

NRC-CNRC

From *Discovery*
to *Innovation...*

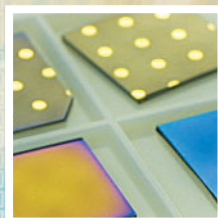
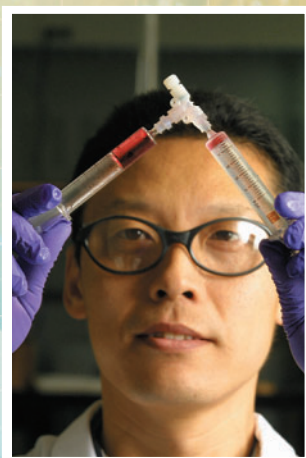
Science
— at work for —
Canada



National Research Council Canada

Directory

of NRC Institutes, Programs
and Technology Centres



National Research
Council Canada

Conseil national
de recherches Canada

Canada

National Research Council Canada

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

NRC operates world-class research facilities as well as information, technology and innovation support networks from coast to coast.

Its outstanding people help turn ideas and knowledge into new products, processes and services, creating value for Canada.

NRC works hand in hand with partners from industry, government and universities to help ignite the spark of innovation in communities across the land and to give Canadian companies a competitive edge in today's marketplace.

Excellence in R&D

NRC is Canada's R&D and commercialization powerhouse. Its cutting edge research spans the spectrum of science & engineering, with 20 NRC research institutes and 10 other centres across the country. Each helps transform ideas into new products, services and technologies whether that involves partnering with universities and innovative firms or creating new companies.

Taking Technology to Market

NRC combines scientific excellence and entrepreneurship in an institution designed to push the envelope and encourage outside-the-box thinking. The result is a surge in new knowledge and commercialization — patents, licensing, new companies — and wealth creation for Canada.

Community Innovation

Stimulating the growth of community-based technology clusters across Canada is an important part of NRC's business. NRC research institutes and networks are central hubs, bringing local and regional interests together with groups of innovative companies around a common area of technology. NRC and its partners are actively expanding research capabilities, building new facilities and augmenting knowledge and industry support networks from coast to coast.

On the World Stage

NRC is an active player in international research collaborations and partnerships — over 60 formal arrangements with 22 nations along with hundreds of informal alliances. NRC's global reach helps Canada access the world's best S&T talent, facilities & networks and creates opportunities for Canadian companies abroad.

Outstanding People

Great people. Great minds. NRC is home to nearly 4,000 creative and highly skilled employees. Its people have earned international acclaim for excellence in leading-edge research and innovation — they are held in the highest regard by their peers, colleagues and collaborators. And where else but NRC have employees won a Nobel Prize for science, an Academy Award and helped Canada capture Olympic Gold.

National Research Council Canada —
Directory of NRC Institutes, Programs
and Technology Centres

Title on additional title page:
Conseil national de recherches Canada —
Répertoire des instituts, programmes
et centres de technologie du CNRC

Also available in electronic format (HTML and PDF) at:
<http://www.nrc-cnrc.gc.ca>

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Table of **Contents**

Institutes, Programs and Technology Centres

NRC Biotechnology Research Institute (NRC-BRI)	2
NRC Canada Institute for Scientific and Technical Information (NRC-CISTI)	3
NRC Canadian Hydraulics Centre (NRC-CHC)	4
NRC Centre for Surface Transportation Technology (NRC-CSTT)	5
NRC Herzberg Institute of Astrophysics (NRC-HIA)	6
NRC Industrial Materials Institute (NRC-IMI)	7
NRC Industrial Research Assistance Program (NRC-IRAP)	8
NRC Institute for Aerospace Research (NRC-IAR)	9
NRC Institute for Biodiagnostics (NRC-IBD)	10
NRC Institute for Biological Sciences (NRC-IBS)	11
NRC Institute for Chemical Process and Environmental Technology (NRC-ICPET)	12
NRC Institute for Fuel Cell Innovation (NRC-IFCI)	13
NRC Institute for Information Technology (NRC-IIT)	14
NRC Institute for Marine Biosciences (NRC-IMB)	15
NRC Institute for Microstructural Sciences (NRC-IMS)	16
NRC Institute for National Measurement Standards (NRC-INMS)	17
NRC Institute for Nutrisciences and Health (NRC-INH)	18
NRC Institute for Ocean Technology (NRC-IOT)	19
NRC Institute for Research in Construction (NRC-IRC)	20
NRC Integrated Manufacturing Technologies Institute (NRC-IMTI)	21
NRC National Institute for Nanotechnology (NINT)	22
NRC Plant Biotechnology Institute (NRC-PBI)	23
NRC Steacie Institute for Molecular Sciences (NRC-SIMS)	24

NRC

Biotechnology Research Institute (NRC-BRI)

Montréal, Quebec

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<http://irb-bri.nrc-cnrc.gc.ca>

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CANADA

Improving the Health of Canadians and Their Environment

NRC-BRI promotes, assists and performs leading-edge R&D in biochemical engineering and molecular level biology closely linked to the needs of industries in the pharmaceutical and environment sectors.

The NRC-BRI Research Program has three sectors: health, environment and bioprocess.

The **Health** sector is active in the development of new strategies for the treatment of cancer and infectious diseases, such as research at the molecular level, the use of receptors and signal transduction, and the use of proteases and protease regulation.

The **Environment** sector's work is centred on prevention and pollution control, including technology and process development; identification and behaviour of pollutants; monitoring and ecotoxicological risk evaluation; green technologies and sustainable development; production of non-pollutant products; and exploration of ways to re-use organic wastes and turn them into value-added products.

The **Bioprocess Platform** sector is engaged in the identification and integrated development of new bioprocesses; optimization of bioprocesses; scale up of fermentation processes to industrial levels; recovery and purification of biotechnology products; production of research materials; and training of industrial personnel.

NRC-BRI is also involved in two major Centres:

- The Montréal Centre for Excellence in Brownfields Rehabilitation, in cooperation with the Government of Quebec and Canada Economic Development
- The National Joint Centre for Structural Biology — providing a focal point for protein engineering research in the region — with the Université de Montréal, McGill University, Merck Frosst Canada Ltd. and Boehringer-Ingelheim (Canada) Ltd.



NRC Canada Institute for **Scientific and Technical Information (NRC-CISTI)**

Across Canada

Knowledge and Information for the New Economy

NRC-CISTI is one of the world's leading providers of information in science, technology and medicine (STM). It is also Canada's foremost publisher of scientific journals and books, through its publishing arm, NRC Research Press. As the global economy evolves from resource to knowledge and innovation-based, NRC-CISTI is increasingly considered a key strategic component of Canada's S&T information infrastructure.

Canadians access the information resources of NRC-CISTI and of the world through NRC-CISTI's Web-based catalogue and state-of-the-art document delivery service. Fast turnaround times and electronic ordering, processing and delivery ensure that Canadians have access to the STM information they need when they need it. NRC-CISTI resources benefit researchers, innovators, students, librarians and medical workers in industry, universities, government, hospitals and libraries across Canada and throughout the world.

