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## **2011 Federal Budget Targets Funding to Industry-Academic Research Collaborations**

The 2011 federal budget, tabled on June 6, outlined a number of important funding initiatives directed to the Natural Sciences and Engineering Research Council of Canada (NSERC). A combination of new and existing programs was endorsed through specific funding measures, and *Budget 2011* expressed a clear commitment to programs that will help boost industry-academic partnering across Canada.

New investments to promote industry's work with colleges and universities include:

- \$15 million per year to support outstanding collaborative research in the natural sciences and engineering through programs such as the Strategy for Partnerships and Innovation;

- \$3 million in 2011–12, and \$5 million per year on a permanent basis starting in 2012–13, for 30 new chair positions at Canadian colleges, dedicated to accelerating applied research; and
- \$12 million over five years, starting in 2011–12, for the Idea to Innovation Program, which supports joint college-university research and development projects.

Read more about [Budget 2011](#).

## Industrial Undergraduate Student Research Awards Program Moves to On-line Submissions

As of July 2011, companies must complete and submit applications for the [Industrial Undergraduate Student Research Awards](#) (USRA) through NSERC's On-line System.

The On-line System will automatically check for errors in each application before being accepted, saving you work and time. As in the past, all applications will be verified by NSERC staff before awards are approved.

## We Want to Hear from You: Survey on Effective Commercialization Aims to Improve Canadian Environment

Are you a company involved in the commercialization of innovations? NSERC is requesting your participation in the online survey on [Effective Commercialization of Innovations in Canada](#). This survey aims to help Canadian executives benchmark their organization's success in the commercialization of innovation, develop better practices, and support programs for ensuring competitiveness on the global scale. The survey has been developed by the Canadian Advanced Technology Association, with the advice of NSERC in collaboration with several other major industry associations, federal and provincial agencies and not-for-profit organizations involved in business acceleration. The survey is part of an industry study about Canadian industrial commercialization. More information about this program can be found on the [Commercialization Portal](#).

The [Canadian Survey on Effective Commercialization](#) is available in English and French. Participants will receive a free summary of results and an invitation to participate in a Webinar outlining proposals, resulting from the survey, on how to achieve a more effective commercialization environment in Canada.



## Visit the Revamped Partnership Web site

Looking for information about how to start a collaboration? The [nsercpartnerships.ca](http://nsercpartnerships.ca) Web site has been revamped, providing company-friendly information about how to get started, the benefits of collaboration, and brief summaries of NSERC grants that support collaborations. Visit the [nsercpartnerships.ca](http://nsercpartnerships.ca) Web site regularly for information about NSERC's programs, updates and more. To tell us what you think of the revamped Web site, please send an e-mail to Kasia Majewski at, [kasia.majewski@nserc-crsng.gc.ca](mailto:kasia.majewski@nserc-crsng.gc.ca).

## Successful Partnerships

*Interested in partnering? Wondering about the return on investment? Learn how companies across Canada are partnering with researchers to advance their products or processes by participating in an NSERC partnership.*

## Montréal Firm Partners with the University of British Columbia to Predict Canada's Solar Payoff

People may not think of heat when they think of Canada, but we have a lot of solar energy potential. Thanks to an NSERC [Engage Grant](#) partnership, Montréal's [Turquoise Technology Solutions Inc.](#) partnered with [Nicholas Coops](#) of the Faculty of Forestry at the University of British Columbia (UBC) to combine data on solar radiation and cloud cover to create a more accurate map of solar radiation for Canada.

The combined data was used to update solar energy calculations and [maps of Canadian provinces](#) unveiled at Solar Canada 2010 in Toronto last December.

Anyone considering solar energy—from a basic rooftop installation to utility-scale photovoltaic systems—needs to know how much solar energy to expect over the lifetime of their investment. Turquoise Technology Solutions offers solar resource assessment, advising those planning a solar installation on the amount of available solar energy at a given location, using weather-satellite data, and following cloud-cover data.

