

NRC · CNRC

*From Discovery to Innovation...*

COMMUNITY-BASED INNOVATION  
*teamwork*

Building Technology Clusters across Canada



National Research  
Council Canada

Conseil national  
de recherches Canada

Canada

## **NRC VISION**

Recognized globally for research and innovation, NRC is a leader in the development of an innovative, knowledge-based economy for Canada through science and technology.

This Vision is founded on five strategic pillars:

### **Outstanding People – Outstanding Employer**

Recognition as a leading research organization distinguished by creativity and innovation

### **Excellence and Leadership in R&D**

Integration of public and private strengths to create new opportunities and meet national challenges for Canada

### **Technology Clusters**

Development of the innovative capacity and socio-economic potential of Canada's communities

### **Value for Canada**

Commitment to the creation of new technology-based enterprises, technology transfer and knowledge dissemination to industry

### **Global Reach**

Access to world-class science facilities, as well as global research and information networks. Stimulation of enhanced international opportunities for Canadian firms and technologies.

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**Cover photo:** Aquaculture netting used at the NRC Institute for Marine Biosciences research station at Sandy Cove, Nova Scotia. Aquaculture is the world's fastest growing agri-food business and accounts for more than 40 percent of the revenues generated from fisheries worldwide. In Canada, aquaculture production has tripled since 1989 and continues to expand at a rate of about 15 percent per year. The Canadian aquaculture industry is now on pace to exceed \$1.5B in sales by 2005.

# Building Technology Clusters across Canada

## Stimulating Community-Based Innovation

Clustering is a term that economists have borrowed from science to describe the growth of a significant concentration of innovative companies around a nucleus of R&D facilities, such as those provided by a university or a leading-edge government laboratory.

In a successful cluster, business entrepreneurs, R&D leaders, government representatives and the financial community come together to discuss needs, generate new ideas and create commercial opportunities. Fuelled by

innovation, the cluster becomes a hotbed of investment and technology transfer. The success of one company attracts

another, and another – eventually building a critical mass of skilled people, expertise, capital and entrepreneurial drive. Such an environment helps create local jobs and fuels economic growth in a region. Overall, clusters contribute to a higher quality of life for the community, the region and the country.

Communities such as Montréal, Ottawa and Saskatoon have seen the tremendous growth that can occur when industry leaders and researchers come together to identify needs and develop solutions.

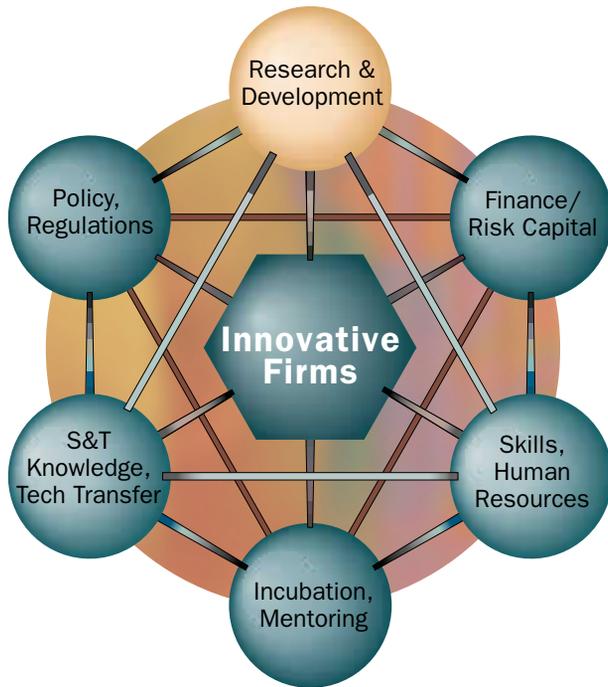
With its world-class R&D, its Industrial Research Assistance Program (NRC-IRAP) to provide technology advice and support to SMEs, and the Canada Institute for Scientific and Technical Information (NRC-CISTI) as a national knowledge resource, NRC plays a leading, dynamic role in many Canadian communities.

“Competitive cities and healthy communities are vital to our individual and national well-being, and to Canada’s ability to attract and retain talent and investment.”

