading pharmaceutical organizations (Merck, Pfizer Canada, AstraZeneca, GlaxoSmithKline, Boehringer Ingelheim, Eli Lilly Canada, and Novartis Pharma Canada) and the Quebec and Canadian governments. It provides critical funding and a neutral ground where pharmaceutical and biotech companies, venture capitalists, universities, hospitals and governments work collaboratively to accelerate the development and validation of pre-competitive research tools and platforms. Here's how they're doing it:

- Good governance and management: CQDM's strategic direction, research priorities and investment decisions are guided by a board of directors and two advisory committees – all of which have strong representation from seven of the world's top 12 pharmaceutical companies as well as academia, biotechnology, venture capital and government. Research projects are evaluated by an independent, international panel of scientific experts for their research excellence and potential industrial impact. A risk analysis on all intellectual property, financial, ethical and organizational aspects (including involvement of a private sector collaborator) is performed in parallel by CQDM. In addition to their participation on committees and as mentors, pharma members provide essential industrial expertise and access to specialized equipment, databases or clinical samples.
- Shared funding, shared risk, shared benefits: The network's globally unique business model reduces the risk of early-stage research and fills a critical financing vacuum. Its collaborative, pre-competitive approach pools private and public funds to support research that is too advanced for traditional research grants, too early stage for venture capital, and too expensive for companies to support on their own. This model allows it to generate a financial leverage of 20 times. Cash contributions from pharma members comprise nearly half of CQDM's budget. Similar consortiums in other countries tend to attract more in-kind than cash contributions.
- Aligning research with industry needs: Up to seven top scientists from pharma sponsors act as mentors for every project. This forges strong links between the pharma industry and scientific community – both within and outside of CQDM – while ensuring that research is aligned with each company's needs.
- Strong industry oversight: Each project plan includes clear milestones, critical steps, deliverables and go/no go decision points. This ensures scarce resources go to projects with the best chance of success. Mentors play a critical role in these evaluations through their advice to CQDM's advisory committees.



These resources [from Mitsubishi] provide us the ability to foster the development of innovative vaccines with the financial stability to expand our Quebec, Canadian, U.S. and global operations.

- **Andy Sheldon**, President/CEO, Medicago (July 12, 2013, *Globe and Mail*)

SHOW ME THE RESULTS

Medicago, a clinical-stage biotech company, has invested \$4 million in its Quebec City pilot production plant, created 20 new jobs, launched a U.S. subsidiary and signed an agreement with a CQDM pharma member to develop a new flu vaccine. Medicago's growth is the result of a high-throughput platform — developed with support from CQDM — that identifies vaccine candidates in less than 10 weeks, and at one-tenth the cost of conventional methods. VLPExpress™ is expanding Medicago's portfolio of vaccines, including Ebola and rabies. CQDM support enabled Medicago to increase its market value without reducing its equity. In July 2013, Medicago announced a strategic alliance that will see Japan's Mitsubishi Tanabe Pharma acquire the company for \$357 million.

How CQDM benefits biotech partners:

- Non-dilutive funding: Rather than selling equity, CQDM's support allows firms to de-risk research and build a portfolio of assets before seeking venture capital.
- Companies retain royalties, milestones and product development rights.
- Collaborations with pharma members advance and validate technology, and open channels to global markets.



At a glance

Network of Centres of Excellence: ArcticNet

Headquarters:

Université Laval, Québec, Quebec

Scientific Director:

Louis Fortier

Board Chair:

Bernie Boucher, President, JF Boucher Consulting Ltd.

Board Co-chair:

Duane Smith, President, Inuit Circumpolar Council Canada

NCE funding:

\$113.2 million (2003–18)

Partner contributions as of March 31, 2013:

\$146,763,634

CASE STUDY

Taking action now to safeguard Canada's Arctic

THE CHALLENGE

Climate change is rapidly transforming the Arctic and drawing increasing attention to the region's global and geopolitical importance. Local communities, policymakers, regulators and industry need a solid foundation of science and traditional knowledge to address these challenges and take advantage of the opportunities.

THE OPPORTUNITY FOR CANADA AND INUIT COMMUNITIES

Timely and credible data is helping Inuit communities develop sustainability plans. Canada needs solid research to protect human health and the environment, promote economic and social development, improve Northern governance, and strengthen its sovereignty. Research results will also inform Quebec's \$80-billion, 25-year "The North for All" plan and the 25-year Plan Nunavik, and support the overarching theme for Canada's chairmanship of the eight-country Arctic Council: development for the people of the North, with a focus on responsible Arctic resource development, safe Arctic shipping and sustainable circumpolar communities.

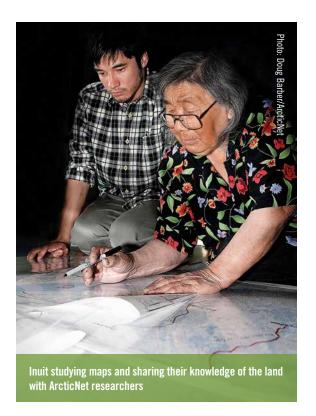
WHAT ARCTICNET IS DOING RIGHT

ArcticNet plays a unique role in connecting science and policy. It collaborates with multiple stakeholders to conduct complex assessments of the regional impacts of climate change in the Canadian Arctic, and determine how to minimize negative impacts and maximize benefits.

Strong networks and partnerships: Never before has Canada had such a collaborative and inclusive
approach to Arctic research. ArcticNet brings together over 145 researchers from the health,
social and natural sciences from 32 Canadian universities, and over 150 partner organizations,

including federal, provincial and territorial agencies and departments, and Inuit organizations.

- Good governance and management: ArcticNet's board members represent the Inuit organizations, government agencies and industries that put the network's research into practice. These end users work alongside academic researchers to manage the research program and ensure ongoing assessment of all projects.
- Sharing funding, shared benefits: All stakeholders have contributed to ArcticNet's success. It leverages more than \$2 in public and private sector funding for every \$1 from the NCE. Industry, alone, has contributed more than \$25 million. The Government of Canada and ArcticNet also share the costs of the network's primary research platform, the CCGS Amundsen icebreaker.
- Public access to data: ArcticNet requires that its data
 be made available to the public within three years
 of a project ending. A low-bandwidth search tool
 has been developed to ensure data is accessible to
 Northern partners whose internet speed is limited.
- Engaging local communities: The Inuit Advisory Committee provides guidance and recommendations related to strategic planning, research needs/gaps, input of traditional knowledge, community involvement, participation, training and education. ArcticNet also collaborates closely with Inuit Tapiriit Kanatami, the Inuit Circumpolar Council (Canada), and all four regional Inuit land claim organizations in developing and conducting its research programs.
- Putting research into practice: ArcticNet researchers and students publish extensively, steadily adding to our knowledge of Arctic processes. Successful knowledge mobilization also requires making science relevant and accessible to non-scientific audiences. ArcticNet bridges this gap by putting all its research findings into roadmaps – called Integrated Regional Impact Studies – which provide region-specific information, including practical policy recommendations.
- Training the next generation: ArcticNet's more than 1,000 graduate students, postdoctoral fellows, research associates, technicians and other specialists work with local partners who will put this research into practice. ArcticNet also provides opportunities for high school students to study aboard the CCGS Amundsen and in Arctic coastal communities, inspiring students to consider careers in science, research and the environment.



