



# Accelerating Innovation

**Colleges, Institutes & Polytechnics:  
Applied Research for  
Economic and Social Development**



**November 2010**

# Accelerating Innovation

## Applied Research for Economic and Social Development

With campuses in 1,000 communities, Canada's 150 colleges, institutes and polytechnics are innovation accelerators. No other institutional infrastructure exists with this breadth and impact. Their mandate is to support economic development. They deliver programs that support the human resource needs of local employers.

Building upon 45 years of higher education, colleges, institutes and polytechnics are active in applied research. Faculty and students, in partnership with employers, enable businesses and community organizations to develop new or improved products, processes and services for purposes of commercialization, technology transfer and productivity. They are key contributors to Canada's innovation system.

Small- and medium-sized enterprises are by far the largest contributors to Canada's employment growth. These companies regularly turn to local colleges and institutes for product and process innovation, research and development. With limited resources, colleges and institutes have established centres for applied research and increased the numbers of students and faculty involved. The match between the advanced skills of college faculty and students, and commercialization-stage research is dynamic.

The Government of Canada showed strong support for applied research and technology transfer at colleges, institutes and polytechnics through three funding announcements in 2010. As part of the March 2010 federal budget, funding was doubled for the College and Community Innovation Program providing \$30 million annually to develop and expand technology transfer activities at colleges through partnerships with local companies and organizations. In July, a \$32.5 million investment was announced for research infrastructure and equipment for colleges through the Canada Foundation for Innovation. Earlier in the year, post-secondary institutions in southern Ontario received \$15 million for the creation of an applied research and commercialization initiative to support regional economic development through the Federal Development Agency for Southern Ontario.

This is the second annual report showcasing the research projects of colleges, institutes, polytechnics, cégeps and universities with a college mandate. The first volume was published in October 2009. Both volumes are available at [www.accc.ca/english/publications/brochures.htm](http://www.accc.ca/english/publications/brochures.htm).

Advanced Skills

Excellence

Knowledge

Prototype

Commercialization

Technology  
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Innovation

Product  
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# Information and Communications Technologies

## Biotechnology Scavenger Hunt

Engaging today's digitally-savvy youth in educational pursuits relies on the creative production and integration of innovative teaching technologies in the classroom. **Centennial College** and Spongelab Interactive, a Toronto-based educational game design and production company, are collaborating to produce a biology-based game that will assist teachers to bring technology into the classroom and provide users with an immersive learning experience. Genomics Digital Lab: History is an educational game designed around a Flash interface to provide an interactive, story-driven experience about the genomics revolution and its scientists. The game's innovative scavenger hunt approach engages learners in curriculum-based interactive learning. Centennial College students were involved in the production of a custom game engine, the background research and storyline development, and the creation of artwork. The game has world-wide market potential, and is being launched online as part of Spongelab's internationally award-winning platform of biology-based games.

*"We're a small firm, doing cutting-edge development. Our work is technically challenging and requires a lot of passion and perseverance. The talent at Centennial has been an enormous asset, especially in this particular game, which had strong development challenges."*

Dr. Jeremy Friedberg, Co-Founder, Spongelab Interactive

## Software Technology for an Aging Population

In partnership with PointerWare Innovations Ltd., the **Sheridan College Institute of Technology and Advanced Learning** Elder Research Centre (SERC) has explored ways adults over 55 use and think about computers. PointerWare creates software that turns a complex computer interface into one simple enough for an older computer novice. Funded by the Colleges Ontario Network for Industry Innovation, SERC and PointerWare surveyed senior users across Ontario to assess the functionality of this software. The survey results will be integrated into PointerWare's product development plans.



*"The partnership with SERC is valuable to us. They help evaluate our software and connect us with the senior community and its changing needs."*

Paul Rupsingh, CEO of PointerWare Innovations Ltd.



## Centre for Excellence in Print Media

The printing industry is the fourth largest manufacturing sector employer in Canada. Most are private businesses with fewer than 20 employees. The Centre for Excellence in Print Media at **NorQuest College** supports Canadian printing and graphic communications industries by providing a state-of-the-art facility for companies to explore new technologies and research evolving production processes. The Centre collaborates with experts from around the world to offer training and educational services to professionals in all aspects of the industry. The Centre is working with Alberta printers to improve pre-press workflows to eliminate errors, decrease wasted products and improve business profits.

*“Having the Centre for Excellence in Print Media located in Western Canada allows our businesses to access information and research that otherwise would not be available, without going outside the country.”*

**Craig McEwan, Chair of Alberta Print Promotions Committee and Managing Partner, Ion Print Solutions**

## A Blackberry App for Mobile Trip Reporting

**Niagara College** is working in partnership with Convergent Telecom to develop Blackberry applications. The first will help businesses track travel expenses by integrating GPS technology to log an individual’s time and distance traveled. Upon arrival at any destination, a report can be sent to the company office, saving the employee time normally spent tabulating travel costs. The application will help those who divide their time between multiple work sites monitor their travel expenses. It could help companies with many employees using mobile devices keep track of who is on the premises and when they arrive or leave—virtually eliminating the need for time cards.

## Adult Literacy Resources for Deaf Learners

Improvements in instructional design and technology have made it possible to produce appealing and interactive teaching materials. Since the deaf depend on visual modes of communication, technologies that incorporate visual displays of information are highly successful. The **NorQuest College** Reader CDs include video clips, text displays and interactive exercises and are accessible to any student with a computer and CD-ROM drive. The CD also includes hypertext for challenging vocabulary and syntax, interactive pre-reading and post-reading exercises, and American Sign Language video clips of text. The stories reflect essential elements of good narrative and non-fiction to demonstrate literal and figurative English text. Students and practitioners have embraced this innovative resource for adult students.

## 3D and Audio Design on the Web

**Seneca College** partnered with Mozilla, the creators of the Firefox web browser, to develop the Processing.js programming language. The original Processing language was created at MIT's Media Lab to help non-programmers such as artists and designers build graphic applications and teach fundamentals of computer programming in a visual context. This new open source language is popular among educators, game developers, and data visualizers and is being used by companies around the world in both open and commercial products. Where Processing was designed to work on desktop PCs only, Processing.js enables anyone to make 2D and 3D visualizations in a web browser without add-ons. It is also appearing on other platforms like the iPad and smartphones. Seneca has extended this application programming interface and the Firefox web browser, allowing web developers to read and write raw audio data. The work has generated excitement, and the World Wide Web Consortium (W3C) is now starting discussions to standardize it for the next version of HTML.

*"This year, Seneca students ... played a leading role in developing a new web language for artists and creators. This is a huge contribution not just to Mozilla but to the whole of the web."*

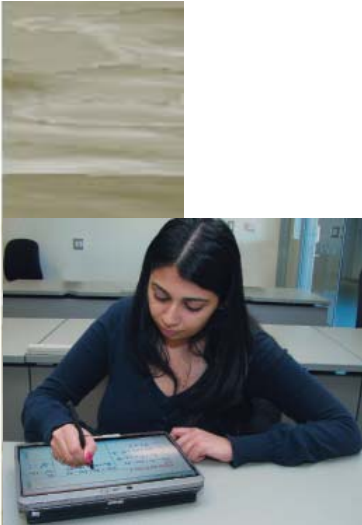
**Mark Surman, Executive Director, Mozilla Foundation**

## Cultural Mapping of Annapolis County

Cultural mapping blends technology and conventional mapping techniques to paint a vivid picture of an area's artistic, cultural and heritage assets. The Applied Geomatics Research Group of **Nova Scotia Community College** has created a cultural assets map for the town of Annapolis Royal. The community plans to use this information to develop an Annapolis learning institute.