– *Speech from the Throne, September 30, 2002*



# teamwork



Technology clusters are powerful drivers of regional innovation and economic development. By applying the cluster-building approach, many Canadian communities are poised to make a major entrance into the global knowledge-based economy.

Today, helping stimulate the growth of technology clusters in communities across Canada has become an integral part of NRC's business. NRC's research institutes and networks have become central hubs to bring local and regional interests together with groups of innovative companies around a common area of technology defined by the community.

## Resource Attraction

NRC's cluster-building efforts attract highly qualified resources, secure valuable talent for Canada and help stimulate growth in Canadian communities.

NRC's Track Record for 2002–2003 Includes:

- ▶ NRC IAR Aerospace Manufacturing Technology Centre, Montréal – 10 new hires
- ▶ NRC Institute for Information Technology-e-Business, Fredericton, Moncton, Saint John – 10 new hires
- ▶ NRC Aluminium Technology Centre, Ville Saguenay – 15 new hires
- ▶ National Institute of Nanotechnology, Edmonton – 20 new hires
- ▶ NRC Institute for Fuel Cell Innovation – 13 new hires

## Highlights of Community Innovation Initiatives

### **IT/e-Business – Fredericton, Moncton, Saint John and Sydney**

Integrating regional strengths to build a competitive IT/e-business cluster.

### **Nutrisciences and Health – P.E.I.**

Growing research capacity in bioactive compounds from marine and other sources.

### **Life Sciences – Halifax**

Building enabling technologies and integrating players in the fields of genomics for aquaculture, marine biosciences and brain repair.

### **Ocean Technologies – St. John's**

Creating new opportunities for ocean engineering locally, nationally and internationally.

### **Aluminium Technologies – Ville Saguenay**

Building value-added manufacturing in a region housing 95 percent of Canada's aluminium players.

### **Aerospace, Biopharmaceuticals, Industrial Materials – Montréal**

Building infrastructure to assist SMEs in Canada's largest aerospace and biopharmaceuticals clusters, investigating novel materials and manufacturing techniques.

### **IT, Life Sciences, Photonics – Ottawa**

Contributing to cluster activities in information technologies, life sciences, photonics and optoelectronics.

### **Medical Devices – Winnipeg**

Advancing medical technologies, precision and virtual manufacturing.

### **Ag-Biotech, Nutraceuticals – Saskatoon**

Adding new dimensions to this world-leading agro-biotechnology cluster.

### **Nanotechnologies – Edmonton**

Building Canada's R&D capacity, infrastructure and programs in this emerging field.

### **Fuel Cells – Vancouver**

Supporting the development of fuel cell and alternative energy technologies.

### **Astronomy – Victoria, Penticton**

Creating new opportunities in structural engineering, radio engineering and precision instrumentation.

## **NRC – Community Innovation Initiatives across Canada**

NRC is now applying its successful model of cluster development in many centres across the country. NRC's approach ensures that the entrepreneurial spirit in local industry sectors can tap into NRC's primary strengths: R&D expertise, scientific and technical information resources, and innovation assistance programs. In the process, NRC helps Canadian companies make the most of its national and international networks. NRC and its partners are actively expanding research capabilities, building new facilities and augmenting knowledge and industry support networks from coast to coast.

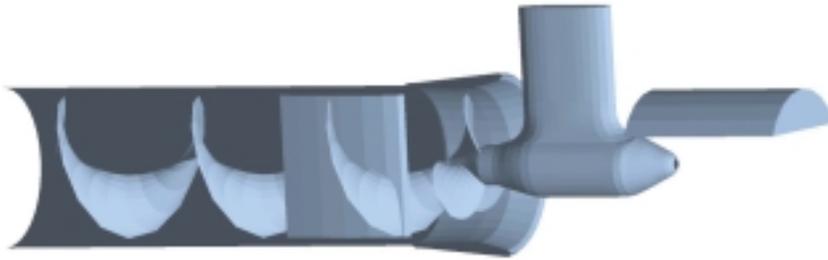
### **Newfoundland & Labrador – Ocean and Marine Technologies**

To support the new ocean technologies cluster in St. John's, NRC began expansion of its core R&D programs to respond to the community's future requirements. NRC completed plans to construct a dedicated Industry Partnership Facility in 2003 to support young entrepreneurs and new ventures. It also increased NRC-IRAP, CTN and NRC-CISTI forces in St. John's to engage and support local SMEs.