SHOW ME THE RESULTS

Limiting the sports hunt for caribou and increasing the commercial sale of traditional and healthy country foods such as fish and wild berries could improve the health and sustainability of people living in Nunavik and Nunatsiavut. Those are among 23 policy recommendations included in ArcticNet's first Integrated Regional Impact Study, which addresses four priority issues: human health; safety and security; transportation and infrastructures; and socio-economic development and resource exploitation.

There are few comprehensive studies on the impacts of climate change on regional ecosystems, societies and human populations. That's why the Arctic Council is using ArcticNet's IRIS (Integrated Regional Impact Studies) model to shape its Adaptation Action for a Changing Arctic assessment, to be completed in 2017. It will create the first integrated picture of ongoing changes in the coastal Arctic.

Imperial Oil has incorporated environmental data from ArcticNet's Beaufort Sea study into its exploration drilling planning and program design to ensure that proposed operations are safe and environmentally responsible. These multi-stakeholder research collaborations guarantee that decisions about exploration drilling, environmental assessments and regulations are based on the best scientific information available.



At a glance

Centre of Excellence for Commercialization and Research: **GreenCentre Canada** — **GCC**

Headquarters:

Kingston, Ontario

Executive Director:

Rui Resendes

Board Chair:

Peter Snucins, President & CEO, Polycorp Ltd.

NCE funding:

\$18,190,000 (2009–19)

Partner contributions as of March 31, 2013: \$10,237,200

CASE STUDY

A one-stop shop for Canadian green chemistry discoveries

THE BUSINESS CHALLENGE

Promising green chemistry technologies are being developed in university labs across Canada, but few make it to market. That's because industry wants technologies that are proven to be scalable, optimized for specific applications, produced in kilogram-scale batches and largely de-risked. Academics rarely have the resources to take those steps.

THE OPPORTUNITIES FOR CANADA

Turning these green chemistry discoveries into competitive commercial products and processes will create environmental solutions that benefit Canadians and people around the world. It will put Canada on the vanguard of a sustainable green chemical and materials industry as manufacturers around the world race to find alternatives that use benign substances, reduce waste and energy consumption, and make the most efficient use of non-renewable resources.

WHAT GREENCENTRE IS DOING RIGHT

This is the first facility of its kind in North America to offer a "one-stop shop" to Canada's best chemistry and material science discoveries. Technologies sent to the centre are assessed for their commercial potential and their estimated environmental impact compared to current technologies. The most promising technologies are in-licensed, then developed, de-risked, and scaled up in GCC's labs. The result: a strong business case that companies can take to their clients. Here's how they're doing it:

- Good governance and management: GreenCentre's board of directors is led by senior executives representing major players in the chemical supply chain (e.g. NOVA Chemicals Corp. and Bayer MaterialScience) as well as end-users (e.g. Ford Motor Company and Veolia Water Solutions & Technologies). GCC recruited industry members with strong global connections, and an understanding of the public sector environment, to ensure technology development aligns with market opportunities. The board was recently restructured to include more independent members from the venture capital and communications sectors.
- Technical expertise: The centre's staff includes highly experienced chemists, commercial experts and business professionals. It also has a commercial and production development team with deep technical expertise and a proven track record of commercializing new technologies in this sector.
- Shared funding, shared risk, shared benefits: GreenCentre takes a sweat equity approach, exchanging its technical, management and legal services for a share of licensing revenues and equity in any new spin-off. This business model has helped bring early stage technologies to market while generating short-term revenue to ensure the centre's sustainability. GCC returns 75% of profits to the institution/inventors. In exchange for their financial support and participation in governance, industry sponsors gain one-stop access to Canadian green chemistry discoveries.
- Aligning research with industry needs: Industry partners
 review every project disclosure, provide development
 and marketing advice, and receive priority access to
 IP. GCC takes a 90-day licence option on new technologies to conduct a thorough assessment of market
 opportunities, technology maturity, IP position,
 competition, price and required next steps. Industry
 partners then provide feedback on the results.
- Ongoing oversight: The centre has adopted a gold-standard industry process for product development (called "stage gate") which ensures projects are strategically managed, remain focused on market objectives, and are regularly evaluated as they evolve.
- Flexible intellectual property (IP) frameworks: Rather than negotiate IP agreements with individual universities a major hurdle to industry-university collaborations GCC offers one-stop access to green chemistry discoveries from across the country. Companies have the option of licensing technology or acquiring it outright. The centre also helps partners file and protect any new IP.



GreenCentre's access to expertise in synthesis and manufacture of novel electronic chemicals is helping our company hit the market faster with new chemical precursors that our customers need to meet the semiconductor industry's demands for faster and smaller microchins

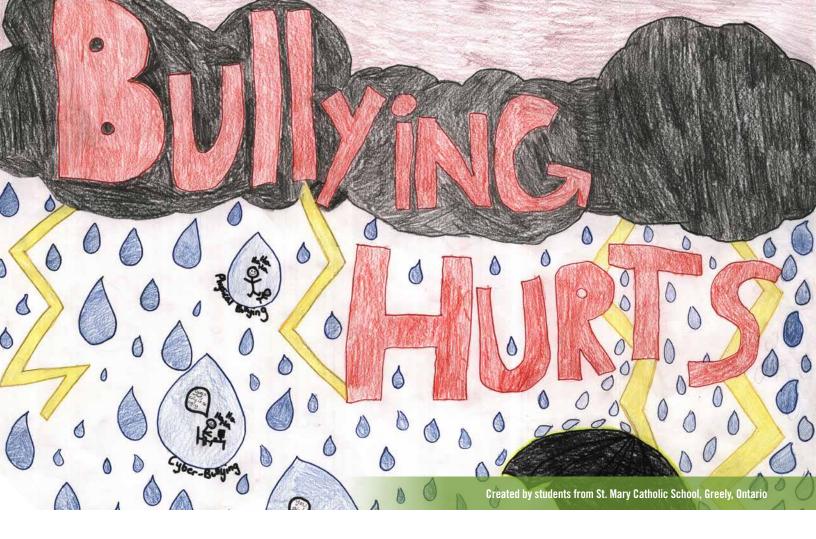
Bill Stibbs, VP, Marketing & Business Strategy,
 Digital Specialty Chemicals Limited, Toronto

SHOW ME THE RESULTS

Two Canadian companies — Digital Specialty Chemicals and Green-Centre spin-off Precision Molecular Design — have licensed a technology from GCC that will help microelectronics companies meet the insatiable demand for smaller, cheaper and faster devices. Called Atomic Layer Deposition, the technology overcomes the problem of connecting ever smaller microchip circuit components with metal conductors.

