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NSERC Funds Efforts to Reduce Sodium in Food Industry

NSERC and the Canadian Institutes of Health Research-Institute of Nutrition, Metabolism and Diabetes (CIHR-INMD) are helping the food industry and academic research community work together to reduce sodium in the Canadian food supply through collaborative research and development activities. Successful projects will be funded through NSERC's Collaborative Research and Development (CRD) Grants Program and through the CIHR-INMD.

College Capacity for Applied Research Enhanced with New Funding

NSERC's College and Community Innovation (CCI) Program, is supporting new projects at 11 community colleges working with businesses on a range of applied research—from clean energy technologies to healthcare tools for professionals. The new partnerships between colleges and business help create and promote a wide range of leading-edge technologies, and help transfer innovation into the marketplace. The projects will share more than $18 million over a period of up to five years. As part of the program, colleges use these funds to grow corporate participation in their selected project. To leverage college research expertise in your area, learn more about NSERC's CCI Program.

Wondering how NSERC Funding Works and how you can Benefit?

Irene Mikawoz from the NSERC Prairies Regional Office presented an overview of NSERC programs at the Alberta Centre for Advanced Micro-Nano Technology Products(ACAMP) Conventional Energy Seminar on March 8, 2011. View the video proceedings.

Successful Partnerships

Fine-Tuning the Wind Catchers

The first step in harnessing wind for energy is deciding where to put your wind turbine. Selecting the right location is critical to getting the maximum energy from the installation and it's not as simple as its sounds. The 12- to 18-month measurement process is costly, especially for smaller firms.

To better understand how wind behaves and how it is affected by structures, Cleanfield Energy Corporation joined forces with Kenny Corscadden, of the Department of Engineering at the Nova Scotia Agricultural College in Truro, Nova Scotia, for a short-term NSERC Engage Grant project.

"Cleanfield was interested in how to improve turbine performance by modifying the wind environment around turbines on buildings," says Dr. Corscadden. "The Engage project was to investigate the potential benefits of modifying the wind with structures."

"We may have very good wind on one corner of a building and on another corner of the same building no wind at all. We want to be able to determine the optimal location of a wind turbine in a way that isn't too costly," says Mihail Stern, Cleanfield's Chief Technology Officer.

Dr. Corscadden and his team developed a multi-stage modelling process that created results for Cleanfield.

"We started with theoretical analysis, with software that allowed us to analyze wind flow around structures and determine what type of shape gave us the best increase in wind speed," says Dr. Corscadden. "Then we moved to a tabletop model, which we put in a small wind tunnel to verify the results we had from the theoretical analysis.

"Finally we went to large-scale testing, about one-third full scale, and tested with a structure 12-feet square for a few months in one of our research fields."

In testing how different structures affect wind flow at a site with Cleanfield turbines, Dr. Corscadden's team was able to provide valuable insight to Cleanfield.

"We were able to show them that a couple of the turbines were installed at sub-optimal locations," says Dr. Corscadden. "They could immediately see the potential of using software to determine the placement of multiple turbines on buildings.

"As a result, we've submitted an application to NSERC for a Collaborative Research and Development (CRD) Grant to develop this software."

Both Stern and Dr. Corscadden say software to determine the optimal position of small wind turbines in a building environment will be of interest to many companies.

"When they do a business case now, they have to predict the potential performance of each turbine and give the purchaser a return on investment based on that," says Dr. Corscadden. "To be able to choose locations based on the software means they will be able to show their customers where their information comes from."

The Engage Grant project proved critical to jump-starting the relationship between Cleanfield and Dr. Corscadden's group.

"We are very happy with both the theoretical and practical work they did," says Stern. "The software is very promising, and we are looking forward to further testing."

"We wouldn't have had this project without the Engage Grants Program," says Dr. Corscadden. "The project created a great opportunity to demonstrate our ability and our skills."

Research Chair Helps COM DEV Assess Risks and Opportunities for Miniaturization in Space

No business wants to be caught unprepared to respond to market change. A decade ago, COM DEV International Ltd. decided to team-up with world-renowned expert in miniaturization and micro-fabrication processes Raafat Mansour, of the University of Waterloo, for a long-term study of a disruptive technology that could affect the Cambridge, Ontario company's competitive position in the global space market.