A national network of NRC information centres, staffed by highly trained specialists, brings vital information resources and expertise to local innovation communities. These centres help researchers and innovators in fields of strategic importance, including biotechnology, biosciences, molecular sciences, fuel-cell technology, e-business, and specific industry sectors.

NRC-CISTI's publishing arm, NRC Research Press, offers scientists and engineers 15 international, peer-reviewed journals and a growing list of monographs and conference proceedings. It also provides publishing services, such as journal and Web publishing, to many Canadian science and engineering societies.



NRC-CISTI Strengths

- 13 NRC information centres across Canada
- Close links to NRC institutes, NRC-IRAP and networks, ensuring NRC-CISTI is known and used by a wide variety of sectors and interest groups
- Consortia agreements with university libraries, extending its information links and dissemination strengths across Canada
- International partnerships and agreements with six major S&T libraries, giving access for Canada to the STM resources of the world and for the world to Canada's STM resources
- NRC Research Press, supporting Canada's scientific community by publishing peer-reviewed journals and offering advanced publishing technologies

Web site:

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CANADA**

NRC

Canadian Hydraulics Centre (NRC-CHC)

Ottawa, Ontario

Web site:

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General enquiries:

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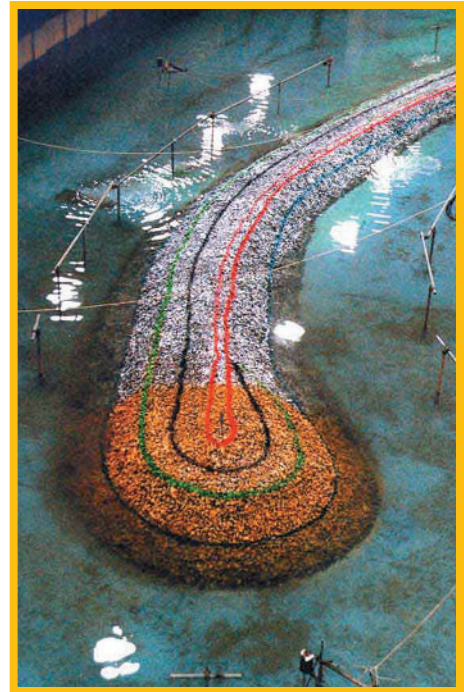
CANADA

Solutions to Water-related Problems in Rivers, Lakes, Coastal Areas and Oceans

NRC-CHC is Canada's largest hydraulics and coastal engineering laboratory. It is a non-subsidized, self-supporting business unit within the National Research Council of Canada.

NRC-CHC develops and provides technologies for studying maritime structures, coastal processes, environmental hydraulics and cold regions engineering. NRC-CHC has established itself as a centre of excellence for hydraulic studies which are relevant to Canadian and U.S. clients. It also works closely with other Government Departments such as Environment Canada and Transport Canada to assist them in developing tools for their operational and regulatory measures.

NRC-CHC is well positioned to address topics of national and global interest such as climate change, energy efficiency, environmental impact assessment, water resources and quality, sustainable development and coastal environments.



NRC Centre for Surface Transportation Technology (NRC-CSTT)

Ottawa, Ontario • Calgary, Alberta

Improving and Protecting Human Life through Mobility

NRC-CSTT is a financially self-supporting business division of the National Research Council of Canada. NRC-CSTT does proprietary research, technology development, engineering, and testing of civilian and military vehicles and vehicle systems under contract to the rail and road transport industries, defence departments, and a wide range of vehicle and equipment manufacturers. NRC-CSTT serves Canadian and international clients in a world market.

The range of NRC-CSTT's services is extensive:

- Contract research
- Technology development
- Computer-based modeling and simulation of vehicles and systems
- Vehicle systems prototyping and integration
- Field and laboratory testing
- Technology visioning and project management

At the heart of NRC-CSTT's business model are three business divisions, each specializing in a particular aspect of transportation technology.

NRC-CSTT's **Rail Division** supports rail industry clients with railway car and track design improvement, vehicle/track systems optimization, problem-solving, cost-avoidance, and product testing and evaluation. It develops and implements leading new maintenance strategies for track and rolling stock.

The **Road Vehicle and Military Systems Division** designs, develops, prototypes, and integrates new vehicle on-board systems; it conceives and develops performance-enhancing hardware; and does a wide range of engineering, problem-solving, testing and characterization of military and civilian heavy vehicles and their systems and components.

NRC-CSTT's **Climatic Engineering Division** tests the performance of vehicles and equipment under an exceptionally wide variety of climatic conditions, and provides problem-solving support for vehicles and on-board systems including HVAC, cold-starting, defrosting, de-icing, anti-icing, fuel, condensation, humidity management, snow ingestion, snow and ice accumulation, and a host of other climate-related problems.

NRC-CSTT's **Advanced Products and Technology Division** does research, technology development, and proprietary IP development, partnering, licensing, and other forms of commercialization in a wide range of railway, military, and civilian vehicles and systems. Its products extend from hardware to software. They can be prototyped and evaluated in NRC-CSTT facilities as well as client applications.



Web site:

<http://cstt-ctts.nrc-cnrc.gc.ca>

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NRC Herzberg Institute of **Astrophysics** **(NRC-HIA)**

Victoria and Penticton, British Columbia

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PO Box 248

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CANADA

Canada's Gateway to the Stars

NRC-HIA operates all astronomical observatories established by the Government of Canada and ensures the Canadian scientific community can access these facilities. The Institute operates the Dominion Astrophysical Observatory in Victoria, B.C. and the Dominion Radio Astrophysical Observatory in Penticton, B.C.

Through NRC-HIA, Canada is a partner in the seven-nation Gemini Observatory, with its twin 8-m optical telescopes, one in Hawaii and the other in Chile. NRC-HIA is also a partner in the 3.6-m Canada-France-Hawaii optical Telescope and the 15-m James Clerk Maxwell Telescope for short wavelength radio emission, both based in Hawaii. These collaborations leverage Canada's investment in astrophysics, providing researchers with new opportunities and safeguarding Canada's standing as a major player in international astronomy. NRC-HIA is leading efforts to secure Canada's participation in the next generation of ground- and space-based observatories.

NRC-HIA also designs and builds advanced scientific instrumentation for astronomical observatories and operates other elements of the national astronomy infrastructure. This includes a major data archiving and distribution service for clients in Canada and around

the world, the Canadian Astronomy Data Centre in Victoria, B.C. The Centre receives data from domestic and international telescopes, including, with support from the Canadian Space Agency, the Hubble Space Telescope. Other services include daily measurements of the level of solar activity that are used in countries worldwide.

NRC-HIA has earned an international reputation for its astrophysics research, as well as for its development of advanced scientific instrumentation, innovative technologies, and data management, mining, and manipulation technologies, including:

- Optical design and coating procedures
- Optical and infrared detector technology
- Multi-object spectroscopy
- Adaptive optics
- Data processing, archiving, distribution and data mining
- Antenna design
- Signal processing
- Sub-millimetre instrumentation
- Phase monitoring for radio interferometry



Credit: Todd Mason, Mason Productions

NRC-HIA works closely with Canada's academic community and a growing number of industrial partners to transfer the technologies and knowledge it develops in the demanding realm of astronomy to other unrelated fields. NRC-HIA also helps train students in astronomy and engineering, and supports a major program of public outreach for astronomy, including NRC's first full-fledged public interpretative centre: the Centre of the Universe in Victoria, B.C.