"Satellites capture cloud images almost every 15 minutes. By merging that cloud information with our computer model, which takes into account what happens throughout the day and year, we get a report on how much solar energy we can expect on a daily or monthly basis." says Ozgur Gurtuna, President of Turquoise Technology Solutions.

Since elevation and slope also affect the amount of solar energy on the ground, Turquoise Technology Solutions sought spatial data for their model. A colleague suggested Dr. Coops, and that contact led to the NSERC Engage Grant project.



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Dr. Coops is also interested in determining available solar radiation, but his work focusses on spatial analysis, calculating solar radiation on different slopes and different aspects.

"We can model the radiation of the sun and where it hits the surface, factoring in the impact of slope and aspect. This allows us to assess the solar radiation input you would have for any point in Canada," says Dr. Coops.

Dr. Coops provided Turquoise Technology Solutions with a high-resolution digital elevation model for Canada, which helped improve the accuracy of the company's model, and shared ground-station datasets for British Columbia to enable comparisons with actual ground measurements.

"The Turquoise data gives us broad-scale, Canada-wide consistent spatial data, including clouds, and that allows us to do finer, more detailed work in individual cities, which is our focus," says Dr. Coops. "The Engage project has given us access to expertise we wouldn't have had otherwise."

Both partners agree Canada has a lot of solar potential. "People often think of Canada as really cloudy and cold," says Dr. Coops. "But we have a lot of solar potential, and there is a lot of interest in solar energy among researchers and private companies. It's a good field to work in."

## Calgary Company's Work with NSERC Chairholder Pays Off: Champion Looks to Commercialize New Chemical to Treat Oil Sand Tailings

Calgary-based [Champion Technologies, Inc.](#) is looking at the commercial production of a new chemical that could minimize the amount of water used for bitumen recovery from the oil sands and help reduce the size of oil sands tailings ponds, potentially increasing the rate of land reclamation in northern Alberta.

The chemical—called Al-PAM was identified by [Zhenghe Xu's](#) team at the University of Alberta under the NSERC Industrial Research Chair (IRC) in Oil Sands Engineering, along with former Chairholder Jacob Masliyah—a scientific pioneer in bitumen extraction.

In the surface mining industry, the current process for separating bitumen (heavy, viscous oil) from sand grains requires up to 18 barrels of water for every barrel of oil produced. The majority of this water—approximately 85 percent—is recycled. The remaining mixtures of water, waste clays and mineral fines are carried to tailings ponds where they are left to slowly consolidate. Managing and reclaiming these large artificial ponds are both difficult and costly for industry.



Al-PAM shows promise as an effective process aid for tailings management. The chemical is added to the tailings, causing the solids within to coagulate and sink. After rapid settling of these coagulated fine particle agglomerates, fines-free water from the upper layer of the ponds can be recycled into the oil sands process, reducing the amount of fresh water needed.

"This chemical could help settle the tailings solids quickly and release a larger volume of cleaner water. This water could then be recycled into the process thereby reducing the amount that needs to be taken out of the Athabasca River," says Champion Technologies' Section Manager of Oil Sands, Roger Melley.

Al-PAM has been shown to work in the lab, and now Champion Technologies is scaling-up its production, to facilitate potential, future large-scale testing.

Although Champion Technologies has its own in-house research and development programs studying the recovery of bitumen from oil sands, its involvement with NSERC's IRC in Oil Sands Engineering allows the university's fundamental findings to become inputs for the planning of its applied research.

Champion Technologies has already done a laboratory proof-of-concept of Al-PAM, using an experimental system that simulates the hydrotransport process (LHES)—where the processing of oil sands begins in a mining operation. Both the IRC and various companies use these laboratory hydrotransport extraction systems to test new ideas before implementing them in the field.

"LHES was developed within the NSERC IRC and it has become a key test for our chemicals," says Dr. Melley. In addition to basic science and new technologies, Dr. Melley stresses that one of the main benefits of its participation in the IRC is the opportunity to network with their customers and experts in academia.

