



# Colleges, Institutes and Polytechnics:

STIMULATING INNOVATION FOR SMALL BUSINESSES AND COMMUNITIES

**April 2013**

Association of Canadian Community Colleges





The Association of Canadian Community Colleges (ACCC) is the national and international voice of Canada's publicly-funded colleges, institutes and polytechnics (hereinafter referred to as colleges). With campuses in 1,000 urban, rural and remote communities, these institutions educate learners of all ages and from all socio-economic quarters. They partner with small- and medium-sized enterprises (SMEs) to foster innovation and business growth by supplying graduates with advanced skills and providing applied research and development support.

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## Colleges, Institutes and Polytechnics: Stimulating Innovation for Small Businesses and Communities

Canada's colleges, institutes and polytechnics stimulate innovation, enhance curriculum and produce highly skilled, innovative graduates through applied research partnerships with firms and community organizations. Closely linked with regional public and private enterprises, colleges play a central role in advancing innovation.

In its 2012 economic survey of Canada, the Organisation for Economic Co-operation and Development (OECD) recognized that Canadian "colleges are becoming proactive in directly meeting the needs of small businesses in areas of problem solving, process innovation and technical skills." In 2011-12, more than 24,000 college students and 1,700 faculty and staff collaborated with 4,586 companies across 524 research areas.

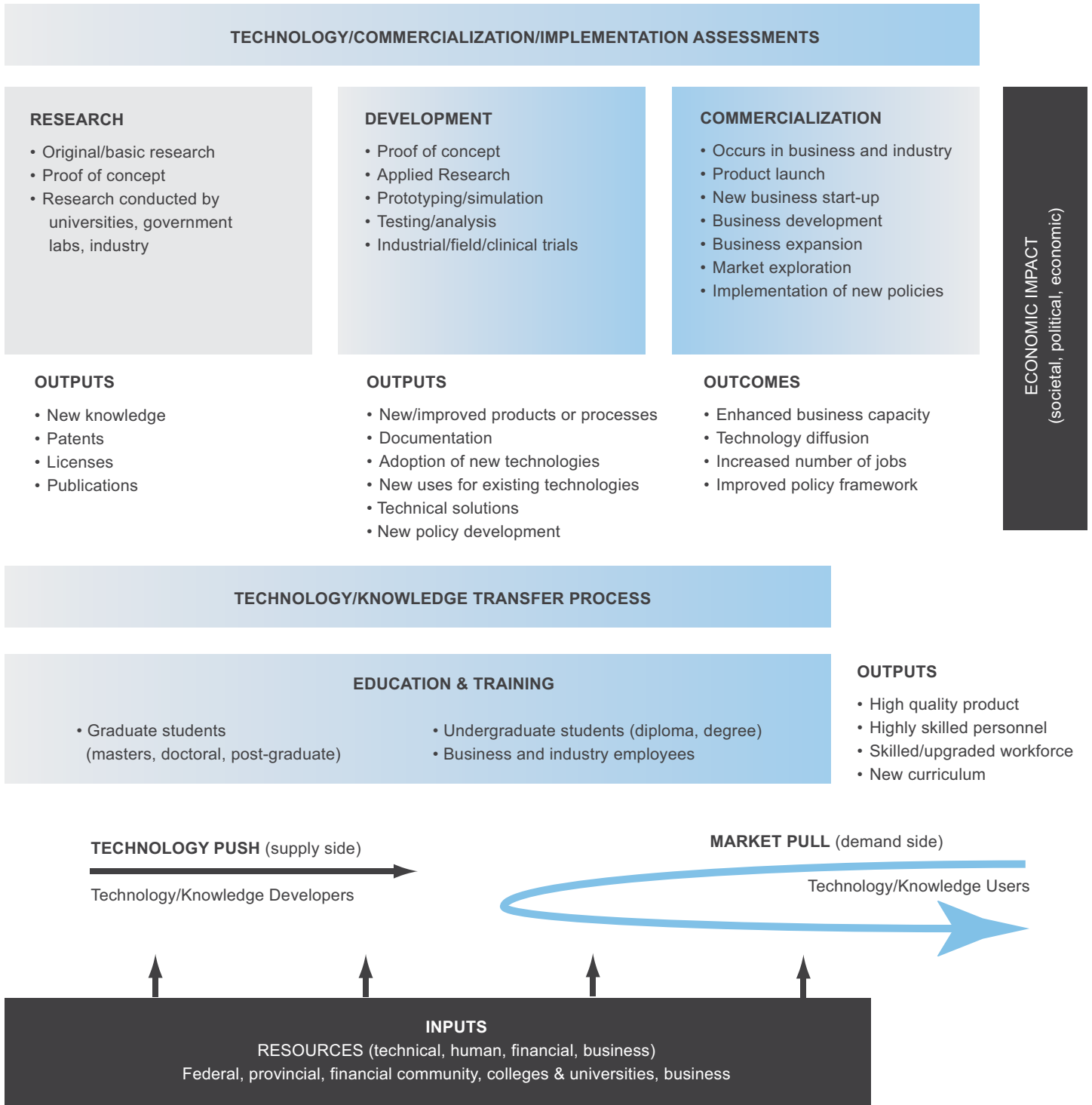
Targeted federal funding programs for colleges such as the Tri-Council College and Community Innovation (CCI) Program and the Canada Foundation for Innovation College-Industry Innovation Fund enable colleges, institutes and polytechnics to strengthen their capacity. Expansion of the CCI program by \$12 million annually in Budget 2013 will allow more institutions to work with local companies, particularly SMEs, and support applied research collaborations to stimulate commercialization, technology transfer, and adaptation or adoption of new technologies. Other significant federal investments include the National Research Council of Canada's Digital Technology Pilot Program and those from the regional economic development agencies. The private sector and provincial governments are also major contributors.

These strategic investments make a real difference in growing the capacity of colleges, institutes and polytechnics to engage in industry-driven and social development research. They provide SMEs and communities with the expertise and knowledge needed to be productive and inclusive at a reasonable cost.

This fourth ACCC Vignettes Showcase celebrates innovations created through college applied research partnerships in a wide range of sectors that are generating economic, social and environmental benefits for Canada.



# Canadian Colleges and Institutes – Role in Research, Development and Commercialization



Colleges and Institutes = blue

Note: process has feedback loops and is normally not as linear as this chart appears.

# Colleges, Institutes and Polytechnics: Stimulating Innovation for Small Businesses and Communities



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# Manufacturing



## An Engine of Innovation

ALBERTA: NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY

Besides being a product of natural mechanical aptitude, Ross Taylor's reinvention of the internal combustion engine is also the result of a mild obsession. "I'm always looking for opportunities to improve things," says the Northern Alberta Institute of Technology (NAIT) Computer Engineering Technology instructor.



With the help of Prototype Development Project grants from novaNAIT, funded by Alberta Innovates Technology Futures, and matching support from the School of Information Communication and Engineering Technologies, Taylor's engine is now a working, proof-of-concept model.

Produced through the collaboration of several NAIT schools and departments, his design features a circular configuration of pistons that, compared to V8 engines, produce more energy per stroke, have fewer parts and less chance of wear and breakdown. His machine is also lighter than a conventional V8, and easily converts to a hybrid model with the addition of magnets.

"We're hoping it will compete, if not replace, a certain section of the internal combustion market," says Taylor, with reference to its potential applications in trains, planes and automobiles.

Taylor will finish patent applications, test his novel gear system and, next year, will build a full-size engine for further testing. With novaNAIT's help, he will also seek out a business partner so he can keep teaching – and finding new ways to make things better. Regardless of the potential of his engine to revolutionize an industry, "I'd like to continue as a skunk works, behind-the-scenes operator," he says.



## Better Management of Electric Motorcycle Autonomy Through Development of an Innovative System

QUEBEC: CÉGEP DE SAINT-JÉRÔME, COLLÈGE LIONEL-GROULX, AND CÉGEP DE TROIS-RIVIÈRES



Greater autonomy is the battle horse of all electric vehicles. For an electric motorcycle, this constraint is particularly important since the on-board battery volume and weight is very limited. This project developed a power control algorithm for effective energy management to ensure that a motorcycle can reach its desired destination. This is called the Safe Range System and interprets GPS routing data, communicates with battery modules and then actively modulates motor operation consistent with distance, grades along the route and battery charge status.





This project was funded by the Ministère de l'Enseignement supérieur, de la Recherche, de la Science et de la Technologie's applied research assistance program. Three College Centres for the Transfer of Technology (CCTT) from the following colleges partnered to realize this project: the Institut du transport avancé du Québec at Cégep de Saint-Jérôme; the Centre d'innovation en microélectronique du Québec at Collège Lionel-Groulx; and the Centre de géomatique du Québec at Cégep de Trois-Rivières. This project also upgraded the knowledge of researchers, electrical engineering faculty and students in the areas of traction control and energy management.

***"This wealth of cooperation between three CCTTs generated a synergy of knowledge and birth of an innovative product that will stand out in the international market,"***

*– Mr. Jean-Pierre Legris, President, Lito Green Motion*



## Welding Process Improvement

ONTARIO: ST. LAWRENCE COLLEGE

Five St. Lawrence College students worked with MetalCraft Marine Inc., technical advisors and faculty to present and test different welding processes. Business students assisted by identifying the latest technology in the marine welding environment. Over forty weeks, welding students assisted the technicians and consultants to prepare sample welds, and present their findings to the partner. This new welding process gives MetalCraft Marine Inc. a strategic advantage in the marketplace. Welding precision was improved and production process streamlined, which enabled efficiencies in both time and cost of production of high performance emergency watercraft, such as fireboats.

***"The welding project with the college will set us apart from our competition, not only because the quality of our product has been improved, but this new process will save us hundreds of thousands of dollars giving us a competitive advantage like no other company will have."***

*– Bob Clark, Contracts Manager, MetalCraft Marine Inc.*





## Innovation through Lean Efficiency: The New Paradigm in Graphic Communication

ALBERTA: NORQUEST COLLEGE

The NorQuest College Centre for Excellence in Print Media, partnering with Western Economic Diversification and the National Research Council-Industrial Research Assistance Program, is conducting a research project exploring the benefits that lean manufacturing concepts can provide small- and medium-sized printing companies in Western Canada. The Centre hosted a series of lean manufacturing workshops across Western Canada and proceeded to work with four individual printing industry companies to develop specific, customized implementation plans. These plans, developed by lean leaders in each company, are supported and audited by the Centre for Print Media to determine benefits the company might gain by eliminating production and process waste as well as identify barriers that similar companies might face in implementing lean initiatives in their operations.



The project incorporated the 5S method, which is a type of workplace organization that focuses on the elimination of waste and increased productivity that result in improved business performance. One company identified a decrease in their shipping and receiving area by 60% and is now using the space for revenue generation. The project will result in an industry survey to determine future trends and will be presented in a series of white papers to be shared with the Canadian printing industry.

*“The simple and practical applications you shared are of significant interest to our company, and we’ll be pursuing the philosophy and taking the necessary baby steps to become more productive.”*

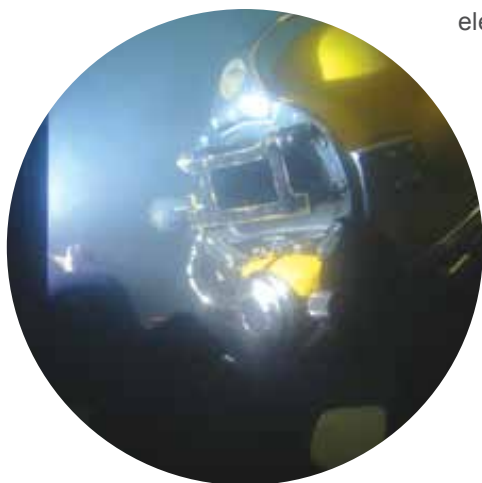
— Rick Kroeker, President, Little Rock Document Services Ltd.



## Innovations in Underwater Welding

ONTARIO: SENECA COLLEGE

Faculty and students from the Underwater Welding program at Seneca College worked with the Acuren Group to examine the mechanical properties of metal during wet welding with different electrodes, in order to determine whether surface quality welds could be achieved in an underwater environment. Project findings included a greater understanding of performance enhancement of electrodes (burning, deposition, and penetration) to be achieved by having the welding machine ‘dialed in;’ and the realization of greater consistency in the burning of electrodes that allow diver/welders to better manipulate and control the weld. These findings support new innovations in the practice of underwater welding, which are being deployed by the industry partner to realize performance improvements and efficiencies. The impact has been direct in terms of the quality, level of difficulty, and the success rate of divers/welders training at Seneca or coming to Seneca College to retrain or re-qualify. The project was funded by the Colleges Ontario Network for Industry Innovation.







## Small Wonders

ALBERTA: NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY

Alberta's oil industry, construction sector and municipal governments will benefit from NAIT's first-ever international applied research project, which involves identifying Alberta applications for a breakthrough nanotechnology developed in Israel.

The company at the centre of this innovation is Alberta Nano-Monitoring Systems (ANMS) – a client within the NAIT Nanotechnology Centre for Applied Research, Industry Training and Services (NanoCARTS), and also of NAIT's business incubator. ANMS is a spin-off of Israeli nanotechnology company Particle-Monitoring Technologies (PML).

PML's particle size analyzer uses a laser to determine the particle concentration of solids, liquids and gases. Besides its power to analyze at the sub-micron level, the device is unique for its cost-effectiveness and capacity to operate in real time.

This technology could be used to analyze the contents of waste streams from oil sands operations, including those associated with tailings ponds. It could also be used by municipalities to analyze wastewater, and by the engineering, manufacturing and construction industries to analyze cement, thereby ensuring greater quality control.

Through NanoWorks funding, Alberta Innovates Technologies Futures is providing \$2.2 million in funding over two years to support this applied research. NAIT's School of Information, Communication and Engineering Technologies is helping to develop the technology for the Alberta market, and industry has already begun to show interest.

***“The project provides a tremendous opportunity for NAIT academic staff to participate in developing a nanotechnology system that is cutting edge,”***

*– Dr. David Carpenter, Associate Vice President Academic and Applied Research, NAIT*





## Harbour Hopper Brake and Bracket Project

NOVA SCOTIA: NOVA SCOTIA COMMUNITY COLLEGE

Murphy's Cable Wharf uses refitted Lark V amphibious vehicles to provide tours of downtown Halifax via land and water and, because of the hills in Halifax, the brakes on the vehicles were wearing out quickly. Replacing the brakes was costly to the company and a time-consuming process requiring custom machining. With funding from the Nova Scotia Economic and Rural Development and Tourism Department Productivity and Innovation Voucher Program, Nova Scotia Community College (NSCC) and Murphy's collaborated to tackle the problem of finding a solution that would be accessible, cost-effective and safe.