GCC's Technical Director Philip Jessop invented "switchable" solvents that facilitate the separation of oil from solids or water. GCC tested and scaled up the technology, and created a new spin-off (Switchable Solutions Inc.) to market it as an environmentally friendly process for bitumen recovery and industrial processing.

Funding from the Ontario government enabled GCC to launch a commercialization fund to support Ontario-based, chemistry-driven small-and medium-sized enterprises. That funding, combined with GCC's commercialization services, convinced U.S.-based biofuel developer Altranex to relocate its R&D operations to Kingston, Ontario.



At a glance

Knowledge Mobilization Network:

Promoting Relationships and Eliminating Violence Network (PREVNet)

Headquarters:

Queen's University, Kingston, Ontario

Scientific Co-directors:

Wendy Craig & Debra Pepler

Board Chair:

Martha Tory, Ernst & Young

NCE funding:

\$1.6 million (2011-2015)

Partner contributions as of March 31, 2013: \$2,374,849

CASE STUDY

Reducing bullying with evidence

THE SOCIETAL CHALLENGE

Canada has many local, provincial and national programs aimed at reducing bullying. Unfortunately, few are based on evidence and even fewer are scientifically evaluated to measure their effectiveness. As a result, Canada ranks in the bottom third internationally when it comes to bullying and victimization. At the same time, parents, teachers and those who work with children and youth must protect children from all forms of abuse, including bullying.

THE OPPORTUNITY FOR CANADA AND CANADIAN YOUTH

Many strategies to prevent bullying are already known and proven effective, thanks in large part to Canadian research. What was needed was a national network where expert researchers and national organizations work together to translate this research into practice.

WHAT PREVNET IS DOING RIGHT

PREVNet developed and honed its highly successful model of bringing researchers and national organizations to work together when it was initially funded through the NCE New Initiatives pilot program in 2006. Its model is designed to stop bullying and victimization and create environments where children feel safe. Here's how they're doing it:

• Strong networks and partnerships: PREVNet has created a national network of 90 leading Canadian researchers and their students at 29 universities, joined by 56 national youth-serving organizations, including industry, federal and provincial agencies, and NGOs. The network has the potential to reach all Canadian children where they live, work and play.

HANDS-ON PARTICIPATION: PREVNet's working groups ensure that research is relevant and will be turned into practice. Partners share knowledge of emerging trends and identify critical issues and unmet needs. Researchers contribute relevant evidence-based knowledge and the scientific capacity to evaluate partners' programs. Graduate student participation develops the "highly qualified personnel" able to bridge research and practice.

CONNECTING WITH YOUTH: In Spring 2013, PREVNet and its NGO partners established two National Youth Advisory Committees, one for 13–18 year olds and a second for 19–25 year olds. These young ambassadors help identify strategies to engage youth in PREVNet activities.

- Good governance and management: PREVNet's board members come from a broad range of corporate and not-for-profit endeavours. Its executive committee of researchers and partner organizations provide leadership and direction for the network's Key Signature Projects. PREVNet's graduate student executive committee advises the executive committee and works with mentors on research and education goals.
- Putting research into practice: PREVNet's model of knowledge mobilization covers four key pillars: Education, Assessment, Intervention and Policy.

EDUCATION AND TRAINING: PREVNet and its partners hold workshops and develop training tools (e.g. manuals, quick reference guides, continuing education courses) to teach those who work with youth how to deliver evidence-based programs.

ASSESSMENT AND EVALUATION: PREVNet's universal assessment tools provide the baseline for understanding the nature and extent of bullying problems, and identify which programs should be selected to meet the specific needs of an organization.

PREVENTION AND INTERVENTION: PREVNet develops prevention strategies that specifically define bullying and establish steps to be taken when bullying occurs.

POLICY AND ADVOCACY: PREVNet provides guidelines for policies and a united voice for children's rights to safety and inclusion and for promoting healthy relationships. Each province and territory has its own definitions, legislation or policies related to bullying. PREVNet developed legislative fact sheets to help parents and educators understand their rights and responsibilities in each province or territory.

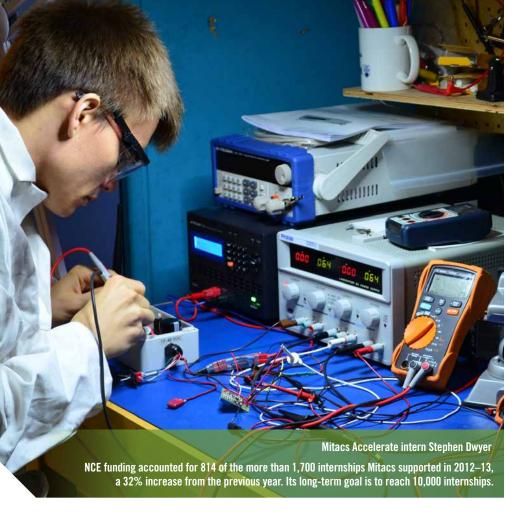


SHOW ME THE RESULTS

Parents struggling to help a child victimized by bullying don't usually turn to scientific papers for help. That's why PREVNet has compiled this invaluable knowledge into an easy-to-use resource for parents, called *Bullying Prevention: What Parents Need to Know.* Nearly 3,000 copies of the book have been purchased to date by PREVNet partners and others around the world.

Research shows most educators choose bullying prevention programs based on word of mouth, but 15% of these programs do more harm than good. That's why PREVNet worked with the Public Health Agency of Canada to develop an online collection of evidence-based violence prevention programs suitable for schools, community organizations and other users.

PREVNet has co-created more than 150 organization-specific bullying prevention initiatives, including cyber bullying resources for the Canadian Teachers Federation, which represents more than 220,000 teachers, and a handbook available to more than 14,000 principals across Canada.



At a glance

Industrial R&D Internship: Mitacs Accelerate

Locations:

Montréal, Toronto, Vancouver

CEO and Scientific Director:

Arvind Gupta

Board Chair:

Brad Bennett,

President, McIntosh Properties Ltd.

NCE funding:

\$29,762,000

Partner contributions as of March 31, 2013:

\$26,713,155

CASE STUDY

Internships drive Canadian innovation

THE BUSINESS AND SKILLS CHALLENGES

Graduate students and postdoctoral fellows often lack the opportunity to apply their research to real-world business challenges. Having this experience not only makes them more employable, it also helps Canadian companies become more innovative, productive and competitive.

THE OPPORTUNITIES

Canada has embraced an internship model that connects the research expertise in universities with the needs of industry to help Canadian companies grow and compete on the international stage.

Mitacs Accelerate helps Canada address three main innovation and prosperity objectives: job creation, improved industrial productivity and increased business expenditures in R&D. Interns gain valuable experience, and industry partners get access to talented researchers and potential future employees.

