



NCE RCE

WHAT IF...



Government of Canada
Networks of Centres
of Excellence

Gouvernement du Canada
Réseaux de centres
d'excellence

Canada

TURNING WHAT IF... INTO SOLUTIONS

Canada has the scientific expertise to solve many of the challenges facing our country.

We also have a proven model for connecting that knowledge, skills and experience—wherever it may be—and putting it to work on the ‘what ifs...’ that matter most to Canadians. The NCE funds more than 40 research networks, commercialization centres and knowledge mobilization networks focussed on doing exactly that.

Our networks and centres draw on the thousands of researchers and students in our universities, colleges and polytechnics, and connect them to companies that need innovative solutions to compete and grow, and to grassroots organizations and decision makers who need evidence-based solutions to build healthier, safer and more sustainable communities.

What our stakeholders and partners like about the NCE:

- Access the best talent and resources
- Field-test ideas under real conditions
- De-risk technology for investors
- Shrink the gap between academia and front line practice
- Protect intellectual property
- Verify market potential
- Access critical R&D funding and mentoring

The NCE is an initiative of:



SSHRC CRSH



BioCanRx investigators developing and testing the potential new therapy (from left): Brian Lichty, McMaster University; Derek Jonker, The Ottawa Hospital; David Stojdl, CHEO Research Institute; and John Bell, Scientific Director, BioCanRx.

WHAT IF... A VIRUS COULD CURE CANCER? BioCanRx

More than 50 Canadians with lung cancer will participate in a world-first trial that combines two viruses with an antibody therapy to strengthen and train the body's immune system to find and kill cancer cells. BioCanRx is providing strategic funding to support the trial and pharmaceutical-grade virus manufacturing facilities in Ontario. A new biotech company, Turnstone Biologics Inc., has hired a veteran biotech executive and raised \$11.3 million in Series A funding (with follow-on capital committed in excess of \$20 million) with a Toronto venture capital firm to test the vaccine platform, which has been shown to shrink tumours in animals and in human tumour samples. Clinical trials at multiple sites across Canada are targeted to begin by the end of 2016. Other partners include the Ontario Institute of Cancer Research, a major pharmaceutical company and the Ontario Lung Association.

“BioCanRx has been an invaluable partner in helping the founding scientists and academic institutions advance the technology to a point where investors could be brought in. We look forward to continue working with BioCanRx as we begin to test this combination therapy, which could provide new hope to patients with lung cancer, but also prove useful for all forms of cancer.”

Sammy Farah, CEO, Turnstone Biologics Inc.



Simple, mobile and wearable technology keeps emergency responders connected.

WHAT IF... WEARABLE TECH COULD HELP POLICE?

Wavefront

The RCMP contacted CommandWear Systems following the June 2014 shooting rampage that killed three police constables in Moncton, NB and the fatal shooting of a Canadian soldier at the National War Memorial in Ottawa just four months later. They were interested in a new wearable technology—developed with support from Wavefront—that allows responders to stay in contact with each other via text and video, and enables commanders and dispatchers to locate and communicate with their team in real time—in any situation. The software works on smartphones and smartwatches, and requires just minutes of training to learn. It even works when cellular networks are overloaded or unavailable. Several Canadian responders are now using the technology, including the RCMP, with interest growing within the U.S. intelligence community and public safety agencies worldwide.

“Our software platform provides a cost-effective and easy way for first responders to remain heads-up and hands-free to do their job. Wavefront was invaluable in helping us to get to this stage.”

Mike Morrow, CEO, CommandWear Systems



The interior of the mobile water treatment plant at Lytton First Nation, BC.

“It is important for the success of the project to have sufficient community input during the design phase. In our case, we required a cost-effective system that could handle our source water challenges, and one that could be operated reliably using the resources we have in the community.”

Jim Brown, Maintenance Manager and Operation Supervisor, Lytton First Nation



Queen's University graduate student and Mitacs Accelerate intern Carmela Paolozza tests a young child using SR Research's EyeLink eye-tracking technology.