Using a multi-disciplinary approach, NSCC called on the expertise of its Heavy Duty Mechanical and Mechanical Engineering Technology programs. The College teams were challenged with identifying an accessible braking unit technology that would both meet the technical brake requirements of the Lark V vehicles while adapting to the existing frame to minimize the overall impact and changes required to the vehicles. Once a solution was identified by the automotive team, a specialized bracket was designed by NSCC's mechanical engineering group to mount the electromagnetic braking unit. ABCO Industries of Lunenburg, Nova Scotia fabricated the specialized bracket to install the new braking system on the Harbour Hopper providing a truly local and successful resolution for Murphy's.

*"Our Harbour Hoppers are extremely popular touring vehicles in Halifax. Our work with the NSCC has resulted in a new braking system infused with modern technology. This new system has been tested and is extremely efficient. This will now be applied to all current Harbour Hopper vehicles owned by our company. Our experience with the NSCC has been fantastic. We are about to embark on a new project of building a Harbour Hopper prototype with new technology, and hope to continue our partnership with NSCC."*

— Jeff Farwell, Co-owner of Murphy's The Cable Wharf



## Viscus-Therapeutic Pedaling Device

ONTARIO: SAULT COLLEGE

Continuous passive motion devices are used for rehabilitating soft tissues following surgery or trauma and can provide significant value for people who have undergone joint replacements, suffer from fractures or circulatory problems, and for people with certain neurological conditions such as stroke victims.

Rehabilitation specialists, Back in Motion Management Inc., has successfully developed, deployed and sold such a device, known as the "Viscus," for 15 years. Lacking the resources to incorporate design changes that could improve Viscus' position in the market place, the company partnered with Sault College students and faculty from the Mechanical Engineering Technology program, to radically re-design and manufacture a prototype of the new Viscus. For a full semester, students acquired hands-on experience, including project management, design, drafting, machining, assembling and testing.



With a new planetary gear system, the improved Viscus is more compact, making it marketable in the office setting, more stable, smoother, and packs a higher gear ratio with an improved inertial momentum, which reduces the pedaling force needed to keep it running at optimal speeds. Back in Motion Management Inc., plans to complete the development of the Viscus and ultimately set up a local manufacturing and distribution centre to commercialize the device.

*“Working with their professors, the Sault College Engineering students were able to design and manufacture a prototype incorporating the ideas presented to them. The end product exceeded all my expectations in timeline and quality.”*

– Andre Riopel, President, Back in Motion Management Inc.



## Unique Vest to Monitor Athletes' Health Remotely

QUEBEC: CÉGEP MARIE-VICTORIN

Imagine a hockey player practicing on the ice and a doctor miles away assessing his or her health in real-time. Imagine no longer, as Carré Technologies in Montreal has created a revolutionary “smart vest” that will soon reach the market.

With typical athlete performance tests both cumbersome and outdated, the vest delivers an athlete’s vital signs straight to their doctor, with no disruption. Sensors embedded in the material record electrocardiogram readings, as well as thoracic and abdominal respiration rates. The data are sent to an iPod through a small Bluetooth device, and then are processed automatically by a software application.

The challenge was to design a light, flexible garment able to capture signals no matter how an athlete from any sport is moving. The design went from concept to prototype with the emergence of mobile computing, and the Centre de recherche et d’innovation en habillement – VESTECHPRO, affiliated with Cégep Marie-Victorin, produced an initial run of 100 vests.

*“As engineers, we knew how to create the software for the vest. The complicated part was the fabric. The folks at Vestechpro aren’t just experts in the field; they’re artists. They helped us avoid a number of stumbling blocks. It’s been delightful working with them.”*

– Yvan Ouellet, Vice-President, Business Development, Carré Technologies

This partnership, supported by a CCI Applied Research and Development grant will lead to the creation of a full line of garments. The demand is already high, with orders from many organizations including the Canadian Space Agency and the Quebec Major Junior Hockey League.

*“Carré Technologies is very open to new ideas. It has a young, energetic and creative team with more than one invention under its belt.”*

– Christine Harding, Director, Research and Development, Vestechpro

## Norgen Biotek Experiences Unprecedented Rise in Production Volume

ONTARIO: NIAGARA COLLEGE

NorgenBiotek provides their global customer base with first-class sample preparation kits for RNA, DNA and protein purification, as well as dedicated and expert support services. Norgen holds more than a dozen issued and pending patents, and is a market leader.



Niagara Research, a division of Niagara College, worked with Norgen to enhance their manufacturing abilities through quality and productivity improvements. Through funding from the Federal Economic Development Agency for Southern Ontario (FedDev Ontario) Applied Research and Commercialization Initiative, the research team introduced automated elements to their kit manufacturing process. Two opportunities were identified and acted upon. First, the automation of bottle labeling provided more consistency and essentially eliminated labeling time from the manufacturing process. Second, by producing tooling for an automated column machine, Norgen increased column production volume from 500 to 12,000 columns per day, or from 10 kits to 240 kits per day. Cost per unit has decreased, therefore increasing profit margins per unit sold. Aside from a satisfied industry partner, the student research assistants learned how to use milling machines, lathes, and precision grinders, and gained professional knowledge from Norgen's team of engineers.

*"The increases in productivity and quality have brought benefits to the company on several fronts."*

– David Findlay, Research Engineer, NorgenBiotek

## Partnering With Bombardier for Laser Welding

QUEBEC: CÉGEP DE LA POCATIÈRE

Welding is critical to quality and production capacity in the construction of railroad cars. Bombardier Transport Amérique du Nord (BTAN) and Solutions Novika, the CCTT affiliated with Cégep de La Pocatière, have worked since 2008 on the development of laser-welding processes as part of a research and development project funded by a CCI Innovation Enhancement grant.

This partnership has optimized BTAN's laser-welding process during manufacturing, introduced novel techniques and applications, overcome technological limitations, and transferred expertise to BTAN employees.

Laser welding has improved productivity with a 90% reduction in machine time. Through this improvement, BTAN has built products whose aesthetics surpass those obtained through conventional welding methods. BTAN/Novika's recent innovations in hybrid laser-gas metal arc welding have produced much stronger joint welds, allowing the company to make and re-engineer lighter, more environmentally friendly products at lower costs.

Partners have acquired in-depth expertise based on practical experience with laser welding. BTAN has successfully incorporated the advantageous process into its manufacturing activities, while Novika has provided business clients with a new range of services and gained greater visibility in the industry.



## Centre for Innovation in Manufacturing – A Model for Rural Business Development

ALBERTA: RED DEER COLLEGE

The resources needed to grow and develop a business, including service and innovation support are not readily accessible to rural businesses or are prohibitively expensive. To address this challenge, Red Deer College, with funding support from Western Economic Diversification Canada, built the Centre for Innovation in Manufacturing, which is part of the College's Applied Research and Innovation Department. The Centre is a facility equipped with state-of-the-art manufacturing equipment to support the design and development of new products and prototypes.

Producing prototypes is only a small part of how the Centre for Innovation in Manufacturing supports smaller businesses. The Centre can train business owners on new equipment and techniques so that they can expand into new markets. Red Deer College's creation of the Centre for Innovation in Manufacturing, paired with the College's extensive trades and technology programs, is a solution for sustaining and developing business and manufacturing in the rural environment and may be a model worth repeating across Canada to foster growth in rural communities.



***“The resources needed to grow and develop a business, including services and innovation support that are often close at hand for businesses and manufacturers in larger cities, are often far enough away from rural businesses that the costs to engage such services are prohibitive.”***

– Mark Burggren, Board Member, Central Alberta Rural Manufacturers Association (CARMA)



## Advisory Services for Manitoba Manufacturing SMEs

MANITOBA: RED RIVER COLLEGE

As part of its involvement in the National Research Council Canada Industrial Research Assistance Program's Digital Technology Adoption Pilot Program, Red River College (RRC) offers advisory services to small- to medium-sized enterprises (SME) looking to improve their productivity through adopting new digital technologies.



Between March and April 2012, RRC Technology Management students worked with three Manitoba SMEs from the manufacturing sector, Dixon Group Canada Ltd., Melet Plastics Inc., and Argus Industries, to identify digital-technology automation opportunities - such as welding, additive manufacturing, robotics, mechatronics and integrated manufacturing. In three teams (one for each SME), students spent five weeks working directly with each company, assessing technology and productivity needs. Each team prepared final reports based on their findings and presented them to representatives from each respective SME.



The students demonstrated the ability to quickly grasp the key elements of each manufacturing facility and offer solutions to different productivity challenges. Each report recommended at least one new idea or technology that the SMEs had not considered before. These ideas ranged from implementing 3D printing to eliminating outsourced prototyping, to using rubber sheets to dampen noise generated by vibrating metal hoppers.

*“The RRC students were very resourceful and interacted very effectively with our employees to assess our needs. In the end they provided us with a well-researched recommendation for a technology that we now intend on implementing into our operations in the relatively near future.”*

– Franklin Hodgson, Manager of Manufacturing Services, Melet Plastics Inc.

## Seneca

### Heaven Fresh

ONTARIO: SENECA COLLEGE

Founded in 2003 by two Canadians, Heaven Fresh promotes the anti-aging and detoxification benefits of pure air and water. Their portable air ionizers and purifiers incorporate new technologies that tackle virtually every indoor pollutant and energize the air with negative ions. With support from the FedDev Ontario Applied Research and Commercialization Initiative, students and faculty from the Centre for Advanced Technologies at Seneca College developed a digital CAD model of a “green” air purifier enclosure. The model will be used to develop a marketable commercial consumer product to house Heaven Fresh’s Nano-technology filter for maximum efficiency. The product will get rid of a wide spectrum of indoor air borne pollutants. Heaven Fresh expects to increase its global revenue by selling this product online and through major retail outlets.



*“It was a great experience working with the Seneca team to develop and design a new breed of air purifiers. We found everyone involved to be very professional and passionate about their work. Professor Miri’s in-depth involvement on the technical side, Mr. Deepak Bajaj’s extremely business oriented approach and the hard work of the students were the key drivers for the success of our project.”*

– Imran Bashir, President, Heaven Fresh Canada Inc.



### Solving a Community Dilemma

SASKATCHEWAN: SASKATCHEWAN INSTITUTE OF APPLIED SCIENCE AND TECHNOLOGY

The town of Wakaw, Saskatchewan, needed detailed research to decide whether to renew or rebuild its recreation centre and arena. Saskatchewan Institute of Applied Science and Technology (SIASST) Architectural and Building Technologies program offered the solution. Several SIASST Architectural and Building Technologies students, assisted by an instructor, made a site visit, toured the facilities, examined the original blueprints and spoke with a Wakaw Community Developer. Back on campus, students worked under the supervision of their instructor to evaluate the mechanical systems, energy efficiency, lighting and compliance with the National Building Code.

*“This partnership and the final report will allow Wakaw to develop a long-term, sustainable plan for upgrades to our community recreational facilities. We now have a valuable tool to guide us in areas of energy efficiency, accessibility, safety and structure.”*

– Erin Standish, Wakaw Community Developer



## The Manufacturing of Flexible Composite Hose for the Petroleum Industry

ONTARIO: LAMBTON COLLEGE

Lambton College is conducting research on improving the manufacturing process used to produce composite flexible hose used to convey petroleum products, funded by the Ontario Centres of Excellence.

A local company, Feher Machine and Manufacturing makes flexible hose of up to four inches in diameter. The hoses used in the petroleum industry have the highest pressure rating, compared to others on the market. The hose is manufactured by wrapping steel wire and fabric around a round tube called a mandrel. The company wants to manufacture hose of larger diameter, but it is more difficult to remove the mandrel than for smaller diameter hose. The company has been testing a collapsible mandrel that could be shrunk inside the hose after the hose has been made. The collapsible mandrel prototype works however there are some design challenges to overcome that will lead to better hose quality and consistency.



Feher Machine and Manufacturing turned to Lambton College to help build an improved prototype mandrel based on the lessons learned from the first prototype. The project involves designing and fabricating a collapsible mandrel that will enable the company to start manufacturing hose with a 6-inch diameter. Market research has indicated there is demand for a hose of this diameter. The company will be starting a new production line devoted to manufacturing this hose.

*“During the past year, Feher Machine & Manufacturing was fortunate to have Lambton College collaborate on the development of an expandable mandrel. Without the continued engineering support from Lambton College, we would not be able to successfully pursue this market. We look forward to continued relationships with Lambton College.”*

– Feher Machine and Manufacturing



## ARGILE, the Living Lab

ONTARIO: GEORGE BROWN COLLEGE

Today's cities use 75% of the world's energy and are responsible for 80% of energy-related carbon impact, with existing buildings being responsible for over 40% of the world's total primary energy consumption.

Research being done at George Brown College's Applied Research Green Innovation Lab Experience (ARGILE) aims to achieve urban sustainability by developing new technologies to re-construct cities.

The five-year research program will see students from the Centre for Construction and Engineering Technologies and Applied Research and Innovation working with industry partners to develop ARGILE, a “Living Lab” dedicated to investigating Building Construction, Restoration, Energy Efficiency, Product Testing, and the Development of Innovative Environmental Building Solutions. The research is funded by the Ontario Research Fund – Research Excellence Program.





## Making Huge Strides in Olympic-Caliber Footgear

BRITISH COLUMBIA: CAMOSUN COLLEGE

Designed by athletes and proven by science, a groundbreaking performance-enhancing footgear has been engineered to protect the foundation of an athlete. It is called “DRYFEET”, and stems from the same team developing gear for U.S. Navy Seals. DRYFEET is a water repellant footwear cover for rugby and soccer cleats, repelling 95% of moisture that would otherwise seep through.

To ensure that the product would live up to a high performance athlete’s expectations, DRYFEET partnered with the Sport Innovation Centre (SPIN) at Camosun College, with funding from a CCI Innovation Enhancement grant. SPIN is the premier equipment testing and leading edge technology integration facility for Canada’s Olympic and elite athletes.

SPIN acted as a full testing facility for DRYFEET. Researchers devised tests for abrasion, tensile strength, thermoregulation, performance enhancement, water ingress, and water retention. The facility helped prove that the product is ready for market and up to the highest standards.

