

# Contact

Investing in people, discovery and innovation

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### Strategic Partnerships: Bridging Discovery and Innovation



Suzanne Fortier

NSERC's strategic partnership initiatives have emerged as key instruments for addressing the nation's science and technology priorities. Part of the reason is that they align seamlessly with the federal S&T strategy's three priorities for natural sciences and engineering (NSE) research: energy and natural resources; environmental S&T; and information and communications technology.

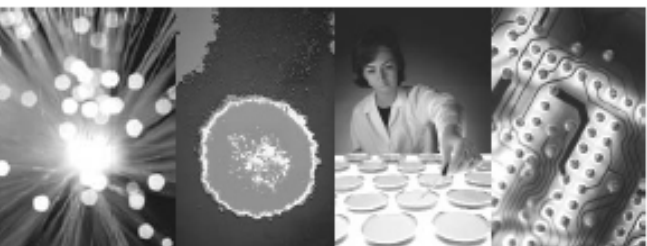
As many of you know, we recently issued a special supplemental call for strategic partnership proposals in the three priority areas. The response was extraordinary.

The speed and agility with which our community addressed the challenge merits high praise. It is especially uplifting to note that more than a third of the submissions to the supplemental call were from first-time applicants to the program.

In my view, our community's response speaks volumes about the value of our discovery research investments. Indeed, without those investments, it would be difficult, if not impossible, for NSERC researchers to respond as swiftly as they did to the government's priorities.

NSERC's strategic partnership initiatives are really about building bridges between discovery and innovation. Like any bridge, these initiatives must have sturdy footings — both in basic and applied science. In other words, the foundations must be solid before we can effectively transform scientific discoveries into marketable innovations or expert knowledge into useful public policy.

*(continued on page 2)*



The Natural Sciences and Engineering Research Council of Canada (NSERC) is a key federal granting agency investing in people, discovery and innovation. It supports both basic university research through partnerships among postsecondary institutions, government and the private sector, as well as the advanced training of highly qualified people.

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It is also important to recognize that these strategic bridges support two-way traffic. Knowledge is not simply transferred in one direction from academe to non-academic stakeholders; rather, there is an exchange of knowledge that can inform both the discovery and innovation processes, and ultimately enhance R&D effectiveness.

The benefits of knowledge exchange are neatly illustrated in a successful strategic partnership showcased in this issue. It is an inspiring story about how researchers at the University of Toronto, in cooperation with DuPont Corporation, achieved a quantum leap in the performance of next-generation solar energy cells.

Going forward, we will continue to reinforce these strategic bridges. We are also enriching the diversity of traffic on the bridge by encouraging participants from non-NSE disciplines to join us in these strategic partnerships.

At the end of the day, I am convinced that our investments in strategic bridge building will be amply rewarded. And by connecting ever-increasing numbers of stakeholders to exciting opportunities in both discovery and innovation, we will deliver benefits to Canadians for generations to come.

# Federal Budget Highlights

On February 26, the federal government released Budget 2008, which contained a number of initiatives of interest to the granting councils and postsecondary research.

Of note, an additional \$80 million was allocated to the annual budgets of the three granting councils, including \$34 million to NSERC for collaborative research that directly contributes to the knowledge and innovation needs of Canada's automotive, manufacturing, forestry, and fishing industries.

CIHR received an additional \$34 million to fund research that addresses the health priorities of Canadians, while SSHRC was given an extra \$12 million, mostly for northern research.

The federal government also directed the three granting councils to support multidisciplinary and internationally peer-reviewed research in priority areas, as well as partner with public and private stakeholders to develop practical solutions to problems.

To support the three councils' increases, the government allotted an additional \$15 million annually to the Indirect Costs of Research.

Students also benefited from the budget with the government adding \$25 million over two years for a new Canada Graduate Scholarships (CGS) Program to support 500 top Canadian and international doctoral students annually. Named in memory of former governor-general Georges Philias Vanier, the \$50,000 annual scholarships may be renewed for up to three years. Another \$1.5 million was pledged annually for 250 International Study Stipends valued at \$6,000 each for Canadian CGS holders to study abroad for one semester.

The government also created 20 new Canada Global Excellence Research Chairs in the four priority areas: environment, natural resources and energy, health, and information and communication technologies. A program worth \$21 million over two years, each Chair will receive up to \$10 million over seven years.