In partnership with Industry Canada and a number of public and private sector partners, NRC led the Marine and Ocean Technologies Roadmap Initiative to identify future market opportunities and technology requirements of Canada's marine, shipbuilding and energy sectors. The roadmap delivers on one of the government's commitments announced in *A New Policy Framework for the Canadian Shipbuilding and Industrial Marine Industry: Focusing on Opportunities 2001*.

“Many in the local industry believe the ocean technology cluster is poised to help leverage the sector’s technology capacity for strong export growth based on local research, development and production.”

– Jeff Tulk, President, Newfoundland Association of Technology Industries



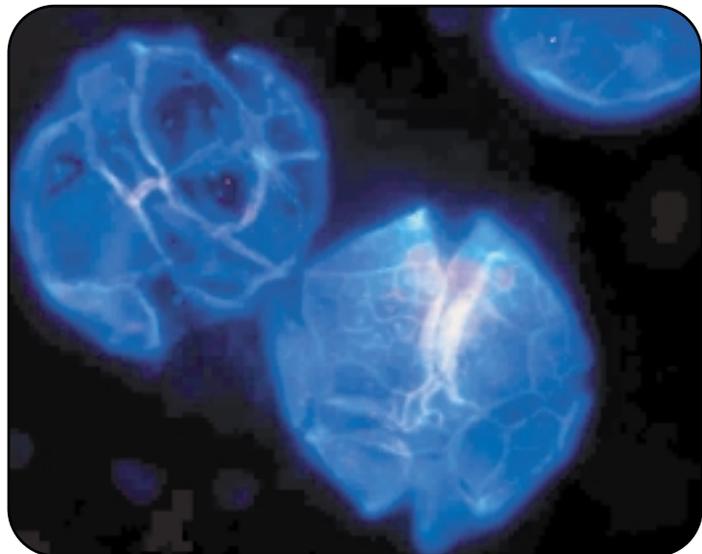
### Prince Edward Island – A Roadmap to the Future

In the February 2003 Federal Budget the Government of Canada announced \$10 million in new funding for the creation of a new NRC research institute focused on the area of bioresources, more specifically nutrisciences. The announcement capped the latest milestone in an ongoing cluster-building effort in the province led by NRC.

NRC co-led an initiative with Atlantic Canada Opportunities Agency (ACOA), the province, university and private sector partners to assess opportunities for P.E.I. to translate its economic strengths in primary resources into a sustainable bioresources technology cluster. The Bioresources Technology Roadmap was completed in March 2002. The exercise considered over 100 opportunity areas and recommended a focus on bioactive compounds from

marine and other sources while taking into account regional strengths and a sustainable development context.

The Steering Committee commissioned supplementary reports on receptor capacity in Atlantic Canada and on the bioresource



**“NRC is a very important part of Halifax’s Life Sciences community. Its world-class research enriches innovation in Nova Scotia and Canada. NRC is a leader.” – Lois Levine, Executive Director, Life Sciences Development Association**

inventory in P.E.I. Follow-up studies pointed to significant health and nutriscience-oriented opportunities in areas such as nutritional genomics. This exercise brought the Atlantic community together around a common vision for the growth of the cluster.

To support the further growth of innovation capacity in the province, NRC has established an NRC-CISTI Information Centre and is expanding its NRC-IRAP and CTN presence. Negotiations were underway at the end of the year to lease long-term space in

Charlottetown to house NRC’s increased activities and pending establishment of a research institute.

### **Nova Scotia – Life Sciences and Marine Biosciences**

The Greater Halifax Region is emerging as one of the “smartest” and fastest growing research centres for life sciences in Canada. Life sciences are one of the province’s most dynamic industries, expanding at more than double the national rate.



Construction of the new Industry Partnership Facility at NRC-IMB in Halifax began in early 2003 and is slated for completion by the end of the year.