NRC

Industrial Materials Institute (NRC-IMI)

Longueuil and Saguenay, Quebec

Working with Industry to Improve Materials Processing

Industrial materials and processes permeate every sector of the economy. **NRC-IMI** promotes the growth and competitiveness of Canadian industry through research and development activities related to materials processing technologies. The Institute works in a number of sectors, including metal, polymer, aerospace, automotive and bio-medical sectors, as well as in virtual fabrication, advanced instrumentation and environmental technologies.

In support of this mission, NRC-IMI strives to:

- be the leader in developing competencies and knowledge related to the creation and development of industrial materials;
- be a partner-of-choice with industry in the diffusion of knowledge and the adoption of strategic technologies; and
- be a catalyst for innovation and a magnet for future technologies of relevance to industry.

NRC-IMI offers multidisciplinary expertise focused on the next generation of technologies and high-performance systems necessary to produce new materials and manufacture the products that consumers in the 21st century will demand. R&D efforts are centred on three fields of activities:

- **Design of Materials Processing** through the understanding of science principles to optimize the formulation and the behaviour of material in the process-structure performance continuum.
- **Virtual Technologies and Intelligent Control** through 3D modeling, simulation, visualization and real-time sensing, high-performance computational methods and information processing.
- The new **Aluminium Manufacturing Technology Centre** offers advanced aluminium manufacturing technologies: hydroforming, electromagnetic forming, bonding, laser welding, vertical roll strip casting as well as semi-solid forming die-casting.

The Institute has received international recognition for its work with scientific collaborators as well as for its active involvement in technology transfer to industry.

Web site:

<http://www.imi.cnrc-nrc.gc.ca>

Longueuil

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Saguenay

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**Aluminium Manufacturing
Technology Centre
501 Université Boulevard East
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NRC

Industrial Research Assistance Program (NRC-IRAP)

Across Canada

Web site:

<http://irap-pari.nrc-cnrc.gc.ca>

General enquiries:

1 877 994-4727

1200 Montreal Road
Ottawa
Ontario
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CANADA

Building Capacity in the Canadian Innovation System

The National Research Council Industrial Research Assistance Program (**NRC-IRAP**) is the Government of Canada's premier innovation and technology assistance program in support of Canadian small- and medium-sized enterprises (SMEs). For almost 60 years, NRC-IRAP has helped SMEs across the country improve their competitive technological performance and build their innovative capability.

A key component in Canada's innovation system, NRC-IRAP is the federal catalyst that links a diverse network of people, institutions, organizations and programs in support of SMEs. As a national program with strong regional presence, NRC-IRAP helps build local and national economic systems, as well as technology clusters.

NRC-IRAP delivers a client-centred mix of services and activities designed to help SMEs develop and exploit technology and, ultimately, excel in a competitive, knowledge-based economy. NRC-IRAP's extensive networks link entrepreneurs with local, national

and international sources of knowledge, technology and financial resources. On average, NRC-IRAP works with approximately 12,000 client companies per year, providing customized solutions to the increasingly complex projects they undertake.

The program also provides Canadian SMEs with repayable financial assistance for projects at the precommercialization stage through the NRC-IRAP Technology Partnership Canada Program. Recognized for its skill in facilitating business-to-business connections and multi-stakeholder collaborations, NRC-IRAP helps bring together community capabilities in support of SMEs, stimulating innovation and the development of new technologies that can generate new wealth and improve the quality of life for Canadians.

To help SMEs address the need for highly qualified personnel, NRC-IRAP manages two Youth Internship programs on behalf of Human Resources Development Canada.

More than 260 NRC-IRAP Industrial Technology Advisors (ITAs) deliver customized field services to clients at 190 sites in 90 communities across five time zones. Widely recognized for their technical expertise, knowledge and dedication to client success, ITAs follow clients through all stages of the innovation process, providing technical advice, referrals and other innovation services as they are needed.

NRC-IRAP also maintains a vital and growing network of more than 100 of Canada's leading public and private research and technology-based organizations. NRC-IRAP's partner organizations extend and complement the Program's innovation services, as well as provide Canadian SMEs with easy access to a full range of resources and expertise available within Canada's innovation system. These collaborations contribute to stimulating innovation in Canadian SMEs, which in turn create value for Canada.



NRC Institute for **Aerospace Research** **(NRC-IAR)**

Ottawa, Ontario • Montréal, Quebec

Taking Canadian Aerospace Research to New Heights

NRC-IAR's vision is to be recognized as Canada's foremost centre for aerospace research and as the leader in aerospace innovation through R&D programs, partnerships and collaborations with stakeholders.

NRC-IAR develops and maintains the core competencies and knowledge base critical to the needs of the Canadian aerospace community. It fosters innovation in the design, manufacture, performance, use and safety of aerospace vehicles and supports the development, commercialization and implementation of leading-edge technologies through world-class research, technologies and networking, nationally and internationally.

NRC-IAR focuses on six strategic areas of critical importance to Canada's aerospace industries:

- Development and use of national aeronautical facilities
- Advanced design and manufacture
- Transportation safety
- Aerospace and the environment
- Human resources development
- International programs and strategic intelligence

NRC-IAR provides the major national facilities used to design, develop and certify Canadian aerospace products, and the core competencies to maintain and develop the facilities and interpret the data they supply. The Institute's facilities include eight wind tunnels, air compressor/exhauster facilities, engine test cells, a full-scale structural fatigue rig, aeroacoustics chambers, a Flight Data Recorder Playback Centre, manufacturing facilities, and a fleet of research aircraft.

NRC-IAR is also responsible for the new Aerospace Manufacturing Technology Centre on the campus of the Université de Montréal.

Web site:

<http://iar-ira.nrc-cnrc.gc.ca>

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Aerospace Manufacturing

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NRC Institute for **Biodiagnostics** **(NRC-IBD)**

Winnipeg, Manitoba • Calgary, Alberta • Halifax, Nova Scotia

Web site:

<http://ibd.nrc-cnrc.gc.ca>

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Nova Scotia
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CANADA

Improving Canadian Patient Care and Medical Diagnostics

NRC-IBD conducts research and develops instrument-based, non-invasive medical diagnostic technologies. The Institute performs its research in partnership with medical schools, universities, other research organizations, and industry to foster socio-economic development through R&D and commercialization of its advanced medical devices.

NRC-IBD has five core research groups:

- The **Biosystems Group** uses non-invasive investigative techniques, such as magnetic resonance (MR) and infrared (IR) spectroscopy, and is primarily focused on cancer, heart disease, and infectious diseases.
- The **Biomedical Informatics Group** develops and adapts methods to analyze and monitor complex biomedical data and helps bring the resulting software products to market.
- The two **Magnetic Resonance Technology Groups** develop magnetic resonance techniques and instruments to diagnose human disease, create

protocols to apply these techniques to solve medical and biological problems, and partner with the MR industry to develop new products.