WHAT MITACS ACCELERATE IS DOING RIGHT

This unique internship model attracted unprecedented industry interest when it was launched in 2003 by the Mathematics of Information Technology and Complex Systems (MITACS) NCE¹ as a pilot program for advanced mathematical sciences graduate students and postdoctoral fellows. Today, with support from the NCE IRDI program, other federal departments and agencies, and provincial governments, Mitacs Accelerate remains an important legacy of the original NCE and has evolved to become Canada's largest internship program for graduate students and postdoctoral fellows of all disciplines. Here's how they're doing it:

- Good governance and management: The board of directors of Mitacs consists primarily of industry members, as well as representatives from partner universities. The Mitacs Research Council oversees the research integrity of all programs, including the independent peer-review performed by more than 1,200 academic and industrial researchers from across North America. The Accelerate program is delivered by a business development team of professionals with industrial research experience.
- Shared funding, shared benefits: Costs are shared by the federal and several provincial governments and industry. More small- and medium-sized companies are also participating over 100 in 2012–13 thanks to the National Research Council's Industrial Research Assistance Program which pays 50% of each company's contribution.

The success of the NCE-supported Accelerate model has enabled Mitacs to partner with other organizations and funders to offer a unique suite of programs that cut across all sectors and regions of the economy: traditional and emerging; economic and social; and rural and urban.

¹ In 2011, MITACS became two organizations: the Mprime Network carried on the NCE mandate, while Mitacs Inc. became a separate organization dedicated to internships and training

CASE STUDY

Tackling national challenges at the local level

THE CHALLENGES

The availability of safe drinking water, sustainable infrastructure and good public health practices are complex global issues that require multiple stakeholders and scientific disciplines to come up with solutions that are cost-effective and sustainable.

THE OPPORTUNITIES

Canada and India share strong bilateral ties, including a well-established history of research collaborations. At the same time, India's government has made public-private partnerships a priority to deal with an infrastructure deficit that compromises public health and economic growth. This opens opportunities for technology sharing, professional development and partnerships with Canada.

WHAT IC-IMPACTS IS DOING RIGHT

The centre and its partners are developing and implementing community-based solutions to the most urgent needs of Canada and India: poor water quality, unsafe and unsustainable infrastructure, and poor health from water-borne and infectious diseases. Under IC-IMPACTS leadership, researchers, industry innovators, community organizations and government agencies work collaboratively to develop and test local solutions that can be scaled up across India and Canada. The centre also provides training and professional development to address critical skills shortages. Here's how they're doing it:

- Good governance and management: Senior representatives from both the public and private sectors are represented on IC-IMPACTS' Board of Directors. Equity, transparency and accountability are overseen by a Research Management Committee. A Community Advisory Board and committees are being struck to oversee commercialization and training. To ramp-up operations faster, IC-IMPACTS appointed an interim board of directors to set up its governance and management structure.
- Aligning research with partner needs: Before any projects are funded, IC-IMPACTS hosts



workshops to identify research priorities for each partner community. It also helped bring Canadian partners such as Starmass Environment Technologies and Stantec Inc. of Ottawa to India, where they are working on infrastructure projects with several Indian companies.

Since launching in March 2013, IC-IMPACTS has linked with partner communities in India (Nagpur, Faridkot/Bathinda Region and villages near Thondebavi) and in Canada (Hamlet of Pangnirtung, NU and Dene Tha, Alberta).

Training innovation leaders: The centre's handson research, curriculum development and
professional training will help turn more
than 700 students, researchers and professional practitioners into innovation leaders.
IC-IMPACTS partnered with FOSROC
(India) Chemicals Ltd. to hold a professional
training program in India for over 50
practising engineers and consultants. It also
works with India's National Institute of
Technology and Mitacs to engage interns in
both countries.

At a glance

Canada-India Research Centre of Excellence:

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

${\bf Head quarters:}$

University of British Columbia, Vancouver

Scientific Director and CEO:

Nemy Banthia

Board Chair:

The Honourable Roy MacLaren

NCE funding:

\$13,796,350 (2012–2017)



"... capture more value from world-class research ..."

Michel Bouvier,
 President and CEO, IRICoR

Building Canada's strengths COLLABORATIVE CASE STUDIES



Co-locating our conferences provided a wonderful opportunity for students to talk with potential commercializers of their work, and for faculty members to get ideas from industry about how to focus their research on finding solutions for Canadian organizations engaged in the digital media sector.

- **Kellogg Booth**, Scientific Director, GRAND

It's the future employees and prospective employers who really benefit from these collaborations. Companies need skilled individuals who have a creative arts education, along with computer science, business and marketing expertise. That's a dynamite combination that companies like ours can really benefit from.

- **Tom Jenkins**, Chair, CDMN Advisory Board; Executive Chairman and Chief Strategy Officer, Open Text Corp.

COLLABORATIVE CASE STUDY

Building Canada's Strengths: Information and Communications Technology (ICT)

CANADA'S PRODUCTIVITY DEPENDS ON GREATER ADOPTION OF ICTs



CDMN Soft-Landing Program alumnus Andrew Cherwenka, Co-Founder & CEO of Authintic speaks to an audience about his experience taking his startup abroad at CDMN Canada 3.0 conference; May 14, 2013.

ICT has grown faster than the overall Canadian economy over the past five years, created 32,000 jobs between 2011 and 2012, and performed 33% of all private sector research and development in 2012. Yet to remain competitive, Canada needs to connect innovative firms to sales opportunities globally, promote linkages between firms to advance business-to-business market opportunities, and leverage government investments to benefit hundreds of small and medium sized firms.

Building blocks

ICT is one of Canada's most innovative sectors, and a priority area for the federal government and for NCE programs. In 2009, the NCE funded the Graphics, Animation and New Media (GRAND) Network, which supports a broad range of multidisciplinary digital media research and innovation spanning 27 universities. GRAND addresses complex issues in digital media and transforms multidisciplinary research into user-centred solutions.

Also launched in 2009, the Canadian Digital Media Network (CDMN) connects Canadian technology companies to a national network of 28 digital media acceleration hubs. It produces Canada's biggest digital media forum (Canada 3.0), strengthens regional ecosystems and solidifies Canada's position in the global digital media ecosystem.

Wavefront received CECR funding in 2011 to provide small- and medium-sized wireless companies with access to commercialization resources and market linkages normally beyond their reach. It also connects academic researchers with commercially viable innovations to suitable industry partners. This approach to commercialization strengthens domestic collaboration, grows companies and creates jobs.

Taking collaboration to the next level

Shared expertise and collaborative governance

- The leaders of Wavefront, GRAND and CDMN collaborate on an operational level by serving on each other's boards of directors and contributing their strategic advice.
- Key partners, such as the Chairman of OpenText Corporation and Chief Technology Officer of Christie Digital Systems Canada Inc., sit on both the GRAND and CDMN boards, as do the President of OCAD University and Vice-President Research of Wilfrid Laurier University.

Accelerating commercialization

 CDMN and Wavefront participate in GRAND's ongoing industry workshop series, which connects entrepreneurs to university researchers involved in a broad spectrum of digital media application areas. Similarly, GRAND researchers have a wealth of opportunities to take part in networking and discussion forums at these commercialization centres.