*“After 24 months, 22 product iterations, and numerous obstacles defied, we nailed it. SPIN has been an integral partner in our R&D process to both validate and enhance the performance of our curve-jumping miraculous innovation, DRYFEET Performance Footgear. Their facilities and the minds working there are world class.”*

– Matt Weingart, Co-founder, DRYFEET



## College helps Better Made Wheelchairs

ALBERTA: RED DEER COLLEGE

Red Deer College's (RDC) Centre for Innovation in Manufacturing has helped a local wheelchair company develop a new brake system. When Bob Radgowski, owner of Red Deer-based Better Made Wheelchairs, wanted to develop a new type of braking system for a wheelchair, he was prepared to create a CAD file by measuring every piece by hand. Fortunately, a chance meeting with Mark Burggren, who worked with the RDC Centre for Innovation in Manufacturing, saved Radgowski a huge amount of time and effort.

Mr. Radgowski is a wheelchair user himself. Being able to get the parts scanned significantly shortened the amount of time it took to have a CAD file ready to send to a product developer. “I would have had to draw all the parts manually. It definitely shortened up the time and it was a fraction of the time I would have had to spend re-creating it on a computer,” Radgowski said. Mark Burggren was eager to try out two new tools, a laser scan arm and a handheld laser scanner, both can turn physical parts into computer models quickly and efficiently. At the Centre for Innovation in Manufacturing, companies can move forward quickly with new products through services such as laser scanning, design engineering and prototyping.

Through ongoing collaboration with the college, Mr. Radgowski hopes he can bring more products to market with the assistance of the Centre for Innovation in Manufacturing.

*“At RDC’s Centre for Innovation in Manufacturing. The ability to get the parts scanned significantly shortened the amount of time it took to have a CAD file ready to send to a product developer. In the future I’m looking forward to working with them again. I found them extremely approachable and extremely understanding.”*

– Bob Radgowski, Owner of Better Made Wheelchairs



## Lean Manufacturing Principles Cut Production Time in Half at Calhoun Sportswear

ONTARIO: NIAGARA COLLEGE

Calhoun Sportswear is a full-service global sourcing company for NHL.com and renowned companies such as Coors and the Canadian Football League. During the 2011 playoff hockey season, orders for NHL sportswear rose from less than twenty orders per day to between four and five hundred orders per day, and Calhoun needed to adapt. Enter Niagara College.

Under funding from the Federal Economic Development Agency for Southern Ontario Applied Research and Commercialization Initiative, Niagara College’s advanced manufacturing research team assisted Calhoun Sportswear in implementing lean manufacturing principles to their NHL workstation.

Adoption of these techniques improved factory efficiencies, drove down cost-pricing, and increased their internal capability to serve their customers. Calhoun was able to cut the time to complete production of an item and prepare it for shipping by almost half, and they succeeded in meeting increased demand with existing employees.



*“We will continue to use this daily fulfillment practice on our manufacturing floor... and expand the lean principles into all possible areas.”*

– Michelle Myers, Co-owner of Calhoun Sportswear

**Power Wheel Chair**

ONTARIO: SENECA COLLEGE

With support from the Federal Economic Development Agency for Southern Ontario Applied Research and Commercialization Initiative, students and faculty from the Centre for Advanced Technologies at Seneca College partnered with Argonaut to engineer a tracking system for the company's Power Wheel Chair. Seneca's contribution to the project included investigating tracking system configurations that could be added to a power mobility device, preparing engineering drawings details, and performing stress analysis of specific critical parts/or locations. This tracking system adds significant functionality to the Power Wheel Chair and allowed it to move on soft surfaces in addition to negotiating shallow stairs, climbing into and out of a van, and to navigating off-road terrains such as grass and gravel. These contributions will help Argonaut outperform many of the multifunctional wheelchairs in the marketplace.



*“We had an outstanding working relationship with Seneca College. The personnel assigned to our project were well qualified and dedicated to the spirit of collaboration. Special thanks to be extended to Mr. Seyed Miri for his expertise and professional guidance and to Mr. David Gonzalez for his enthusiastic and systematic managing of the project’s progress and looking after the logistics of the venture. Last but not the least our sincere appreciation goes to Mr. Deepak Bajaj for putting all the hard work in organizing and fuelling this collaboration from the start to the finish.”*

– Vladimir Ivanchenko, Founder of Argonaut Corporation

# Health and Life Sciences Technology



## Simleggings and Simsleeves

ALBERTA: LETHBRIDGE COLLEGE

Karen Kennedy, co-ordinator of Lethbridge College's Simulated Patient Health Environment for Research and Education (SPHERE) lab, teamed with experienced seamstress Colleen Ward (BSHEc), to create Simleggings and Simsleeves to enhance the simulated learning experience of nursing students. Simleggings are designed to zip over the ankles and lower legs, and Simsleeves over the arms of a human patient simulator to display pitting edema, a symptom resulting from an abnormal accumulation of fluid in body tissues, indicative of specific diseases of the heart, liver, lungs and kidneys.

"Those of us who facilitate learning with simulated patients recognize the importance of creating as real a client presentation as possible," says Kennedy. "One of the most popular simulated experiences for our nursing students has involved a patient with chronic heart failure who goes into cardiac and respiratory arrest. In this scenario, we do several things to make this client as realistic as possible. What we didn't have was a way to display pitting edema."



Simleggings and Simsleeves exhibit the characteristic "pitting" when pressure is applied to the material and can be made in a variety of skin colors and can also be used on standardized patients or modeled in the classroom by instructors and students.

Intellectual property protection has been received in Canada and the USA. Kennedy and Ward formed Eriter Creations to produce and market Simleggings and Simsleeves worldwide.

*"Simleggings have been that added feature, to make our simulation experience... just that much more realistic. They give our students more of an actual clinical experience, with a 'touch' of human symptoms missing when we tried to say the manikins had pitting edema to the lower extremities, by either stuffing nylons with foam or placing a 'stickie' on the extremity and saying '+3 edema'. Thank-you! GREAT learning tool, they were all I expected and more!"*

– David J. Dunham, DHEd, MS, RN, Director of Clinical Laboratories, College of Nursing and Health Sciences, Hawaii Pacific University

## Using RFID for Improved Hospital Logistics

QUEBEC: CÉGEP ANDRÉ-LAURENDEAU



The Institut international de la logistique à Montréal (IILM), affiliated with Cégep André-Laurendeau, in cooperation with Sherbrooke University Hospital, has developed a project to introduce new technology that will ensure better tracking of medical supply deliveries. Radio Frequency Identification (RFID) technology is essential for ensuring the quality of medical supplies as it can continuously track high value products without depending on employee vigilance. To obtain the anticipated outcomes and extend the service life of supplies, IILM has developed a process to insert RFID tags in composite plates. Significant results were achieved with a middleware component that reads the tags as they pass by antennae on loading docks and sends the information to the warehouse management system. This process provides real-time knowledge of the cart location and is also useful in forecasting future deliveries. This technology provides many other benefits such as considerable reduction in inventory shrinkage, in time lost searching for products and in the impact on quality of care. The project also has an environmental impact as the tags are reusable with an unlimited service life if properly maintained.



## Knights in Training

ALBERTA: RED DEER COLLEGE

Knights in Training focuses on promoting positive social and emotional development in younger boys and targets identity formation. While the benefits of mentorship in childhood development are well documented, the Red Deer College Health Research Collaborative is undertaking a research project funded by Alberta Health Services to evaluate whether a new mentorship program designed exclusively for boys can have a positive impact on their lives.

The Knights in Training program brings together Grade 12 boys to mentor Grade 5 boys. The 12-week program involved making a chessboard while talking about compassion, commitment, safety, identity, and goals. The research aims to demonstrate that this program has a real benefit in terms of enhancing coping skills and social and emotional well-being.

Although the pilot program is still underway, there are signs of its effectiveness. The boys are having positive experiences. They are working in groups, creating teams and learning about character traits that are important. If the study provides that evidence then the school district may incorporate it into the curriculum.

*“Mental wellness programs over the last decade have focused on issues like self-esteem and body image, messages that resonate more strongly with girls, effectively leaving boys out of the conversation. Building boys’ social skills and promoting their emotional well-being will foster the development of resilient and well-adjusted young boys. If kids are anxious or stressed, it is hard for them to learn. Mental wellness is an important issue to address and this program is one that may offer a little of the support boys need,”*

– Cathy White, Community School Health Liaison with Alberta Health Services



*“There’s been a lot written on our boys that they are kind of getting lost. They are drawn to the imaginary world of gaming and technology where they are getting constant reinforcement and they do not have to go and deal with the world. We need to be showing them that there are other ways of dealing with their emotions. We’re trying to determine what the boys’ thoughts and feelings are around the program and how it might be helping them to become well-adjusted young men.”*

– Sean Grainger, Vice Principal, Mattie McCullough Elementary School

## Finding Balance: Increasing Postural Control in Elderly Populations

BRITISH COLUMBIA: LANGARA COLLEGE

Falls are a significant source of morbidity and mortality among elderly populations. Many diseases can also cause impairments in postural control, which can increase the likelihood of a fall, even in non-elderly populations.

A Langara College Kinesiology instructor conducted a study to explore the use of augmented visual feedback to improve postural control during quiet standing balance. Participants were asked to stand with as little movement as possible while they were shown on a screen, in front of them, a real-time, magnified image of the position of their centre of pressure beneath their feet.

The study found that, when provided with visual feedback, participants were more able to reduce the movements of their centre of pressure, suggesting increased postural control. Possibilities exist for using augmented visual feedback to increase postural control for those who are susceptible to falls. This research might also be applied in a physical therapy setting, where patients in hospitals and residential care facilities participate in balance recovery programs.

The college partnered with the BC Medical Services Foundation (BCMSF), which has Summer Scholarships administered by the Vancouver Foundation and the University of British Columbia. The BCMSF supports interdisciplinary and collaborative research in academic and community settings that explores solutions to healthcare issues and that will have a direct impact on health and health care in British Columbia.



*“The UBC School of Kinesiology is pleased to work collaboratively with research partners such as Langara to advance the health and wellness of Canada’s aging population. Balance impairments and falls represent a significant challenge for our healthcare system. Applied research with community partners plays an important role in overcoming this challenge.”*

– David Sanderson, PhD, University of British Columbia



## Researching New Ways to Fight Oral Conditions

SASKATCHEWAN: SASKATCHEWAN INSTITUTE OF APPLIED SCIENCE AND TECHNOLOGY

The BioScience Applied Research Centre at the Saskatchewan Institute of Applied Science and Technology (SIASST) offers state-of-the-art applied research expertise and infrastructure to support industry's need for process, product and business innovation. In a project funded by a CCI Applied Research and Development grant, Marei Therapeutics Inc. partnered with the Centre to assess the antimicrobial activity of two drug formulations against microbes implicated in oral candidiasis infection and "dry socket," a common complication following tooth extraction. The company benefited from access to expertise and equipment crucial to the proof of concept success of its dental formations. For students of the Bioscience Technology program at SIASST, the project provided unmatched experience in planning and carrying out technical projects.



## Understanding Licensed Practical Nurses' Full Scope of Practice

ALBERTA: BOW VALLEY COLLEGE

While Licensed Practical Nurses (LPNs) are key contributors to the nursing workforce, little research exists to support evidenced-based decisions to maximize the contribution of these skilled professionals within healthcare systems.



Bow Valley College conducted a study on LPNs' role and scope of practice through a survey with 2,323 respondents and six case studies at sites across Alberta. The study involved interviews and focus groups with senior managers, team leaders, registered nurses, LPNs and health care aides. A steering committee of senior representatives from government, professional associations, post-secondary institutions, and employers guided the research.

The study shed light on the individual, work-team, organizational, and system factors that promote and inhibit use of LPNs to their full potential; and examined LPNs' contribution to the quality of patient care. This project was supported by the College of Licensed Practical Nurses of Alberta through funding from the Alberta Health - Workforce Division.

*"We are now in the process of studying the findings and recommendations of this comprehensive study, which has broad implications not only for Licensed Practical Nurses, but for the entire health system. I am grateful to Bow Valley College for conducting this excellent study."*

– Linda Stanger, Executive Director/Registrar, College of Licensed Practical Nurses of Alberta



## Producing stable microbubbles for the battle against breast and prostate cancer

ONTARIO: LA CITÉ COLLÉGIALE

Under a research project conducted in partnership with Artenga Inc. and with the financial support of a CCI Innovation Enhancement grant, the Centre de recherche appliquée en biovalorisation (CRAB) at La Cité collégiale supported the production of breast and prostate cancer medication by designing microbubble structure-stabilization and dimension-control conditions using macromolecular materials.

The microbubbles serve as therapeutic agents and transport vectors for drugs designed to target cancerous cells. The bubbles have already shown their effectiveness during tests conducted by a research team at the National Research Council, a partner on the project.

Thanks to this very high-level research, three students in the biotechnology bachelor program acquired new knowledge and mastered new skills, such as using the Coulter Counter and the microbubble generator (MGD5) developed by Artenga Inc.

*“Our collaboration with La Cité collégiale has been beneficial to our technology development. The College team has acquired and developed expertise with an advanced characterization system that provides much greater insight into our product variants. This has allowed us to optimize our technology, demonstrate the benefits, and advance us toward commercialization.”*

– James Keenan, President, Artenga Inc.



## Improving Aboriginal Health Services to Reduce HIV Infection

ALBERTA: RED DEER COLLEGE

Despite decades of research, HIV infection rates in Canada's Aboriginal communities continue to rise. A partnership between Red Deer College's Health Research Collaborative (HRC) and Shining Mountains Living Community Services is trying to change that. Raye St. Denys, the Executive Director of Shining Mountains Living Community Services, believes that traditional academic research into Aboriginal peoples and HIV has led to few results.

In 2010, Raye St. Denys adopted a different approach and contacted Red Deer College to collaborate on an applied research project to address the rising infection rates. The project assessed the ability of health services to address Aboriginal people's health in a culturally sensitive manner. While health regions across the country strive towards cultural sensitivity, many health agencies do not yet possess the best tools.

Ten Aboriginal field researchers were trained to collect stories on the impact HIV was having in their communities – including a need to share lessons through story-telling and cultural sensitivity to the Aboriginal way of life. This partnership was an opportunity to develop conversations on the need for cultural sensitivity. “Many Aboriginal Canadians still feel that health regions do not regard Aboriginal peoples with HIV as having different needs than non-Aboriginals with HIV,” says Dr. Scott Oddie, Red Deer College. This research partnership may be the first step in the fight against rising infection rates.