## Creation of IC3D Game for Ontario House at Vancouver Olympics

Working in partnership with Toronto-based Spatial View Inc., **Sheridan College Institute of Technology and Advanced Learning's** Visualization Design Institute created a glasses-free 3D game to promote Ontario tourism destinations at Ontario House Pavilion during the 2010 Olympics. The Sheridan IC3D Game is an interactive, real-time application where players use BlackBerry smartphones as game controllers to assemble puzzles featuring some of Ontario's most popular tourist attractions. Staff from the Visualization Design Institute worked with a team of Sheridan students to take the application from concept to finished product. It was one of three technological innovations selected by the Ontario government to be showcased in the Ontario House Pavilion.



## Enhancing Marginalized Students' Success in Science and Mathematics

Applied Science and Technology students at **Seneca College** are evaluating the use of HP tablet PCs and DyKnow interactive software for improving learning in mathematics and science. The research goals are threefold: student engagement, student learning, and application of concepts. Preliminary data suggests that these learner-centered tablets foster greater engagement and improve academic success. The technology is being showcased with community outreach programs promoting mathematics, science and technology careers. This data will support the addition of a second lab to explore the success of tablet technology and interactive learning activities in a larger classroom. The scope of the teaching methodology will also be broadened to include English courses. This project was funded by an HP Technology for Teaching Grant.

## BLAZE: Open Education Resources

The BLAZE web development project used Flintbox, a global intellectual property exchange network, to create an open technical vocational education resource repository similar to MIT OpenCourseWare. The open courseware is an initiative that makes MIT's course materials available online to anyone, anywhere. Post-secondary curriculum content posted on Flintbox can be accessed and used by other post-secondary institutions, including those in developing countries. Content is provided by members of the Canadian Virtual College Consortium, led by **Red River College**, **Vancouver Community College**, and the **Marine Institute**.

# Natural Resources and Environmental Science and Technology

## Biological Control of Greenhouse Pests

**Douglas College** researchers in partnership with greenhouse growers, insectary companies and **Kwantlen Polytechnic University** are investigating the use of insect predators and parasitoids for biological control of pests of greenhouse-grown vegetables in BC. Biological control uses the natural enemies of pest species to reduce crop damage. It provides a sustainable, ecologically-based alternative to the use of chemical pesticides. Existing pests continue to cause substantial crop losses in BC greenhouses and new pests are regularly introduced as a consequence of global warming and international trade. Research will focus on the management of aphids and tomato psyllids, two key pests in BC vegetable greenhouses.



*“The two key pests described in the [Douglas College] proposal are included on our research and industry development priority list. We will greatly benefit from research into better management of these major pests.”*  
BC Greenhouse Growers Association

## Fly Ash Waste to Agricultural Boon

“One industry’s waste could be another’s treasure” describes the approach used by the **College of the North Atlantic**, Corner Brook Pulp and Paper Limited and the Centre of Environmental Excellence. The paper mill burns hog fuel, a biosolids and waste oil mixture, to produce electricity. The process produces large volumes of fly ash which has a high pH. Dairy farms in the area need agricultural lime to condition Newfoundland’s acidic soil for their pastures, but lime is expensive and not readily available. The ash division project is analyzing the chemical composition of the ash to determine whether it is safe for land application. The project is funded by a grant from the Multi Material Stewardship Board, Newfoundland.



## City of Welland Street Lighting Analysis

Students from the Photonics Technology program at **Niagara College** are comparing high pressure sodium (HPS) lighting technologies with light-emitting diode (LED) lighting technologies for street lighting. The first half of the evaluation is being conducted under controlled conditions in a lab environment comparing beam patterns, spectral emissions and energy utilization. The second half of the evaluation will be conducted with the lights installed in a typical light standard in operation. The effects of various environmental conditions will be noted and the results will allow the municipality to make unbiased comparative assessments of the two technologies.



## New Crops for Woodlots

As part of an initiative to develop rural areas, Biopterre, a bioproducts development centre affiliated with **Institut de technologie agroalimentaire de la Pocatière** and **Cégep de la Pocatière** tested the cultivation potential of the forest floor. Working with six maple woodlot owners, the project identified and developed sites suited to several value-added crops such as American Ginseng, golden seal, Canada wild ginger and bloodroot. On-site observations have been encouraging and half the woodlot owners have decided to expand their planting area. If the second season proves equally successful, several producers intend to plant new acreage. These types of agroforest systems offer an attractive way to diversify woodlot owners' income.

*"A key component in the success of this project was the presence of the research team in the field."*

Sylvie Lavoie, Agroforestry Development Agent, Centre local de développement de la MRC de Montmagny



## Pollutants to Products (P2P)

**Grande Prairie Regional College's** Pollutants to Products (P2P) initiative studies how to utilize algae, plants and trees to capture CO<sub>2</sub> and other pollutants. Three applied research projects have been developed over last decade with \$1.5 million support from industry. One of the projects, turning CO<sub>2</sub> and air pollutants into micro-algae products, has resulted in a system that is far more efficient for CO<sub>2</sub> capture than any other yet reported. Another project has produced significant improvement in conditioning white spruce seedlings. The benefits include increased seedling survival, enhanced reforestation and more carbon capture. The third project will divert treated municipal wastewater from waterways and apply it to a hybrid poplar research grove.

*"The state-of-art technology proposed by GPRC...presents a great opportunity to develop a more environmentally sustainable alternative in disposing of and utilizing municipal effluent and biosolid in the northern rural communities."*

Richard Krygier, Intensive Fibre Management Specialist, Canadian Wood Fibre Centre

## LiDAR Mapping of Climate Change Impact

Seaside communities in Nova Scotia are on the front line of two environmental challenges, climate-change and erosion. To understand how to prepare for and respond to these challenges, the provincial government turned to **Nova Scotia Community College's** Applied Geomatics Research Group, the only post-secondary institution in Canada with Light Detection and Ranging (LiDAR) technology. The LiDAR equipment was flown along the coastline between Antigonish and Canso approximately 15 kilometres inland. Using a laser, precise elevations were captured which will help accurately predict both the impact of future sea-level rise and the risk of erosion. A preliminary report was shared with Nova Scotia's Departments of Environment, Natural Resources and Economic Development as well as the federal Department of Fisheries and Oceans.



## Tracing Antibiotics and Hormones in Bio-waste

There is a growing public concern about the presence of antibiotics and hormones in water and soil, and their pathway to the food chain. Sixty to 80 percent of livestock are treated with antibiotics and hormones and much of the dose is excreted unchanged or as active metabolites. A **Grant MacEwan University** research project is developing a practical approach for detecting, tracing and destroying antibiotics and hormones in bio-waste. The project aims to improve methods of producing sustainable and renewable energy, biofuels and other value-added products. MacEwan collaborates with Highmark Renewables Research and other members of Biowaste to Energy for Canada Integration Initiative Corp., a not-for-profit clean energy corporation that brings together institutions and organizations with an interest in the bio-energy sector.

*“Our collaboration with MacEwan is crucial to advancing our own efforts to develop and deploy advanced technology to manage biowaste, especially as Highmark lacks infrastructure to carry out this type of study.”*

Xiaomei Li, PhD, Chief Science Officer, Highmark Renewables Research

## Artificial Nesting Boxes for Hole-Nesting Birds

The Northern Research Institute at **Yukon College** is developing artificial nesting boxes for birds threatened by loss of habitat. This project involves the provision and installation of artificial boxes for birds that nest in naturally existing cavities and cannot make their own nesting holes. This research project is part of a larger biodiversity monitoring project in conjunction with the Yukon Wildlife Preserve.