**“The National Research Council, through its cluster strategy, is developing the kinds of communities that become magnets for investment and opportunity. This e-business Institute is an important new element of the New Brunswick innovation climate and has a unique role to play in building an internationally competitive technology cluster in New Brunswick.”**

*– The Honourable Allan Rock, Industry Minister*

To support this dynamic sector and help strengthen innovation in the region, NRC has begun to increase its R&D capacity in genomics, proteomics, bioinformatics and advanced imaging. The NRC Institute for Marine Biosciences (NRC-IMB) in Halifax will devote an additional \$15 million to this research. NRC is now building a new Industry Partnership Facility (IPF) at the institute to increase technology transfer and commercialization strengths.

In partnership with Dalhousie University, the Queen Elizabeth II Health Services Centre and the Halifax medical community, NRC is setting up a strong R&D and business presence at a new Brain Repair Centre in Halifax. NRC’s key contributions include the installation and operation of a functional magnetic resonance imaging system and the establishment of fundamental R&D infrastructure and capability for the centre.

The Life Sciences Development Association, established in 2000–2001, has now elected a permanent Board and formed new Executive and Steering Committees.

**New Brunswick – Moving into the e-Business “Big Leagues”**

In 2002–2003, construction finished on the new NRC Institute for Information Technology-e-Business on the Fredericton campus of the University of New Brunswick. The new facility will be home to 40 NRC researchers and a similar number of guest workers, visiting scientists and industrial researchers.

It will be tied closely to NRC institutes and national facilities across Canada as well as being home to an NRC Information Centre. Through an additional \$12 million investment by ACOA and the Government of New Brunswick, the research program also includes e-Business satellite facilities



**Construction of the NRC Aluminium Technology Centre is near completion.**

in Saint John (e-Health focus) and Moncton (e-Learning), and a broadband research network to connect all NRC New Brunswick facilities with partners, and create a truly pan-NRC cluster.

In Cape Breton, NRC has established the nucleus of an IT research group connected to its national IT and R&D strengths. Located at the University College of Cape Breton in Sydney (UCCB), the group is focusing on adapting existing or developing new low-power and low-cost wireless communication technologies for use in dynamically reconfigurable wireless sensor networks. NRC's Wireless Systems research group is located in the Technology Enterprise Centre which will now house some of the group's industrial partners and encourage technology transfer. NRC-IRAP recently initiated an internship program with UCCB that will see up to 10 graduates per year join the NRC research group.

### **Quebec – Aluminium Technology, Aerospace Manufacturing, Biopharmaceuticals**

#### *Aluminium*

NRC moved forward with its value-added aluminium products industry cluster development effort in Ville Saguenay, an initiative led by the Longueuil-based NRC Industrial Materials Institute. Construction began on the NRC Aluminium Technology Centre (NRC-ATC) on the campus of the Université du Québec à Chicoutimi. The centre will provide industry with technical support and expertise needed to develop value-added aluminium-based products and services. The facility is expected to begin operations in the fall of 2003.

R&D will focus on two main areas to support the transformation of aluminium into finished and semi-finished products. NRC-ATC will provide expertise and cutting-edge facilities for

advanced manufacturing processes such as strip casting, assembling and hydroforming. Another key area of research will involve design, control and simulation technologies. These activities will be completed in collaboration with a number of partners. The centre has already made progress on this front, having signed partnership agreements with several SMEs as well as industry giant Alcan for a five-year research project worth \$16 million.

The centre will be home to 60 researchers and 40 guest workers. In addition, about 20 young scientists will be trained at the centre each year – helping build the highly skilled talent Canada needs in this important sector.

### *Aerospace*

In Montréal, NRC made significant progress towards the world-class NRC-IAR Aerospace Manufacturing Technology Centre. Construction took place through most of

the reporting period. The facility, set to open in late 2003, will provide the region with an integrated approach to aerospace manufacturing technology research, development and application. Construction efforts were matched by partnership-building with post-secondary institutions and the aerospace industrial community.

Located on the campus of the Université de Montréal, the new facility will accommodate up to 100 staff and guest workers investigating advanced manufacturing technologies for metal and composite products. The research will focus on next-generation manufacturing with particular relevance to SMEs. The centre will respond to the needs expressed by the industry, including challenges in manufacturing and life cycle costs, environmentally compliant materials, processes and systems, strategic intelligence and information management systems, and the training and development of highly skilled people.