# Strategic Partnership Boosts Promising Solar Innovations

An NSERC strategic partnership involving scientists at the University of Toronto and DuPont Corporation has yielded a huge dividend to Dr. Ted Sargent, one of the world's fastest rising stars in solar energy research. The three-year Strategic Project Grant, launched in 2005, enabled Sargent's team to achieve a staggering 1000-fold increase in the efficiency of the first-ever plastic solar cell that captures energy from the sun's infrared (IR) spectrum.

That accomplishment was handsomely rewarded in March when Sargent won a \$10 million Global Research Partnership grant from Saudi Arabia's new King Abdullah University of Science and Technology (KAUST). The Saudi funding, the largest grant of its kind to a Canadian researcher, will allow Sargent's research team to advance its groundbreaking innovations IR solar cells to the point of full integration with solar cells that capture energy from the sun's visible spectrum.

Recently listed by *Newsweek* magazine as one of 10 fixes for the planet, Sargent's plastic IR solar cells derive their potential from quantum dots — artificial atoms made from semiconductor crystals. By combining the quantum dots with nano-scale organic molecules, the researchers successfully demonstrated a material that is highly sensitive to IR light.

"The relationship with DuPont was really critical to our success," explained Sargent,

a Professor of Electrical and Computer Engineering and the Canada Research Chair in Nanotechnology. "DuPont's knowledge base about what's out there helped to inform our thinking about materials options, allowing us to steer our research in the right direction."

Sargent emphasized that the knowledge flowed in both directions. He said DuPont acquired a better understanding of the "academic state-of-the-art" in IR solar cell materials, while the researchers gained new insights into the "industrial state-of-the-art" in plastic optoelectronic technologies.

The technology will be commercialized by a new University of Toronto spin-off company, which currently employs 10 people in Canada. By integrating solar cells that capture both the visible and IR rays from the sun, Sargent and his colleagues hope to push power conversion rates to as high as 30 percent. That is between five and 10 times higher than emerging, commercially-available organic and polymer solar cells.

"If we're successful, then solar could compete with any other form of energy purely on economic grounds," remarked Sargent. "The end result is a no-compromise solution: an energy technology that is both economically and environmentally compelling."

# Synergy Awards get a boost

Researchers winning a Synergy Award will take home a much larger grant after a thorough review of the program increased the amount to \$200,000, up from the \$25,000 prize in previous years.

Synergy Awards for Innovation encourage and celebrate university-industry partnerships that remain essential to ensure Canadian research efforts leverage the most from investments. The awards promote the Entrepreneurial Advantage described in the government's recently released S&T Strategy.

Created in 1995 to highlight successful Canadian university-industry partnerships and to serve as role models for others, NSERC Synergy Awards are offered in four categories:

- **Small and Medium-Sized Companies** – A partnership with a single company of up to 500 employees.
- **Large Companies** – A partnership with a single company of more than 500 employees.
- **Two or More Companies** – A partnership with two or more companies of any size.



The Synergy Awards help research ideas soar.

- **Leo Derikx Award** – An established innovative model of long-standing university-industry partnership in pre-competitive R&D that has improved the general well-being of an industry.

Established in 1995, the \$25,000 award lost roughly 25 percent of its value over the past 13 years due solely to inflation. As a comparison, NSERC's budget for Research Partnerships increased from \$80 million to more than \$170 million during the same period.

In response, the Synergy Award was increased to \$200,000 with one winner in each of the four categories.

# Researchers speed to glory

André Bandrauk and Paul Corkum's research may happen in a flash, but it certainly lasts long enough to get the attention of NSERC's John C. Polanyi Award.

Using advanced molecular theory and precision lasers, the pair are able to measure the movements of molecules and their electrons in an attosecond, which is equivalent to one-billion billionth of a second (0.000,000,000,000,001).

And that cutting edge research in the lightning fast world of attosecond science delivered Dr. Bandrauk, of the Université de Sherbrooke and Dr. Corkum, of the National Research Council Canada and the University of Ottawa, the Polanyi Award at a gala ceremony in Ottawa.

The goal of their research is to control the movements of electrons inside molecules,

something that would have applications in fields as diverse as quantum computing and diagnostic medicine.

National Revenue Minister Gordon O'Connor presented the Polanyi Award on behalf of Industry Minister Jim Prentice.

Named in honour of 1986 Nobel Prize in Chemistry winner John Polanyi, the award honours an individual or team conducting research in Canada that has led to a recent outstanding advance in the natural sciences or engineering. It comes with a \$250,000 research grant.

[About the award](#)



Paul Corkum (from left), John Polanyi, André Bandrauk



# Top scientist takes NSERC's top prize

Nobel Laureate John C. Polanyi has added the Gerhard Herzberg Canada Gold Medal for Science and Engineering to his crowded trophy case.