Micro-electromechanical systems (MEMS) technology had already become widely adopted in ground-based systems and there was no shortage of predictions on how these tiny mechanical devices would result in smaller, lighter and better performing satellites and other space systems. "COM DEV produces fifty to seventy percent of the world market for filters and switches for satellite applications, but they use conventional technologies that are quite bulky and large in size. Miniaturization, using MEMS technology can provide an excellent option to improve performance for large switch matrix configurations and provide higher satellite functionality," says Dr. Mansour.

With spaceflight subsystems and instruments at the heart of the business, COM DEV knew it couldn't ignore MEMS. COM DEV could either do the research itself, or partner with Dr. Mansour and establish a globally recognized laboratory to perform leading edge research in the MEMS field with emphasis on space applications. The company chose to invest $1.5 million in an NSERC Industrial Research Chair (IRC).

"If we had done it in-house, we could easily have spent in two years what it cost us to sponsor the Chair over eight years and not be even close to the research and amount of experimentation that we have performed with Dr. Mansour," says Tony Stajcer, COM DEV's Vice-President, Corporate Research and Development. "Working with Dr. Mansour gave us a longer window to study the technology and reduce the risk that somebody else would come along and take market share. By staying on top of the technology, we had something we could readily leverage to get into the market if we had to."

The IRC's research found that MEMS-enabled space systems will take much longer to develop than many had predicted. The findings have enabled COM DEV to focus its research and development activities on more immediate challenges and opportunities.

"Our risk level has dropped significantly as a result of the Chair," Stajcer says. "We're pretty confident now that no one is going to be unexpectedly overtaking us."

Over its eight-year term, the IRC filed six patents—three of which have been licensed to COM DEV—including one for innovative filter structures. Although the IRC ended in 2010, COM DEV is continuing to collaborate with Dr. Mansour. In November 2010, Dr. Mansour was appointed the Canada Research Chair in Micro and Nano Integrated Radio Frequencies (RF) Systems.

Extracting the Future of Energy from the Ocean's Floor

Is an answer to Canada's future energy needs lying on the ocean floor off the coast of British Columbia? It's very possible, says University of Victoria marine geophysicist Ross Chapman. Dr. Chapman's research has led directly to a commercial product with Quester Tangent (QTC)—a provider of acoustic bottom classification products.

Dr. Chapman has spent the last 30 years studying the ocean floor and identifying what is on it, hoping to bring us one step closer to a cost-effective way to mine the ocean floor for methane gas—a plentiful source of clean burning fuel.

Hundreds of deposit sites have been identified beneath the ocean floor off the coasts of Japan, India and Costa Rica, among others, although the technology to tap into these sites doesn't yet exist. Using an NSERC Ideas to Innovation (I2I) Grant to further his research in seismo-acoustics, Dr. Chapman worked to advance the application of acoustic methods for exploring the ocean floor.

The use of underwater acoustics for remotely measuring biological and physical characteristics of the seabed is a rapidly developing area that is quickly becoming an accepted standard. Dr. Chapman wanted to develop an idea to associate an acoustic echo signal from the ocean floor directly with a specific seabed type.

With the I2I funding, Dr. Chapman and his graduate student, Ben Biffard, refined and tested their technology. The results were impressive. Dr. Chapman and Biffard explored the depths of Barkley Canyon, 80 kilometres off the coast of Vancouver Island, and found the largest methane hydrate deposit ever discovered on Canada's ocean floor.

"We know from previous research that there are deposits under the seafloor all along the B.C. coast," says Dr. Chapman. "These Barkley Canyon deposits are the largest visible ones we've found. Learning all we can about them will help us figure out whether the gas can be extracted economically and safely."

Dr. Chapman's research led directly to a commercial product with QCT. With the support of an NSERC Collaborative Research and Development Grants, Dr. Chapman has continued his research and brought the original idea into a series of options QTC can use to develop their next phase of seabed classification products.

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