## Aquarium Chiller for the Sackville Rivers Association

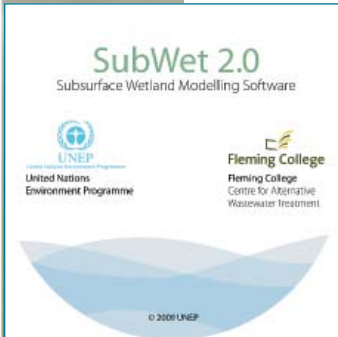
The Sackville River Association has a stewardship program in approximately 200 elementary schools in Nova Scotia that involves building an ecosystem and raising organisms in a large aquarium as well as hatching and raising salmon from eggs. The Sackville River Association partnered with **Nova Scotia Community College** to design a water cooling system for its aquariums and develop a prototype. Mechanical Engineering Technology students designed a more efficient and environmentally-friendly heat exchange and refrigeration system for aquariums that will be gradually phased in at all participating schools.

*“There are many groups in the region that will be interested in a cooling system that replaces the archaic equipment currently used.”*  
Larry Bell, Vice-President, Sackville River Association



## Cleaner Technology for Emergency Power

Large-scale diesel generators used to supply emergency power give off harmful emissions. **Seneca College** has been working with Safety Power Inc. (SPI), a leading Canadian supplier of emissions control products for diesel generators and natural gas engines to implement new sensor technology and a model-based control system designed to reduce emissions. A second phase of the project will develop drawings for a new design of SPI’s reactor that incorporates the results of extensive Computational Fluid Dynamics modeling. The goal is to create a reactor which is smaller, lighter, cheaper and more efficient than SPI’s current design.



## Engineering Design Software: Helping the UN Meet Global Sanitation Goals

**Fleming College** recently released new environmental design software, SubWet 2.0, developed in collaboration with the United Nations Environment Programme. The College’s Centre for Alternative Wastewater Treatment upgraded the software that sanitation engineers use to design constructed wetlands to treat domestic wastewater in any climate. This software is a significant step toward the UN’s Millennium Development Goal to reduce by half by 2015 the 2.6 billion people in the world that do not have access to basic sanitation.

*“Fleming College’s Centre for Alternative Wastewater Treatment has shown it has the skills and capability to undertake this challenge.”*  
Vicente Santiago, Water and Sanitation Officer, United Nations Environment Programme

## The Lobster Life Extender

Clearwater Seafoods approached **Nova Scotia Community College (NSCC)** looking for a flexible, accurate and user-friendly device that would help advance the company's research into improving shipping of live lobster. The research analyzes the relationship between a lobster's heart rate and temperature, an important factor when transporting live lobster around the world. Students in the Electronic Engineering Technology diploma program at NSCC developed the Lobster Life Extender for Clearwater as part of their studies. The new device uses optocouplers attached to the crustacean's shell to accurately measure heart rate and temperature. It will be put to use immediately by Clearwater to log data vital to their research.



## Low Carbon Electricity from Organic Waste

The **Collège Communautaire du Nouveau-Brunswick - Campus d'Edmundston** is partnering with Laforge Holstein Ltd. of St. André, to construct Atlantic Canada's first biogas system for producing low carbon electricity and liquid fertilizer from organic waste. The biogas system will initially use manure from Laforge Holstein's dairy operations and food waste from McCain Foods' processing facility in Grand Falls. The project is particularly innovative because it is a first demonstration of biogas production from multiple waste residues and is being conducted in a rural area.



*"There is a substantial financial and environmental cost tied to transporting organic waste to landfills. This project reduces that cost and adds value at the same time by producing a new, low greenhouse gas energy source."*  
Calvin Milbury, President, New Brunswick Innovation

## GPS Wildlife Tracking Collar

Researchers at **Red River College** are developing a collar with a memory chip to be mounted on wildlife to record their movements. The collar stores GPS data and has a radio beacon that allows animals, such as caribou, elk, moose, bison and polar bears, to be located from a distance of five to 15 kilometers. The device also has an accelerometer which can detect animal movements. If the animal stops moving for long enough, the device sends a signal indicating the animal has died. The collars are intended to run for one to two years without needing battery replacement. With the GPS technology, researchers will be able to retrieve data and change collar settings remotely.



## Creation of Pool Skimmer Prototype

Through a research agreement with A.B.D. Solar Power Pool Tools, **Durham College** has created a pool debris skimmer/extraction device prototype that removes surface debris from above-ground pools eliminating clogging in skimmer baskets. Frequent clogging puts stress on pool pump motors as water is constantly being drawn through a congested area. The prototype extraction device travels up and down in the pool skimming surface debris with its lower portion immersed in water. The debris is carried by a perforated belt, allowing water to flow through it and separating debris. This is Durham College's first Colleges Ontario Network for Industry Innovation-funded research project developed with support from the Office of Research Services and Innovation.

*"The staff and students at Durham College have put 110 per cent toward the development of this prototype."*

Doug Bryant, Partner, A.B.D. Solar Power Pool Tools



## Optimization of Anaerobic Digester Systems

Production of biogas from the breakdown of organic material (anaerobic digestion) has become an attractive source of renewable energy. CH-Four Biogas Inc., an Ottawa-based company specializing in the design and implementation of anaerobic digester systems, is working to incorporate biotechnological advances into its systems. The applied biotechnology research team at **La Cité collégiale** is testing ways to optimize biogas production from organic wastes such as chicken manure in lab-scale digesters. The team is also conducting feasibility studies to incorporate innovative technologies and materials into CH-Four Biogas anaerobic digester systems.



## Strawberry Yields Forever

Strawberries may be an alternative high-value crop for small greenhouse growers in Ontario. **Niagara College** is researching the viability of growing ever-bearing strawberries in greenhouses as an alternative winter crop. Various growing substrates are being investigated, including peat and coco coir. Initial data indicates excellent flower production and good fruit set. Pest problems and nutritional disorders were evaluated, however further work needs to be done to identify the growing parameters, nutritional challenges and costs of production.

## Analyzing Labrador's Paleo-Environmental Landscape

**Grant MacEwan University** has begun research into historic changes to the landscape in Okak Bay, Northern Labrador. Inuit and their ancestors have occupied this area for more than 5,000 years. However recent changes to climate and vegetation are having profound impacts on available foods and resources. Modifications of the Okak landscape will be analyzed through pollen analysis and macro botanical evidence to reconstruct the influence of anthropogenic and/or climate changes in this sub arctic ecosystem. This work contributes to interdisciplinary Inuit environmental archaeology projects in Labrador and other arctic locales.



## A Green Alternative to Softer Water

**Georgian College** has partnered with HydroFlow Canada Inc. to design and develop a circulating water testing system that replicates residential and industrial water supply systems. HydroFlow's patent technology is a green alternative to using chemicals to address lime scale buildup. This process suspends the minerals, thus eliminating both scale build up and the breakdown of existing scale. The data obtained from this project will be used to demonstrate and quantify the effectiveness of current water treatment technologies. The objective is to have the testing system adopted as an industry standard, which would measure and quantify the effectiveness of emerging water treatment technologies.



*"Our partnership with Georgian College and its students was a new concept to us. We had no idea such resources were available to us in our community. We see this project as the first of many applied research projects with Georgian."*

**Shaun Jackson, Technical Advisor, HydroFlow Canada Inc.**



## Biological Controls for Multiple Pests

Greenhouse propagation areas are ideal breeding sites for many pests of ornamental plants. Industry has relied on chemical control to manage these pests. Pesticide resistance, availability and cost have generated interest in the use of biological controls, but greenhouse propagation areas generally have several types of pests. This presents a challenge in using biological controls. With Koppert Canada support, **Niagara College** is testing an improved management technique for shore fly and fungus gnats. This research looks at strategies for maximizing pest management using a predaceous mite, parasitic nematode and combinations of these organisms in a greenhouse with diverse crops.



