

NRC Technology Clusters

COMMUNITY INNOVATION, ECONOMIC GAIN

Through dynamic and rapidly growing technology clusters, the National Research Council advances world-class R&D in collaboration with Canadian communities. Using its research facilities as hubs for community innovation, NRC partners with universities and industry to inject local drive into the Canadian economy.

TINY PARTICLES, COLOSSAL GOALS

Nanotechnology applies the science of controlling tiny pieces of matter—atoms and molecules—to produce revolutionary products and processes. Although still in its infancy, nanotechnology has produced a wide range of improved consumer products such as sunscreen lotions and golf clubs, and has potential to alter the way we make everything from transistors to skyscrapers.

Aware that the worldwide market for nano-goods and services could reach an astonishing \$1.5 trillion U.S. annually by 2015, industry and university communities are eagerly partnering with NRC to leverage its R&D expertise.

with more than 100 university scientists and 120 NRC researchers and staff. NINT, and the partnerships it engenders, secure Edmonton's position as Canada's foremost nanotechnology cluster—and are driving the region to the forefront of nanotechnology R&D globally.



Establishing a cluster champion

The Edmonton cluster consists of 19 commercial organizations with world-renowned expertise in specialized nanoscience-related areas. In 2003, NRC helped initiate a formal partnership among industry, the University of Alberta, and the Government of Alberta. The result is NanoMEMS Edmonton, a vibrant cluster champion committed to building R&D capacity in 'small tech' not only among local members, but also with similar public-private partnerships around the world.

Edmonton— Nanotechnology

NRC's bold decision to construct a state-of-the-art \$120 million National Institute of Nanotechnology (NINT) in Edmonton was taken to achieve a very specific objective: to secure Canada's position at the vanguard of nanotechnology research worldwide.

NRC's new institute is already a hub for Edmonton's rapidly expanding nanotechnology cluster. Established in 2001 as a partnership among NRC, the University of Alberta and the Alberta and federal governments, NINT has the capacity to house 30 principal investigators who will collaborate



Assisting with industrial research

The NRC Industrial Research Assistance Program—aimed specifically at helping small- and medium-sized businesses develop technologies for market—contributes funding and expertise to all NRC clusters, including Edmonton's.

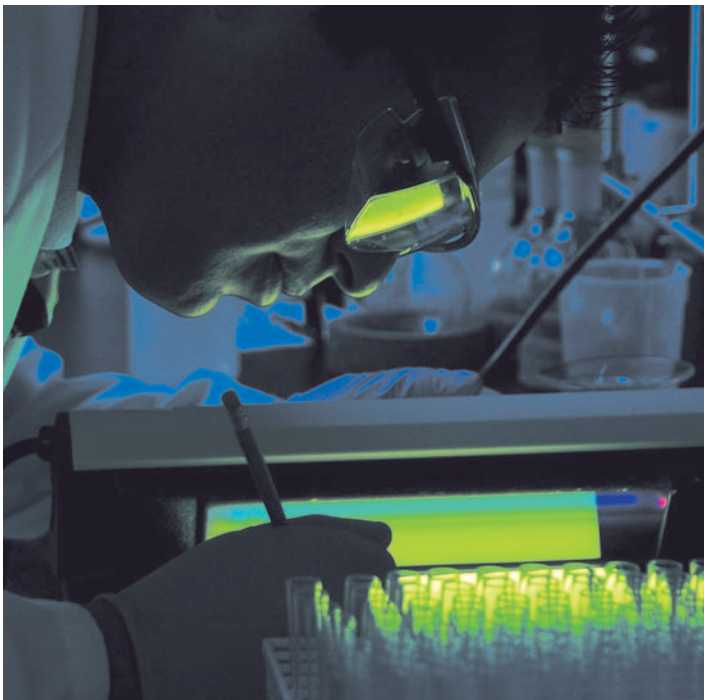
The program has been involved in a host of cluster R&D infrastructure projects that have included partnering with major players, including:

- NINT
- The Government of Alberta
- local universities
- the Alberta Foundation for Science and Engineering Research and Alberta Heritage Foundation for Medical Research
- Microsystems Technology Research Institute
- Informatics Circle of Research Excellence
- ACDC Alberta Cancer Diagnostics Centre
- the Edmonton Economic Development Corporation
- NRC research institutes across Canada



“By choosing Edmonton as the home of its flagship nanotech lab, NRC has rightly acknowledged the strength of our community’s nascent, but rapidly expanding small-tech cluster. Adding NINT to Greater Edmonton’s already considerable research infrastructure and established commercial enterprise community will ensure the region attains its goal of becoming one of the leading nanotechnology centres in the world.”

Leigh Hill, Director, NanoMEMS Edmonton



Uniting key players

NRC has a proven track record of bringing nanotechnology organizations together around common research and commercialization strategies. In 2002, NRC initiated a cluster development Round Table to forge links between NINT and key community stakeholders, including Syncrude Canada Ltd. To ensure the cluster community shares NRC's vision and strategic direction, NRC representatives sit on the steering committee of NanoMEMS Edmonton, on the advisory board of the Microsystems Technology Research Institute, and on the board of directors of CMC Microsystems—all major players that foster growth and company creation around commercially promising NINT technologies.

Building research capacity

NRC and the University of Alberta are committed to recruiting top-flight nanotechnology researchers from across Canada and around the world. For example, NINT's unique staffing structure—principal staff may split their time between teaching at the university and leading research groups—has already attracted several leading nanotechnology researchers to Edmonton.

FACTS AT A GLANCE

- NRC aims to make its National Institute for Nanotechnology (NINT) one of the world's top-five nanotechnology research labs by 2010.
- NINT is the most technologically-advanced research facility in Canada.
- The worldwide market for nano-goods and services could reach an astonishing \$1.5 trillion U.S. a year by 2015.
- Between them, NRC and the University of Alberta have 55 research teams, comprised of more than 400 researchers, post-docs, technical officers and graduate students, working in the field of nanotechnology.
- A nanometer is one billionth of a meter, or 1/80,000 the diameter of a human hair.



COMMUNITY ENGAGEMENT

- 2001—Prime Minister of Canada and Premier of Alberta unveil \$120 million plan for NINT
- 2001—NRC, University of Alberta and Government of Alberta sign Memorandum of Understanding
- 2002—NRC initiates cluster development Round Table
- 2003—NanoMEMS Edmonton created
- 2003—NRC unveils design plans for NINT
- 2003—NINT begins construction of Canada's quietest research laboratory
- 2004—NINT hosts Canada's first-ever NanoForum Canada
- 2004—NINT purchases unique transmission electron microscope
- 2005—NINT hosts Canada's third annual Nano-Medicine Workshop
- 2005—Announcement of NINT Innovation Centre which includes 15 rental lab and office spaces for collaborators

Best available science and technology literature

NRC is a world leader in electronic publishing, and Canada's largest and best resource for scientific, technical & medical information. NRC's information specialists are highly active in Edmonton's nanotechnology cluster, offering clients access to the same top-notch document-delivery services NRC scientists enjoy. Users can take advantage of:

- pioneering technical information
- literature searches
- cutting-edge industry and market information
- patent information
- rapid delivery of up-to-date full text articles from online sources
- referrals to industry experts or organizations

NRC'S CLUSTER PARTNERS

- University of Alberta
- Government of Alberta
- NanoMEMS Edmonton

CUTTING-EDGE FACILITIES

Of the original \$120 million invested in NINT, one-third was earmarked to construct one of the quietest buildings in Canada. NINT offers lab space with ultra-low vibration and minimal acoustic noise or electromagnetic interference. These are conditions critical to conducting nanotechnology research and fabrication—and to attracting world-class scientists as research collaborators.

The six-storey, 20,000-square-metre facility has specialty labs for chemical and biochemical synthesis and analysis of atomic-scale structures. NRC has installed more than \$40 million worth of state-of-the-art scientific equipment, including a transmission electron microscope equipped with a cold-field emission gun.