Knowledge translation and networking opportunities

- GRAND and CDMN hosted a Brazilian delegation at the 2012 Canada 3.0 conference that led to the creation of the Brazil-Canada 3.0 conference, held in 2012 and again in 2013. This is Canada's main international summit devoted to boosting ICT cooperation with Brazil.
- In 2013, Wavefront hosted 34 technical and business training events in five provinces, attracting 1,865 attendees. Hands-on training was delivered in person by industry experts as well as academic organizations such as GRAND and Mitacs.
- CDMN and GRAND are supporting partners of the Wavefront Wireless Summits, which have become the marquee machine-to-machine conference in North America.
- The inaugural Gamification conference in 2013 hosted by University of Waterloo Stratford Campus was co-sponsored by GRAND and CDMN, and attracted industry and academic professionals interested in human motivation and the power of "gameful" design and digital games.

"

CCRM was able to launch from a position of strength thanks to the support provided by the Stem Cell Network and MaRS Innovation. The real successes will come by collaborating and capitalizing on our respective strengths to translate regenerative medicine discoveries into products and therapies.

 Michael May, CEO and President, Centre for Commercialization of Regenerative Medicine MaRS Innovation was proud to partner with CCRM on their original CECR application since regenerative medicine is a research discipline that is so strongly represented in Ontario. Our productive sistership ensures that regenerative medicine gets the attention and funding it needs to propel Ontario forward in this crucial commercialization area.

 Raphael Hofstein, President and CEO, MaRS Innovation

Arezu Jahani-Asl, Postdoctoral Fellow at the Ottawa Hospital Research Institute's Sprott Centre for Stem Cell Research

By collaborating with one another, our organizations are able to leverage our combined resources to help scientists advance their research, help industry to adopt these technologies, and provide Canadians the first-class health care options that they expect and deserve.

"

 Philip Welford, Executive Director, Stem Cell Network

COLLABORATIVE CASE STUDY

Building Canada's Strengths: Regenerative Medicine

CANADA'S RISE AS AN INTERNATIONAL POWERHOUSE IN STEM CELL RESEARCH IS NO ACCIDENT



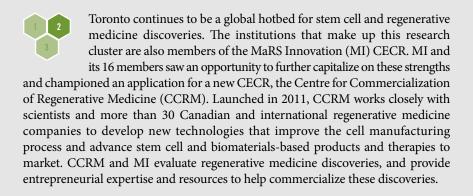


Shahryar (Shery) Khattak, Product and Process Development Scientist, working on the BioStation CT in the CCRM development facility.

Canada is recognized as a global leader in stem cell and bioengineering science, with over 400 stem cell scientists working in 68 research centres within, or affiliated with, 25 Canadian universities. Given its rich history of research excellence in the field, this country is uniquely placed to be one of the earliest beneficiaries of stem cell advances.

Building blocks

The field of stem cell research began in Canada in the 1960s through the pioneering work of Drs. James Till and Ernest McCulloch at the Princess Margaret Cancer Centre in Toronto. That foundational research trained a generation of world-class scientists who propelled Canada to the top of the charts in regenerative medicine. A group of those scientists came together in 2001 with the launch of the Stem Cell Network (SCN), the first national enterprise focused on translating stem cell research into clinical applications, commercial products and public policy. The SCN combined Canada's internationally recognized strength in stem cell biology with world-class expertise in bioengineering, ethics, clinical practice and commercial expertise from industry partners.



In 2014, the NCE supported a new NCE Knowledge Mobilization network, which will harmonize and optimize best practices and quality controls between five cell manufacturing facilities across Canada. The CellCAN Regenerative Medicine and Cell Therapy Network provides the physical, management and regulatory infrastructure needed to build patient awareness of regenerative cell therapies, expedite regulatory approvals and facilitate adoption of these therapies into clinical practice.

Taking collaboration to the next level

Shared expertise and collaborative governance

 The networks and centres share board expertise and even administrative personnel where appropriate. This organized approach to collaboration significantly increases the overall impact of NCE program investments. Members of this same regenerative medicine community were instrumental in securing funding for CellCAN.

Accelerating commercialization

- CCRM is helping develop and operate a new GMP (good manufacturing process) cell manufacturing facility that will support academic and private sector partners.
- SCN, CCRM and MI co-invest to develop and commercialize stem cell-based technologies and assist each other in sourcing investors for start-up companies.
- Collaboration will help to attract industry-led clinical trials and cell manufacturing to Canada.

Communicating with Canadians and the world

- Canada's largest annual conference in the field, the Till & McCulloch Meetings, is a collaboration between SCN and CCRM, who also work together to organize workshops for highly qualified personnel, public symposia, and a travelling science museum exhibit.
- SCN and CCRM engage with the lay public and scientists to provide thoughtful analysis, interesting content and scientific insight about stem cells and regenerative medicine via their award-winning blog (signalsblog.ca).
- The organizations promote each other's news and accomplishments through their social media platforms and respective networks, and direct partners to collaborate with key players in this ecosystem to secure investment and engagement.



we were operating in isolation.

- William Jefferies, Executive Director, LOOKNorth

COLLABORATIVE CASE STUDY

Building Canada's Strengths: Oceans R&D

NCE CONNECTS CLUSTERS OF EXPERTISE FROM ACROSS COUNTRY





Canada is a global steward of the sea, with three world-class science clusters (British Columbia, Quebec and Atlantic Canada) and the longest coastline in the world. A recent Council of Canadian Academies report concluded that coordination across jurisdictions and disciplines is critical to maintaining this leadership position. The NCE has been doing exactly that since funding the first national network in this sector in 2003.

Building blocks

The Government of Canada has invested more than \$113 million in ArcticNet since its launch in 2003. It represents Canada's largest commitment to date to explore the social, economic and environmental impacts of climate change and modernization in the coastal Canadian Arctic. Headquartered at Quebec City's Université Laval, ArcticNet facilitates multidisciplinary projects involving 145 researchers, as well as students, Inuit organizations, northern communities, federal and provincial agencies and the private sector. Its main research platform is the CCGS *Amundsen* icebreaker.

A second oceans-related NCE is hosted at Dalhousie University. The Marine Environmental Observation Prediction and Response Network (MEOPAR) facilitates partnerships between academia, government, the insurance industry, the oil and gas sector, marine technology firms, coastal communities and NGOs to reduce Canada's vulnerability to marine hazards and emergencies.

Two CECRs are capitalizing on Canada's global expertise in ocean sciences to open new markets for Canadian companies. The Ocean Networks Canada Innovation Centre (ONCIC) supports commercialization and export opportunities for advanced technologies developed by the NEPTUNE and VENUS cabled observatories on Canada's west coast, as well as a mini-observatory in the Arctic Ocean. The St. John's NL-based Leading Operational Observations and Knowledge for the North (LOOKNorth) validates and drives commercialization of remote sensing technologies for environmental monitoring, and safe and sustainable development of Canada's northern natural resources.

Taking collaboration to the next level

Shared expertise and collaborative governance

- Leaders from ArcticNet, MEOPAR, ONCIC and LOOKNorth have served on each other's boards of directors and contributed to their strategic direction.
- Researchers and stakeholders from ArcticNet, ONCIC and MEOPAR were among the Expert Panel members that produced the Council of Canadian Academies landmark report, Ocean Science in Canada: Meeting the Challenge, Seizing the Opportunity (November 2013).