## Recycling Printing Solvents by Ultra-filtration

The Centre national en électrochimie et en technologies environnementales at **Collège Shawinigan** has developed an effective and economical membrane filtration process for a Canadian printing company. The new ultra-filtration process treats and recycles the organic solvent used in its flexographic plate production process. In addition to substantially reducing processing costs, the process recycles 90 percent of the used solvent and, most importantly, preserves the integrity and composition of various solvent additives. Transfer of this technology led to the construction of a filtration unit at the partner's printing facility.

# Renewable Energy

## Energy Modeling for Sustainable Housing Design

MacFadden Design and Drafting Studio turned to the **Nova Scotia Community College's** (NSCC) Applied Energy Research team to produce sustainable, low-energy home designs. Researchers, faculty and a student from the Energy Sustainability Engineering Technology program completed energy modeling for sustainable homes using advanced software programs and provided advice on in-home systems. NSCC investigated options for modular-home designs that reduce material, labour and overall project costs. The analysis will allow MacFadden Design to provide clients with innovative, sustainable housing that is architecturally-unique. NSCC and MacFadden continue to work together on developing building materials, systems and processes for sustainable housing that will run almost entirely on renewable energy.



## Integrating Renewable Energy Technology

**St. Lawrence College's** new Wind Turbine Maintenance Training facility is boosting the college's resources for programs like Energy Systems Engineering Technician/Technologist, Control Engineering Technician, Wind Turbine Technician and, coming soon, Geothermal Technician. College research projects are developing renewable energy technologies to integrate with one another and with the grid. Projects include analyses of single and dual axle trackers, an energy consumption dashboard in a cold storage facility, enhanced solar wall output, and evaluation of an energy conservation advocacy project. The college offers renewable energy courses in maintenance of offshore, near-shore and onshore wind developments, producing exciting synergies for applied research.



## Solar Batteries for Electric Cars

**Fanshawe College's** Centre for Sustainable Energy & Environments (CSEE) undertakes research projects with private sector partners in renewable energy technology, built environments and liveable communities. The centre is currently working on a solar-powered electric utility vehicle with improved battery charging and peak power demand management systems. Electric vehicles are considered impractical due to short battery life and long recharging times. The Fanshawe project focuses on using solar energy to charge the battery while in use, to extend battery life. A prototype vehicle has been built and tested. Now that the concept has been proven, researchers are working on optimizing the charging technology and moving toward commercialization.





## Remote Monitoring for Wind and Solar Energy

An integrated data logging system was developed and installed in **Lakeland College's** Renewable Energy Cabin, an off-grid demonstration building at the Vermilion campus. The system reads and posts information on the performance of the solar photovoltaic, solar thermal hot water, and wind turbines as well as weather information. This provides detailed performance data from the Energy Cabin website to researchers and students in the on-line Renewable Energy Certificate program.

*"WSE was pleased to partner with Lakeland College in the construction of their Energy Cabin demonstration facility and is looking forward to developing a closer relationship between WSE personnel and Lakeland College researchers."*

Linda Henderson, General Manager, WSE Technologies Inc.



## Green Hydrogen Golf Cart and Cycles

Research is underway at **Lambton College** to gain a better understanding of electrochemical processes in low-temperature hydrogen fuel cells. Using mathematical modeling and experimental techniques, researchers are trying to optimize the electro-deposition of platinum and platinum alloys on various substrates. Applied research is carried out to incorporate the membrane-electrode assemblies, fabricated in the college's facilities, into proton exchange membrane fuel cells used to power a number of test vehicles. Fuel cells have been successfully used in a golf cart, a tricycle and two bicycles.



# Building Technology

## Improving Irrigation for Modular Green Roofs

Green roofs have been demonstrated to reduce energy costs in new and refurbished structures. Modular green roofs make construction, maintenance and plant replacement easier but present a challenge for effective irrigation. A **Niagara College** research project is evaluating the Damm irrigation system for modular green roofs using various cultivated and native ornamental plants for Ontario roofs. Phase one of this project is being conducted indoors under controlled growing conditions. Irrigation systems are set at planting time and before plant establishment. Plant survival and plant coverage will continue to be monitored outdoors in the demonstration green roof structures.

## Testing Strain in Composite-Reinforced Concrete Beams

Composite external reinforcement products are applied to the underside of concrete beams to increase their strain limits, but these limits are difficult to measure. Neubrex, a Japanese company specializing in unique sensors, has developed strain-testing equipment featuring a fibre optic cable that is run lengthwise in the underside of a beam. Light is transmitted through the cable at the same time as an increasing downward force is applied to the top of the beam. Eventually, when sufficient force has been applied, the fiber optic cable will kink, showing where beam failure is imminent. Researchers at **Red River College** are teaming up with Neubrex and Vector, a Canadian concrete restoration company, to test the strain limits of concrete beams treated with new composite external reinforcement products.

## Net-Zero Lab Lighting System

As a spin-off from research being conducted with Dx2 Technologies and the Kortright Centre on the Archetype Sustainable House, **George Brown College** students installed and tested solar panel systems at the school's Casa Loma location. Electromechanical Technician and Mechanical Design students investigated the possibility of powering lab and classroom lighting without using hydro. The students designed and built the solar panels and a tracker that maximizes sunlight exposure, developed an intelligent switching battery bank to store power in a number of batteries, wired the system from a lab to the roof and tested different lighting systems to find an appropriate match. With ample rooftop space, Casa Loma may be able to develop a fully sustainable lighting installation.



## Temporary Shelter for Disaster Relief

As part of an Applied Research and Innovation project, **Algonquin College** students and professors worked with an Ottawa firm, HousAll, to design a larger version of their existing emergency shelter. The new 16' model was intended to be used in refugee camps as medical clinics and classrooms. As soon as the larger version was completed and successfully tested, a major earthquake hit Haiti leaving one million people homeless. HousAll immediately received orders from relief organizations such as Save the Children and CARE Canada. The company flew Algonquin construction students and professors to Haiti to install the shelters and train Haitians to build them. Students and a professor from the documentary film program went along to record the experience.

*"As far as the students are concerned, I think the experience is invaluable. School is all fine and nice, but there's nothing like the school of hard knocks."*  
Miles Kennedy, Chairman, Founder and Chief Technical Officer, HousAll Systems Corporation

## Monitoring the Structural Health of Buildings

**Red River College** (RRC) has formed a research partnership with SMT Research, a Winnipeg-based company that designs and manufactures technology for monitoring the structural health of buildings. Using the unique common wall configuration of the environmental chambers at RRC's Centre for Applied Research in Sustainable Infrastructure, researchers assisted SMT to evaluate their sensors' suitability to detect condensation on windows or door frames. RRC has also constructed and calibrated moisture sensors for SMT to use in concrete. These are currently being used in a prominent Ottawa heritage building. SMT provided training on the use of its sensor and software technologies and RRC anticipates using these capabilities for future building envelope evaluation projects.



# Manufacturing

## Better Recipes for Filling Chocolates

Karma Candy Inc is a specialist in manufacturing hard candy and chocolate confectionary products. The company supplies some of the most recognizable brands in Canada with high quality products and works continually to develop innovative and high-quality products to maintain its competitive advantage over offshore contract manufacturers. Candy shelling lines are an important focal point for the company as it offers a wide range of popular filled chocolate products, including caramel, peanut butter and fondant. International consumers have shown a desire for filled chocolates with Canadian flavours, such as ice wine or maple and Karma Candy is interested in broadening its product line to meet these needs. It is working with **Niagara College** chocolatiers to develop uniquely Canadian chocolates for this target audience.