Photo: Katelyn Verstraten

WHAT IF... AN EYE TEST COULD SCREEN BABIES FOR FASD?

NeuroDevNet

NeuroDevNet-supported researchers have made two groundbreaking discoveries that could lead to a less expensive and faster screening tool to identify young children, and even infants, with fetal alcohol spectrum disorder (FASD), and other neurological and psychiatric disorders such as attention deficit hyperactivity disorder, Parkinson's disease and autism. In a global first, the Queen's University team showed that children exposed to alcohol before birth have less control over their eye movements than typically developing children. They then collaborated on the development of analysis tools that allow an eye-tracking system made by Canada's SR Research Ltd. to be used as a high-performance, low-cost screening tool. Hundreds of children from across Canada have already participated in these studies, and new research is examining if the same approaches can be used in infants as young as 12 months. Early detection and intervention can significantly improve a child's quality of life and reduce health care costs.

“From the perspective of SR Research, the FASD discovery can not only save years of frustration in the lives of patients, and give them hope for leading more fulfilling lives, but it represents a potential new market opportunity for our company. It is our hope that NeuroDevNet will be instrumental in bringing together researchers with industry to prove the concept and produce the rigorous evidence needed to help bring a screening product to market.”

William Schmidt, Director of Sales, SR Research Ltd.

SOLUTIONS GROUNDED IN EVIDENCE AND COLLABORATION

Two of Canada's greatest science, technology and innovation advantages are its knowledge and talent. The NCE brings together the creativeness and inventiveness of health, natural and social scientists and engineers to create a critical mass of expertise focusing on specific challenges. The NCE connects these knowledge makers with knowledge users to accelerate the creation and application of proven solutions.

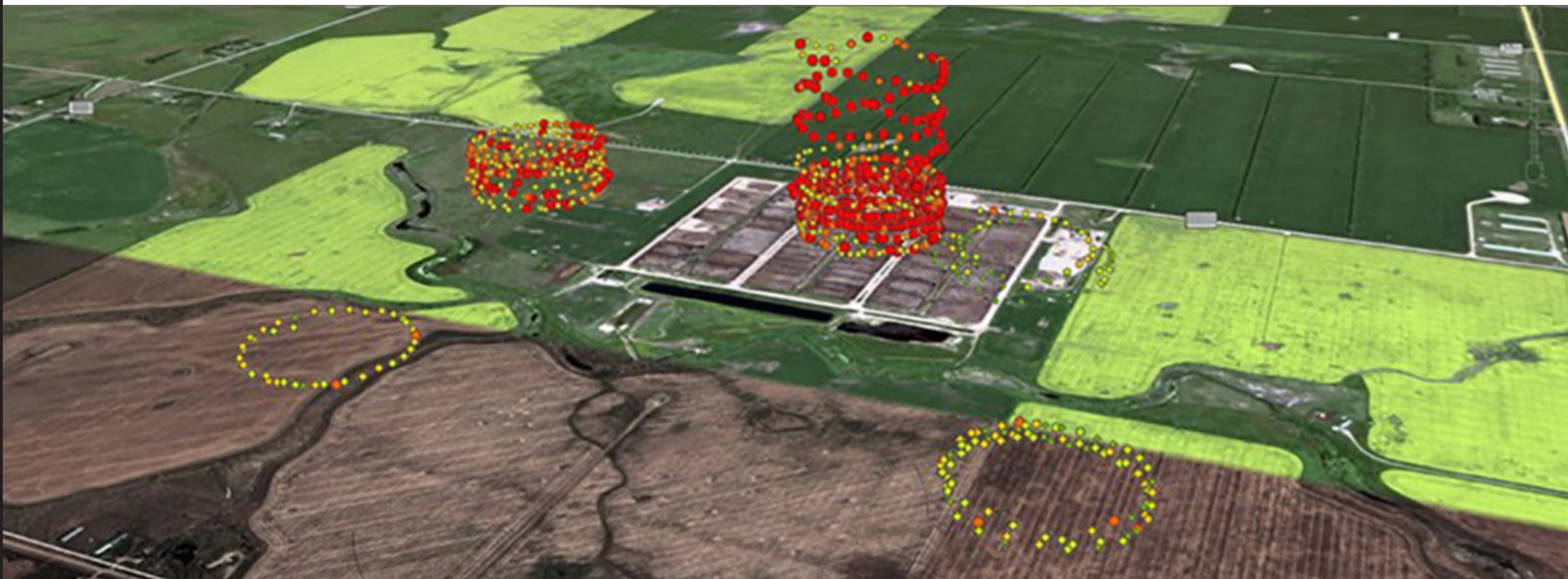
In 2014-15, NCE networks and centres published **3,858 articles** (including 2,353 that were peer-reviewed).