Collaborative research

- Germany and Canada signed an agreement in 2012 that supports greater collaboration between their respective researchers, including formal links with ArcticNet and MEOPAR. Common areas of interest include climate change, tsunami risk and resource exploration.
- ONCIC and ArcticNet collaborate in developing and demonstrating world-leading Canadian technologies that provide continuous and real-time monitoring of the Arctic marine environment.
- LOOKNorth and ArcticNet investigated ice island fragments from Greenland's massive Petermann glacier, which threaten oil platforms in the Grand Banks off Newfoundland. LOOKNorth used the data to develop a risk model for drift and deterioration of the ice islands.

Accelerating knowledge transfer and commercialization

- ONCIC provides Canadian industry with expertise and access to the Ocean Networks Canada Observatory to commercialize technologies needed to develop coastal risk models for MEOPAR, including underwater sensors to detect a passing tsunami.
- ONCIC organizes international trade missions to introduce new technologies into growing markets such as Brazil, China and India, and to establish academic-industry collaborations involving ArcticNet and MEOPAR.



This exciting partnership will leverage the unique expertise within IRICoR and its partners to capture more value from the world-class research being carried out in Quebec, Ontario and British Columbia.

- Michel Bouvier, President and CEO, IRICoR

corrections technology platform is available to laboratories across Canada, and can work on many technology types or therapeutic areas. This enables us to provide support where the other CECRs may not be able to work. In turn, we are able to partner with other CECRs for a particular specialized expertise or capacity we require.

- Karimah Es Sabar, President and CEO, CDRD

COLLABORATIVE CASE STUDY

Building Canada's Strengths: Drug Discovery and Commercialization

CREATING AN ECOSYSTEM OF COLLABORATION: FROM BENCH TO BEDSIDE



Developing new drugs is a long, complex and expensive process. The NCE supports several models that are helping reduce the risk and accelerate the commercialization of medical innovations that will improve health-care delivery and patient care in Canada and abroad.

Building blocks

The life sciences industry is an important contributor to Canada's innovation economy and one of four priority areas of the government's Science and Technology Strategy. Industry players are primarily clustered in Montréal, Toronto and Vancouver. They include small- and medium-sized companies developing diagnostics, biopharmaceuticals, pharmaceuticals and medical devices; global companies with R&D and manufacturing operations; and contract service providers providing industry support for all these activities.

In 2008 the NCE strengthened the commercialization pipeline in each of these clusters when it awarded CECR funding to centres such as the Centre for Drug Research and Development (CDRD) in Vancouver, the Institute for Research in Immunology and Cancer – Commercialization of Research (IRICOR) in Montréal and MaRS Innovation (MI) in Toronto. Both CDRD and IRICOR identify early-stage opportunities and advance them towards commercialization, either through licensing or the creation of spin-off companies. MI is the commercialization agent for discoveries originating at 16 Ontario research institutions.

One year later, the NCE awarded a BL-NCE to the Montréal-based Quebec Consortium for Drug Discovery (CQDM), which connects global pharmaceutical companies with leading university researchers and Canadian biotech firms to develop shared tools and technologies that accelerate the drug discovery process. Today, these siblings in the NCE family are demonstrating that geography is no barrier when like-minded organizations pool their knowledge, infrastructure and business resources for the benefit of patients and the economy.

Taking collaboration to the next level

Strengthening regional clusters

- CQDM, MI, the Ontario Centres of Excellence, Life Sciences
 Ontario and BiopolisQuébec have partnered to support
 collaborative R&D within the Ontario-Quebec Life Sciences
 Corridor. The initiative funds industry-academic projects
 that accelerate the drug discovery process and lead to
 safer and more effective compounds. This has expanded
 the reach of CQDM's pharmaceutical members into
 Ontario, providing access to leading health scientists.
- In 2013, Merck invested \$4 million in IRICoR to support
 a pan-Canadian collaboration with CDRD and Ml. The
 partnership leverages the expertise and infrastructure
 of all three centres. This reduces risk while allowing each
 centre to fund a larger number of early-stage projects,
 thereby increasing the chances of licensing new products
 or creating a new company.

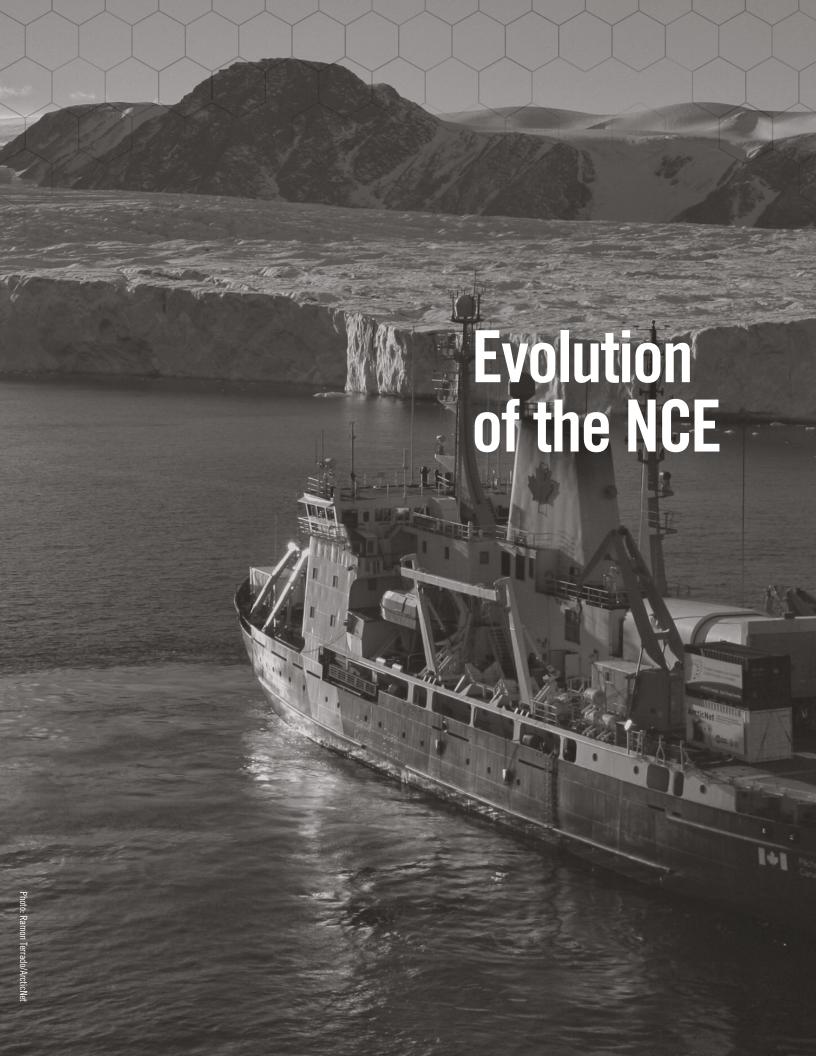
Accelerating commercialization

- Domain Therapeutics of France is establishing a new subsidiary in Montréal to commercialize a biosensor technology that was licensed from IRICoR and developed with funding from CQDM. The agreement gives Domain Therapeutics co-exclusive access, with AstraZeneca, Merck and Pfizer having access via their participation in CQDM.
- IRICOR and another CECR, the Centre for Commercialization of Regenerative Medicine (CCRM), are launching a new company to commercialize technologies developed at both IRICOR and CCRM.
- Technologies developed at any of MI's member institutions can be brought into CDRD for further development, under an agreement between the two CECRs. If scientific milestones are met, then CDRD's investment arm, CDRD Ventures, or MI will step in to commercialize the technologies.