## De-Burring Project

COM DEV manufactures high precision satellite components and their current practice is to manually de-burr the machined edges of these components with great precision to maintain the quality. This is both time consuming and extremely costly. A fourth-year Mechanical Systems Engineering project at **Conestoga College Institute of Technology and Advanced Learning** focused on automating the manual de-burring process for machined edges. Conestoga students conducted a feasibility study and prepared a process and manufacturing cost study for automating this process. The students designed an automated de-burring system that uses a robot with a brush-ceramic stone tool de-burring cell. This solution met COM DEV's technical requirements of movement tolerances, supporting the tooling during the de-burring process and reducing noise, time, cost and manpower.

*"We rely on Conestoga and its technologist training programs for 'here and now' solutions and we offer students opportunities for high quality jobs. Fourteen percent of our employees are Conestoga graduates."*  
Greg Healy, COM DEV International

## Wireless Remote Industrial Data Measuring System

The Centre collégial de transfert de technologie en télécommunications affilié avec **Cégep de Trois-Rivières** and the Centre d'innovation en microélectronique du Québec affilié avec **Collège Lionel-Groulx** develop innovative products for various applications. Through this partnership, the two centres have developed an industrial data acquisition system for a hostile environment, using a secure wireless MIMO multi-antenna network paired with the Zigbee Mesh Network standard. The Zigbee standard supports a high degree of energy independence and provides data routing reliability if one network node goes off-line. The MIMO mode increases transfer speed and range. Favourable initial results have encouraged development of a higher-performance version. This project won an award from the Trans-Tech network in 2010 for its training benefits.

*"The development of this technology provides the region and its industries with an economical and secure wireless technology. We anticipate interesting spinoffs in several industrial and service-based sectors."*

Robert Proulx, President, Xittel Télécommunications Inc



## A Potter's Prototype

Nova Scotia Community College's (NSCC) applied research team is helping a small business owner turn an idea into an innovative tool that will increase productivity. The owner of Artifacts in Clay, a producer of hand-made pottery, needed a more efficient tool to hand finish one of her most popular designs. Since the tool didn't exist, she developed her own design. With support from Nova Scotia's Productivity and Innovation voucher program, she took her idea to NSCC's Mechanical Engineering Technology program students, who designed and produced a conceptual prototype. The device is expected to be completed in the next year.

## Ore Crusher for Senegal

In partnership with the Lycée Technique et Minier in Senegal, **Cégep de Sherbrooke** mechanical design students have developed, produced and delivered an ore crusher to the West African country. Ore has been traditionally crushed manually and this hammer crusher significantly increases the speed of crushing and reduces dust through more effective control. The crusher is compact, inexpensive to produce, and the manufacturing technologies are adaptable so local tradespeople can make their own hammer crushers. In addition to producing the crusher, the students developed mercury recovery drums that reclaim up to 95 percent of the mercury used to consolidate the gold. Without the drums, the process widely used by Senegalese gold washers evaporated mercury into the open air.

## Ergonomic All-Terrain Vehicle

Cégep de Sherbrooke's mechanical engineering students participated in the Baja Society of Automotive Engineers 2010 challenge to design and manufacture a one-man all-terrain vehicle equipped with a safety cage. To win the North American competition a vehicle must feature better performance and ergonomic design than its competitors and have the potential to be mass produced. In its first competition in South Carolina in the spring of 2010, the Cégep de Sherbrooke team captured 14th place in the general ranking and 9th in the design rating out of 100 participants. The competition, organized by the Society of Automotive Engineers, brings together hundreds of educational institutions, mostly universities.



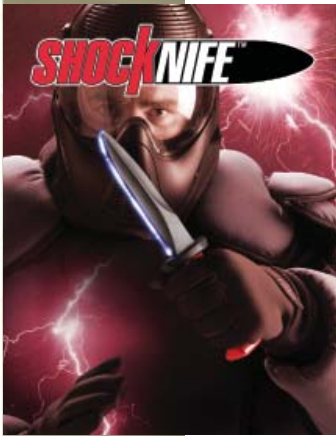
## Scale Models for Sculptors

Researchers at the College of the North Atlantic assisted members of the local art community to create new and cost-effective methods of producing sculptures. The artists use plaster and clay to create a mock-up which can then be laser scanned, refined, and fabricated as a prototype using a 3-D printer. Such models mimic the final finish and allow artists to use them for display in competitions, and do scale modeling for manufacturing.

*"The willingness of the College to work with me allowed me to make a complicated model in a relatively short time. The 3D printing proved to be a quick and effective way to solve a problem when time and money are short."*  
Jim Maunder, Artist

## A Better Cutting Edge

Rita's Outerwear is a small business in Nova Scotia with potential to expand. To increase its market, the company must increase its rate of production. Currently, product pieces are cut simultaneously from 100 layers of fabric at a time. Fabric is pulled from bolts by hand and each layer is perfectly aligned. Rita's Outerwear approached Nova Scotia Community College (NSCC) to design and build a device that would improve efficiency without compromising quality. NSCC Mechanical Engineering Technology students produced a full-scale, functioning prototype that is ready for installation. NSCC will license the prototype for use by Rita's Outerwear but will retain the rights to the design and may pursue commercialization in the future, to help other small companies become more profitable.



## “Shocking” New Tool for Law Enforcement Training

As part of **Red River College’s** Applied Research and Commercialization initiative, a “shocking” product has been developed. The Shockknife is a molded plastic tool used to train law enforcement officers how to deal with knife attacks. The tool looks like a real knife and delivers an electric charge that simulates the pain of a knife wound, but leaves no permanent damage. Since it was launched in 2006, more than 500 Shockknives have been sold to customers around the world including the FBI, the Norwegian Military Academy, the US Marine Corps, and the Special Protection Group that guards India’s Prime Minister. The Shockknife won the prestigious Manning Innovation Award in 2009 and has been featured on the Discovery Channel.

## Hydrogen Hybrid Bus for Cold Climates

The Hydrogen Hybrid Internal Combustion (HHICE) bus is a transit bus built in Winnipeg by New Flyer Industries, the leading transit bus manufacturer in North America. Following a brief time in service in California, the bus was brought back to Winnipeg for cold-weather testing. During its operational service in Winnipeg, the HHICE bus carried more than 1,000 fare-paying passengers and traveled more than 500 kilometers. This testing was significant as it successfully demonstrated the operability of hydrogen buses in one of the world’s coldest populated climates. **Red River College** was a key partner in this demonstration providing staff and students to help with operations, maintenance and troubleshooting.

## Scaling Up Manufacturing for Small Batch Preserves

Developing new recipes can present a major challenge for small companies in agri-food production. Mill Pond Cannery and Preserves, a family-owned start-up company in Ontario, collaborated with **George Brown College** (GBC) to create innovative recipes, test products, analyze nutritional value and label their maiden line of products. GBC’s commitment to innovation led to the commercialization of four all-natural fruit butters, enabling Mill Pond to pursue its vision of offering health-conscious products using produce from local growers. This interdisciplinary effort is the first GBC project funded by Ontario Centres of Excellence to see a product through R&D to the assembly line and to store shelves.