**“Our business is education, education has an imbedded component that’s called research ... I think it was quite visionary to have this facility established here, to combine expertise and excellence established in the two institutes [Carleton University and NRC-IMS].” – Dr. Feridun Hamdullahpur, Vice-President, Research, Carleton University**



### *Bioprocessing*

The NRC Biotechnology Research Institute (NRC-BRI) continued to play a key role in helping bring together key players in support of a growing bioprocessing sector. NRC research expertise played a significant role in the decision by DSM Biologics to plan the creation of a significant new processing facility directly next to NRC-BRI. DSM Biologics, part of the Dutch firm DSM, has maintained a long-term collaboration with NRC-BRI and is a tenant in the institute’s IPF.

NRC-BRI also helped establish links between Montréal and bioprocessing capacity elsewhere in Canada. NRC-BRI helped prepare plans for a Canadian Bioprocessing Research Network which received \$2.2 million in funding from the Natural Sciences and Engineering Research Council. The institute also worked with the Ottawa Life Science Council to establish the Canadian Bioprocess Institute in the Ottawa-Gatineau region.

### **Ontario – Photonics – Light Speed Technology for Canada, Life Sciences**

#### *Photonics*

NRC moved ahead with plans to establish its NRC Canadian Photonics Fabrication Centre (NRC-CPFC) in Ottawa. Groundbreaking for the facility took place in the fall of 2002 and the entire outer shell of the building reached completion by the end of 2002–2003.

The NRC Industrial Research Assistance Program (NRC-IRAP) and the NRC Canada Institute for Scientific and Technical Information (NRC-CISTI) play a significant role across all NRC technology clusters, helping deliver initiatives that allow small and medium-sized enterprises to benefit from NRC research and knowledge networks. NRC-CISTI operates 19 information centres across Canada. Examples of innovative NRC-IRAP initiatives include the Young Entrepreneurs Program in St. John’s, delivered in partnership with the Institute for Marine Dynamics (NRC-IMD), and the Prairie Centre for Business Intelligence, which operates in conjunction with the NRC Institute of Biodiagnostics in Winnipeg and the NRC Plant Biotechnology Institute in Saskatoon.

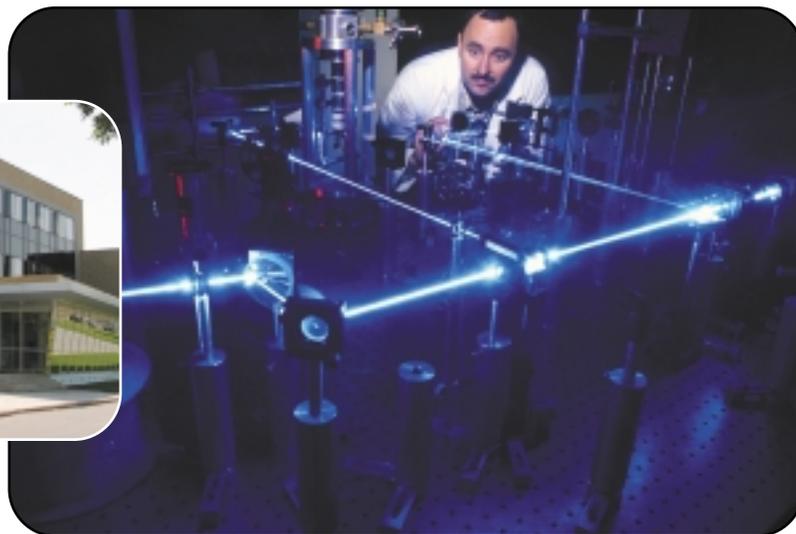
The NRC-CPFC groundbreaking was followed by a full workshop where members of the client community were given a voice in the governance structure of the new facility.

The new centre will focus its initial R&D, design, fabrication and technology transfer activities around new lasers, photonics integrated circuits, detectors and sensors, chips for wavelength division multiplexing and semiconductor optical amplifiers – technology fields with enormous growth potential.