"... shrinking that gap between the academic world and the front line practice world..."

- **Timothy Crooks**, Executive Director, Phoenix Youth Programs





Evolution of the Networks of Centres of Excellence program

MEETING THE NEEDS OF USER COMMUNITIES THROUGHOUT CANADA

NCE PROGRAM GOAL

To mobilize Canada's research talent in the academic, private, public, and not-for-profit sectors and apply it to the task of developing the economy and improving the quality of life of Canadians

INGREDIENTS FOR SUCCESS

- Good governance and management models to allow fast ramp-up of activities, strategic planning that meets the needs of partners, and ongoing assessment of the research programs
- Solution-driven research that engages the right mix of partners and end-users to accelerate the creation and application of new knowledge
- · Mobilizing world-class, multidisciplinary research capacity from across Canada
- Training the next generation of highly qualified people
- Leaving a legacy of lasting value and long term impacts beyond the conclusion of NCE funding

NEW FEATURES

- A revised funding cycle of two, five-year terms with the possibility of a third term
 that addresses the knowledge translation needs of the partners. This replaces
 the cycle of two seven-year terms, enabling networks to receive feedback earlier
 and make adjustments if needed.
- Annual review of progress by the NCE Monitoring Committee to replace the mid-term review
- Detailed information required on governance, management and first year ramp up of activities
- In-person meeting with the Standing Selection Committee to assess leadership
 of the proposed Board Chair and Scientific Director
- Detailed Knowledge Transfer, Exchange and Exploitation strategy to maximize the application of new knowledge
- Solution-driven networks to advance knowledge and/or technology for the benefit of Canadian society
- A Standing Selection Committee, modelled on the NCE Private Sector Advisory Board, to enhance and ensure continuity in the review processes of all NCE networks

NCE-KM GOAL

To further the application and mobilization of world-class research to benefit end users by supporting networking and collaboration between well-established research teams and knowledge users.

INGREDIENTS FOR SUCCESS

- Strategy for knowledge mobilization that involves end user communities
- A drive to address key problems, challenges and opportunities of strategic importance to end user communities, and Canadians in general
- Excellence and composition of the proposed network team (e.g. multidisciplinary and multi-sectoral)
- Stakeholder engagement (through knowledge mobilization, and financial and in-kind commitments)
- Good governance and management (through accountability, proven track record, detailed budget and the participation of end user communities)



Q&A with Peter Nicholson

CHAIR, NCE STANDING SELECTION COMMITTEE

Made up of international experts with a broad range of expertise, the NCE Standing Selection Committee reviews applications and makes funding recommendations for the Networks of Centres of Excellence program.

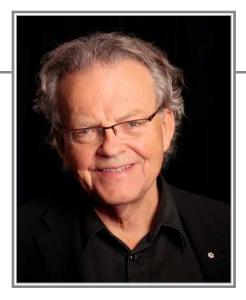
Q: What ongoing needs do the networks fulfill?

A: The NCE program is as relevant today as when it was created 25 years ago. Its networking model, which has been pioneered in Canada, enables big multidisciplinary issues to be tackled that are well beyond the scope and resources of individual academic research teams. An NCE network has proven to be a uniquely effective way to bring generators and users of knowledge together and to create a critical mass of expertise that is otherwise difficult given Canada's huge geography and thin population.

Q: What strengths do you look for in an application?

A: We are disciplined in assessing every application against five main selection criteria, all of which are equally weighted.

- We begin by assessing the quality of the proposed research, its multidisciplinarity and its relevance to Canada's needs. Most applications are strong in this regard, which speaks to the exceptional overall strength of Canadian research.
- Second, we need evidence of networked partnerships involving the right academics and relevant stakeholders.
- Third, we look for a strong and innovative commitment to the multidisciplinary training of graduate students. In fact, the development of highly qualified people is society's most important return on public investment in academic research.
- Fourth, proposals need to demonstrate a practical and well-conceived
 plan for "knowledge translation" turning the academic research
 into something that can be put into practice. Many applicants
 underestimate the difficulty of this task. We believe it's better to
 have a realistic proposal even if it might look modest, than an
 unrealistic one that looks grandiose.
- Last, but by no means least, we look carefully at the management
 and governance plan to ensure proper accountability and absence
 of potential conflicts of interest. Experience has demonstrated that
 having entrepreneurial leadership prepared to commit considerable
 time to the network, is perhaps the single most important factor in
 its ultimate success. And we're always impressed when partners
 come forward with cash contributions rather than just in-kind.



Peter Nicholson is the former president of the Council of Canadian Academies, and has held senior advisory and executive positions in government, banking, telecommunications and fisheries.

Q: How has the program strengthened its focus on knowledge translation?

A: All proposals must include a knowledge translation plan. In addition, the NCE Knowledge Mobilization initiative was launched to support networks that focus on challenges where the solutions are scientifically known, but their implementation is lacking. It's actually very difficult to apply knowledge directly from the academic sphere. Whether it's in hospitals, schools, industry or society generally, the core issue is how to mobilize research-based knowledge to actually change behaviour. The KM networks, which build on the NCE's strong history of knowledge mobilization, are intended to address this challenge by focusing sharply on the people who must put the research results into practice.

Q: How do you measure success?

A: One measure is the creation of highly influential networks, such as ArcticNet and MITACS. The impact of these and other NCEs cannot be adequately measured just in quantitative terms, and a final verdict takes time. You're addressing really big issues that cut across disciplines and stakeholders. But if a network leaves a clear legacy in terms of uptake of its research, or continued operation of key activities after NCE funding ends, these are, to my mind, the most significant indicators of success.



Evolution of the Centres of Excellence for Commercialization and Research and Business-Led NCEs

RESPONDING TO THE NEEDS OF CANADA'S R&D ECOSYSTEM

CECR GOAL

To bridge the gap between innovation and commercialization by matching clusters of research expertise with the business community to bring innovations to market faster

INGREDIENTS FOR SUCCESS

- · Results that provide social and economic benefits to Canada
- · A strong team with business and commercialization expertise
- · Good governance and management models (e.g. accountability and transparency)
- A strong business plan with detailed financial information, revenue projections, risk assessment and a credible path to sustainability
- Committed partner engagement and financial support from a range of sources

NEW FEATURES

- Longer mandates and additional funding opportunities recognize that different centres require different timelines to achieve sustainability.
- Leveraging other government funding recognizes that innovation requires an
 ecosystem of support and commitment from a variety of public and private
 sector partners.
- Better guidance is provided on what makes a strong business plan and a clear financial plan.