- The **Spectroscopy Group** uses optical methods, including the development of infrared imaging, to improve diagnostic capabilities in the health care of Canadians.
- NRC-IBD also has a prototyping team to take science from the proof-of-concept stage and develop it to the point where it can be transferred directly to industry.

NRC-IBD operates two satellite facilities — NRC-IBD (West) in Calgary at the Calgary Foothills Hospital and NRC-IBD (Atlantic) in Halifax which assists in the development of the Brain Research Centre. These complement the satellite laboratory at the Health Sciences Centre in Winnipeg.

Construction of NRC's Centre for Commercialization of Biomedical Technology (CCBT) is well underway and expected to be completed in 2005. The CCBT, situated adjacent to NRC-IBD, will provide a mentoring environment for the growth of small high technology companies.



NRC Institute for Biological Sciences (NRC-IBS)

Ottawa, Ontario

Easing the Effects of Debilitating Diseases

NRC-IBS conducts innovative research in the application of neuro- and glyco-sciences to reduce the impact of age-related and infectious diseases. The Institute's programs are carried out with partners in industry, universities, hospitals, and other R&D organizations.

NRC-IBS research focuses on:

- Neurodegenerative diseases, such as stroke, Alzheimer's, and Parkinson's disease
- Vaccines and immunotherapies against infectious diseases
- Therapeutic cancer vaccines

NRC-IBS encompasses two major research programs.

The **Neurobiology Program** develops applications related to therapies for neurodegenerative disorders through its five research groups: Cerebrovascular Research, Neurogenomics, Neurogenesis and Brain Repair, Neurophysiology, and Molecular Signaling.

The **Immunochemistry Program** conducts molecular-level research, through a multidisciplinary team, that leads to the development of novel vaccines and immunotherapeutics. These are pursued through the Bioanalysis,

Carbohydrate-Protein Systems, Vaccine Design, Infection and Immunity, Immunobiology, Molecular Pathogenesis and Pathogen Genomics Research groups.

NRC-IBS has a strong track record for transferring technology and knowledge to multinational, small- and medium-sized Canadian firms. NRC-IBS is also closely involved with the development and activities of Canadian Centre of Excellence Networks such as Bacterial Diseases, and Stroke.



Web site:

<http://ibs-isb.nrc-cnrc.gc.ca>

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NRC Institute for Chemical Process and Environmental Technology (NRC-ICPET)

Ottawa, Ontario

Web site:

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(613) 993-3692

Business enquiries:

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(613) 998-3472

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CANADA

Supporting Industry — Protecting the Environment — A Leader for Sustainable Development

With its partners, **NRC-ICPET** contributes to increasing the competitiveness of Canada's chemistry-intensive industries through research into innovative processes and technologies that enable sustainable development. Chemistry-intensive industries are those where chemistry is a central component of the value-added transformation of materials.

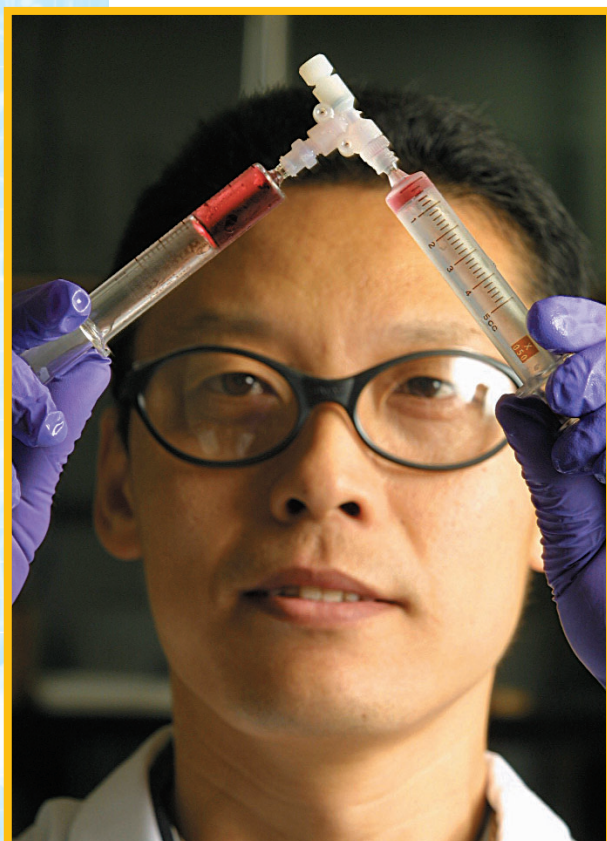
NRC-ICPET's chemical science and engineering capabilities contribute significantly to NRC research, development and technology commercialization in three areas of

application that are economically and socially important to Canada; while supporting environmentally responsible manufacturing within these sectors.

- Fuel Cells
- Oil Sands
- Bioproducts

The Institute's core competency focuses on multiphase reactive systems within a sustainability framework. This includes scientific and technical expertise in:

- **Computer Modeling:** including computational fluid dynamics (CFD), life cycle and sustainability analyses and molecular modeling
- **Material Sciences:** polymers, ceramics, colloids and nanostructured materials
- **Process technologies:** involving electrochemistry, separations, interfacial and particulate technology and combustion science



NRC Institute for Fuel Cell Innovation (NRC-IFCI)

Vancouver, British Columbia

Powering the Future through Partnership

NRC-IFCI is working in partnership with industry, university and government stakeholders to build fuel cell technology clusters across Canada and to support the innovation needs of Canadian fuel cell companies through:

- **Research and Development:** strategic research aimed at advancing fuel cell science and technology and facilitating the commercialization of fuel cells
- **People:** a multidisciplinary team of over 60 researchers, all focused on fuel cell research, provide advice and expertise to stakeholders
- **State-of-the-Art Facilities:** hydrogen-ready labs and environmental chamber, Membrane Electrode Assembly (MEA) characterization and fabrication facility, fuel cell test stations and specialized equipment to support the NRC Research Program as well as the needs of Canadian fuel cell companies
- **Partnership:** research collaboration, people exchange and large-scale strategic initiatives and demonstration projects
- **Technology Acceleration:** lab and office space to support emerging fuel cell companies
- **NRC Fuel Cell Program:** headquarters of a horizontal program designed to leverage NRC expertise and facilities across Canada

Research is focused on five strategic areas of critical importance to Canada's fuel cell industry:

- Polymer Electrolyte Membrane Fuel Cells (PEMFC)
- Solid Oxide Fuel Cells (SOFC)
- Prototyping, Integration and Evaluation (PIE)
- Microtechnology and Sensing
- Modelling

The Institute is also home to the Mining Wear Resistant Materials Consortium, an international group of industry giants in the mining and energy sector that work with NRC to discover ways to lower costs associated with wear and tear of machinery and equipment.