NRC Technology Clusters

GLOBAL REACH—LOCAL TOUCH

NRC has played a critical role in the development of emerging and mature clusters, acting as a catalyst for technological progress and economic growth in every region of Canada. Its successful clustering model encourages and supports local strengths while leveraging NRC's national and international resources, science and technology capabilities, networks and partnerships. This proven approach ensures that each cluster can develop according to its unique needs, opportunities and challenges.

Committed leadership

Successful clusters need staying power, often taking decades to mature. The building process must be community-driven and focused, and must have the support of effective networks and committed local champions.

For many years, NRC has distinguished itself as an effective catalyst for cluster development, providing not only R&D expertise, but also the leadership clusters need to move research out of the lab and put it to work for Canada's economy.

NRC stimulates the growth of world-class technology clusters, putting its leading-edge research to work in innovative communities across Canada.



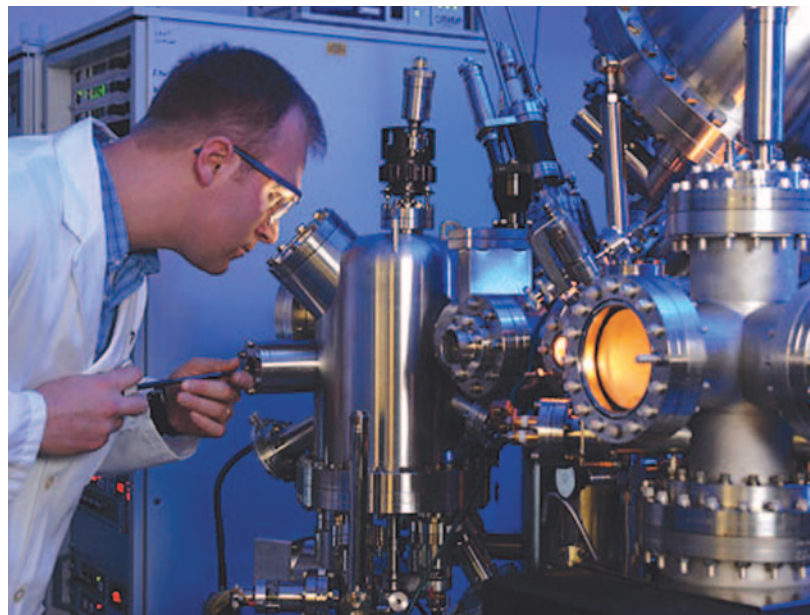
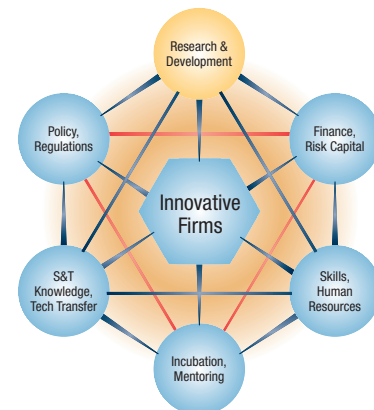
● NRC Technology Cluster Initiatives

Delivering results

Clustering is a term economists have borrowed from science to describe the significant concentration of innovative companies around a nucleus of R&D facilities in a single locale—the ideal environment for innovation to flourish.

A key ingredient is the presence of a science and technology anchor—usually a government research institution or a university—able to work with local companies, transfer technology and spin off new enterprises.

Innovative, knowledge-based firms act as a magnet, attracting others with technical and business expertise to locate and invest in the area. Over time, partners grow into a critical mass of skilled people, capital and entrepreneurial drive.



GREAT PEOPLE, GREAT MINDS

Recognized globally for cutting-edge research and innovation, the National Research Council helps Canada create a world-class, knowledge-based economy. NRC is home to nearly 4,000 creative and skilled people held in highest regard by their colleagues and collaborators worldwide. NRC employees have earned international acclaim for excellence and for winning innovations – their honours include a Nobel Prize, an Academy Award, and helping Canada capture Olympic Gold.

<http://nint-innt.nrc-cnrc.gc.ca>

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