*“My initial meetings with GBC indicated a strong commitment to innovative culinary research, as well as unparalleled knowledge and experience, combined with a rigorous and professional project management-based approach to the initiative.”*

Dave Smythe, Co-Owner, Mill Pond Cannery and Preserves

## Advanced Materials from Recycled Plastic

The Advanced Materials Engineering Research (AMER) laboratory at **Lambton College** has been home for collaborative research and development with multinational and local chemical process industries. The AMER laboratory consists of a pilot scale twin-screw extruder, an injection molding machine, modern test equipment and a sophisticated process control system. Technologies developed at the college can be scaled up quickly and easily transferred to the factory floor. Researchers have been working on environmentally-sustainable projects which include grafting polymeric material used as a fuel additive, using industrial waste as a filler for recycled plastics, producing thermoplastic vulcanizates for automotive parts, and reducing air permeability with nano-composite material.



## “Survival Perk” Coffee-to-go

The Office of Applied Research at **College of the North Atlantic** has worked with local manufacturer Demand Innovation Inc. to design and fabricate the components needed to manufacture an innovative mobile ‘squeeze’ coffee maker. This portable, lightweight, and durable coffee maker looks like a water bottle and produces fresh ‘perked’ coffee at home, at work, while travelling or camping.



*“The work you have done has not only demonstrated your capabilities, it has also given me the confidence needed to go forward on other projects.”*  
Bernard Cook, CEO, Demand Innovation

# Social Sciences and Humanities

## Cooperatives and Community Agriculture in Quebec

The **Cégep de Victoriaville** is conducting research in rural farming communities to identify and analyze the socio-cultural factors that contribute to social cohesion in each community. Some are recognized as communities with strong social cohesion with common farming practices such as organic farming, community-supported farming and farm solidarity cooperatives. Farm producers in these communities develop a sense of belonging that breaks their sense of isolation and makes them active members of their community. The project will also analyze communities recognized as devitalized, where farm activities are poorly diversified and do not foster increased social activity.

*“As a cooperative, one of our missions is to create and maintain various means to integrate the community into our fields. We believe that our participation in this research will prove useful and enriching.”*

Dora GoldenOne, Coordinator, La Clé des champs cooperative in Saint-Camille

## Learning from Volunteer Experiences in Hurricane Katrina

In the wake of Hurricane Katrina, Child and Youth Care student volunteers from **Red River College** (RRC) traveled to Louisiana to provide support to vulnerable children and youth. Researchers at RRC are now documenting aspects of this experience to share with other child and youth care students and professionals. Volunteers and the agency staff were invited to participate in focus groups and surveys about their experiences in Louisiana. This project provided an opportunity to reflect on their experience and have direct impact on future opportunities for students and professionals from RRC. The researchers intend to develop recommendations for student involvement in post-emergency situations.

## Investigating Market Opportunities for Small Utility Tractors

The Electric Tractor Corp. designs, assembles and markets the Electric OX series of small non-polluting utility tractors. **Seneca College** Industry Innovation provided the client with market intelligence research to gain a better understanding of the market size, growth potential and future market opportunities for lawn and garden tractors, sub-compact and compact utility tractors in North America and abroad. This information provided key inputs for the company and strategic planning activities and direction for product re-design and commercialization.

## Rural Disaster Resilience Network

This **Justice Institute of British Columbia** project is creating a virtual 'Community of Practice' for disaster management in rural and remote communities. The virtual community will support knowledge generation and exchange, curriculum development, a 'network of networks' connectivity and engagement with policy and public safety decision makers. The project will strengthen organizational resiliency, engagement of stakeholders and response capacities for all hazard threats, including biological threats such as pandemic influenza. The virtual community of practice is intended to foster a culture of disaster preparedness, planning, response and recovery in remote communities.



## Energy Saving Analysis for Commercial Refrigeration

Unified Corporation, the Canadian manufacturer of refrigeration systems, was developing a new energy-saving system for commercial refrigerators. Competitive and market intelligence research conducted by **Seneca College** Industry Innovation helped make decisions on the viability of investments in research and development, evaluate the importance of energy efficiency in the decision to buy commercial refrigeration units over the past several years and determine the company's outsourced manufacturing plans.

*"It is imperative that any established or new business engage professional researchers, such as those at Seneca Industry Innovation, to provide a clear picture of the competitive landscape in which they operate."*

**Mark Fleming, President, Unified Corporation**

## Innovative Social Practices for Immigrant Integration

The Institut de recherche sur l'intégration professionnelle des immigrants (IRIPI), housed at the **Collège de Maisonneuve**, is researching innovative solutions to facilitate the integration of immigrants into the labour market. IRIPI's approach includes analyzing needs and objectives and designing innovative methods and tools which can be adapted and transferred to the workplace. Every stage is carried out in cooperation with local businesses. Research projects have included the development of human resources management tools adapted to cultural diversity and to a specific economic sector or individual business culture, an analysis of staff selection processes to make them free of cultural bias, and an analysis of intercultural conflicts and measures for resolution.



## Marketing Professional Cleaning Services

Clean 4 Me is a professional cleaning company initiating business planning to raise venture capital for a new market opportunity. **Seneca College** Industry Innovation accessed a variety of sources for Clean 4 Me to determine the structure of the residential market for cleaning services, including key players, typical demographic profile of a residential customer and demand for these services. This provided guidance and validation of the market opportunity as well inputs for business planning.

*“Seneca College’s Industry Innovation competitive market research intelligence has given our business the depth and insight of a large business as we pursue continued growth in our market. Great and valuable insight!”*  
Chris Collucci, General Manager, Clean4Me



## Researching Diverse Funeral Practices

**Saskatchewan Institute of Applied Science and Technology’s** (SIAST) funeral service program recently completed research on changing religious and cultural funeral preferences in the province of Saskatchewan and the impact they are having on the local funeral industry. The research explored current interaction between funeral directors and religious groups in the province and looked at whether the relationship could be enriched if there was a better understanding of funeral customs preferred by various religious groups. It also looked at the resource materials used by SIAST funeral service students. The research revealed that the SIAST funeral service program and funeral directors could benefit from updated information on religious, cultural, and ethnic funeral practices and written materials from ethnic groups could be used as reference sources. This project was supported, in part, by a SIAST seed applied research grant.



## ESL in the Workplace

The English in the Workplace: Common Ground project is a part-time program model that assists new immigrant employees to develop language skills and knowledge of workplace culture. Funded by Alberta Employment and Immigration, the program is designed to be delivered by employers using facilitators without formal teaching or ESL experience. The program model and resource guides were piloted in five companies in the hospitality, food processing and manufacturing sectors in rural and urban Alberta communities. Employees made improvements in pronunciation clarity, idioms, asking questions and managing conversations dealing with conflict. Resource guides can be accessed from the **NorQuest College** Centre for Excellence in Intercultural Education website.

## Nursing Education Innovation in Rural Areas

This **Saskatchewan Institute of Applied Science and Technology** study examined the potential for capacity building through community-based nursing practice education in rural Saskatchewan. Two applied research projects have been completed in rural communities. One project focused on the need for nurses from different disciplines to better understand each others' education and scope of practice. The research looked at innovative practice education models such as triad and co-teaching and emphasized community-based education. Diversity and cultural care were also important as the students' clinical experiences were in a rural community with a large First Nation population. Students felt they developed a better understanding of primary health care from in a rural setting and had a better understanding of the competencies of different nursing disciplines. The second project focused on community involvement as a critical element of learning. The students participated in health care promotion activities at the local elementary school and practiced direct patient care at the community hospital and long-term care facility.