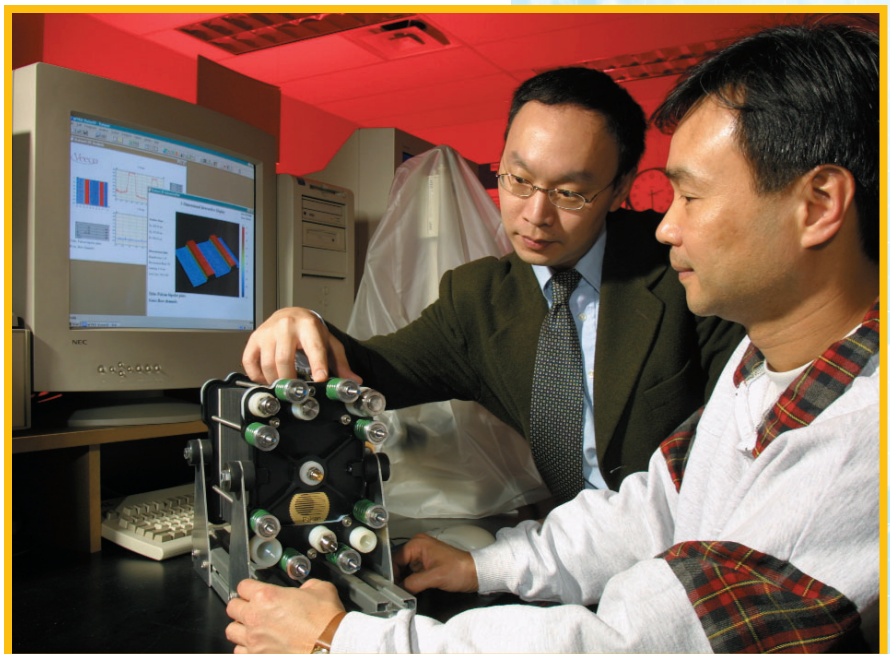
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NRC Institute for Information Technology (NRC-IIT)

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Strengthening Canada's Leadership in Information Technology and Telecommunications

NRC-IIT creates and commercializes software and systems technology to help Canada prosper in the knowledge economy. Through its research, the dissemination of its findings and innovative business services, including licensing opportunities, R&D support, business mentoring and strategic partnerships, NRC-IIT strengthens software engineering practices and provides a competitive advantage to myriad industry sectors, from health care and manufacturing, to transportation and entertainment.

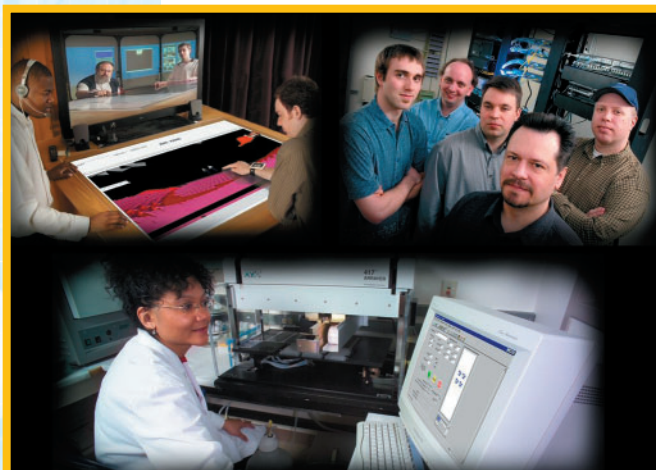
NRC-IIT's research focuses on three strategic directions:

- **Knowledge from Data:** Enhancing access to information, research in Knowledge from Data involves extracting real world information and representing it in meaningful and useful ways — whether through 3D visual representation, virtual or augmented reality, text, video or voice applications. Also focusing on data and literature mining, as well as information capture and storage techniques,

Knowledge from Data simplifies the analysis, interpretation and extrapolation of essential data to assist in decision-making and knowledge discovery.

- **People-Oriented Systems:** People-Oriented Systems explores how humans interact with technology. Examining the context of technology use, including cultural and social influences, personal preferences, and the user's knowledge base, it includes the development of advanced user interfaces, broadband technologies and advanced collaborative environments that enable distance collaboration. This direction also studies mobile and pervasive technologies, accessibility requirements and language and localization technologies that mediate communication between users.
- **e-Business:** Enabling Internet transactions for applications in e-health, e-learning and e-government/e-citizen, e-Business investigates tools that empower citizens to control their own personal information. Current research includes the electronic health record, digital rights management for course content in online learning, more effective use of online ordering and supply processes for business, and increased participation in the democratic process. e-Business also explores privacy, security and trust solutions to ensure that such transactions respect citizens' privacy rights.

NRC-IIT operates Industry Partnership Facilities (IPF) at its Ottawa and Fredericton sites to help small- and medium-sized business exploit emerging technologies by providing a supportive working environment and access to NRC expertise.



NRC Institute for Marine Biosciences (NRC-IMB)

Halifax, Nova Scotia

Leadership in Marine Biosciences and Biotechnology for Canadians

NRC-IMB is an internationally recognized leader in Marine Biosciences and Biotechnology research. As an integrated systems biology institute, NRC-IMB is capable of investigating life from the level of the genome to the whole organism. The Institute carries out its research programs with partners in industry, research organizations and government. With more than 100 highly skilled staff, their research targets three core areas:

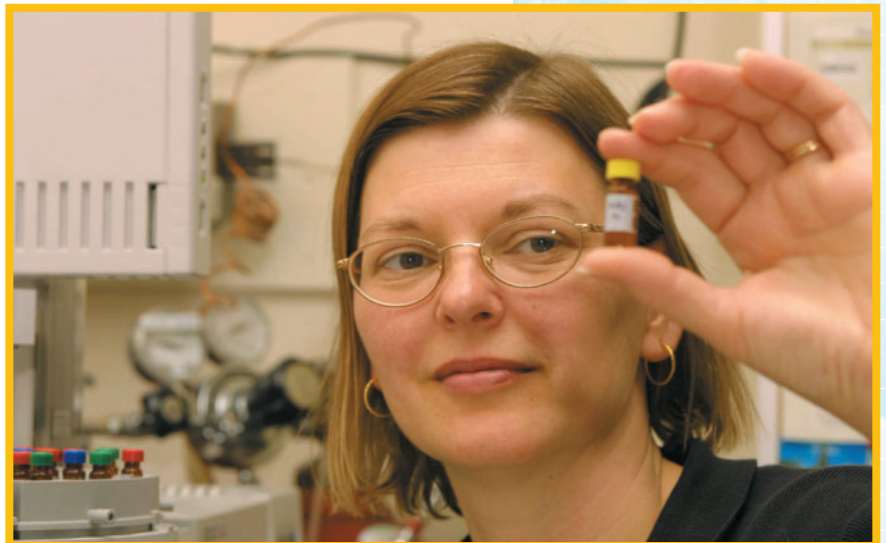
- **Aquaculture:** fish and shellfish health, nutrition, and husbandry
- **Natural Toxins:** analytical methods, toxin detection kits, Certified Reference Materials Program
- **Advanced Research Technologies:** genomics, bioinformatics, proteomics, advanced mass spectrometry

NRC-IMB has a comprehensive suite of life sciences laboratories at their Oxford Street location in central Halifax and at their Marine Research Station along the Atlantic coast, a 25-minute drive from downtown Halifax.