Along with taking home Canada's most prestigious science prize, the University of Toronto professor also receives a guaranteed \$1 million in research funding over the next five years.

Dr. Polanyi won the 1986 Nobel Prize in Chemistry for his work uncovering the movements of molecules in chemical reactions. His most recent research involves using scanning tunneling microscopes to characterize the reactions of individual molecules and fabricating molecular structures less than a thousandth the width of a human hair.

His long list of honours also includes being named a Companion of the Order of Canada and a Fellow of the Royal Society of Canada and of the Royal Society of London.

While his achievements in science speak for themselves, Dr. Polanyi also dedicates time to those who do not have a voice, as a founding member and president of the Canadian Committee for Scientists and Scholars, a human rights organization. He is also a member of the Committee on Scholarly Freedom of the Royal Society.

The other finalists for the NSERC Herzberg Medal were Gilles Brassard of the Université de Montréal and Graham Bell of McGill University. Both received a \$50,000 research grant. Dr. Bell and Dr. Polanyi also received an NSERC Award of Excellence, which is awarded



Canadian astronaut Julie Payette helps Herzberg winner John Polanyi with his medal.

only to first-time finalists (Dr. Brassard was a second-time finalist).

Six rising stars of Canadian research were also named winners of the NSERC E.W.R. Steacie Memorial Fellowships, which help enhance the career development of outstanding and highly promising university faculty who have earned a strong international reputation for original research.

The 2008 recipients are:

- Pierre Berini, Faculty of Engineering, University of Ottawa;
- Troy Day, Department of Mathematics and Statistics, Queen's University;
- Dennis Hall, Department of Chemistry, University of Alberta;
- Jean-Christophe Leroux, Faculté de pharmacie, Université de Montréal;
- C. Barth Netterfield, Department of Physics, University of Toronto; and,
- Carl Svensson, Department of Physics, University of Guelph.

[About Gerhard Hezberg](#)

# NSERC well-represented at AAAS in Boston

Canada's natural sciences and engineering research was well-represented at the annual American Association for the Advancement of Science (AAAS) conference on February 14-18 in Boston, Mass.

A highlight of the conference was a Canadian reception where researchers, diplomats, and research partners proudly introduced about 300 AAAS delegates from around the world to research opportunities and science and technology partnerships in Canada.

The reception's host, Michel Têtu, Deputy Consul General and Senior Trade Commissioner with the Canadian Consulate General in Boston, outlined the reasons why Canada is a world-class partner in innovation.

A Canada quiz helped liven the atmosphere and prizes were awarded.

Several NSERC-funded researchers were in attendance during the five-day conference that began February 14, and media interest in their work was significant. Five NSERC-funded researchers were also inducted as AAAS Fellows.



Waterloo's Perimeter Institute unveiled its *Mystery of Dark Matter* video in Boston.

In its continuing effort to make physics accessible to high school students, the NSERC-funded Perimeter Institute unveiled the first volume of its planned video series in a well-attended AAAS session.

The next AAAS conference will be held from February 12-16, 2009 in Chicago.



## Bacon & Eggheads

### Researchers sizzle on the Hill

The popular “Bacon and Eggheads” series’ April session featured University of New Brunswick professor Kevin Englehart, one of the world’s top biomedical engineers.

A researcher with the Institute of Biomedical Engineering in Fredericton, Dr. Englehart works on developing systems that control artificial limbs that promise to change the lives of people with disabilities.

“Bacon and Eggheads” is a monthly breakfast meeting held on Parliament Hill to inform parliamentarians about recent advances in science and engineering. It is sponsored by the Partnership Group for Science and Engineering and NSERC.

In November, Dr. Englehart was part of an international team that won the Popular Mechanics’ 2007 Breakthrough Award for its work in developing Proto 2, an artificial arm that can send signals to the brain using a complex system of sensors and software.

Once fully developed, the arm’s pattern recognition software will be able to learn the wearer’s biological signals and refine itself to control as many motions as possible. The team hopes to have the prosthetic available by 2012.

### New diseases require new approaches

University of Toronto immunologist Eleanor Fish’s research into newly emerging viral infections that represent significant threats to human health was in the spotlight in March. Dr. Fish began with an outline of the risks posed to Canada by emerging diseases.

The good news is that focusing on the host – the human body – rather than the virus may offer new avenues to help defend against viruses on the front lines and give medicine precious time to catch up to constantly mutating strains.