*“We wouldn't be where we're at without the HRC's guidance and their mentorship in gathering information and developing research skills. The relationship we've developed with the College is one we can use as a template for other aboriginal communities. We are raising the bar for partnerships between aboriginal agencies, communities, colleges, and universities.”*

– Raye St. Denys, Executive Director, Shining Mountains Living Community Services





## Intercultural Training for Recruitment and Retention of Frontline Health Care Providers

ALBERTA: NORQUEST COLLEGE

Bayshore Home Health is a national health care organization with diverse clients and staff. The Edmonton Branch has experienced challenges in recruiting and retaining qualified Health Care Aides and Licensed Practical Nurses. A significant proportion of front line staff hired at Bayshore is internationally educated health care providers who often have less than 5 years of experience living and working in Canada. The first stage of the collaboration with NorQuest College focused on enhancing front-line staff recruitment and retention processes in their organization.

The project explored methods to enhance intercultural communication to help engage internationally educated frontline staff, improve the use of language and increase the understanding of the role of context in communication. Research participants included 19 staff members involved in recruitment and retention and 20 Health Care Aides. Data collection included focus groups, on-site observation of the context for communication and completion of an Intercultural Development Inventory to identify participant's intercultural sensitivity profile.

Based on a preliminary analysis of findings, recommendations were provided to Bayshore Home Health to enhance their recruitment, orientation and first year onboarding processes for diverse front line staff. The emphasis was on modifying existing tools, structures and approaches to support a culturally diverse staff. A need for increased communications training to support effective communication between office and home care staff was also identified.

## Seneca

### Supporting Active Aging through Innovation

ONTARIO: SENECA COLLEGE

Tertec Enterprises Inc. is a seasoned systems design house with more than 25 years of experience in the design, construction, implementation and deployment of real-time systems. Tertec has created, designed and produced a 21st century innovation called Mon Ami™, an electronic assisted living device to enable those with special needs and the aging population. This product enhances the quality of life, supports caregivers, reinforces active aging and allows its users to have more independent and structured lives. With support from the FedDev Ontario Applied Research and Commercialization Initiative, faculty and students from the School of Community Services at Seneca College ran a pilot to determine the usability of the Mon Ami™ system for seniors who are able to live independently through the aid of community support organizations. The pilot helped optimize the commercialization of the product as a remote support system for organizations that provide home assistance and their clients.

***“The FedDev Ontario Applied Research Commercialization Initiative is a shining example of how the government, industry and academia can work together to meet the needs of people and create jobs as well as products for export markets. Seneca is a valued partner in meeting these goals.”***

– Terry D'Silva, CEO, Tertec Enterprises Inc.





## Student Collaborates on Speech Pathology Study

ALBERTA: RED DEER COLLEGE

Collaborative research projects between Alberta Health Services and Red Deer College have enabled one student to share in a prestigious national award from the Canadian Association of Speech Language Pathologists and Audiologists. Two students and two faculty members from Red Deer College worked on a research project with four Alberta Health Services speech language pathologists to design and implement a screening tool that detects speech and language delays in very young children. The research paper that documented the results of their study won the Editor's Award for the best research paper in the Canadian Journal for Speech Language Pathology and Audiology.

The multi-year project was a partnership between the David Thompson Health Region and Red Deer College. Since that project, Alberta Health Services and the college have a formal partnership to continue working together through the college's Health Research Collaborative. Collaborative research projects between an academic institution and a health authority are common across Canada, but bringing in undergraduate students as part of the research team is not. Bringing students into research teams is a valuable experience for students and team members alike.

*"Having students on their team enabled them to take on a more ambitious project. It was great to have students working with us. I have a job with lots of responsibilities and they were able to come in and pick up a lot of the work. We wouldn't have been able to do it if we didn't have them,"*

– Janis Carscadden, Principle Investigator, Speech Language Pathologist, Alberta Health Services



## Heart Diagnostic System that Remotely Detects Cardiac Arrhythmia

ONTARIO: SHERIDAN COLLEGE INSTITUTE OF TECHNOLOGY AND ADVANCED LEARNING

m-Health Solutions understands the urgency and seriousness of heart troubles and recently partnered with Sheridan College to develop an advanced heart diagnostic system to detect cardiac arrhythmia remotely.

To assess cardiac arrhythmia, doctors often ask patients to wear a recorder – a small electronic device that records the heart's electrical activity. When a patient feels an irregular rhythm, they just push a button and a recording of the heart's activity is sent to a cardiac centre through a specially modified BlackBerry. But that only tells doctors part of the story. In addition to heart rhythm data, knowing a patient's physical symptoms and what they were doing at the time also play a crucial role in diagnosis.



The specialized BlackBerry application is designed to work with an Event Loop Recorder to relay the personal information doctors need. Patients can choose from easy-to-follow menus and select different physical symptoms (dizziness, light-headedness, pressure), as well as what they were doing in terms of exertion and activity level. This information is perfectly aligned with the heart activity reading, which is then sent to m-Health's cardiac centre for analysis by cardiologists.

Rigorous testing is underway and m-Health Solutions hopes to commercialize the technology in the near future.

This project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.

*“Working with Sheridan allows visionaries to move things forward. As a smaller company with limited resources, you often have to pick and choose what you do. Sheridan allowed me not to have to make that choice.”*

– Sandy Schwenger, CEO, m-Health Solutions



## Assistive Technologies

ALBERTA: RED DEER COLLEGE

The proper use of assistive technologies can improve quality of life by enabling people to live with greater autonomy and self-determination. While assistive technology can improve the quality of life for the elderly and people with disabilities, a Red Deer College research study is identifying for which areas of daily life assistive technologies are most needed by consumers and care providers.

The research included interviews with care providers and consumers about use and perceptions of the impact certain assistive technologies have on mobility, communication, safety, leisure, daily living and connectivity.

The study found that there are some disparities in access to different types of technology. The technologies to which people with disabilities have access and use are sometimes not the ones they need the most. Results from surveys and focus groups have uncovered a need for more access to assistive technologies in the fields of communications, leisure and connectivity. Research on the use of assistive technologies is important, as the baby boom generation ages and more people require assistance or, become care-providers themselves. The study will improve access and evaluate several new assistive technologies for ease of use and functionality. The research team will develop strategies for meeting needs and overcoming barriers and evaluate the effectiveness of several assistive technologies.



## Natural Resources and Energy



### Alberta Biochar Initiative's Production Begins!

ALBERTA: LAKELAND COLLEGE

Lakeland College and Alberta Innovates-Technology Futures (AITF), with assistance from Western Economic Diversification Canada and industry support, have collaborated to develop the Alberta Biochar Initiative (ABI). The ABI is intended to develop and demonstrate technologies that will enable the large-scale commercial deployment of biochar products and applications for the benefit of Albertans. In the fall of 2012, two mobile pilot-scale pyrolysis units demonstrating different production technologies were purchased, each with the capacity to produce 1 tonne of biochar per day.

*“This biochar equipment will help our company develop new products from our pulp and paper waste streams. Lakeland’s commitment to helping us commercialize these products will help grow the success of the biochar industry in Canada.”*

– Gary Smith, Technical Director, Alberta Newsprint Company

Biochar has applications in soil amendment, land reclamation, greenhouse media, district heating, and wastewater recovery from oil and gas operations. Besides wood chips, the units are configured to accept agricultural and biowaste feedstock. The Alberta Newsprint Company, The Prasino Group Inc. and NovaGreen Inc. are foundational partners in the Alberta Biochar Initiative.



*“Integrating biochar with compost can provide a means of improving the soil and increasing yield – while addressing climate change. Working collaboratively, we hope to build-out the business case for biochar.”*

– Keith Driver, Managing Partner, The Prasino Group



### Would you like algae with your biogas?

NEW BRUNSWICK: COLLÈGE COMMUNAUTAIRE DU NOUVEAU-BRUNSWICK



The Biorefinery Technology Scale-up Centre (BTSC) at Collège communautaire du Nouveau-Brunswick, partnered with local engineering companies Complete Senergy System and Solutions4CO2 to test a CO2 infusion system prototype that purified biogas by solubilizing CO2 and H2S in water for a “cleaner” CH4 used in electricity. The design was tweaked and optimized and led to the development of the Biogas Purifier and Infusion System.

Solutions4CO2 has since launched a biogas refinery that integrates an Anaerobic Digester that produces biogas with the newly developed Biogas Purifier and Infusion System, an Algae Cultivation System that uses CO2 and H2S in the production of high-value algae biomass, as well as a Harvesting and Dewatering System.

The industry-college collaboration, funded by a CCI Innovation Enhancement Grant, continues with the first commercial demonstration of an algae cultivation system that uses CO<sub>2</sub> removed from biogas.

*“Integrated Biogas Refinery™ is a game changing solution for the multiplication of anaerobic digester projects in North America, reducing the payback period from over seven years to less than three.”*

– Solutions4CO<sub>2</sub>



## Biochar for Yukon Mine Site Reclamation

YUKON: YUKON COLLEGE

The Yukon College Research Centre's Cold Climate Innovation unit and Laberge Environmental Services partnered to research the potential use of biochar to aid in the reclamation of abandoned mine site soils. The three mine site soils tested included low and high pH levels, but all of them could be characterized by a sandy texture and low organic content. Two of the sites had been abandoned for a substantial period of time with very limited reclamation success. Biochar, a heat treated wood product, was tested as a way to improve soil conditions to allow for native grass species, as well as a native pea species, to grow and improve soil conditions for the long term reclamation process. Students were hired to perform the field tests, and a laboratory growth chamber experiment, to assess the potential use of this technology. They gained valuable experience and insights into the applications of mine site reclamation research. The project will run over three years and will demonstrate whether timber harvested on site can be turned into biochar and aid in the reclamation process at the end of the mine life cycle.

*“As part of the biochar research team, we are building technical expertise that will be immediately applicable to current services we supply. We are particularly excited to see the potential for biochar as a soil amendment in re-vegetation programs at the early stage of mining.”*

– Laberge Environmental Services



## Protecting and Controlling a Power Grid

ONTARIO: MOHAWK COLLEGE

Ontario is modernizing 80% of its energy infrastructure, much of which is 50 to 100 years old. There is a critical need to invest in advanced energy grid technologies that lead to new energy policies. A CCI Innovation Enhancement grant awarded to Mohawk College is helping to address this need. Mohawk College is helping utilities adopt new protection and control technologies, such as digital relays, intelligent electronic devices and communication protocols, as well as help them devise a comprehensive and implementable power protection and control system model, in partnership with Hydro One Networks and local utilities distribution companies, and General Electric, Schweitzer Engineering Laboratory and Siemens. The research model provides very detailed data that illustrate how power utilities and vendors can optimize their systems to meet new challenges associated with green energy technology, as well as additional load-requirements from electric vehicles and smart appliances.

*“We believe that the research activities under this program will effectively support the evolution of intelligent grids through integration and management of emerging technologies for Ontario’s electrical power distribution system. Hydro One will benefit from advanced technology assessment and testing of micro grid components for integration, monitoring, protection and control of micro grids including mitigation of power quality impacts created by loads and renewable generation sources. This initiative also provides colleges the opportunity to gain valuable experience and expertise in support of power distribution management systems as well as preparing them to potentially assume active roles as future Hydro One employees.”*

– Ravi Seethapathy, Manager System Innovation and Advanced Grid Development, Hydro One Networks Inc.



## Algae Transformations

ALBERTA: LETHBRIDGE COLLEGE

Algae have the potential to provide food, nutraceuticals, and biofuels. They can also serve a role in sequestering carbon dioxide, nitrogen fixing and remediating waste water.



Trevor MacMillan saw the potential of algae and had an idea for producing better strains of algae for specific purposes. He started working in his basement, but soon needed better lab facilities and technical support. He reached out to Lethbridge College and was provided with research equipment and lab space. Mr. MacMillan soon attracted venture capital to form Phytocentric Biotech Inc. Phytocentric is working at Lethbridge College, with a Vancouver company, AlgaeCan, to produce a better algae strain that grows faster and produces more astaxanthin, a powerful anti-oxidant.

Lethbridge College is helping with the development and commercialization of Phytocentric’s patent-pending Algae Transformation Technology. This research gives eight Lethbridge College students a chance to learn additional skills and to participate in cutting edge research. This arrangement allows students to work directly with Farkhanda Khawaja, Phytocentric’s visiting scientist. Phytocentric is now starting to form strategic alliances with other southern Alberta companies with interests in algae.

## Ensuring Salmon Farms are Environmentally Friendly

BRITISH COLUMBIA: NORTH ISLAND COLLEGE

Northern Vancouver Island is now the main salmon farming region in British Columbia. Strengthening the sustainability and vitality of this industry offers direct and tangible benefits for communities across the region. As the industry develops, it is critical to understand the environmental impact of farm sites.

Both the B.C. Salmon Farmers Association and the Department of Fisheries and Oceans identified a need to strengthen monitoring of hard bed substrates – the site of many current and future fish farms. North Island College is conducting research funded by a CCI Innovation Enhancement (IE) grant to identify the significant ecological changes likely to occur at hard bottom sites associated with salmon farm operations; and to determine what the physical, biological and/or chemical habitat indicators are, and their thresholds where significant negative macro-benthic changes occur. These investigations will provide a solid foundation for future industry growth in hard bottom areas. Research results will also contribute to a broader, more thoughtful dialogue about the impacts of the industry. Industry partners include BC Salmon Farmers Association, Marine Harvest Canada Inc., and Mainstream Canada.

*“We at Mainstream Canada anticipate that the IE grant will advance our knowledge base and provide additional capacity to turn our research program results into commercial success.”*

– Dr. Peter McKenzie, DVM, BSc, Veterinarian and Fish Health Manager, Mainstream Canada

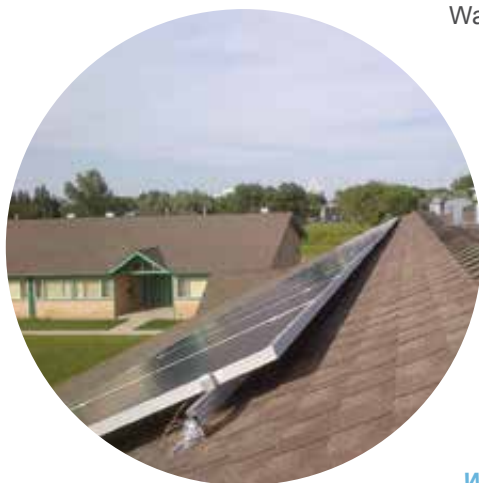


## Integrating Solar Energy Technologies into the Institutional Grid

ALBERTA: MEDICINE HAT COLLEGE

Medicine Hat College has installed a solar photovoltaic and solar thermal energy system on-site at the institution, with their solar panels and evacuated tubes visible from a number of locations on the campus. The energy produced by both systems is integrated into existing college utilities. The solar panels provide electricity to a campus residence and the solar thermal tubes provide heat for the domestic hot water supply in the college's trades wing. The design, construction, and commissioning of these systems involved local SMEs including Terralta, which specializes in solar and geothermal installations, and Quick-

Way, an electrical company which diversified their operations to include renewable energy projects as a direct result of this initiative. The amount of energy produced by these systems can be viewed online through the college's solar energy blog, which provides real-time performance data and information on the viability of renewable energy technologies.