NRC-IMB hosts one of the most active, high-throughput DNA sequencing facilities in Canada. Their advanced mass spectrometry research facility and analytical chemistry capabilities are among the strongest in North America. The addition of a Fourier Transform Ion Cyclotron Resonance Mass Spectrometer later this year will bring NRC-IMB's mass spec capabilities to the absolute forefront among public facilities in North America.

NRC-IMB is also home to the Canadian Bioinformatics Resource (NRC-CBR), providing researchers with convenient access to biotechnology-related databases and bioinformatics software tools.

NRC-IMB significantly influences innovation and economic growth in the region through its expertise and relationships with clients in private, academic, and government sectors. Its new Industry Partnership Facility allows companies to develop their technologies surrounded by the expertise and facilities needed to bring ideas to the marketplace. The Institute serves as a mentor and incubator for marine biosciences and biotechnology, as well as a conduit for international technology coming to Canada. It is a key player in the establishment of a Life Sciences cluster for the Atlantic Region.



Web site:

<http://imb-ibm.nrc-cnrc.gc.ca>

General enquiries:

(902) 426-6095

1411 Oxford Street
Halifax
Nova Scotia
B3H 3Z1
CANADA

NRC Institute for **Microstructural Sciences** **(NRC-IMS)**

Ottawa, Ontario

Web site:

<http://ims-ism.nrc-cnrc.gc.ca>

General enquiries:

(613) 993-4583

1200 Montreal Road
Ottawa
Ontario
K1A 0R6
CANADA

Leading the Information Technology Revolution

Taking advantage of the opportunities resulting from the convergence of physical and biological sciences, the mission of **NRC-IMS** is to provide leadership, in collaboration with industry and universities, in the development of emerging and enabling technologies related to future hardware requirements for information processing, transmission, storage and display.

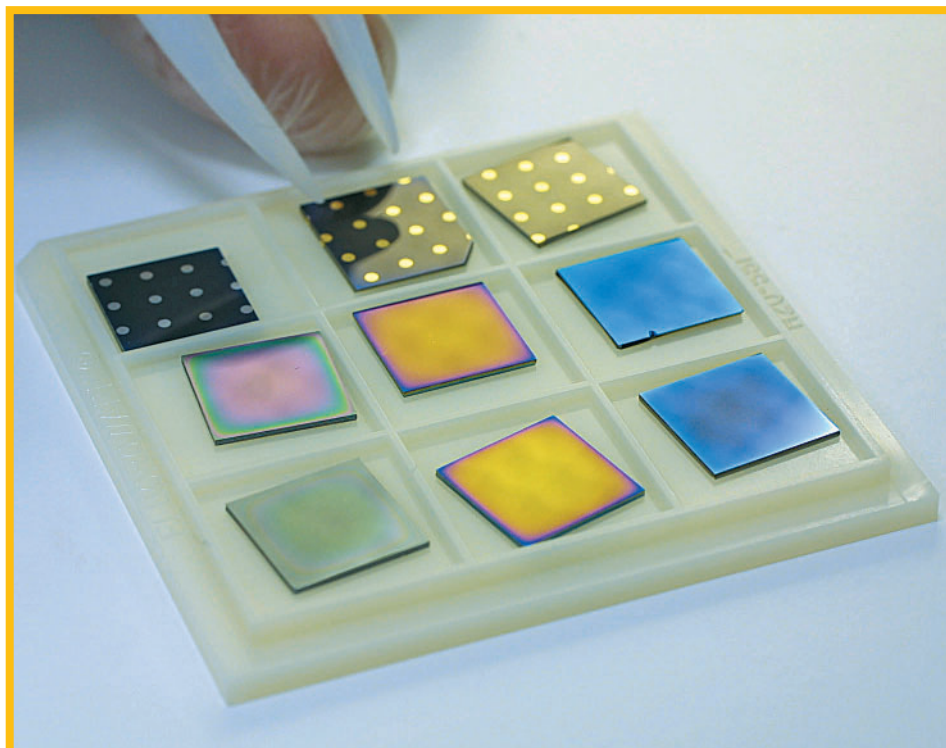
NRC-IMS collaborates with Canadian industry to provide national leadership in developing this strategic base — creating the enabling technologies needed by the industry to take a leading place in the emerging IT markets in the global economy.

NRC-IMS partners with industry to exploit the technological advances that result from research and to reduce the risk to industry

by investing in those alternative technologies, which if achieved, would represent a paradigm shift and major opportunity areas for the future of the sector.

The Institute's core competencies include: optoelectronics, photonics, semiconductor growth, processes and materials, thin film technology, nanotechnology, and acoustics. Its markets include: microelectronics, communication hardware, multimedia, sensors and biotechnology.

NRC-IMS applies its expertise in novel materials and components to solve problems posed by the need for advanced hardware through both national and international initiatives.



NRC Institute for National Measurement Standards (NRC-INMS)

Ottawa, Ontario

Ensuring Canada Measures Up

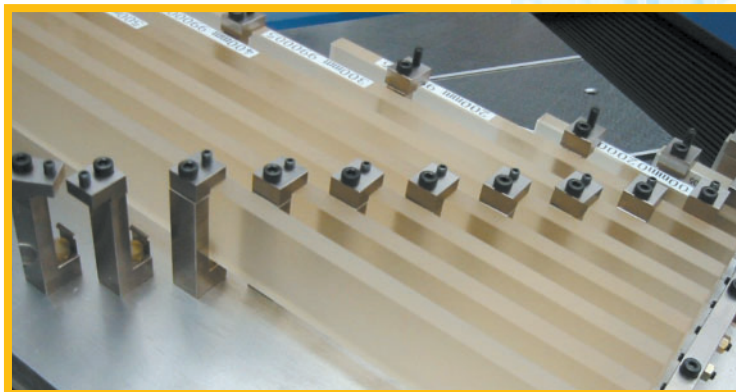
As Canada's primary centre of reference for the accuracy, validity and traceability of physical and chemical measurements, **NRC-INMS** anchors the national measurement system and provides a fundamental technical infrastructure that supports Canadian industry and the Canadian public by:

- facilitating Canada's global trade and global co-manufacturing by providing high accuracy, primary measurement standards and services compatible with those of other countries;
- strengthening the competitiveness of Canadian companies by facilitating the traceability of their measurements to recognized international standards of measurement;
- ensuring that Canadian companies exploiting emerging technologies are supported by the timely development of appropriate new measurement standards and services;
- addressing health and environmental issues through chemical metrology services that create appropriate measurement standards and certified reference materials.

Central to NRC-INMS activities is the international recognition of Canada's primary measurement standards, an issue vital to Canada where over 40 percent of GDP is dependent on exports — a level five times

greater than in the United States. To this end, NRC-INMS actively cooperates with the counterpart organizations of Canada's trading partners, and participates in high-level international comparisons of primary standards and measurement techniques. The Institute's high accuracy calibration services disseminate measurements that are recognized worldwide to industry, universities, hospitals, and government departments and agencies.