The centre will be a unique national resource designed to give the Canadian photonics industry the competitive edge it needs. It

will provide a facility to develop and test prototypes of new photonics devices, train highly qualified personnel, and serve as a leading-edge R&D resource and network centre for industry and university researchers. Completing the innovation equation, the centre will help address the shortage of personnel in photonics through remote and on-site training, internships and re-skilling programs.

In addition to tying into the strengths of the NRC Institute for Microstructural Sciences and all of NRC's program, network and knowledge resources, the centre will be closely connected to the business and government communities.



### *Life Sciences*

NRC is also helping support the growing life sciences cluster which, itself, is poised to take advantage of convergence with the Information and Communications Technology (ICT) sector in areas such as biophotonics and bioinformatics.

The NRC Institute for Biological Sciences (NRC-IBS) played a key role in cluster activities and was active on a number of fronts. NRC-IBS continued to work with the University of Ottawa and the Ottawa Health Research Institute (OHRI) to put in place the joint NRC-Ottawa University Institute for Proteomics Science. NRC-IBS has continued to build expertise and capacity in proteomics. Renovations of new proteomics laboratories were initiated to double current capacity. An agreement was signed with OHRI and CHEO to acquire CIPHERGEN technology for proteomics R&D applications which was installed in NRC-IBS labs.



**Graphic representation of future IPF at the NRC Institute for Biodevices in Winnipeg**

The Institute also upgraded its mass spectrometry systems to state-of-the-art and to increase capacity, hired additional staff to carry out proteomics research. And NRC-IBS completed major renovations to its Bacterial Culture Facility, which included an upgrade of an existing large scale level 2 (LS2) containment laboratory to an LS3 certification by Canadian regulatory agencies. The move assures that NRC-IBS will continue to have a unique, leading-edge facility for small- and large-scale growth of fastidious bacteria in support of in-house and collaborative projects with external clients.

### **Manitoba – Medical Devices Manufacturing**

The NRC Institute for Biodevices (NRC-IBD) continued to make steady progress towards the creation of a vibrant cluster in medical devices manufacturing. Plans were made for construction of a much-needed IPF, expected to get underway in November 2003. Space currently allocated for industrial tenants is fully occupied.

The IPF will help promote medical diagnostic technologies manufacturing and house spin-offs from NRC and other companies with related manufacturing technologies. It will provide them with access to business support services, commercialization support and linkages to NRC's R&D, knowledge dissemination



Hundreds of patients at Calgary's Foothills Medical Centre have benefited from NRC's unique expertise in intraoperative MRI, which has significantly reduced the need for repeat neurosurgeries.

and industrial research assistance strengths. The IPF will also house a prototyping facility that will support the manufacture of large, high-tech products, such as magnetic resonance imaging (MRI) devices. The entire clustering effort is being defined, coordinated and integrated with key players in the community including Manitoba hospitals, universities, local industry and business partners, and federal, provincial and local economic development organizations.

Significantly, NRC-IBD expertise has begun to spread to other locations to help complement technology development efforts in other centres. In Calgary, NRC-IBD has established a significant research presence with key installations at the University of

Calgary's Experimental Imaging Centre and a specialized intraoperative MRI system at the Calgary Foothills Hospital. The strength of these facilities has attracted significant interest among local companies interested in partnership opportunities. The Neuro-imaging Research Laboratory, to be equipped with NRC's high-field MRI system, will be an important facility within the emerging life sciences cluster in Halifax.

### **Saskatchewan – Crops for Enhanced Human Health, Urban Infrastructure**

*Crops for Enhanced Human Health*  
NRC moved forward with work on a new research program – Crops for Enhanced Human Health – at the NRC Plant



Biotechnology Institute (NRC-PBI) in Saskatoon. The Government of Canada announced \$10 million in funding over five years for this unique initiative.

The world market for these types of crops is expanding rapidly – projected growth is on the order of 10–15 percent annually. The potential market for Canadian firms is estimated to be worth \$1.5 billion within three years. NRC's initiative will enable greater participation by rural communities in these markets.

The program focuses on high-quality crops for enhanced human health, and includes natural health products, functional food

and molecular farming technologies. NRC will support the accelerated growth of a competitive, Prairies-based nutraceuticals/functional foods industry based on its research, technology development and transfer, and NRC-IRAP strengths in the region. As with other NRC cluster efforts, local institutes play a significant role in helping bring together key players to help propel the cluster forward. In the past year, NRC-PBI helped establish Bio-Products Saskatchewan Inc., a non-profit, industry-led sector development agency with a mandate to assist in the growth and development of the industry.