*“Medicine Hat College has reaffirmed their community leadership with the installation of solar thermal and solar photovoltaic projects on campus. Terralta is proud to have been involved throughout the entire project, providing design, product advice, and installation services. This will greatly benefit Medicine Hat College students and act as visual reminders of the need for green technologies. These projects also function as field training systems.*

*We feel that our involvement has greatly benefited our company and our image throughout the community and Southern Alberta.”*

– Marcus Campbell, Project Manager, Terralta Inc.



## Making Wood Panel Production Eco-Friendly

QUEBEC: CÉGEP DE RIMOUSKI

Phenol-formaldehyde (PF) resin is an adhesive petrochemical critical to the production of high quality, water-resistant wood panels. The resin includes phenol, a petrochemical ingredient used in production.

Rising oil prices, a reduced desire for fossil fuels, and the call for more eco-friendly products have increased the need for renewable resources for the production of these wood panels.



The Service de recherche et d'expertise en transformation des produits forestiers (SEREX), the CCTT affiliated with the Cégep de Rimouski, is working with Uniboard Canada Inc., a mass producer of particleboards, to replace phenol with pyrolysis oils with the support of a CCI Innovation Enhancement Grant and CCI Applied Research and Development grant.

SEREX has built a small-scale pyrolysis unit and is analysing its reaction products, including bio-oils. The process allows researchers to evaluate and optimize products drawn from biomass, and study how operating conditions affect the bio-oil quality. The next stage is to replace up to 75% of phenol with bio-oils during PF resin synthesis. The new bio-oil-PF resin performs to an even higher standard than unmodified PF, and it reduces the cost of wood-panel production.

CENTENNIAL  
COLLEGE

## An Off-grid Street Light System

ONTARIO: CENTENNIAL COLLEGE

Centennial College faculty and students from the Energy Systems Engineering Technology program worked with Clear Blue Technologies to validate and optimize the design of the Off-grid Hybrid Streetlight, with a unique wireless control system. Students learned new simulation software and analytical skills that are already being put to use in their new professional careers. The results of this project led to an optimized system design that has increased market readiness and allowed Clear Blue Technologies to begin the commercialization process. The project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.



## Research by the Ocean that Re-invigorates a Community

NEWFOUNDLAND AND LABRADOR: COLLEGE OF THE NORTH ATLANTIC

The College of the North Atlantic is developing a device to extract energy from ocean waves in order to pump seawater onto land for shore-based aquaculture. The team is developing an Integrated Multi-Trophic Aquaculture system, which uses bio-filtering before returning the water to the ocean. The aquaculture facility will use ecologically sound and sustainable production methods to minimize its ecological impact.

The team is also developing a fully instrumented test site for performance evaluation of devices or systems exposed to severe marine environments. This has had a positive impact on the small community of Lord's Cove on the Burin Peninsula. Researchers have converted a closed fish plant into a test site, providing a boost to this coastal community.





Students from multiple disciplines at the College of the North Atlantic are solving real world problems through practical assignments related to this project funded through a CCI Innovation Enhancement grant, the Research and Development Corporation of Newfoundland and Labrador, and the Government of Newfoundland and Labrador Department of Innovation, Business and Rural Development.



## Northern Biochar for Northern Restoration

YUKON: YUKON COLLEGE

With the expansion of industrial activities in Canada's North there is a need for appropriate cost-effective remediation and restoration technologies. Yukon College has a CCI College-University Idea to Innovation grant, Northern Biochar for Northern Restoration, which is working with local industry to develop biochar for promotion of hydrocarbon degradation in northern contaminated soils. This project is a collaboration between Yukon College, the University of Saskatchewan and three industrial partners in northern Canada: Nunatta Environmental, Federated Coop Limited (FCL) and Zakus Farms.



Photo credit:  
Zakus Farms

Nunatta Environmental and FCL are interested in the production and/or development of biochar for their hydrocarbon restoration needs, while Zakus Farms is an expanding biochar producer in Whitehorse, YT. Biochar is a term for a product that results from heating various biological ingredients, such as wood, fish or animal bone under oxygen limited conditions. In southern climates biochar has proven to have many benefits for the environment, including increased soil pH, water holding capacity, and plant growth, as well as promoting hydrocarbon degradation at contaminated sites.

Identification of the optimum biochar formulation for hydrocarbon degradation in the North will not only improve the likelihood for effective treatments, but will also provide economic benefit. Reduced logistics and shipping costs for companies operating in the North and income generation opportunities for northern biochar producers are two important impacts of the project. College and university students are gaining valuable northern research experience, while making important connections with local industry and gaining important skills for employment.



## Nature Friendly, Nature Safe: Powered by Olds College Biodiesel

ALBERTA: OLDS COLLEGE

The objectives of the Olds College Biodiesel project were to increase the college's biodiesel production capacity, conduct agronomic and processing trials on alternative, non-edible feedstock and optimize small-scale biodiesel solutions for industry partners' equipment, processing, quality assurance, by-products and safety. Research was conducted on oilseeds with little or no market value, such as heated or frost damaged canola seed, as well as non-edible oilseeds and weeds such as stinkweed (Pennycress) that could be grown in Alberta at low cost. As a result of this project, the college provides blends of biodiesel for use in partners' vehicles.



Twelve individuals, three companies and two municipalities (Town of Olds and the Mountain View County) participate in the biodiesel adoption and use program. The project has resulted in 20 new industry and community partnerships and increased participation of faculty and students in college applied research. The project was funded by a CCI Innovation Enhancement grant.

*“I feel I am making a choice to support sustainable change by using alternative fuel. It has been great; I have had no problem with fuel compatibility or performance in my diesel VW Jetta.”*

– Carlen Vandenberg Community partner and user of Olds College Bio-diesel



## Pursuing Clean Energy through a Solar Power Attic Vent

ONTARIO: GEORGIAN COLLEGE

Air ventilation plays a critical role in home cooling. In attics, this is usually done via passive, turbine and powered vents. Passive vents rely on convective air movement caused by temperature differences within the attic space. Though turbine- and electric-powered vents are efficient at moving large amounts of air, they need at least one electrical connection in the attic to supply power. The Solar Powered Attic Vent leaps this hurdle by providing improved attic ventilation using solar energy to power the fan.



Student researchers at Georgian College designed experiments and conducted research on the Solar Powered Attic Vent developed by Green Leaf Distribution, through a project funded by a CCI Innovation Enhancement Grant. Students tested various vent designs, including with vents installed in a 1,300 square-foot house. Their objective was to determine if a solar powered vent keeps an attic cooler, thus reducing air conditioning use during peak electrical periods. Green Leaf Distribution is using the results to produce an even more efficient and effective product.

*“Working in partnership with Georgian College’s Centre for Applied Research and Innovation has been extremely beneficial for our business development and marketing strategies. The students conducted testing on the Solar Powered Attic Vent and provided Green Leaf Distribution with a final comprehensive report including ideas for product innovation and growth. This cross-curricular participation with the students was both positive and inspiring. Green Leaf Distribution is truly grateful for this incredible collaboration and has already made plans to work with the college on future initiatives.”*

– Abby Stec, Managing Director, Green Leaf Distribution

## Social Innovation



### **“A Chance for a Better Life”**

ALBERTA: BOW VALLEY COLLEGE

This community research project, entitled Development of the Immigrant Workforce in Smaller Communities and Rural Alberta, engaged immigrants, employers, and service providers to assess rural immigrants' needs for language learning, education, and career training in small urban centres and rural communities around Calgary. Partners included employers in the agriculture, hospitality, manufacturing, tourism, and healthcare industries, and service providers specialized in adult education, family and youth, library, settlement, and language instruction services.



The project identified key workforce development needs for rural immigrants, including increased access to language training, foreign qualification recognition support, and affordable transportation. The final report “A chance for a better life” details action recommendations for enhancing access to education and training, strengthening workforce development, and fostering public awareness and is available for download at: [www.bowvalleycollege.ca/thefuture](http://www.bowvalleycollege.ca/thefuture). As of result of this research, Bow Valley College is piloting an online course to train and develop rural-based immigrants' workplace communication skills.

The project was funded by Citizenship and Immigration Canada and the Government of Alberta, Human Services and Enterprise and Advanced Education.

*“A chance for a better life’ has provided a much-needed, in-depth look at the issues facing rural communities and foreign workers deployed therein. Both communities and workers will benefit greatly from the research project and it will provide a beacon to guide the efforts of government at all levels, leading them to program creation for the benefit of all.”*

– John O'Donnell, HR Director, Verus Animal Health Alliance

### **Mass Gatherings – Risks and Perceptions**

ONTARIO: CENTENNIAL COLLEGE

Whether attending a music concert or participating in a demonstration, mass gatherings are a phenomenon that arise from the unique interactions of people, places and activities. The key to providing a comfortable environment for crowds is planning, and understanding human behaviour dynamics and public perception.

Through this project Centennial College's Culture & Heritage Institute collaborated with the Emergency Management & Public Safety Institute and Toronto Police Service and Emergency Medical Services. They examined hallmark events of mass gathering in Toronto and delivered a survey to key stakeholders that gauged the awareness and perception of public event organizers on risk and public safety settings as they relate to planning or hosting future events.



Results indicated that safety and security were the greatest challenge when planning for mass events, with potential use of alcohol and drugs being a key factor influencing public behaviour. Riots were rated as the biggest negative factor impacting a city's profile; however, most mass gatherings raise the profile of a city as a tourist destination. The results of the project will be used to assist in the planning of responses to future mass gatherings. This project was funded by the Centennial College Applied Research and Innovation Centre Fellowship Grant.

*"This project was a great introduction to qualitative research techniques and the work that goes into publishing an article. It also enlightened me about the vast number of opportunities to expand on current knowledge in the fields that interrelate with para-medicine."*

– Greg Watkinson, Student Research Assistant, Centennial College



## Research in Education, an eEssential Component of our Research Activities!

QUEBEC: CÉGEP RÉGIONAL DE LANAUDIÈRE

Research on teaching, learning and student success plays an important role at Cégep régional de Lanaudière. A research team at the Joliette campus is leading a project on social science students' perceptions about science programs and is assessing a pedagogical approach based on a dialogue between theory and practice in a research environment with partners involved in regional history. At the L'Assomption campus, another team is completing research with former college drop-outs who moved on to universities studies, to evaluate their experiences during the post-drop out period and the skills they acquired that enabled them to pursue post-secondary studies. A team from the college's three campuses, in collaboration with the Comité régional pour la valorisation de l'éducation (CREVALE), are identifying the next steps following a survey on the characteristics of cégep students who are a product of the secondary school education renewal in Quebec.

*"Mobilizing the community around educational success [...] improves school retention, graduation and qualification among adolescent and adult Lanaudière residents, to ensure their social and occupational integration."*

– Comité régional pour la valorisation de l'éducation



## Business Retention and Expansion

BRITISH COLUMBIA: SELKIRK COLLEGE

The Business Retention and Expansion (BR+E) pilot project at Selkirk College is being spearheaded by the Columbia Basin Rural Development Institute (RDI) funded by the Columbia Basin Trust. The program is being tested by groups like the Lower Columbia Initiatives Corporation, Kootenay Association for Science and Technology, and Kootenay Rockies Innovation Council.

BR+E focuses on addressing the needs of businesses already in a community by encouraging them to stay or grow; thus improving job creation and the economic health of the community. Through the three-year pilot project, RDI will offer research and training support to communities interested in BR+E initiatives.

The RDI will work in partnership with local governments, chambers of commerce and the BC Ministry of Jobs, Tourism and Innovation to gather information from local businesses and analyze the data. With the information collected, decision makers and economic development practitioners in the Basin will be well positioned to provide targeted support to local businesses.



Other Basin communities – particularly those without an economic development officer or plan – can look for support from RDI to develop capacity and understanding before moving ahead. The project's region-wide approach allows the entire Columbia Basin to identify and respond to shared challenges. This is important in areas with limited resources and community capacity.

***“Business development and job creation are key factors in developing healthy and vibrant communities. We look forward to being able to using this tool to provide support to local businesses in order to create a strong, diverse regional economy that supports community development, growth and economic prosperity.”***

– Sandy Santon, Executive Director, Lower Columbia Initiatives Corporation



## Designing Replacement Services for Quebec Farmers

QUEBEC: CÉGEP DE VICTORIAVILLE

Farmers encounter challenges on several key fronts: entrepreneurial, climactic, production-related and legislative. Farming has become more complex and stressful, so much so that society now needs to improve farmers' quality of life. Quebec, for instance, has no mechanism for replacing farmers in case of illness, accident or holidays. Yet, France has been using such replacement services successfully for some 70 years.

The Centre d'innovation sociale en agriculture (CISA), an affiliate of the Cégep de Victoriaville, has launched an initiative to set up replacement services in Quebec through a risk-management pilot project. The feasibility of an adapted model for Quebec farmers is being tested, with the ultimate goal of implementing a risk-management structure designed not only to improve farmers' quality of life, but also to foster rural and agricultural development.



The project, conducted with producers and partners such as the Producteurs laitiers du Centre-du-Québec and the Centre d'emploi agricole du Centre-du-Québec, involves the following stages:

- surveying the needs of milk producers in the Centre-du-Québec region
- analysing current best practices in Europe
- designing a made-for-Quebec replacement service model
- conducting a pilot project to implement the service for a test group of milk producers, with coaching from European specialists.

The project was funded by the Ministère du Développement économique, de l'Innovation et de l'Exportation.

## Science Meets Technology: Learning CAN Be Fun

ONTARIO: CENTENNIAL COLLEGE

Spongelab Interactive, located in downtown Toronto, is made up of a group of scientists, teachers, animators, artists, and programmers who are passionate about science education with a desire to enhance learning through gaming. They have created a platform of educational video games focused on various areas of biology, targeting elementary and high schools students around the world. Spongelab has had a long-standing partnership with Centennial College, and a research project carried out in 2011 involved creating a digital biology trivia game that can be implemented into both elementary and high school curriculums, catering to science students from grades 7-12. Drawing on the knowledge of Centennial College Biotechnology students, the content for over 3,000 multiple-choice questions were developed, along with student support developing the back-end programming and creating the illustrations and graphics to accompany the game. The project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.

