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The Natural Sciences and Engineering Research Council of Canada's (NSERC) *InPartnership* bi-monthly e-bulletin showcases the many ways Canadian business can connect and collaborate with researchers, and prosper as a result.

Latest News

Increasing Industry-Researcher Collaboration in Cloud Computing, Green-Buildings

NSERC is supporting two new [Strategic Networks](#) bringing industry and researchers together to develop innovative solutions in the building, and information and communications technologies (ICT) sectors.

As energy costs rise, the [NSERC Smart Net-Zero Energy Buildings Strategic Research Network](#) (SNEBRN) is focused on making a difference by finding the best ways to achieve zero average annual energy consumption at both the building and neighbourhood levels. This Network brings together top university and business expertise to facilitate widespread adoption of optimized net-zero energy buildings. The network will look at building methods including integrated solar systems, high-performance windows, short-term and seasonal thermal storage, heat pumps, combined heat and power technologies and smart controls. The SNEBRN will also map-out methods for optimal use and adoption of these technologies in new buildings, for the retrofit of old buildings, and use or adoption at the neighbourhood level. The Network builds on the work of a previous consortium of researchers who contributed to the design of the [Eco-Terra™ house](#)—the first demonstration of a near net-zero energy solar house. Led by [Andreas Athienitis](#) at [Concordia University](#), the Network combines the experience and knowledge of 20 experts from government, academia and the private sector in tackling this challenge.



The [NSERC Strategic Network for Smart Applications on Virtual Infrastructure](#) (SAVI) is tackling the challenge of developing enabling software and technologies for network-based, or "cloud" computing services. As the Internet of the future will be increasingly disaggregated—with services, support and information based at a variety of disparate locations, users will demand ever-smarter services and increasingly sophisticated devices to interact seamlessly with the cloud. The Network is lead by [Alberto Leon-Garcia](#) from the [University of Toronto](#). The Network's team involves 16 researchers in nine universities and brings together nationally and internationally recognized researchers from the electrical engineering and computer science disciplines. The industrial partners involved in the initiative include TELUS, MTS Allstream, IBM Canada, INSA, BelAir Networks, Ciena, Cisco Canada, DragonWave, Juniper Canada, Ericsson Canada, Nitido, and SeaWell Networks.

New NSERC Grants Help Lower Commercialization Costs While Adding Expertise

The new College-University Idea to Innovation (CU-I2I) Grants support college and university researchers to work with businesses to get their technology to the next level. Grants enable companies to collaborate with university and college experts as they work to realize innovations for promising opportunities. Direct project costs are shared by the company partner(s) and NSERC, helping lower innovation costs.

The Grants can provide up to \$250,000 per year for the college and university participants. Company partner contributions can be matched at a maximum level of 1:1 for both the college and the university participants.

NSERC is now accepting proposals for CU-I2I Grants. If you are interested in working with a researcher, contact us at colleges@nserc-crsng.gc.ca.



Successful Partnerships

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

Engage Grants Energize Research on Conductive Paper

Producing paper that conducts electricity may seem like a big enough breakthrough for any company, but [KnowCharge Inc.](#) of Fredericton, N.B., has its eye on an even greater prize: a battery market expected to grow to almost \$100 billion in the coming years.

KnowCharge's core technology is a patented process to produce electrically conductive paper by engineering regular pulp fibres, which can be added directly to raw pulp during paper-making. The company already uses the process to manufacture and sell packaging to protect electronic components from the harmful effects of electrostatic discharge.

About a year ago, the company saw additional uses for their conductive paper, but before they could raise the investment capital to finance them, they needed to test their feasibility in the lab. [Shane Beattie](#), Chief Science Officer at KnowCharge, was familiar with NSERC's Engage Grants and approached researchers at the University of New Brunswick (UNB) and Mount Allison University working in the fields they wanted to explore.

"The Engage grant was the ideal fit for us as a start-up company," says Robert Morrow, CEO at KnowCharge. "It enabled us to quickly qualify the opportunity, because for us it's all about the follow-on investment right now."

Dr. Beattie approached [Adam Dyker](#), Assistant Professor in the Department of Chemistry at UNB, who was starting research on batteries. Dr. Dyker tested the conductive paper's suitability as a potential replacement conductive for non-renewable materials in a battery. "With any battery, you want to store as much energy as possible in as little mass as possible," he says. "Lithium-ion batteries store a lot of energy, but a lot of their mass is dead weight. If we use paper instead of metals, which are fairly dense, we can reduce the mass of the battery by about 20 per cent—a significant decrease."

Results were positive: "Our results showed that we were able to improve power densities with the conductive paper," says Dr. Dyker.



Laurentian University Research Aids Mineral Exploration

The Raglan mine in Northern Quebec, some 1,800 kilometres north of Montréal, sits upon one of the world's finest sulphide nickel deposits.

Yet, despite extensive exploration and an initial investment of about \$600 million by Xstrata PLC (formerly Falconbridge Ltd.) when the mine began commercial production in 1998, it was unclear if the complex system of deposits held enough promise to risk hundreds of millions of dollars on new explorations. Xstrata turned to [Michael Lesher](#)—one of the world's leading experts in geochemistry and volcanology and [Laurentian University's](#) first NSERC Industrial Research Chair—to find out how much ore could be found in the host rocks and where it was located.

Dr. Lesher and several graduate students worked with Falconbridge geologists to identify the geology and structure of the deposits, mapped the surface geology and examined the drill cores in more detail. Having a geological model that predicted where to find ore gave the company confidence to invest money in further exploration and helped it decide to open the mine, which now employs over 700 workers.

"Drilling is expensive," says Dr. Lesher. "Not all potential host units are mineralized, and not all parts of mineralized host units are equally mineralized, so the better you understand how the system formed, the better chance you have of selecting the right part of the system to drill in."

The Chair also played an important role in transforming Laurentian University into a North American powerhouse for mineral exploration and mining research. Dr. Lesher, currently Director of Mining Initiatives at Laurentian and responsible for building a soon-to-be-established School of Mines, says the Chair fuelled a major boost in mining-related research at Laurentian University that continues to benefit research and the companies that need highly skilled workers.



New Digital Technologies Give Construction Firms Global Edge

Faced with the challenge of maintaining world-class productivity, Canada's largest construction companies and steel makers turned to [Simaan AbouRizk](#)—the NSERC Industrial Research Chair in Construction Engineering and Management at the [University of Alberta](#).

"Our company prides itself on getting involved in IT advancements as soon as we can and with the Chair we've had opportunities to improve both technology and production processes," says Paul Zubick, Vice-President of Sales with Waiward Steel Fabricators—the largest steel fabricator and erector in Western Canada. "This ensures we can compete in a global market."

One such advance is [Waiward's SteelWorks](#)—a sophisticated database that integrates and tracks employee hours, quality assurance, shipping, commercial invoicing and scheduling.

"This is our golden egg from the Chair," says Zubick. "What's great about this software is you can have 100 people simultaneously working with the same integrated database and with the same information."

Waiward is working with the Chair to add radio-frequency identification (RFID) to SteelWorks by the end of 2011, with real-time 3D-modelling software that will track each piece of steel across production.

Other industrial partners have also benefited. Canada's largest construction group—[PCL Industrial Management Inc.](#)—began using the simulation technology in 2005. Rick Hermann, PCL's Manager of Construction Engineering, says the user-friendly system has already saved PCL about half a million dollars on labour costs related to scheduling.

"Before we started this Chair," recalls Dr. AbouRizk, "the construction industry was not interested in hiring students with postgraduate credentials. Now that the companies have seen what these students can do, we can't train enough of them."