The new program and the recent opening of a new IPF at NRC-PBI are natural fits given

**“The National Research Council has already been a major catalyst for economic growth in the Saskatoon high-tech sector. This facility will build upon the NRC presence in a unique way, while strengthening the Ag-Biotech cluster and Canada’s position as a leader in research and innovation in this field.”**

*– The Honourable Ralph Goodale, Minister of Public Works and Government Services Canada*

NRC’s exceptional track record in nurturing the development of the agro-biotechnology cluster in Saskatoon. A number of government, private sector and university players are already actively moving this cluster initiative forward, including Western Economic Diversification Canada, the Universities of Calgary, Manitoba and Saskatchewan, federal and provincial government agriculture ministries, provincial research organizations, agro-manufacturing/processing companies, and the Saskatchewan Nutraceutical Network – to name a few.

### *Urban Infrastructure*

The February 2003 Federal Budget allocated \$10 million in funding for the creation of an NRC Centre for Sustainable Infrastructure Research in Regina. The initiative will help the city of Regina achieve cost-effective, community-based actions to meet its existing and future infrastructure challenges in sustainable ways, and to become a national centre for environmental infrastructure management research and innovation. Other communities in Canada will benefit by adopting systems proven in and modelled on Regina.

The initiative will also provide competitive advantages to Saskatchewan businesses, especially those in Regina, in the areas of information technology (IT) applications and environmental management technologies. This Centre will be supported by NRC’s Institute for Research in Construction and will be closely linked to regional and national research facilities.

### **Alberta – Nanotechnology Poised to Pay Off for Canada**

The National Institute for Nanotechnology (NINT), a strategic partnership among NRC, the University of Alberta and the Province of Alberta, continued to break new ground. This story is unfolding at a number of levels, including: defining the research direction



for the institute; staffing positions at the new facility; engaging the community in the cluster-building effort; and designing plans for the new laboratory spaces required by NINT.

In the past year, NINT undertook a detailed Research Planning Initiative to identify specific research areas where it could compete and win, which would align with the University of Alberta, and would catalyze innovation in Alberta. The research programs will assemble atoms, molecules, nanoparticles or macromolecules to create new materials, devices or processes with critical lengths between 1 and 100 nanometres. NINT will take a systems level view of



nanotechnology and integrate biological and traditional information systems that:

- ▶ Are self-assembled from components on a surface or self-supported in a liquid;
- ▶ Are powered by local chemical sources;
- ▶ Can be programmed to carry out a specific function or set of functions;
- ▶ Are able to sense and respond to changes in the chemical and/or physical environment.

NINT's temporary facilities were completed in July 2002 and provide laboratory and office space for approximately 45 people. Design for the new building started in May 2002, with construction expected to start in August 2003 for occupancy in July 2005. The new building will include provisions that will make it one of the world's most technologically advanced research facilities. In order to provide the optimal conditions for nano-scale research, "quiet" lab space is absolutely critical.

### **British Columbia – Fuel Cells Lighting the Way**

According to the Canadian Fuel Cell Commercialization Roadmap, the global fuel cell market is projected to reach \$46 billion by 2011, with an annual growth rate of 60 percent. Canada is currently recognized as a world leader in developing fuel cell technologies.

**“Our partnership with NINT is critical. NINT will be a key factor in the emergence of an internationally recognized cluster of nanotechnology researchers and companies in Edmonton and Alberta.”**