*“The FedDev Ontario Applied Research and Commercialization Initiative is a phenomenal program that lets small businesses like Spongelab engage with talented groups with appropriate budgets – to get tangible results. Working with the team at Centennial we are able to develop of a fabulous educational game and I look forward to a continued relationship with the College.”*

– Dr. Jeremy Friedberg, CEO and Founder of Spongelab Interactive



## Evaluation of the PEI Preschool Excellence Initiative

PRINCE EDWARD ISLAND: HOLLAND COLLEGE

The evaluation of the Prince Edward Island Preschool Excellence Initiative (PEIPEI) was an project taken on by the Applied Research Department of Holland College to measure the change from the existing sector to an Early Years system, including all the transitional impacts related to this change. With financial support from the Margaret and Wallace McCain Foundation and the Department of Education and Early Childhood Development, Holland College's Applied Research Department assessed the core elements of this initiative during its first year of implementation including governance, quality, access and sustainability in reference to children and their families, programs, communities, and systems.

This project provides policy makers on Prince Edward Island immediate outputs such as baseline data to gauge later outcomes associated with the transition from a sector to system approach, as well as positive relationships fostered with government and early childhood industries. The data collected from this initiative sets the stage for future evaluation and measurement of impacts associated with a major governmental policy shift. The findings and recommendations will guide future government policy associated with the early childhood initiative.





## Navigating Transitions: Immigrant and International Students' Experiences at College

ALBERTA: LETHBRIDGE COLLEGE

Immigrants and international students make valuable contributions to the social, economic and academic make-up of colleges and they form a significant portion of the college-student population. As Canada increases immigration quotas, colleges are providing innovative programming for immigrants going to college to upgrade credentials and are supporting international students as they transition to the Canadian post-secondary learning environment.



Increased enrolment of students from different cultural and educational backgrounds is altering the face of the Canadian post-secondary classroom. Lethbridge College investigated immigrant and international students' transition experiences into college programs. The results of the Navigating Transitions applied research project help educational practitioners and administrators understand the challenges faced in accessing higher education. The research provides insight into immigrant and international students' experiences in college, such as integrating into a new campus culture and learning in an academic way.

The results will enable institutions to improve responsiveness to immigrant and international students' needs, and to increase awareness about the levels of support needed for students from varied educational and socioeconomic backgrounds.



## Interdisciplinary Research Raises Awareness about an Aging Population

ONTARIO: SHERIDAN COLLEGE INSTITUTE OF TECHNOLOGY AND ADVANCED LEARNING

Population aging is a defining characteristic of the times in which we live. In 2011, an estimated 5.0 million Canadians were 65 years old or older. That number is expected to double and will reach 10.4 million by 2036. This demographic shift and its impact will dominate the Canadian landscape for the next two decades.

The Sheridan Elder Research Centre (SERC) at Sheridan College connects people with ideas and community resources in innovative ways to raise awareness about aging and to design, test and launch programs or research that responds to the opportunities and challenges presented by growing older. SERC's interdisciplinary research through a CCI Innovation Enhancement grant crosses all Tri-Council funding agencies. SERC's research initiatives and educational outreach activities bring historically disparate sectors together to promote collaboration between technological advances and social innovation.

From raising awareness about aging through a compelling exhibition of photographs of adults over 110 years old to exploring the health and psychosocial benefits of participating in dance to computer coaching, SERC bridges the arts, health, the humanities and technology in novel ways.





One example of SERC's outreach is the Business of Aging: Information Exchange Network (BA: IEN). BA: IEN connects business and industry leaders to exchange ideas, information and resources about the needs and wants of mature consumers and their families. The network is a successful promotional and educational tool in supporting both small start-up companies who are creating products and services for older persons as well as more established businesses seeking to diversify their companies.



## A Responsible Supply Policy for Small- and Micro-Businesses in Quebec

QUEBEC: COLLÈGE DE ROSEMONT

In April 2011, with a focus on sustainable development, the Regroupement des Corporations de développement économique communautaire (CDEC) du Québec implemented a responsible supply policy (RSP) drafted in cooperation with the Regroupement national des conseils régionaux de l'environnement du Québec and the Coalition québécoise contre les ateliers de misère.

The Centre d'étude en responsabilité sociale et écocitoyenneté (CÉRSÉ), associated with the Collège de Rosemont, conducted applied research to describe and analyse the various aspects of implementing the RSP with their stakeholders, employees, buyers and suppliers. This study identified the challenges and possible solutions for implementing the RSP policy effectively.



CEDC clients include many start-up small- and micro-businesses that often lack the means to hire a sustainable development resource person. Through this project, CÉRSÉ and the network of CEDCs are providing clients with support and mentoring on responsible supply policies and practices.

This applied research project was funded by Quebec's Ministère de l'Enseignement supérieur, de la Recherche, de Science et de la Technologie through the social innovation component of the Programme d'aide à la recherche et au transfert (PART), social innovation component.



## Inclusive Student Engagement

ALBERTA: NORQUEST COLLEGE

This project was conducted to develop a sustainable student engagement model to improve access to post-secondary education for students with diverse needs. The project was undertaken in an effort to improve access and retention rates, and was funded by Alberta Advanced Education and Technologies. Direct outcomes for the project include increased staff ability to support diverse students, knowledge transfer of practices in inclusive services within the Alberta post-secondary system and enhanced accessibility to student services. A total of 1,813 internal and external stakeholders were engaged with the project.

A model for inclusive student services staff training was developed and piloted with NorQuest College frontline student services staff. This training is effective when integrated with desired service behaviours and outcomes.



Inclusive service interaction norms include: creating personal connection with students; explaining processes step by step; allowing time for students to respond; verifying understanding; conveying respect through verbal and non-verbal communication; using clear speech and a pace of speaking that supports a student's ability to understand (e.g. second language learners).

As part of the model, Inclusion Fusion events engaged students, faculty and staff in intercultural events. The space for an intercultural engagement is a safe place to practice interacting with other people with different or unfamiliar backgrounds, guided by agreements of curiosity and discovery, respect, and openness.

*“I think the Inclusion Fusion project was an awesome project...I had the opportunity to get in many conversations there and it was good for my English.”*

– Participating NorQuest College Student



## Knowing and Serving Youth: a 10-year Study

QUEBEC: CÉGEP DE JONQUIÈRE

Adolescence is a time of profound physical, cognitive, emotional and social change, and young people have a greater risk of developing behaviours that can undermine their well-being. To intervene more effectively, we need to know the extent of the behavioural and emotional problems faced by youth, as well as the risk factors and protective factors involved. That is why the Centre d'étude des conditions de vie et des besoins de la population (ÉCOBES), an affiliate of the Cégep de Jonquière, launched a longitudinal survey of 14 young people in 2002. Interviewed five times between 2002 and 2012 (at ages 14, 16, 18, 20 and 24), the respondents allowed the research team to gather unprecedented data and information on their mental and physical health, their lifestyles, their academic choices and aspirations. The data helped to increase understanding on how self-esteem builds during adolescence, identify the determinants of poor body image, and see how heavy schedules play a role in fatigue and occupational safety for students with jobs. With partners working either directly with young people or indirectly through prevention programs, the research team hopes to continue the longitudinal survey until 2023.

The project was funded by the Quebec Ministère de la Santé et des Services Sociaux, the Direction de la santé publique du Saguenay-Lac-Saint-Jean, the ministère de l'Éducation, du Loisir et du Sport, the Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST), the Fondation Asselin at the Cégep de Jonquière and the Fonds de recherche du Québec – Société et culture (FRQ-SC).

*“As part of our mandate to keep watch over the health of the population and its determinants, the research we conduct at ÉCOBES, be it on the lifestyles of young people or on exposure to certain environmental risks, helps us craft our monitoring strategies and better target our interventions.”*

– Ann Bergeron, M.D., M. Sc., Coordinator of the Service surveillance recherche et évaluation, Direction de la santé publique et de l'évaluation, Agence de la santé et des services sociaux du Saguenay-Lac-Saint-Jean



## Online Workplace Learning Model

ALBERTA: NORQUEST COLLEGE

Currently, language education focuses on work-specific contexts and enhanced competence in language performance is less available. For many internationally educated professionals (IEPs) with credentials one of the barriers to obtaining jobs or to workplace promotion is their “soft skills” (e.g. professional communication, ability to work effectively with others and learn continuously).

NorQuest College is working with Worley Parsons, Brooks Community Immigrant Service, and the Bredin Institute to implement and evaluate an online model for IEPs working or preparing to work in Canadian small or medium-sized companies. The model focuses on building skills to improve IEPs’ ability to communicate appropriately in the Canadian workplace. As part of the pilot cycle, research was conducted to monitor changes in pragmatic language proficiency and intercultural competence. The last pilot is being conducted and preliminary results indicate that the participants are satisfied with their communication skills.

Project results will inform a nationally applicable model to provide access to continuous learning opportunities for IEPs. This project is funded by Citizenship and Immigration Canada, and Alberta Human Services.

*“While I was working when I was taking this course I had a co-worker I didn’t like working with at all. I applied what I was learning in the course with her... I started using more indirect words and her behaviour changed. Before she would always want to argue with me. We had a breakthrough and we began to work well together.”*

– Participating Internationally Educated Professional



## Basin-Boundary Employment Lands Inventory Project

BRITISH COLUMBIA: SELKIRK COLLEGE

The Basin-Boundary Employment Lands Inventory Project directly addresses an issue faced by many communities: access to land to accommodate existing business expansion and future investment and economic growth. The project defines employment lands as those that generate economic wealth, including: agricultural lands, lands zoned or designated for heavy industry, light industry, and commercial (non-retail); First Nations designated employment lands; brown and greyfield sites; and Crown lands available for development.

The project will produce an inventory of employment lands and their associated infrastructure and economic assets in a universal geographic information system platform, Dr. Terri MacDonald, Regional Innovation Chair at Selkirk College’s Columbia Basin Rural Development Institute, will provide research support for the project that covers more than 30 communities, regional districts and tribal nation councils. Once the inventory is completed, key stakeholders will analyse the results and identify collaborative regional solutions by addressing the question: What is our region’s ability to accommodate economic growth? The aim is to build regional collaboration that will help develop solutions to shape future regional growth. In the long term, the inventory is expected to help make the region more attractive to investors, build business retention and expansion and help communities make more informed planning decisions.

The project was supported by Community Futures East Kootenay, Kootenay Association for Science and Technology and the British Columbia Ministry of Jobs, Tourism and Innovation.

*“A better understanding of the availability and type of employment lands will help the region to retain and attract businesses and investment. This information is a key tool to ensuring economic growth, and helping to create and retain jobs.”*

– Rob Gay, General Manager, Community Futures East Kootenay

## Seneca

### Financial Planning

ONTARIO: SENECA COLLEGE

Penny Shore has more than 25 years of experience publishing mass market consumer educational books and multimedia materials. With support from the Federal Economic Development Agency for Southern Ontario Applied Research and Commercialization Initiative, students and faculty from Seneca College Centre for Financial Services collaborated with Penny Shore to develop a conceptual model of a financial planning model and program. Penny Shore developed the model into a final product for adoption by mid-sized to large employers and governments to offer as an employee benefit, which can help employees manage their finances. Penny Shore & Associates anticipate that this product will increase their revenue opportunities and create new jobs.

*“As a result of the Federal Economic Development Agency for Southern Ontario Innovation Research Grant, my company was able to complete research on the final product model and will now proceed more confidently with financing prospects and the development of the product ready for market and sales.”*

– Penny Shore, President and CEO, Penny Shore & Associates Inc.

# Information and Communications Technology

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## Revving up 3D Engines

ONTARIO: CENTENNIAL COLLEGE

Under the guidance of faculty from the School of Communications, Media and Design, two Centennial College students from the Software Engineering Technology and Interactive Gaming program worked with 3Di Solutions ([www.3disolutions.com](http://www.3disolutions.com)) to create a platform and software solution designed to drive 3D graphics, menu overlays, animation, and interactive and narrative elements. Funded by the FedDev Ontario Applied Research and Commercialization Initiative, the overall goal of the project was to generate interactive digital content and deploy it in real-time for use on mobile and touch devices.

The most exciting part of the project was being able to see the growth in the students as the project progressed. New ideas were developed and the scope of the project was broadened to match the ingenuity that the students brought to the partnership. The project finished successfully, with new technologies for condominium developers deployed on iPads, large touch screens and mobile phones. The students were hired full-time by 3Di Solutions for additional projects, working to enhance the technology developed from this project even further.



## Fetal Alcohol Spectrum Disorder: Virtual Community of Practice

ALBERTA: LETHBRIDGE COLLEGE

PMedical studies indicate that one out of 100 babies in North America may live with the effects of prenatal alcohol exposure. Lethbridge College's Fetal Alcohol Spectrum Disorder (FASD) Education certificate program is the only post-secondary online program of its kind in Canada. It is designed for caregivers, human service professionals and those interested in providing services to people living with the effects of FASD. Because it is a distance education program the students and alumni have little interpersonal communication.

As a way of building support and communication among those who live, study, work, teach and assist those living with FASD, Kimber Norbury-Sulin, Lethbridge College FASD Education program coordinator, along with a technical support team have created a "virtual community of practice". This online community, which was launched in the spring of 2012, provides networking opportunities and access to around-the-clock resources. "This online community was something I've wanted access to for years, so I'm very grateful to this team for building it," says Terry Gills of central Alberta. "We live FASD daily and I need all the supports I can access." To connect with members of the community go to: [www.fasdcommunity.ca](http://www.fasdcommunity.ca)



The project was funded by the Alberta Rural Development Network and Lethbridge College.

***"The more people there are to talk to, the more we can cope, plan and support our wonderful persons living with FASD."***

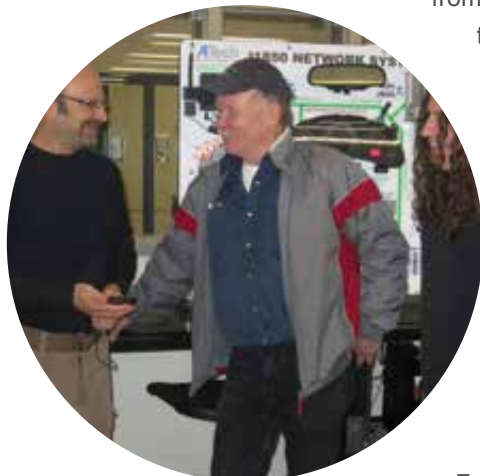
*– Marilyn Leitterman, 2007 FASD Education Alumna and Continuing Student in the Disability and Community Rehabilitation Diploma Program*



## Mobile Vehicle Data Portal

ONTARIO: SAULT COLLEGE

In a new era where a mobile phone is no longer just a phone, but a mobile computer that can be used for almost anything, development of mobile technology is constantly raising the bar and expanding global opportunities.