3,858 PUBLICATIONS
2,353 PEER-REVIEWED ARTICLES

NCE-funded organizations were engaged in **4,615 partnerships** in 2014-15, including with academic institutions, the private sector, government and not-for-profit organizations.

4,615 PARTNERSHIPS

Groups such as the AGE-WELL NCE's Consumer Advisory Committee and the CANet NCE's Patient Advisory Committee are among those that ensure the needs of end users are front-and-centre in developing research agendas.



WHAT IF... GAS PIPELINES WERE SAFER?

LOOKNorth

Monitoring Canada's vast network of more than 242,000 km of gas pipelines, and much more globally, is about to get easier and less expensive. In 2015, LOOKNorth brought together two Alberta companies, Boreal Laser and Ventus Geospatial, to field test a new low-powered sensor that can be mounted on drones to detect natural gas leaks which can cause both loss of life and loss of revenue. The trial, jointly funded by LOOKNorth and Cenovus Energy, demonstrated the ability of the Ventus drone platform equipped with Boreal's GasFinder AB™ laser system to detect leaks while flying over a gas pipeline in Alberta. Boreal Laser credits LOOKNorth's support with reducing its development time by half. The product, now available commercially, can also monitor greenhouse gas emissions from other large-scale infrastructure.

"LOOKNorth's support allowed us to improve on our already functional GasFinder2, rebuilding it with all-new electronics and optical hardware plus a clever, user-friendly interface. GasFinder AB is much better adapted to use in remote field environments. It's convenient, reliable and easy to use. LOOKNorth's Technology Validation Program has helped us achieve a product that is much more attractive to end users."

Hamish Adam, President, Boreal Laser

MATCHING COMPANIES WITH TOP TALENT

Graduate students and post-doctoral fellows with NCE experience are among the best trained and most job-ready employees anywhere. They participate in research with real-world applications. They understand industry priorities and timelines. They work in large teams, often with end users and colleagues from other scientific, technical and business fields.

And, most importantly, they know how to get results!

NCE networks and centres supported more than **2,400 research staff and research trainees** in 2014-15.

2,400
RESEARCH STAFF
& RESEARCH TRAINEES

In 2014-15, the Industrial R&D Internship program supported **1,132 internships** (944 interns) in **677 companies**.

**1,132 INTERNSHIPS AT
677 CANADIAN COMPANIES**



WHAT IF... FIREFIGHTERS COULD SEE THROUGH DARKNESS AND SMOKE?

MiQro Innovation Collaborative Centre

Firefighters and search and rescue teams will be among the first to benefit from a military-grade technology that uses infrared light to see through smoke, fog and darkness. On track for commercial launch in 2016, the new Calibir™ camera from Teledyne DALSA was designed and manufactured in partnership with the MiQro Innovation Collaborative Centre (C2MI) in Bromont, Quebec. C2MI is the only facility in Canada to offer "wafer level packaging"—a cutting-edge assembly process that makes it possible to mass manufacture smaller, less expensive but higher performance electronic products. Other applications for the new camera include cell phones, heat loss detection in buildings, vehicle vision systems, surveillance and security.