## Community-Based Criminology

As part of their practical training, sociology students in the Community-Based Criminology Project at **Grant MacEwan University** are assigned to local criminal justice organizations to conduct research projects. Working with law enforcement agencies, including the Edmonton Police Service and the RCMP, students have created a youth risk assessment tool and identified barriers preventing youth from accessing prevention programs. They have also analyzed how intelligence-led policing can better target organized crime, determined the challenges faced by officers in crime prevention, and evaluated the viability of 'real time' crime analysis for auto theft. Students have also analyzed the effectiveness of the Edmonton John Howard Society's family violence outreach program and identified obstacles to reintegration of offenders.

*"Based on involvement of the MacEwan Community-Based Criminology Project, potential innovations that were destined to remain on the whiteboard became a reality and part of our strategic response to dealing with people at risk. It has been a great experience for all involved."*

**Superintendent David Veitch, Downtown Division, Edmonton Police Service**



## Partnership to Improve Youth Health Outcomes

**Douglas College** Faculty of Child Family and Community Studies is part of a community research partnership with the McCreary Centre Society and the PLEA Community Services Society committed to improving youth health in BC through research and engagement projects. In this partnership, PLEA develops research questions which can be answered using data available through PLEA'S two databases. College faculty supervise students in survey administration, data entry and analysis. Students have undertaken additional research projects during field placements at McCreary. Completed projects include studies of risk and protective factors for gang involvement among PLEA youth and the effectiveness of adult support in the completion rate of community service orders.



## Simulation Training and Exercise Collaboration

As the potential for man-made and natural risks and threats increases, first responders and crisis counselors need evidence-informed guidelines and practical tools to cope with new stresses. Police, fire, paramedics, emergency management personnel and those who provide psycho-social support for affected populations and emergency workers can learn how to deal with psychological effects through simulation exercises and training. Research at the **Justice Institute of British Columbia** is developing an approach to decision-making that includes the psycho-social dimension of disasters and other threats. This approach could be useful for senior administrators of first responder organizations and emergency operation control centres.

## The Social Economy and Development in Lanaudière

The Centre collégial de recherche en économie sociale is a multi-disciplinary centre based at the **Cégep régional de Lanaudière** dedicated to research on social innovation in the social economy. The project's objectives were to locate businesses in this sector, identify the socio-economic benefits for the region, observe the problems encountered by these businesses, and assess the role of the social economy in sustainable regional development. The first phase of the project was a survey conducted in partnership with the regional council on social economy in Lanaudière and other support organizations and groups in the sector. A parallel "social" mentoring project seeks to create mentoring cells in which retirees and pre-retirees could offer their expertise and skills to social development enterprises and organizations in the region.



## Read to Succeed on the Web

In 1997, **Bow Valley College** began developing an innovative literacy and essential skills assessment tool known as TOWES – The Test of Workplace Essential Skills. Today, 58 colleges across the country distribute the assessment tool, making it one of the few successfully commercialized applied research projects conducted by a Canadian college. TOWES is retooling its product line into a variety of web-based assessment tools, beginning with the Read to Succeed (RtS) Assessment Battery. In addition to providing test-writers a score on the international literacy scale, RtS will identify the reading components where the test-writer demonstrates proficiency or weakness. RtS will improve the efficiency of literacy and essential skills programs in both official languages by helping instructors group learners with common learning goals. RtS and other web-based versions of TOWES will be available in 2011. Investment for this project comes from the Federal Government, the Province of Alberta, Bow Valley College and Nexen Inc.

*“Nexen is proud to partner with Bow Valley College on its Read to Succeed project as it helps individuals in underserved communities gain skills and access to the resources they need to thrive.”*

**Pierre Alvarez, Vice President, Corporate Relations, Nexen Inc.**

## Adult Learning for Island Prosperity

Canada has over two million people without a high school diploma, of which 13,585 are PEI workers. **Holland College** is identifying the most effective adult programs to increase the literacy and skills levels needed for PEI’s prosperity. This research identifies the type and cost of learning gained in Adult Education (ACE) programs at Holland College. The project’s experimental design involved more than 480 learners and addressed key research questions such as: What was the cost of the learning gained and how did costs relate to learner and training characteristics? This study presents scenarios for investment in adult learning to develop the skilled labour force needed for PEI’s future prosperity.

## Driving Safety

Weatherford Canada, a major oil field service company, wanted to increase driver safety and reduce motor vehicle collisions. The company approached **Lethbridge College** to develop an integrated program of education, evaluation and research tools. An on-line driver training course and in-vehicle driver evaluation tool were developed. Weatherford also asked the college to develop tools to measure driver attitude, which they thought was a major contributor to collisions. Attitudes were then correlated with driving records to identify attitudes and traits common to high risk drivers. Future work will involve developing customized educational materials to address the attitudes and traits that lead to motor vehicle collisions. This work will also be extended to other high risk occupations.





## Bridges for Rural Immigrants

Successful integration of immigrants is essential for a healthy economy and society. **Bow Valley College** has long excelled at meeting the educational needs of this diverse group using a variety of innovative strategies. Through research conducted by the college, in partnership with the Calgary Catholic School District and with funding from the Alberta government, a Bridge Program has been developed for immigrant youth whose formal education has been interrupted. Bow Valley College is building on its success with a new initiative using video-conferencing to deliver ESL instruction to rural Albertans. Bridges for Rural Immigrants is a partnership between Bow Valley College and the Hanna Learning Centre.

## Holistic Curriculum Combining Bloom's Taxonomy and the Medicine Wheel

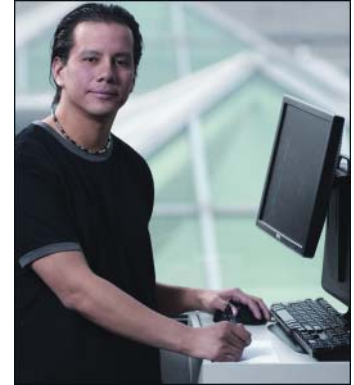
The Schools of Indigenous Education and Learning Innovation at **Red River College** are working on a project that combines the Medicine Wheel and Bloom's Taxonomy of educational objectives to develop a framework for holistic curriculum development. This model separates curriculum development into the intellectual, physical, emotional and spiritual aspects of the Medicine Wheel and ties it into the cognitive, affective and psychomotor domains of Bloom's Taxonomy. The new framework will be used to develop holistic curricula that meet the needs of Aboriginal and non-Aboriginal students. The project has garnered national and international attention, as people see the importance of curricula that meet student needs.

## Adaptech Research Network

The Adaptech Research Network based at **Dawson College** consists of a team of academics, students and consumers that conducts research on the needs and concerns of postsecondary students with disabilities. Its primary focus is on the use of computer, information and adaptive technologies. Funded by both federal and provincial granting agencies, the goal of Adaptech is to provide empirically-based information to ensure that new policies, software and hardware reflect the needs and concerns of students with disabilities, the professors who teach them and the campus service providers who make supports available at colleges and universities.

## Meeting the Needs of Online and Distance Learners

Online and distance learning increase access to education by allowing learners to study any time, in any place and to take any path at any pace. **Bow Valley College** is leading two applied research projects designed to expand support services for distance learning. The projects are being conducted in partnership with **Lethbridge College, Northern Alberta Institute of Technology, NorQuest College, Northern Lakes College, Olds College, Portage College, and Red Deer College** and are funded by eCampusAlberta and Alberta Advanced Education and Technology. The results of these collaborations will identify potential changes to institutional policies, procedures and practices that will increase learner success in alternative delivery programs.



## Columbia Basin Development Planning

The Columbia Basin Trust launched its State of the Basin Initiative in 2008 with the first basin-wide indicator report. Over the same period, **Selkirk College's** Regional Innovation Chair in Rural Economic Development has become a hub for data collection, research and analysis. The Columbia Basin Rural Development Institute (RDI) was established to bring together the assets of these two initiatives to create a sustained resource. The RDI will report on a wide range of community indicators — employment, environment, charitable donations, crime rates — and undertake new research on issues that affect the region. This information will be broadly shared so that communities can apply this knowledge in their planning.