*– Gary Kachanoski, Vice President, Research, University of Alberta*



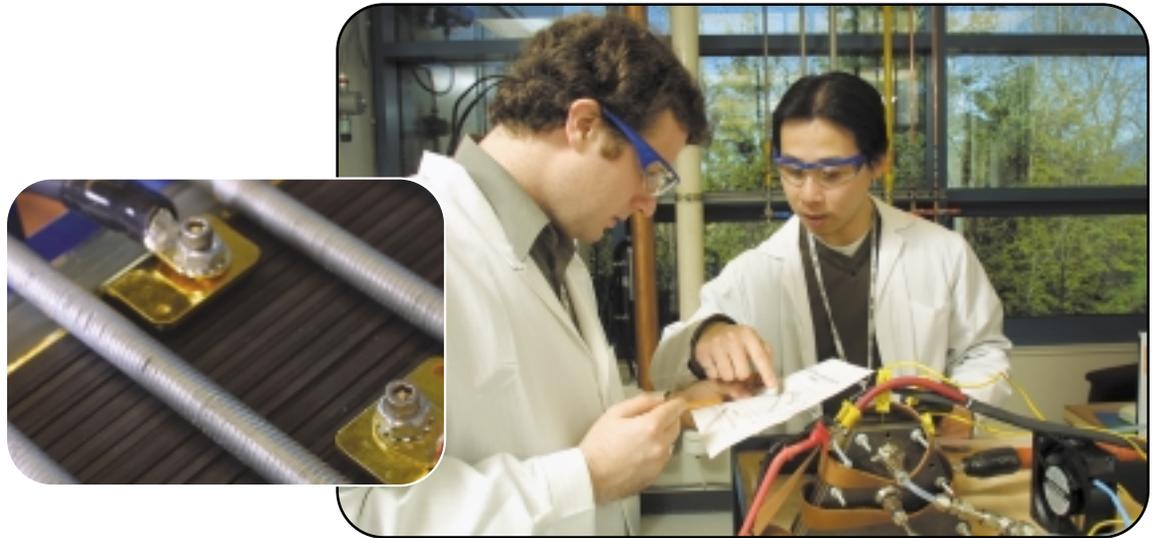
When completed, the NINT building will be one of the quietest, most technologically advanced research facilities in the world, enabling researchers to operate the next generation of electron and scanning microscopes at their extreme limits. The institute will accommodate 120 NRC staff, up to 45 guest workers from industry and universities, and training opportunities for some 275 graduate and post-doctoral researchers.

NRC-IFCI has defined three strategic areas that are important in terms of advancing fuel cell science and technology and facilitating the commercialization of fuel cells. These areas include: Polymer Electrolyte Membrane Fuel Cells; Solid Oxide Fuel Cells; and Systems Integration, Testing and Evaluation.

Launched in 2000, the NRC Fuel Cell Program was created as a horizontal initiative to help Canada capitalize on this opportunity. The program maximizes the use of direct and indirect fuel cell expertise and resources that exist throughout NRC. The program now involves some 50 NRC researchers, six NRC institutes across Canada and representatives from several universities working together in cross-institute teams. The NRC Institute for Fuel Cell Innovation (NRC-IFCI) in Vancouver is the focal point for this initiative.

NRC-IFCI continued to build infrastructure that supports in-house research as well as its growing list of partners. Six new hydrogen-ready labs were completed and put into operation. In addition, funding has been allocated for a hydrogen-ready environmental chamber. The new facility will enable researchers to test and evaluate fuel cell vehicles and products in conditions that simulate a complete range of environments ranging from the Northwest Territories

**“By having our offices located at NRC-IFCI, we gain direct access to objective technical expertise that is critical to assisting us in making informed contributions to government planning. Our proximity gives us the opportunity to bounce ideas back and forth with NRC-IFCI researchers and to clearly define the fuel cell industry’s research and development needs with confidence.” – Ron Britton, President and Chief Executive Officer, Fuel Cells Canada**



to Mexico City. A membrane electrode assembly (MEA) facility is also being built. With such infrastructure, users will have the capability of preparing MEAs and carrying out evaluations of electrochemistry, ion-conductivity, porosity, mechanical properties, and fuel cell performance.

Beyond physical infrastructure, significant progress was made in creating the essential partner and community involvement key to NRC’s cluster-building approach. NRC-IFCI has created a Fuel Cell Advisory Board that

includes many of the major players in the fuel cell sector from industry, academia and regional and national government. The Board ensures NRC-IFCI is closely integrated with the cluster, fosters networking and ensures that R&D activities remain relevant. The institute also signed strategic MOUs and agreements with key partners including Natural Resources Canada, Ballard Power Systems, Simon Fraser University, and the University of British Columbia.