The Mobile Vehicle Data Portal encompasses a newly developed technology that transfers data from a vehicle's onboard diagnostic system using Bluetooth, through a mobile smartphone, to a web server enabling remote, web access to the data. GlobalAutoService Inc. needed help to develop their patented technology and partnered with student and faculty researchers from Sault College's Information Technology Department to develop a working prototype of a customer oriented vehicle diagnostic system. Over eight weeks, the student acquired new skills, specific to vehicle computer systems that included software design, programming, and the development of Android applications. Upon completion, the student was able to demonstrate a working prototype that included a "smartphone to vehicle" and "smartphone to server" communication system, and a web based remote interface to analyze the collected data. This prototype provides GlobalAutoService Inc. with a conceptual model that can be demonstrated and further developed for commercialization.

Funding for the project was provided by the College Ontario Network for Industry Innovation, a part of the Ontario Network of Excellence.

*"This prototype provides tangibility and makes it possible to promote business opportunities, advertise future products and further develop a system ready for commercialization. The college-industry partnership has given GlobalAutoService Inc. the ability to present a new automotive diagnostic service to clients."*

– Mike Kern, President, GlobalAutoService Inc.



## Bringing 3-D Accuracy to Mining Technology

QUEBEC: CÉGEP DE LA POCATIÈRE, CÉGEP ANDRÉ-LAURENDEAU, AND CÉGEP JOHN ABBOTT COLLEGE



OPTECH and the three affiliated cégeps, Cégep de La Pocatière, Cégep André-Laurendeau, Cégep John Abbott College partnered with Photonic Knowledge to develop a 3-D optical digitization process to support highly efficient sample analysis systems for the mining industry. Complementing data gathered during spectral analyses, this process provides an accurate statistical picture of the drilling core's mineral content while avoiding objects of archaeological interest. These analyses take place, in the field, at the deposit site. Mobile units enable technicians to register and identify the spectral signature of drilling-core minerals thanks to patented hyperspectral imaging technology. This patented technology is key to sidestepping inherent difficulties faced by the industry. Due to its fragile nature, a mineral's surface displays cracks and recesses. Textures can differ vastly from one mineral to the next. The project was funded by a CCI Applied Research and Development grant.



*“We’ve been working with Optech Montréal for two years on projects involving the optimization of specialized lighting systems and, more recently, of three-dimensional drilling-core metrology to improve both the speed and accuracy of our hyperspectral mapping products. Our collaboration with Optech helps us fine-tune and adapt our mining-related technology faster and holds tremendous potential for even more innovations in the future.”*

– Ariel Harlap, Director, Research and Development, Photonic Knowledge Inc.



## Adjusting Customer Relations Solutions to the Needs of Francophone Populations

ONTARIO: COLLÈGE BORÉAL

The partnership between Collège Boréal and NexJ Systems Inc. has allowed this Toronto company to adapt a range of Customer Relations Management software products, for financial services, insurance and healthcare, to the Francophone market. All of NexJ's programming related to graphic interface solutions was analysed and tailored to the particularities of the French language and its users. Paul Paiement, Professor of Computer Sciences at Collège Boréal, and one of his third-year students, Kimberley Thériault, carried out this ambitious project financed in part by the Colleges Ontario Network for Industry Innovation.



*“As international demand for our product grows, this partnership with Collège Boréal allows us to take advantage of their considerable domain knowledge to meet the needs of a broad range of prospective customers in the global market,”*

– Ken Ono, Vice President of Innovation and Commercialization, NexJ Systems

CENTENNIAL  
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## Playing with Purpose: Social Learning for Young Girls

ONTARIO: CENTENNIAL COLLEGE

Media is all around us in many different forms, and media can and does influence the lives of children in today's world. The goal of Emerging Methods, a Toronto-based company, is to help ensure the difference made in the lives of young girls is a positive one, and one that can instill confidence, curiosity and inspiration to actively make positive changes in their own lives. They are doing this through the production of a transmedia property (storytelling using multiple digital platforms), The World of Pia, founded by their CEO, Milena Vujanovic and her colleague in New York City, Francesca Birks. Pia herself is a young girl who is curious, creative and a little bit mischievous - all in all, your typical young girl. Centennial College has enlisted the help of several students from the School of Communications, Media and Design to collaborate with Emerging Methods in developing the character of Pia in both her image and her personality, and writing stories in her voice that can connect with young girls around the world, regardless of background or culture. Girls are taken on an interactive journey in Pia's animated world, and challenged to take on an activity with each story on their own, in the real world. Girls can share and grow with other Pia followers and their friends through the experiences that they have had together.

*“It is important today that we think of new models and new forms of playful learning. Media and technology has advanced our potential to connect globally and access knowledge as we need it, but we still need to design the purpose and the playfulness into these aspects. In The World of Pia, we do just that. We listen to the girls we focus group with, play with them, understand what is meaningful to them, and then apply these observations ongoing throughout our design and development. Research and design are one in the same for us and this is our own new model for making things real.”*

– Milena Vujanovic, CEO Emerging Methods, Co-Founder The World of Pia



## Changing Indoor Experiences through Mobile Phones

BRITISH COLUMBIA: CAMOSUN COLLEGE

Victoria's Wifarer Inc. has developed a revolutionary software-only indoor positioning system (IPS). Wifarer heightens visitor exploration, discovery and engagement via indoor positioning, navigation, location-aware content, and a cloud-based content management system.

A partnership between Wifarer and Camosun College developed an “Accurate Indoor Wayfinding Mobile Application for Large Scale Multi-Building, Multi-Site Venues”. The project was funded by a CCI Applied Research and Development grant, and was conducted by a Computer Science instructor and two students - one from Mechanical Engineering Technology and one from Environmental Sciences Technology.

This project will play a significant role in Wifarer's next stage of product development and expand its market potential. At the same time, the aim is for Camosun College to become a technology development and testing partner for the company.

*“This partnership and research project been has been very helpful to Wifarer, enabling us to expand our capabilities in multi-building, multi-venue indoor positioning. The insight and expertise has been very valuable to our development team and allowed us to progress rapidly from concept to prototyping/ alpha stages for real world testing.”*

– Mark Franklin, COO, Wifarer Inc.



## Energy Monitoring and Tracking Dashboard and Analysis Tools

ONTARIO: CONESTOGA COLLEGE INSTITUTE OF TECHNOLOGY AND ADVANCED LEARNING

Can-Technologies Inc. delivers a custom solution for monitoring and tracking energy for high energy consuming businesses such as steel mills and other industrial facilities. As part of their solution, a software tool is used to document energy consumption abnormalities, their causes, and actions taken to address the abnormalities. Five students from Conestoga College's Software Engineering Technology program designed and implemented a database and process that allow businesses to:

- Track abnormal events (like unusually high energy consumption), the facts surrounding the event, the cause of the abnormal event, and the actions taken
- Support multiple users to allow administrative and normal user access, and
- Provide an alert mechanism that will remind employees to acknowledge an alert.

As a cost advantage to Can-Technologies, the Fact-Cause-Action system was compatible with existing systems and at the same time was available for new installations.

This project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.

*“This partnership allowed Can-Technologies to expand its R&D capabilities and allowed it to employ more resources and to increase its profitability with more product and service offerings. Can-Technologies customers have benefited from this collaboration which has allowed them to reduce their energy consumption, reduce their carbon footprint and become more efficient and competitive.”*

— Mahin Derakhshanian, Vice-President, Sales, Can-Technologies Inc.



## Designing a Web application that evaluates supply-chain performance

ONTARIO: LA CITÉ COLLÉGIALE

With the support of the Applied Research and Commercialization Initiative of the FedDev Ontario, La Cité collégiale has partnered with Ottawa-based Lytica Inc. to design a smart Web application that will evaluate the performance of electronic-parts suppliers.

Currently, the performance of supply chains is an essential factor in the successful design of electronic systems. The new survey-based application will allow users to weigh various criteria used to assess suppliers of electronic parts. The survey results will feed metric and statistical reports that companies can then use to analyse trends in the supply-chain market.

The application will enhance companies' decision-making when ordering stock of electronic parts. Lytica Inc. is a world leader in supply-management support for electronic parts and already has a large database of suppliers. The new application will help the company perform its role with even greater reliability.

Design and delivery is expected by spring 2013. The six students hired for the project have been able to expand their knowledge and apply the expertise they acquired in their computer engineering technology courses.



*“Lytica’s collaboration with La Cité collégiale is an excellent example of how the needs of business and those of students can be aligned for mutual benefit. Students are exposed to and work on leading-edge software applications while Lytica is able to extend its software R&D program and see potential new employees at work. A great model.”*

— Ken Bradley, President, Lytica Inc.



## High-tech Nano Managers

ALBERTA: NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY

Just months after its inception at the NAIT, in spring 2012, the Nanotechnology Centre for Applied Research, Industry Training and Services (NanoCARTS) had already attracted \$2.7 million in projects.

NanoCARTS was created to serve the nanotechnology and micro technology needs of industry, mainly small- and medium-sized enterprises, in the areas of prototyping, product development and enhancement, testing, training and characterization.

Two major projects were undertaken by NanoCARTS: The first involved collaboration with Alberta Nano-Monitoring Systems (ANMS) to develop local applications for the company's breakthrough particle size analyzer. The second developed an online portal for Alberta's nine micro- and nanotechnology service providers and industry partners. The portal will be a hub for potential clients and existing service providers to discuss projects and share and access other industry information.

Housed within NAIT's School of Information, Communication and Engineering Technologies, NanoCARTS was established with \$1.75 million in funding over five years from the Natural Sciences and Engineering Research Council of Canada. Funding from Alberta Innovates Technology Futures is also supporting the program's two major projects.

***"We are the absolute newest kid on the block. We have to make sure we do a lot of knowledge translation as well as a lot of relationship building as we move forward."***

– Dr. Olle Lagerquist, Manager, NanoCARTS, NAIT



## Innovative Features Added to Hearing Assessment Software

ONTARIO: NIAGARA COLLEGE

Ultimate Kiosk is a Canadian growth company that develops advanced hearing assessment technologies. Their advanced software and web technology connects dispensing professionals with those in need of their services via kiosk locations in pharmacies, clinics, and other community venues. Under funding from the Colleges Ontario Network for Industry Innovation, Ultimate Kiosk recently collaborated with Niagara College on a software development project designed to add new features to their existing software platform. Now, the administrator of the software can remotely manage the page advertisements and available languages, and remotely update the software platform itself. If the software recommends the user see a professional, nearby clinics will be identified to make the next step more convenient for the user. Finally, the kiosk can now work without an internet connection, whereas the previous version of the software required internet service to display results to the user.



***"These features have been instrumental in increasing the quality and pace of software development, keys to gaining early mover advantage in the international markets."***

– Terry Mactaggart, President and CEO, Ultimate Kiosk



## Bykart CHARM

ONTARIO: DURHAM COLLEGE

CHARM is an oncology appointment manager that optimizes a cancer clinic's capacity to treat more patients with existing resources. It does this by automating processes to make approvals of chemotherapy between the chemotherapy unit, pharmacy, and clinicians more efficient. It also helps to improve scheduling and communication among care providers.



Students and faculty from Durham College's School of Business, IT and Management worked with Bykart to embark on a large-scale project to design and develop a new Enterprise-class health care application framework.

Building on the systemic knowledge gained since CHARM was first developed and deployed, the project created an extensible, modular framework on which to deploy a suite of integrated health care application services to complement existing CHARM functionality and simplify integration into existing hospital software. The result was a functional, efficient, and visually appealing application. The students involved now have sufficient experience in their fields, giving them a competitive edge in the work force.

*"The students and teachers that worked with us on our project continually exceeded expectations. The knowledge they brought to the table was excellent but more impressive was their can-do approach to problem solving, hardworking attitude, and willingness to learn."*

– Bykart



## Protecting Water Systems from Toxic Chemicals

BRITISH COLUMBIA: CAMOSUN COLLEGE

A green technology company on Vancouver Island, Petro Barriers Systems Inc. (PBS), has long promoted the importance of preserving our water systems. PBS is a leader in storm drain water protection systems that serve utility companies and municipalities across the country and internationally.

The company partnered with Camosun College engineering professors to develop sensors that will form a key component of a Hydrocarbon Sensor System. This two-year research project is funded through a CCI Applied Research and Development grant. The funding supports two Camosun Mechanical Engineering Technology instructors, and two students who will work directly with PBS to complete the project.

A new design will be created for a "smart" storm drain filtration system. Data from the system's monitors, including water-flow and daily temperatures, will be delivered to mobile devices or computers. This data will make it easier for industry, municipalities and government agencies to monitor potentially toxic chemicals flowing through storm drains into marine environments. Costly environmental responses and damage to surrounding ecosystems may be prevented or reduced as a result of this research.

*"Big spills make the news, but tons of little spills are happening right outside your door and we are all a part of it. People don't really realize the magnitude of pollution that comes from storm drains alone."*

– Mike Ansley, Vice-President of Marketing and Communications, Petro Barrier Systems Inc.



## Mapping Out a Location Solution

ONTARIO: CENTENNIAL COLLEGE

Centennial College partnered with DMTI Spatial to improve on their Geographic Information Systems suite of location intelligence solutions. Under guidance from DMTI's Director, two students from Centennial's Environmental Protection Technology program worked towards the creation of a national database of multiple dwelling buildings, a first in Canada. The new product is a national infrastructure database for Canada with a specific focus on buildings with more than one unit, which will identify all buildings in Canada and their associated attribution.



The success of this database and its content allows a user to query or match using an address and identify those records which are buildings with greater than 2 units. This distinction is important because some industries, such as insurance companies, make business decisions based on whether the address is a building or a house. Currently no national database exists with this information. DMTI Spatial hired one student to work on additional projects required to ensure the national infrastructure database is robust and comprehensive.

This project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.

*“This work accelerated our goals because it offered an opportunity for us to extend our innovation capabilities. The most important outcome was the increase in intellectual property development, the result of mentoring by senior associates with students.”*

– Robert Szyngiel, Director of Data Engineering at DMTI Spatial

## IMAP Audits Inc. Software and Process Optimization

ONTARIO: LAMBTON COLLEGE

Lambton College provided iMAP Audits Inc. with a functioning beta web application enabling further development to proceed at an accelerated rate. The Lambton College's Applied Research office was instrumental in matching iMAP up with the Ontario Network of Excellence, and was successful in obtaining a secondary grant to develop a business model and pricing structure for export markets.