Essentially, the approach involves the development of a broad spectrum antiviral drug effective against any outbreak. While not a cure, the drug would be able to keep the virus in check until a vaccine can be developed.

This pharmacoeconomic model — comparing the value of one pharmaceutical therapy to another — for drug development has the potential to allow Canada to take a leadership role in the fight against global pandemics and other viral diseases.

### Something fishy in the water

In early February, Trent University’s Chris Metcalfe outlined the environmental risks associated with the variety of chemicals that get flushed down the drain and wind up in rivers and lakes.

Many chemicals, including most medicines, accumulate in higher quantities than PCBs in many fish. That’s because most are not filtered out of the water system when passing through municipal wastewater treatment plants. These chemicals include products such as cosmetics, shampoos and toothpaste, as well as prescription and non-prescription drugs.

While pharmaceutical drugs generally are not toxic, their potential to have devastating effects on wildlife is enormous. One study has already shown that trace amounts of estrogen in lake water causes male fish to feminize and

subsequently may lead to the collapse of populations.

Metcalf outlined the options available to help reduce the amount of chemicals

entering the water system. These include regulating select compounds, disposal programs, best management practices for applying bio-solids on fields, and better treatment of sewage.

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## News from the Regions

### NSERC-Atlantic

#### Getting the Word Out about Science in Atlantic Canada

One of the biggest challenges of scientific research is not just what happens in a lab. While many Canadians know there's value in the complex ideas and specialized knowledge developed in the labs across the country, explaining the research to someone without a PhD often falls short of the mark.

That challenge brought an enthusiastic group of communication professionals and science-minded people, including NSERC-Atlantic Reps, together in late January to hone their skills and get some tips on communicating science effectively to a variety of audiences.

Held at the Scientific Park in Moncton, NB, the free, three-hour "How to Communicate Science Workshop" was led by facilitator, Melanie Jollymore. The 24 participants learned how to analyze and target audiences, boil research down to its vital elements and put together a brief and engaging capsule of the research. The final step was brainstorming practical ideas for communicating research and its impact to various audiences.

One initiative suggested by the participants is to bring science and journalism students together to start the communication sooner than later. The



Melanie Jollymore (third from left in red) and the attendees of the communication workshop

idea is to foster skills on both sides of the equation, by offering science students and faculty some training in communications, while helping journalism students raise their understanding of science.

A French workshop for communicating with print media was also held on March 14, 2008. Called Vulgarisation Scientifique 101, the workshop was delivered by UQAM Professor Sophie Malavoy. Catherine Vardy, Donna Devarenne and Jason Frenette from the NSERC-Atlantic office attended the workshop.

### NSERC-Prairies

#### NSERC research helps students to see science

High school students trying to grasp difficult scientific concepts now see the lessons more clearly thanks to a new interactive tool developed by researchers at King's University College in Edmonton, Alberta.

Supported by NSERC through the Centres for Research in Youth, Science Teaching and Learning (CRYSTAL) program in Alberta, the university-based research helps students visualize difficult

concepts and principles, alleviating significant roadblocks in teaching and learning modern science.

“We were responding to a relative lack of really good tools to help students develop mental models,” said chemistry professor Peter Mahaffy, who co-directs the King’s Centre for Visualization in Science (KCVS) with physics professor Brian Martin.

“We really wanted to give it all a sound research base, where tools are developed in response to specific curricular and cognitive issues we’ve identified.”

KCVS’s interactive visual models allow students to explore unseen scientific phenomena, such as the behaviour of particles in magnetic fields or infrared spectra and molecular vibration. So far, the Centre has created more than 20 computer-based visualizations in physics and chemistry, including several that deal specifically with climate change. All of the visualizations are posted on the [KCVS Website](#), where they can be downloaded free of charge.

The Alberta CRYSTAL is one of five established by NSERC to support collaborative research aimed at improving K-12 science and mathematics education in Canada.

## NSERC-Pacific

### Busy times at NSERC-Pacific

Building on the success of the inaugural B.C. Science Outreach Workshop last year, NSERC-Pacific has teamed with the B.C. Innovation Council to deliver more learning opportunities, build bigger networks and encourage stronger collaborations to increase awareness of the Council’s programs throughout B.C. and the Yukon. The first of these activities, the Second Annual B.C. Science Outreach Workshop, took place on February 22. More than 100 participants from across the region attended the session which included a keynote address by Chantal Barriault, co-director of science communications at Science North, a discussion with a panel of experts, and a “best practices” sharing session, all centred around the day’s theme of “Evaluation.” A Science Outreach Fair earlier this month was a follow-up to the workshop and a directory of regional science outreach programs is also underway.