BL-NCE GOAL

To address private sector R&D challenges in Canadian research priority areas through the creation of business-led research networks that encourage collaborative private sector investment in R&D, innovation and competitiveness

INGREDIENTS FOR SUCCESS

- Be business-driven with a research program that is managed and directed by the private sector participants and that addresses key issues affecting the performance of their sector.
- Enable businesses to develop, capture and share innovative approaches and new solutions to the challenges identified by working collaboratively with private and public sector participants.
- Increase the scope of the solutions and speed of delivery of the research results through a focus on common goals and pooled resources (expertise, facilities, cash).
- Reduce the roadblocks to commercialization for all participants.
- Use an open approach that encourages engagement of large companies, SMEs, not-for-profits, academia, and government with a plan to integrate new partners as the solutions evolve.
- Generate research results, processes and techniques that directly increase business value and/or produce competitive advantages for the private sector.

NEW FEATURES

- · Program made permanent in 2012
- · Flexible funding: funding available for up to five years
- Opportunity to apply for renewed funding at end of first term (to a maximum of 10 years)



Q&A with Adam Chowaniec

CHAIR, NCE PRIVATE SECTOR ADVISORY BOARD (PSAB)

This panel is made up of seasoned, trusted industry advisors who provide the NCE with expert advice and recommendations related to competitions for the Centres of Excellence for Commercialization and Research and Business-Led NCE programs.

Q: What does the board look for in an application?

A: We focus specifically on the commercial value in applications, as opposed to the value of the science alone. We want to know whether the government is likely to get a good return on its investment. In the early days there was still far too much focus on R&D and not enough focus on outcomes. We're seeing that starting to shift. My priority as board chair is to focus on making the business-facing programs better and that means the commercial outcomes must come first.

Q: Why does Canada need commercialization centres and business-led networks?

A: Canada has excellent R&D but it doesn't always lead to economic or social outcomes. Business-Led NCEs and CECRs are beginning to do that. One way is by linking small companies with academia and larger companies in the supply chain. It demonstrates how direct business support helps to grow small firms into larger companies.

Q: What strengths do you look for in an application?

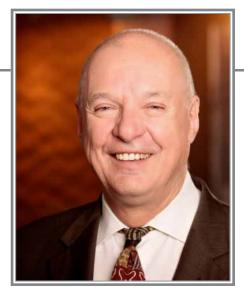
A: For BL applications, we look at the companies that are going to evolve and develop because of this additional R&D. With the CECRs, we're saying this is an opportunity for Canadian industry and researchers to get together and create economic activity that would otherwise not have happened.

Q: How should the private sector be involved with networks and centres?

A: We want to see business leadership behind these programs, including people on the board who understand the business needs and the marketplace. As well as leadership, we're also looking for companies to put cash on the table, not just in-kind contributions, to show they are sharing the risk with government.

Q: How have BL-NCEs and CECRs evolved?

A: For starters, there is a stronger focus on management and business plans. We also recognize that a five-year timeframe for a CECR is too short for them to become sustainable, so we now allow for longer mandates. This is partly because some sectors take longer than others to commercialize a product or service. Advancing the twin objectives of supporting economic growth in a sector, and planning for your own sustainability, is a major challenge.



Adam Chowaniec is a technology industry veteran who has been involved in the creation of over 20 R&D-intensive companies.

Q: How does the board measure success?

A: CECRs have to provide metrics on an annual basis in terms of company creation, jobs created, etcetera. That tells us things are moving forward in the right way but the hard tangible measures that show real economic value will take more time, because these programs are still small and have been operating only since 2007. I think in the next few years we're going to see clear demonstrations of the sustained value from these activities.

Q: How do these programs enable entrepreneurship to flourish?

A: It's through the opportunities we're providing the next generation of researchers — including younger academics and those less experienced in collaborating with industry. We can enhance the understanding of the need for collaboration and how important entrepreneurship is to their careers and to addressing real-world problems. If these centres become sustainable and create strong new relationships between researchers and industry, it will prove to be a very powerful vehicle for encouraging entrepreneurship.



NCE-funded networks and centres

(as of March 31, 2014)

NETWORKS OF CENTRES OF EXCELLENCE

Allergy, Genes and Environment Network – AllerGen

ArcticNet

AUTO21

BioFuelNet

Canadian Arthritis Network - CAN

Canadian Stroke Network - CSN

Canadian Water Network - CWN

Carbon Management Canada - CMC

Graphics, Animation and New Media Canada - GRAND

Marine Environmental, Observation, Prediction and Response Network – MEOPAR

Mprime Network Inc.

NeuroDevNet

Stem Cell Network - SCN

Technology Evaluation in the Elderly Network – TVN

KNOWLEDGE MOBILIZATION NETWORKS

CellCAN Regenerative Medicine and Cell Therapy Network
Children and Youth in Challenging Contexts — CYCC
Promoting Relationships and Eliminating Violence — PREVNet
Smart Cybersecurity Network — SERENE
Translating Emergency Knowledge for Kids — TREKK

CANADA-INDIA RESEARCH CENTRE OF EXCELLENCE

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

CENTRES OF EXCELLENCE FOR COMMERCIALIZATION AND RESEARCH

Advanced Applied Physics Solutions Inc. - AAPS

Bioindustrial Innovation Centre - BIC

Canadian Digital Media Network - CDMN

Centre for Commercialization of Regenerative Medicine — CCRM

Centre for Drug Research and Development - CDRD

Centre for Imaging Technology Commercialization — CIMTEC

Centre for Probe Development and Commercialization — CPDC

Centre for Surgical Invention and Innovation — CSII

Centre of Excellence in Energy Efficiency – C3E

Centre of Excellence in Personalized Medicine — Cepmed

GreenCentre Canada — GCC

Institute for Research in Immunology and Cancer — Commercialization

of Research - IRICoR

Leading Operational Observations and Knowledge for the North – LOOKNorth

MaRS Innovation - MI

MiQro Innovation Collaborative Centre – C2MI

Ocean Networks Canada Innovation Centre - ONCIC

Pan-Provincial Vaccine Enterprise - PREVENT

TECTERRA

The Prostate Centre's Translational Research Initiative for Accelerated

Discovery and Development – PC-TRIADD

Wavefront

BUSINESS-LED NETWORKS OF CENTRES OF EXCELLENCE

Canadian Forest NanoProducts Network — ArboraNano

Green Aviation Research and Development Network - GARDN

PreThera Research

Quebec Consortium for Drug Discovery – CQDM

Refined Manufacturing Acceleration Process — ReMAP

Sustainable Technologies for Energy Production Systems - STEPS

Ultra Deep Mining Network - UDMN





Networks of Centres | Réseaux de centres of **Excellence** of Canada | d'**excellence** du Canada

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