The Institute is organized in three sections: **Electromagnetic and Temperature Standards, Chemical and Mechanical Standards, and Radiation Standards and Optics**, each having specialist groups that encompass a broad range of scientific disciplines. Core R&D activities are aimed at the realization of high accuracy primary standards and at specific applications of measurement techniques. These activities underpin the industrial sector of Canadian economy where measurement is a key component in product quality and the inter-operability and exchangeability of components. Stakeholders include resource industries such as pulp and paper and electrical power, automotive manufacturing, and high-tech industries such as aerospace and telecommunications. Metrology is also essential for consumer and environmental protection and in the health sciences.



Web site:

<http://inms-ienm.nrc-cnrc.gc.ca>

General enquiries:

(613) 993-7666

1200 Montreal Road
Ottawa
Ontario
K1A 0R6
CANADA

NRC Institute for Nutrisciences and Health (NRC-INH)

Charlottetown, Prince Edward Island

Web site:

<http://inh-isns.nrc-cnrc.gc.ca>

General enquiries:

(902) 566-7465

93 Mount Edward Road
Charlottetown
Prince Edward Island
C1A 5T1
CANADA

Science and Nature — Combining Forces to Improve Health

In July 2003, the National Research Council (NRC) in collaboration with the Atlantic Canada Opportunities Agency (ACOA), the Province of Prince Edward Island and the University of Prince Edward Island (UPEI) announced the establishment of the NRC Institute for Nutrisciences and Health (NRC-INH).

The multi-partner nature of the announcement was a direct reflection of the collaborative, community-based origins of the Institute. The roots of NRC-INH lie in an extensive road mapping exercise that involved all of the contributing partners as well as industry representation.

Research at NRC-INH serves Canada and local communities by focusing on the role that naturally occurring compounds (bioactives) found primarily in renewable plant- and marine-based resources can play in optimizing health. NRC-INH scientists are involved in identifying these compounds and determining how they can be used to improve the health of humans and animals, with a special emphasis on disease prevention. They will also study the role that genetics plays in producing varying nutritional and health outcomes.

Key research areas include:

- Neurological disorders
- Obesity-related disorders
- Infection and immunity-related disorders

NRC-INH builds upon existing strengths in nutrisciences and health research in the region. True to the cluster concept, NRC-INH researchers link to NRC institutes across Canada as well as existing local research programs at UPEI, other government agencies and the private sector. NRC-INH interacts with related programs globally to leverage resources and otherwise maximize the benefits of collaboration.

Due to its multi-disciplinary, collaborative approach to research, the NRC-INH is positioned to make important contributions to global scientific activity in the field of nutrisciences and health and to the growth and competitiveness of Canada's research and development sector.

Construction of the 50,000-square-foot facility, to be located on the UPEI campus will begin in fall 2004 with projected completion in early 2006. It is being designed to house leading-edge equipment and to maximize interaction and collaboration among the teams of highly skilled research professionals including NRC and university researchers, undergraduate and graduate students, research technicians, and visiting scientists. Industrial partnership space will also be available within the building. At full complement, the Institute will house approximately 80–100 individuals (research and research support).



NRC Institute for **Ocean Technology** **(NRC-IOT)**

St. John's, Newfoundland and Labrador

Responding to Marine Challenges

NRC-IOT is an internationally recognized leader in ocean engineering research and a catalyst for advancing Canadian ocean technology. The Institute collaborates with industry, research organizations and government to anticipate and respond to challenges and opportunities that will improve the competitiveness of Canadian industry.

Its research program focuses on such areas as ship and underwater vehicle dynamics, ice effects on marine systems, mooring and towed body simulation, wave-current interaction, and wave impact analysis. NRC-IOT conducts its research through modeling ocean environments, predicting and improving the performance of marine systems, and developing innovative technologies that bring benefits to Canada's marine industries.

The Institute's facilities include the world's longest ice tank (90 metres), an offshore engineering basin, and a 200-metre towing tank. NRC-IOT's specialized equipment includes a marine dynamic test facility to evaluate vessel manoeuvring characteristics, a yacht dynamometer and a cavitation tunnel. NRC-IOT facilities provide an essential infrastructure targeted to meet the needs of industry and support leading-edge R&D.

NRC-IOT combines unique expertise and world-class facilities to address the needs of large multinational companies, SMEs and consultants. Its new Industry Partnership Facility allows companies to develop their technologies surrounded by the expertise and facilities needed to bring ideas to the marketplace. The Institute serves as a mentor and incubator for Canadian ocean technology, as well as a conduit for international technology coming to Canada. It is a key player in the establishment of an ocean technology cluster for St. John's, a critical mass of business and research that will permit Canadian industry to compete in the global marketplace of the 21st century.



Web site:

<http://iot-ito.nrc-cnrc.gc.ca>

General enquiries:

(709) 772-4939 or

(709) 772-6001

PO Box 12093

St. John's

Newfoundland and Labrador

A1B 3T5

CANADA

NRC Institute for Research in Construction (NRC-IRC)

Ottawa, Ontario • Regina, Saskatchewan

Web site:

<http://irc.nrc-cnrc.gc.ca>

Ottawa

General enquiries:

(613) 993-2607

1200 Montreal Road

Ottawa

Ontario

K1A 0R6

CANADA

Regina

6 Research Drive

Regina

Saskatchewan

S4S 7J7

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Bringing Quality to the Built Environment

NRC-IRC develops and maintains the core competencies and the knowledge base critical to the needs of the Canadian construction sector, supports the development, commercialization and implementation of leading-edge technologies, and fosters the provision of safe and sustainable built environments through the development of codes and standards.

Key thrusts include:

Building Envelope and Structure:

developing and applying technologies for design, construction, and operation of durable, energy-efficient, and cost-effective building systems. These technologies address both new construction and repair or renovation, for all types of buildings and some concrete structures.

Codes and Evaluation:

- A national code centre supporting the development of the National Building Code and other national model codes on which construction regulation across Canada is based.

- A national evaluation service determining the suitability of innovative construction products and technologies.

Fire Research: fire modeling and experimentation in fire resistance, fire detection and suppression, fire development, smoke production and movement, human factors and fire risk assessment and developing methodologies and technologies that will save lives and reduce the total cost of fire in Canada.

Indoor Environment: improving the technologies and tools to design, operate, and maintain indoor environments for acoustics, thermal comfort, lighting use and air quality in all types of buildings.

Urban Infrastructure: developing technologies to design, construct, maintain and manage buried utilities, roads and surface structures (Ottawa). Developing technologies for sustainable infrastructure for water and wastewater systems (Centre for Sustainable Infrastructure Research, Regina).

InfraGuide (National Guide to Sustainable Municipal Infrastructure): With partners, the Federation of Canadian Municipalities, Infrastructure Canada, and founding member the Canadian Public Works Association, summarizing the best experience and knowledge in Canada in best practice reports which aid informed, smart decision-making for maintaining, repairing and upgrading municipal infrastructure.

Sustainable Built Environment and

Climate Change: developing tools that integrate technologies from all of NRC-IRC's programs, to address environmental and economic impacts of construction.

Technology Transfer: turning knowledge into practical technical information for the construction sector.



