

NSERC Investments

# Manitoba



## \$21.6 million

NSERC Investments in Manitoba (2010-11)

## \$1 billion

Government of Canada Investments through NSERC (2010-11)

The Natural Sciences and Engineering Research Council of Canada (NSERC) is a federal agency that helps make Canada a country of discoverers and innovators for all Canadians. NSERC maximizes the value of the Government of Canada's investments in research by promoting **research-based innovation**, university-industry partnerships and the **training of people** with the scientific knowledge and business skill set to create wealth from **new discoveries in science and engineering**.

## 364

NSERC-funded Professors

## 31

Industrial Partners in the Province

## \$2.5 million

Industrial Contributions  
by these Partners

## 211

NSERC Awards to Students and Fellows

## 34

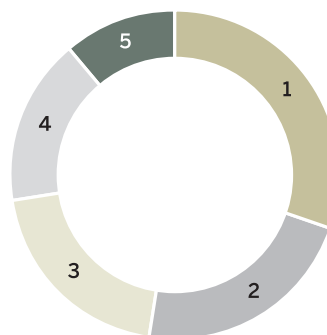
NSERC-supported Research Chairs

For more information, visit  
[www.nserc-crsng.gc.ca](http://www.nserc-crsng.gc.ca)

### NSERC Investments in Manitoba, by Federal S&T Priority Area

Total \$14.4 million (Excludes Scholarships and Fellowships)

- 1 | Environmental Sciences and Technologies  
30%
- 2 | Health and Related Life Sciences and Technologies  
22%
- 3 | Manufacturing  
20%
- 4 | Natural Resources and Energy  
16%
- 5 | Information and Communications Technologies  
11%





## Impacts and Investments

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### Putting Eco-Friendly Buildings to the Test

Research into construction and building technology is providing new ideas for sustainable development that are tailored to northern climates.

Led by Ray Hoemsen, Director of Applied Research and Commercialization at Red River College, the Sustainable Infrastructure Technology Research Group takes a hands-on approach to improving energy performance. They work in the field to test the efficiency of existing buildings and measure the impact of new technologies. For example, the group tested Manitoba Hydro's advanced curtain wall system at its head office — one of the most energy efficient office buildings in the world. They also test office towers for air leakage. Graduates will be equipped to improve the energy performance of new and existing buildings and help reduce greenhouse gas emissions. NSERC's College and Community Innovation Program is providing **\$2.3 million** over five years to support the work. NSERC also made a separate **\$127,000** award to purchase testing equipment.

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### Mobile Devices That Get a Signal Everywhere

Canada is at the leading edge of research into the next generation of mobile communications: wireless systems that allow users to connect with multiple wireless networks to ensure seamless connectivity wherever they travel.

Ekram Hossain, a professor in the Department of Electrical and Computer Engineering at the University of Manitoba, is investigating how dynamic spectrum sharing can be used to always keep mobile devices in touch with the best available signals. The research results will help meet growing demand for low-cost wireless broadband services that are accessible everywhere. Dr. Hossain's current Discovery Grant support totals **\$230,000**.

**“Being able to tap into the expertise and knowledge at the University of Manitoba through NSERC's Industrial Research Chair offers a huge advantage for us. Some of the problems we run into require an extremely high level of theoretical understanding and, at times, I rely on the university to fill in some of those competency gaps that exist within my organization.”**

**Paul Wilson**  
Managing Director  
Subsidiary Operations  
Manitoba Hydro International Ltd.



## Glass That Holds Nuclear Waste

Research into the molecular-level structure of glasses is providing valuable knowledge about the safe storage of nuclear waste.

Scott Kroeker, a professor at the University of Manitoba, is using nuclear magnetic resonance spectroscopy to take a deeper look at the glasses used to contain radioactive waste for safe long-term storage. His research will provide information about where waste ions are bonded in the glassy matrix and how they separate spontaneously into crystalline forms. This work will guide the design of more durable glasses capable of containing nuclear waste products for many millennia. His work will also explore possibilities for the design of high-performance materials with enhanced ionic conductivity for use in advanced batteries and fuel cells. NSERC recently awarded Dr. Kroeker **\$350,000** for his next five years of discovery research.