"It allows me to sit down with the scientific staff of the operators, who are our customers, as well as with faculty members of the university and their student body for open discussion on any aspect of the oil sands extraction process. Of all the Chairs in similar programs that we are part of, this is the one that we always support. Everyone within Champion Technologies believes this is a key venture for us."

Champion Technologies joined the list of companies already sponsoring the NSERC IRC in Oil Sands Engineering in 2002. Champion Technologies, which employs about 340 employees in Canada, develops, manufactures and sells specialty chemicals for the oil and gas industry. It was the first non-oil producing company to join the IRC.



## Energy Collaboration Drives Jobs and Profits at Rockwell's Cambridge Facility

[Rockwell Automation Canada](#) Control Systems has built a major manufacturing and engineering presence in Southern Ontario, largely due to an electric drive technology developed in collaboration with Ryerson University. This technology has revolutionized large-scale motors used to power industrial processes like petrochemical, mining, cement, metals and power generation.

Rockwell Automation engineers have worked with [Bin Wu](#) and his team of Ryerson University researchers over the past 18 years to develop a variety of technologies for variable-speed drives. The Cambridge, Ontario, plant has gone from manufacturing just a few units in the early 1990s, to between 400 and 700 annually. Each unit sells for between \$120,000 and \$400,000 each.

"This is completely a Canadian product—it was designed, developed, manufactured and tested here in Canada," says Navid Zargari, Rockwell Automation's Manager of Medium Voltage Development. "Our collaboration with Ryerson gave us about a five-year head-start over our competitors and has helped us grow the drive part of our business from around \$40 million six years ago to 150 million today. During that same period, we have also doubled the size of our R&D group to 55 people."

Rockwell Automation has continued to work with Dr. Wu and his team—with support from NSERC's Collaborative Research and Development (CRD) Program in the early 1990s, and partnering in 2006 to support the NSERC/Rockwell Automation Industrial Research Chair in Power Electronics and Electric Drives. The partners have co-authored more than 40 technical papers and have 20 patents issued or pending.

"We are able to reduce the time to market for product development and produce commercial results so soon because of previous collaborations supported by NSERC," says Dr. Wu, an international expert in power electronics and electric drives, and head of Ryerson University's Laboratory for Electric Drive Applications and Research (LEDAR). Dr. Wu worked at Rockwell Automation as a senior engineer from 1992-93, before joining Ryerson University.



## Reducing Manufacturing Costs

The most profitable invention to come out of the IRC is a device that eliminates the need to include costly transformers in the company's PowerFlex® 7000 medium voltage drives. Jointly developed by Dr. Wu and engineers from [Rockwell Automation](#), Inc., the integrated direct current (DC) choke has reduced manufacturing costs by 20 to 25 percent, and overall operating costs.

The device also reduces the drive losses by nearly 40 percent and, with no need for a transformer, reduces the size and weight of medium voltage drives by about 30 percent.

"This innovation has allowed Rockwell Automation to grow to the number three position in their global market," says Dr. Zargari, who received the Innovator of the Year Award for this invention from the Government of Ontario in 2009. The collaboration with Dr. Wu also earned the company an NSERC Synergy Award for Innovation in 2002.

Rockwell Automation has contributed more than \$1 million in cash and a significant amount of in-kind support to the Collaborative Research and Development Grants (CRD) and the Industrial Research Chairs (IRC) since 1993. The company has hired six of Dr. Wu's former graduate students and is currently collaborating with Dr. Wu's former postdoctoral fellow, Yunwei (Ryan) Li—an assistant professor at the University of Alberta, on a new research program funded under NSERC's CRD Program.

"These NSERC programs have been a great return on investment for us and for Canada," says Dr. Zargari. "We benefit from both the technology and the talent coming out of Ryerson, and the country benefits from having built up an expertise in an industry with a growing global market."

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