Meanwhile, Rick Warner of NSERC-Pacific hosted a February 12 information session via videoconference on NSERC eligibility and the Community College



Amy Wakeford of BC Innovation Council (left) and NSERC Pacific’s Megan Griffith

Innovation Program. The session was held at the NRC Institute for Fuel Cell participants from B.C. colleges attended, to view a presentation by a team of NSERC professionals in areas such as programs, ethics, and partnerships.

An outreach campaign called Backbone will concentrate its efforts on engaging 50 B.C. life sciences companies in 2008. The renewal of the Backbone program follows a successful inaugural campaign that targeted 35 B.C. high tech companies with information about NSERC’s RPP funding opportunities.

# Tri-Agencies launch knowledge synthesis program

NSERC has joined the Social Sciences and Humanities Research Council of Canada (SSHRC) and the Canadian Institutes of Health Research (CIHR) in a new funding opportunity to support knowledge syntheses on the environment.

Administered by CIHR under its existing Synthesis Grant: Knowledge Translation program, the new initiative will provide a maximum of \$100,000 to support up to six multi-disciplinary research initiatives. These must draw on existing research results and scholarship to address knowledge gaps that have been identified by stakeholders involved in improving the environment.

Successful proposals will focus on interactions between the environment and one or more other sectors — particularly health, energy and natural resources, and information and communications technology. Where possible, syntheses should address social, economic and cultural questions, including governance and policy issues. All applicants will be required to partner with an organization or stakeholder with an identified need for the knowledge synthesis.

[Overview](#)

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## CREATE

In April, NSERC launched the Collaborative Research and Training Experience (CREATE) Program to encourage collaborative training approaches, and facilitate the transition of new researchers to the Canadian workforce. CREATE will support university initiatives that have at least one of the following mandates: to help students acquire professional skills to complement

their technical skills, to allow student mobility between universities and other sectors, and to support interdisciplinary research. The grants are worth up to \$1.65 million over six years, with 80 percent of the funding going towards stipends for students and fellows. See [CREATE program](#) for application forms and instructions.



# Centres of Excellence and Advisory Board announced

The Government of Canada announced \$163 million in funding to world-class facilities designed to help move discoveries out of the lab and onto the marketplace through the Networks of Centres of Excellence last month.

Announced by Industry Minister Jim Prentice, 11 new [Centres of Excellence for Commercialization and Research \(CECR\)](#) located in British Columbia, Ontario, Quebec, and Saskatchewan will share the funding over the next five years. The latest round brings the CECR number to 18.

The program supports the operating and commercialization costs of the centres and encourages more private sector investment in research and development. It is a part of the federal Science and Technology Strategy.

As part of the CECR event, NSERC President Suzanne Fortier announced the



Industry Minister Jim Prentice announced \$163 million for 11 new Centres of Excellence.

names of the members of the [Private Sector Advisory Board \(PSAB\)](#), which assessed the economic and commercial benefits and opportunities of each proposal and provided recommendations to the NCE Steering Committee. The NCE committee determined the final selections.

# Staffing News



Blair Dickerson (left) was appointed to the newly created position of Vice-President, External Relations and Communications April 21. This

new role at NSERC has been established to augment the existing organizational structure in the area of communications, and to further advance the vision of NSERC. Indeed, the role will have very important internal and external dimensions. As a member of the Management Team, Ms. Dickerson will provide leadership and strategic advice in the critical areas of external relations, overall promotion of the organization and the standing of NSERC with its partners and stakeholders.

NSERC-Quebec's inaugural Manager is Alex Navarre, who joined the regional office from the Office of Industry Liaison at the University of Western Ontario in mid-March.

Between 1998 to 2004, he managed sponsored research contracts at McGill University and its affiliated hospitals. He

## NSERC bits

The Council's support of the Science in Society Awards continues this year at the Canadian Science Writers Association's annual conference. The CSWA's 37th annual conference, Science Under the Midnight Sun, will be held May 24-27 in Whitehorse, Yukon.

The Science in Society Book Awards honour outstanding Canadian science writing in "General Audience," "Children," and "Youth" categories.

has also held a number of positions relating to technology, international projects, and economic development within the federal government.

Richard Isnor assumed the role of Manager NSERC-Atlantic on April 7, 2008. He was most recently Director of Innovation Policy and Science at the International Development Research Centre in Ottawa and has previously held science and technology policy and management positions in a variety of federal government organizations.