## Improved Tools for Analyzing Biomolecules

Research undertaken by the Time-of-Flight Mass Spectrometry Laboratory at the University of Manitoba led to internationally renowned advances in using mass spectrometers to analyze biomolecules.

For example, one of the lab's many contributions to medicine and biology involved helping Health Canada work out the structure of the SARS (Severe Acute Respiratory Syndrome) virus. From that came an understanding of how the virus hooks into its host cell. The team consists of researchers at the University of Manitoba and other research institutions in Winnipeg, together with scientists and engineers at MDS Sciex in Concord, Ontario, as well as national and international partners. The group created their improved methods by integrating hard core physics and engineering, all branches of chemistry, and molecular and cell biology. Team members have also been granted patents for improved designs of key components of mass spectrometers produced by MDS Sciex and used by proteomics researchers worldwide. Participants have collected a Brockhouse Canada Prize for Interdisciplinary Research in Science and Engineering and a Synergy Award for Innovation from NSERC for their work.

## Top Institutions Ranked by NSERC Investments

1. University of Manitoba  
\$19.0 million
2. University of Winnipeg  
\$1.3 million
3. Red River College  
\$631,000
4. Brandon University  
\$409,000

**"The NSERC Industrial R&D Fellowship was a great opportunity to better understand the needs of industry and apply my knowledge to solve real-world problems. At the same time, I had access to very large data sets, which gave me a better understanding of processes I studied. It was a very good experience that ultimately led to full-time employment with Stantec Consulting."**

**Nikolay V. Sidenko, PhD**  
Senior Environmental Geochemist  
Stantec Consulting



## Food Safety Research

Given that dry-fermented sausages are manufactured without heat processing, they are occasionally vulnerable to *E. coli* contamination.

University of Manitoba food safety expert Richard Holley is working with food companies on natural treatments that could eliminate this risk. The group's work has revealed ground yellow mustard to be one of the more promising antimicrobial additives. NSERC has funded the project with **\$515,900** over the last five years.

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## Investigating Why Grains Are Good For Us

Research into the molecular structure of whole grains will help to understand why these foods are good for people so processors can maximize the health benefits.

Trust Beta, an associate professor in the Department of Food Science at the University of Manitoba and Canada Research Chair in Food Processing for Grain-Based Functional Foods, is investigating the structure and function of antioxidants in whole grains. Her focus is on phenolic compounds, which are the major antioxidant components of whole grains like wheat, barley, corn and sorghum. She is examining how various processing methods such as milling, baking and fermentation preserve or enhance the antioxidant properties of these compounds. Her research also aims to determine the amount of phenolic compounds needed in food to help combat conditions such as obesity, cardiovascular disease, diabetes and cancer. Over five years, NSERC will provide **\$635,000** to Dr. Beta's Chair program and Discovery Grant research.

## Some of NSERC's Manitoba-based Partners (2010-11)

AcuShot Inc.  
Apotex Fermentation Inc.  
Biogro Technologies Inc.  
Bristol Aerospace Ltd.  
DL Seeds Inc.  
Ducks Unlimited Canada  
Electranix Corporation  
Function Four Ltd.  
GENESUS Inc.  
Hudson Bay Mining & Smelting Co Ltd.  
IMRIS Inc.  
Lembke Research Ltd.  
Manitoba HVDC Research Centre  
Manitoba Hydro  
Murphy et al Inc.  
Pulse Canada  
RTDS Technologies Inc.  
SMT Research Ltd.  
StandardAero Ltd.  
Teshmont Consultants LP  
TransGrid Solutions Inc.  
Vector Construction Ltd.  
Wardrop Engineering Inc.  
Westest  
Winpak Ltd.

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