NRC

Integrated Manufacturing Technologies Institute (NRC-IMTI)

London, Ontario

Breaking New Ground for Canadian Industry

NRC-IMTI focuses on the research and development of integrated technologies for the manufacture of products and equipment. It carries out focused, innovative and strategic research in collaboration with industrial, university and government partners in virtual manufacturing and precision freeform fabrication to give Canadians access to new products that cannot be created by conventional technologies.

NRC-IMTI programs centre in two fields:

- **System Simulation and Controls Research** — strives to provide manufacturers with the tools needed to reduce costs and time to market through better understanding customer design needs, researching advanced simulation and virtual prototyping techniques, and

addressing the global nature of today's manufacturing through agent based distributed planning and scheduling tools, developing flexible and reconfigurable manufacturing technologies.

- **Production Technologies Research** — to provide manufacturers with novel production processes to deliver the best products for clients, taking full advantage of material properties, making shapes or features that are difficult or impossible to produce using conventional processes.

NRC-IMTI's research, conducted with collaborators in key industry sectors such as aerospace, automotive, tooling, medical devices and electronics, is breaking new ground for Canadian industry.



Web site:

<http://imti-itfi.nrc-cnrc.gc.ca>

General enquiries:

(519) 430-7079

800 Collip Circle
London
Ontario
N6G 4X8
CANADA

NRC

National Institute for Nanotechnology (NINT)

Edmonton, Alberta

Web site:

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

General enquiries:

(780) 492-8888

ECERF Building, 6th Floor
University of Alberta
9107-116th Street
Edmonton
Alberta
T6G 2V4
CANADA

Understanding the World at the Nanoscale

NINT is the centerpiece of Canada's emerging nanotechnology sector. Established in 2001, it is an integrated, multidisciplinary research institution involving researchers in physics, chemistry, engineering, biology, informatics, pharmacy and medicine. Funded by the Government of Canada, the Government of Alberta and the University of Alberta, and operated as a partnership of the National Research Council Canada and the University of Alberta, it carries out advanced research and fosters innovation in support of a new generation of nanotechnology-based firms.

NINT's first goal is to establish Canada as a major player in nanotechnology research and development on the world scene. Its five-year objective is to be recognized internationally for excellence in research and innovation as Canada's flagship nanotechnology institute.

Four research groups have recently been established:

- Nanoscale Devices
- Materials and Interfacial Chemistry
- Supramolecular Nanoscale Assembly
- Theory and Modeling

Located on the University of Alberta campus in Edmonton, the Institute's upcoming 15,000-square-metre facility is designed to accommodate 120 permanent staff; up to 45 guest workers from industry and universities; and training opportunities for some 275 graduate and post-doctoral researchers. It will include provisions that will make it one of the world's most technologically advanced research facilities with laboratory space with ultra-low vibration and minimal acoustical noise or electromagnetic interference.



NRC

Plant Biotechnology Institute (NRC-PBI)

Saskatoon, Saskatchewan

Better Crops — Better Markets for Canada

NRC-PBI is the major research centre for plant biotechnology in Canada, with expertise in transformation, promoters, gene expression, genomics, metabolic pathways, DNA sequencing and biochemistry. NRC-PBI performs, assists and promotes strategic discovery research and innovation in plant biotechnology in partnership with key stakeholders, to improve and diversify Canadian industry and strengthen Canada's competitive position in the global knowledge-based economy.

NRC-PBI research covers three domains important to the development of agricultural biotechnology in Canada:

- **Strategic Technologies:** NRC-PBI is a leading developer of platform technologies including genomics and proteomics. Knowledge from genomics technologies combined with NRC-PBI's leading expertise in genetic transformation is a powerful tool for crop improvement and diversification. NRC-PBI has already proven itself with cell culture techniques such as double haploidy, which has led to the development of canola varieties, a hardier, more productive variety of wheat, and is currently being applied to the development of improved nutraceutical plants.
- **Crop Metabolic Modification:** Plant biotechnology promises to add value to crop plants, offering improved nutrition or characteristics that suit them for high-value specialty markets. An understanding of the metabolic pathways involved in oil production is the foundation for developing new varieties that produce more nutritious canola oil, or novel oils for industrial uses. NRC-PBI is also exploring opportunities in plant-based pharmaceuticals and natural health products.

- **Crop Performance:** Years of conventional breeding have provided hardy plants that are the foundation of the country's agriculture industry. Today, NRC-PBI researchers are applying advanced knowledge and expertise to allow plants to better resist disease as well as developing crops better suited to the Canadian climate.



Web site:

<http://pbi-ibp.nrc-cnrc.gc.ca>

General enquiries:

(306) 975-5571

110 Gymnasium Place
Saskatoon
Saskatchewan
S7N 0W9
CANADA

NRC Steacie Institute for Molecular Sciences (NRC-SIMS)

Ottawa and Chalk River, Ontario

Web sites:

<http://steacie.nrc-cnrc.gc.ca>
<http://neutron.nrc-cnrc.gc.ca>

Ottawa

General enquiries:

(613) 991-5419

100 Sussex Drive, Room 1151

Ottawa
Ontario
K1A 0R6
CANADA

Chalk River

General enquiries:

(613) 584-3311, ext. 6274

Neutron Program for Materials

Research
Building 459
Chalk River Laboratories
Chalk River
Ontario
K0J 1J0
CANADA

The Small Things Are Key

The **NRC-SIMS** strives to be cutting-edge in molecular sciences, carefully selecting areas of research that will bring the results of discovery to bear on Canada's innovation system. NRC-SIMS favours interdisciplinary work with national and international partners. Its principal clients are universities, industry and other NRC institutes.

The mission for NRC-SIMS is to provide leadership in collaboration with national and international scientific communities for the development of a knowledge base in molecular science and to ensure that it positively impacts Canadians through pro-active knowledge dissemination to partners.

The NRC-SIMS-Ottawa teams offer expertise in chemical synthesis, material characterizations, understanding the chemistry of biological processes, predicting material properties, and using femtosecond lasers in optics and telecommunications research applications.

With its research partners, NRC-SIMS helps develop innovative technologies across a wide spectrum including: therapeutics, diagnostics, advanced electronics, telecommunications, precision manufacturing, optoelectronics, information sciences, and advanced materials.

NRC-SIMS at Chalk River is the home of the Neutron Program for Materials Research. The NRU (National Research Universal) research reactor at Chalk River Laboratories is a major element of Canada's national infrastructure for science and industry. Neutrons can be used to explore materials of all kinds. NRC-SIMS acts as a custodian for the neutron research facilities, coordinating access for a wide range of academic and industrial users from across Canada and around the world. In-house R&D in strategic areas ensures that the neutron beam laboratory maintains a competitive stature in the global science community.

NRC-SIMS conducts cutting-edge research in selected areas of molecular sciences that have the potential to stimulate entirely new or emerging sectors of the Canadian economy. Strategic research fields include: functional materials, nanoscience, molecular spectroscopy, neutrons for materials research, theory and computation, molecular interfaces, organometallic chemistry, femtosecond science, chemical biology, and a variety of their related technologies. NRC-SIMS continues to move the frontiers of molecular science forward by remaining Canada's leading pioneer in the molecular scientific domain.