*"We are honoured to partner with Selkirk College and build on complementary goals and existing assets in order to generate better understanding of our region and provide support for communities to make informed decisions about their future."*

**Neil Muth, President and CEO, Columbia Basin Trust**

# Health, Medical, and Life Sciences

## Increasing Aboriginal Health Professionals



**Northern Alberta Institute of Technology (NAIT)** faculty is participating in an innovative applied research project exploring the challenges faced by aboriginal youth entering health careers. In the fall of 2009, NAIT took seven high school students from Amiskwaciy Academy on a tour of Edmonton post-secondary institutes introducing them to health sciences programs. The young women documented the challenges they saw for Aboriginal learners entering health career studies. Their insights are now being analyzed for use by First Nations, governments and post-secondary institutes as part of Alberta's strategy under the Aboriginal Health Human Resources Initiative, a federal program that aims, in part, to increase the number of Aboriginal health professionals.

## Optimization of Drug Tablet Formulation

Faculty at **Red River College** are undertaking research in drug tablet formulation and manufacturing. Tablets are a convenient and portable format to provide consumers with drugs in accurately-measured doses. The challenge, however, is to formulate them in a way that releases the active ingredient appropriately. The focus of research at the college is to achieve the desired delivery of the drug by manipulating the formulation and manufacturing processes. The relationships between product quality and formulation and processing factors are also being investigated to ensure quality. This project is expected to foster further applied research in drug delivery technologies.

## Development of a Multi-Function Training and Rehabilitation Device (AME)



CPA, an automated-systems production centre, affiliated with the **Cégep de Jonquière**, has developed a device to assist in rehabilitation of workers or accident victims with a shoulder condition. The idea is to use cutting-edge automation technology to simulate lifting loads instead of traditional rehabilitation exercises. The technological advance developed by CPA is a rehabilitation device that does not use a physical load. The device simulates a load and gives feedback based on muscle exertion. It can also adjust the simulated weight. Experts believe that this approach optimizes rehabilitation time. It incorporates a measurement system for muscle activity that stores information in a database and allows better analysis of progress in healing the wound, as well as constant monitoring.

## Patient Transfer Belt

The **New Brunswick Community College** (NBCC) is working with Loch Lomond Villa, a local Saint John nursing home, and WorkSafe New Brunswick, to develop a new patient transfer belt design. Patient transfer belts are used by nurses and personal support workers to help a patient move from a bed or chair. Engineering and nursing students at NBCC Saint John worked cooperatively on this project to draft and test a first prototype and make modifications for a second prototype. The modified prototype is now under construction and will soon be ready for testing trials at both the Loch Lomond Villa and throughout the Horizon Health Network. An industry partner is being sought for production of the prototypes required for testing.

## Movement Matters: Dance for Health

Through a project funded by the Canadian Institutes of Health Research, **Sheridan College's** Elder Research Centre has designed and tested a protocol for teaching ballet and contemporary dance to adults over 55. The innovative health promotion program, developed collaboratively with Sheridan Music Theatre faculty and students, has been tested in three retirement homes and on campus. Recognizing the low level of older Canadians' participation in physical activity, the objective was to offer an enjoyable activity for this age group that could improve general health. Information about physical fitness, quality of life, health, exercise habits and barriers was collected to evaluate the impact of the program.

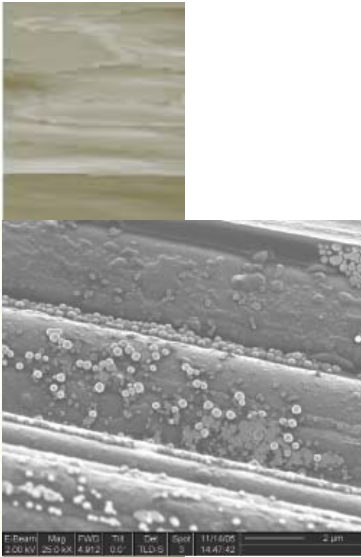


*"The dance initiatives developed at the Sheridan Elder Research Centre and tested both on campus and in our retirement homes are exceptional in fulfilling this mandate."*

**Dr. Mike Sharratt, Executive Director, Schlegel-UW Research Institute for Aging**

## Early Child Development Resources Online

The Science of Early Child Development (SCED), [scienceofecd.com](http://scienceofecd.com), is an online teaching and learning resource consisting of interactive, multimedia ECD information. It offers updated research findings on issues such as how everyday experiences of young children can affect the long-term outcomes of health, learning and behaviour and allows users to put new findings into practice. The website provides readings, slideshows, video and audio clips, web links, and interactive games. SCED was developed by partners **Red River College**, the Atkinson Centre for Child and Society Development (University of Toronto) and the Council ECD in response to a need for current, accessible material that could be easily understood by frontline caregivers. It can now be used by any individual, organization or educational institution interested in child and population development. The research was supported by the Lawson Foundation and the World Bank.



## Silver-Coated Bandages

Groupe CTT affiliated with **Cégep de Saint-Hyacinthe** has developed silver-based medical tissues and antibacterial bandages for treating infections, wounds and burns. Other existing silver-based products have drawbacks such as poor adhesion and high cost. They are also not reusable or washable. The team has developed expertise in synthesizing silver salt nanoparticles or nanocrystals that can be encapsulated. This enhances their performance, adhesion and durability on tissues. The nanocrystal supports application as an antibacterial preparation and can be encapsulated and retained on bandage fibres, generating excellent adhesion and performance of the silver coating.

## Clinical Practice Profiling Tool

In partnership with the Guelph Family Health Team, **Conestoga College Institute of Technology and Advanced Learning** is developing a solution for importing and exporting patient data using the requirements the OntarioMD Clinical Management System Certification Program. Rather than using the tool for importing or exporting data, the Clinical Practice Profiling Tool Project intends to use it as a data source to develop a profile of a clinical practice. This data can be used to make informed decisions about the clinical practice, and take steps to work with collective patient populations. For instance, the tool will provide an indication of the status of a particular patient group, such as diabetics, and determine how well a given clinical practice adheres to current best practices for that population group.

## Fashioning a Heart Monitoring Vest

The Heart Monitoring Vest (HMV) project, developed for Occorant Incorporated, houses an advanced heart monitoring device that performs better than standard monitors and can produce reports projecting heart health. The vest was featured at Ontario College of Art and Design's professional gallery in March 2010 as part of their Fashion Forward exhibit showcasing electronically-integrated clothing. An exemplification of **George Brown College's** commitment to inter-disciplinary projects and technology transfer, the vest has generated interest from fashion designers and medical professionals alike. Fashion and nursing students have now produced a working prototype of the HMV and continue to refine their designs and conduct usability tests.

## Increasing Paramedics' Resiliency to Stress

The daily stress that emergency responders work under makes them prime candidates for psychological distress and burnout. A **Fanshawe College** researcher has completed a study aimed at developing interventions to increase paramedics' resiliency to stress. The study is unique in that it is the first to use pre- and post-testing, provide actual interventions and then measure and quantify the results. Using 23 volunteer subjects, the study sought to determine whether peer support, negative attitudes toward emotional expression and specific coping techniques were tied to levels of burnout and distress. Using stress reduction and relaxation exercises, the treatment group experienced greater improvement than the control group on 10 out of 10 variables measuring psychological distress and burnout symptoms. Plans for a broader study are now underway.



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