"Having local access to advanced packaging technologies is critical to our projects. C2MI also makes it easier to network with suppliers, contractors and especially some of the brightest young minds at Quebec universities. These students work with our engineering teams on projects with important commercial applications."

Marc Faucher, Director, Product Development Solutions,
Teledyne DALSA Semiconductor



 *Wisdom2Action participants in Calgary.*

WHAT IF... YOUTH DIDN'T CHOOSE RADICALIZATION?

Children and Youth in Challenging Contexts

Grassroots groups from across Canada have begun sharing their most effective tactics for steering youth away from violent extremism. The Children and Youth in Challenging Contexts (CYCC) Network brought together over 30 community, religious and youth leaders, youth workers, law enforcement officials, academics and government representatives in Calgary. Participants in the March 2015 event are working to develop a checklist to assess both risk and resilience factors associated with youth radicalization, as well as potential policy responses. CYCC Network's *Wisdom2Action* events in other cities have focused on issues such as indigenous youth suicide and gang violence.


"The Calgary event provided an opportunity to network and share ideas with groups from other cities that are dealing with similar issues. It leads to better communications, better information sharing and new ideas for building resilience in young people."

Chelby Daigle, Editor in Chief, Muslim Link; Community Police Action Committee Administrator, Ottawa Police Service

WHAT IF... MINES WERE FREE OF DIESEL EXHAUST? Ultra-Deep Mining Network

Industrial Fabrication Inc.'s new battery-powered electric vehicle that bolsters the business case for deep underground mining, while creating a cleaner and healthier environment for miners, will hit the market in 2018. With support from the industry-led Ultra-Deep Mining Network, the Sudbury, Ontario manufacturer partnered with FVT Research Inc. of Pitt Meadows, BC to develop a new electric motor that can replace existing diesel engines in heavy-duty utility vehicles. This world first significantly reduces ventilation costs—which account for 30-50% of a deep mine's (over 2.5 km) operating expenses—as well as fuel and maintenance costs.



 Industrial Fabrication's first electric vehicle for underground mining is the MINECAT UT150-EMV. UDMN is supporting development of a new electric motor for even larger heavy-duty utility vehicles.

“Having UDMN's support has been critical to this project. Not only did they provide funding for research and development, they also linked us with some of the big mining companies who are very important customers to us.”

Keith King, General Manager, Industrial Fabrication Inc.

HELPING COMPANIES GROW

Prosperity depends on having an innovative private sector that invests in activities that make companies more productive and more competitive. The NCE's strategic support of incubators, accelerators and other business-building initiatives helps companies convert knowledge into new products and processes that generate jobs, new global markets and wealth.

NCE grants generated more than **\$186 million** in partner investments in 2014-15. The CECR program led the way in leverage capacity, drawing **\$1.80 in partnership** contributions for every **\$1** of federal investment.

\$1 \nearrow **\$1.80**
\$186 MILLION

Network and centre activities led to issuing **106 patents** and granting **43 licences** in 2014-15.

106 & **43**
PATENTS **LICENCES**



“TREKK has formalized and nationalized a process that identifies the truly high-impact conditions that emergency physicians need to hear about.”

Sarah Reid, PERC representative; Pediatric Emergency Physician; and Co-lead of the Children's Hospital of Eastern Ontario Emergency Department Outreach Program

WHAT IF... OUR CHILDREN RECEIVED BETTER EMERGENCY CARE? TREKK

Up to 85% of children who need emergency care in Canada are treated in general hospital emergency rooms whose staff may lack specialized pediatric training or easy access to evidence-based resources—but not for much longer. The TRanslating Emergency Knowledge for Kids (TREKK) network has so far linked 37 general ERs in nine provinces and one territory with their closest pediatric centre through a partnership with Pediatric Emergency Research Canada. Together, they have planned training sessions and meetings to share resources and the latest research to improve pediatric emergency care across the country.