The successful project was funded by the FedDev Ontario Applied Research and Commercialization Initiative and was the springboard that assisted iMAP in securing National Research Council Industrial Research Assistance Program funding to complete the production development of the iMAP software.

iMAP's service offerings have been expanded and remain integrated with its current application. The company expects to double its staff and create job opportunities for self-employed contractors outside its immediate service area throughout Ontario and across Canada.

This activity led iMAP to submit a proposal for India, where iMAP was invited to present its technology and is now in negotiations to license the software and conduct training in its specialized field.



*“As a direct result of funding from the the FedDev Ontario, iMAP is reaching global markets years sooner than we otherwise would have. The software has moved into the forefront of technology, will lead in product development and reach a much expanded market. Job creation in technology, training and our support department is expected to grow significantly as a result of our new sales opportunities.”*

– iMAP Audits Inc.



## Seneca

### Multiplatform Educational Game

ONTARIO: SENECA COLLEGE

Bronskill is a leader in designing and developing exceptional experiential based destinations and programs. With funding from the FedDev Ontario Applied Research and Commercialization Initiative, students from Seneca College Centre for Development of Open Technology (CDOT) worked with the company to build a multiplatform educational game based on the fundamental principles of Mendelian genetics. This unique collaboration enabled students to see the opportunities and challenges of game development in a commercial context; develop and refine processes for use in CDOT; and increase processes and skills in cross-platform testing that includes mobile devices. As a result of this collaboration, Bronskill has expanded production capabilities in HTML5 and will increase approximately 5% of its revenue stream and product offerings.

*“It was a fabulous experience working with the Development team at Seneca. They have a rich talent-base and the creative knowhow to tackle our complex design issues. This was crucial R&D we needed and they certainly delivered!”*

– Jeremy Friedberg, Project Lead of Bronskill & Co. Inc.



## Javelin Reality – A 3D Pre-visualization Tool

ONTARIO: SHERIDAN COLLEGE INSTITUTE OF TECHNOLOGY AND ADVANCED LEARNING

Faculty and students at Sheridan College partnered with Javelin Technologies to create an easy to use, inexpensive pre-visualization tool that can be used by both hobbyist filmmakers and Machinima enthusiasts to make digital movies, as well as for professional cinematographers and 3D stereographers to pre-visualize their film production projects.

The project involved the design and implementation of a virtual camera, which allows a camera to manipulate in a virtual 3D space, via a peripheral such as a Kinect sensor, iPad, or other device. The research team designed the user interface diagram/workflow, which specifies the means by which the user interacts with the tool, and tested the preliminary design. This project will create a completely new line of business for Javelin Technologies. The new prototype will provide a low-cost alternative that will be sold as plugins (modules) to the film industry and to hobbyist filmmakers and colleges.



## Mobile App Tracks Employee Hours, Travel and Expenses

ONTARIO: NIAGARA COLLEGE

Convergent Telecom has developed a network of strategic business partnerships with a focus on helping clients leverage investment in various technologies. Niagara College is leading their newest creation, Mileage Genie Pro – a mobile application that automates the process of collecting various employee metrics. The project has been funded by the Colleges Ontario Network for Industry Innovation.

Within the app, employees can submit work hours, track expenses, such as food costs during business travel, and track commuter travel using the built-in GPS tracking system. All tracked metrics are seamlessly reported to a server where administered users can populate data reports using a template or customized format. The app is being optimized for use on all major platforms, including IOS, Android, Windows Mobile 7 and Blackberry.



***“This project, among others, has helped Convergent Telecom gain insight into new markets and grow and diversify our business,”***

*– Roland Bissell, Founder and CEO of Converge Wireless Inc.*



## Inspiring Literacy and Creativity in the Next Generation

ONTARIO: CENTENNIAL COLLEGE

The not-for-profit business Story Planet Media, started by Liz Haines, is focused on engaging children in self-expression and promoting literacy. Liz Haines' ideas sparked her and her team to embark on a passionate project that aspires to bring literacy and creativity together for kids to develop the skills and confidence to become fearless, creative communicators, inspiring them to develop their unique voice through writing, art and digital media. Working with Centennial College and several students from the School of Communications, Media and Design, the research team helped to design and develop an innovative, interactive website for kids aged 6 to 9, where they can build personalized characters to travel around and visit different planets, creating stories that are uniquely their own. This project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.

## Agriculture and Agri-Food



### Optimized Burner Saves Blueberry Growers Both Fuel and Money

NEW BRUNSWICK: COLLÈGE COMMUNAUTAIRE DU NOUVEAU-BRUNSWICK

Éric Hall of Service Hall Ltd., a blueberry producer located in Saint-Isidore, N.B., approached Alain Doucet, a researcher with the Collège communautaire du Nouveau-Brunswick (CCNB), to determine if there was a way to reduce the fuel consumption of its blueberry plant burner, which can consume up to 280 litres of fuel per hour. This periodic burning process performed with this burner is an essential part of blueberry production and represents a significant operating expense for blueberry growers. As steadily rising fuel prices were negatively affecting revenues, the College Applied research capability helped to identify a solution.

Through the Springboard Atlantic network, the CCNB partnered with the Dalhousie University Faculty of Agriculture to develop and test a prototype that optimized the action of the burner. The resulting prototype, which was originally tested in June 2012, translated into a 45% decrease in fuel consumption costs. This represents significant yearly savings in fuel costs for the producer as well as a reduction of greenhouse gas emissions. Two technicians and college instructors and students from eight different programs participated in the project.

This project received 40% of its funding from the client and 60% from funding agencies, including the National Research Council Canada, the Dalhousie University Faculty of Agriculture, Economic Development – New Brunswick, the Growing Forward program of Agriculture and Agri-Food Canada (in collaboration with the New Brunswick Department of Agriculture Aquaculture and Fisheries) and the New Brunswick Innovation Foundation (NBIF).



***“Most small businesses don’t realize they can access the funding they need by collaborating with college and university researchers. Our research funding helped solve an important financial and environmental problem.”***

*– Mr. Calvin Milbury, President and CEO, NBIF*



## A Better Test for Pesticides in Our Produce

BRITISH COLUMBIA: CAMOSUN COLLEGE

Camosun College partnered with MB Laboratories Ltd. to develop a comprehensive and cost-effective screening method for pesticide residues in fruits and vegetables. The results will provide local farms and businesses with a novel method for testing pesticides residues and could support interventions to reduce pesticide use, which could result in long-term health benefits.



The college-industry partnership funded by a CCI program Applied Research and Development grant, involves an Applied Chemistry instructor from the School of Arts and Science and four co-op students from Camosun's Applied Chemistry and Biotechnology Program working with MB Laboratories, based in Sidney, B.C.

A CCI Applied Research Tools and Instruments grant enabled the college to purchase a state of the art qPCR Gas Chromatography mass spectrometry machine to support this research.



## Baobab – A New and Healthy Beverage

ONTARIO: DURHAM COLLEGE

The market for healthy living products has expanded rapidly over the past few years. To serve growing market demand, Delice d'Afrique Foods Inc. devised an innovative and healthy drink made from the Baobab fruit from Africa. This new-to-Canada super fruit was reputed to contain high levels of vitamin C and calcium. The company approached Durham College to confirm its nutritional content and to refine and perfect the beverage. With funding from the FedDev Ontario Applied Research and Commercialization Initiative and the expertise of Durham College professors and students, product development was completed, moving the beverage to field-testing and commercialization. Delice d'Afrique Foods Inc. is optimistic that the improved Baobab beverage will achieve commercial success.



*“Durham College was my personal R&D centre. Durham’s amazing resources have led me to commercialization and down the line, I would love to work with Durham College again for the development of more products.”*

– Delice d'Afrique Foods Inc.



## Natural Sugar Extracted from Apple Juice

QUEBEC: COLLÈGE SHAWINIGAN

The Centre national en électrochimie et en technologies environnementales (CNETE) affiliated with Collège Shawinigan developed a process for the Vergers Cataphard et fils Inc. to use subgrade apples to produce natural syrup with a concentration of 65 Brix (65% p/v). The process involves several industrial sequences to produce a final concentration of natural sugars extracted from apple juice. The process has been transferred to the plant and industrial production of natural apple syrup will begin in May 2013. A patent is now pending on this process.

The research was funded by the Quebec Ministère des Finances et de l'Économie and the Ministère de l'Agriculture, Pêcheries et Alimentation.



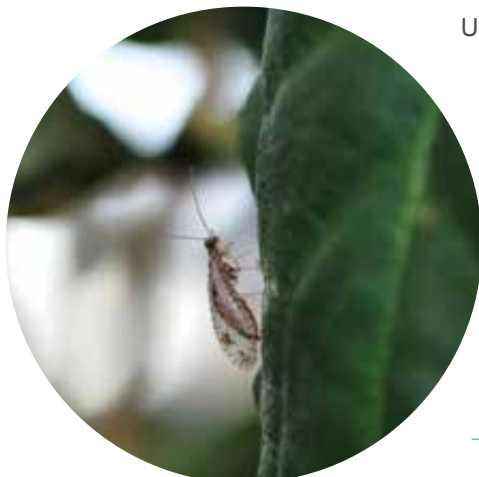
## Devouring Aphids on Greenhouse Peppers

BRITISH COLUMBIA: DOUGLAS COLLEGE

Aphids are unrelenting, serious pests for British Columbia's greenhouse vegetables, as well as on farms and in gardens across the country. That may soon change, as Douglas College's Institute of Urban Ecology is researching new products to biologically control aphids – funded by a CCI Innovation Enhancement grant and a CCI Applied Research Tools & Instruments grant.

The most promising product to emerge from this work is *Micromus variegatus*, a brown lacewing that is a voracious predator of aphids. Greenhouse cage trials indicate that *Micromus* can eradicate infestations of green peach aphids on sweet peppers. The product will play an increasingly important role in aphid management inside and outside the province, on both greenhouse vegetables and field crops such as blueberries.

The research is supported by a partnership that includes Canadian biological control companies Applied Bionomics Ltd., The Bug Factory Ltd., and Koppert Canada Ltd., as well as the B.C. Greenhouse Growers Association and the Institute for Sustainable Horticulture at Kwantlen Polytechnic University. Biological control provides a sustainable, ecologically-based alternative to the use of chemical pesticides in agriculture. The objective: continue identifying and developing new products to biologically control major agricultural pests.



*"The Micromus project is an excellent example of the relevance of your research for our industry and Canadian horticulture. Your connections with the BC vegetable growers have allowed real trials in real situations. Your excellent communications, especially your "Technical Bulletins", have created awareness and demand for the product and integrated pest management in general."*

– Brian Spencer, President, Applied Bionomics Ltd.





## Boosting Organic Agricultural Production in the Horticultural and Cash-crop Sectors

QUEBEC: CÉGEP DE VICTORIAVILLE

With funding from a CCI Innovation Enhancement grant, the Centre d'expertise et de transfert en agriculture biologique et de proximité (CETAB+) at Cégep de Victoriaville is working on the use of green fertilizers and sub-soiling for organic farm production.

Sub-soiling is designed to reduce the impact of soil compaction, which is caused by farm work and heavy equipment on the land. Research compared the effects of different sub-soilers on physical soil properties in a hay field and in growing mulch. An analysis of soil profiles right after sub-soiling in the summer and then later in the fall, has resulted in the identification of the most-effective sub-soilers and, most importantly, the optimal conditions to use them. This is critical data to more than a dozen partners involved in the project, as well as to farm families across the country.



Results from fertilization tests in a semi-permanent greenhouse on tomato and pepper plants have shown equal promise for the project partners and the greater community. Students in the college's bio-horticulture program – many of whom will become market farmers – are also benefiting directly from the college's expanding expertise in this area.

*“The initiative allowed us to team up with specialists from CETAB+ to fine-tune fertilization processes for tomatoes and peppers. And because all of the parameters in crop management have to be coordinated, our work with these experts gives us a better understanding of our crops and a greater awareness of our yields—and that helps us reach our objectives or targets faster. Finally, thanks to CETAB+'s tests at other farms, we can exchange all sorts of data and gain crop-related knowledge that makes us better producers overall.”*

– Robin Fortin, Ferme La Berceuse



## Empowering Rural Entrepreneurs

BRITISH COLUMBIA: OKANAGAN COLLEGE

Entrepreneurs power industry and regional economic development. To that end, each micro-business that grows to SME status adds considerably to employment in the area. New jobs are typically full-time positions, with higher wages, paving the way to stronger regional economies.

Data on rural entrepreneurs is very limited in Canadian communities. In other nations, studies confirm that rural businesses should coordinate their scarce resources to improve their competitive position overall.

Through funding from a CCI Applied Research and Development grant, Okanagan College is enhancing understanding of this issue through a project entitled: “Rural Entrepreneurship and Industry Competitiveness: Value-Chain Innovation in the Agricultural Products Cluster since 2006”. The project investigates the role of entrepreneurs in industry competitiveness and sustainable rural community development, and examines how they overcome significant obstacles to business interdependence, and how this interdependence stimulates innovation that leads to sustainable competitive advantage.

Outside of Canada's urban centres, there is tremendous potential in interdependent entrepreneurs. In the rural areas, that begins with agriculture products.



*“What we’re looking at here is the industry cluster of agricultural products: wine, tree fruits, processing, manufacturers, stainless steel fabrication, equipment manufacturing, the service and support industries, the grower supply companies – all of this is the value chain.”*

– Lee Carter, Business Division Research Lead



## Because Colour Matters in Food Quality Control

ONTARIO: ALGONQUIN COLLEGE

Ottawa’s Sightline Process Control is a leading manufacturer of real-time inspection/rejection systems for food quality control. To keep its competitive advantage, the company needed to expand into precise camera and illumination-independent colour characterization. The project’s goal was to develop a colour management system (CMS) to complement Sightline’s products. A CMS transforms camera-dependent raw colour image data into absolute sRGB (Red-Green-Blue) colours – reproducing real food colours with precision accuracy.

Through a partnership with Algonquin College funded by a CCI Applied Research and Development grant, Sightline Process Control developed a CMS featuring open-source software that plugs seamlessly into Sightline’s Labview system interface – producing corrected, camera-independent colours that were tested thoroughly against known colour standards.

Algonquin was given the problem of allowing the company to measure  $L^* a^* b^*$  colour values ( $L^*$  defines lightness,  $a^*$  denotes the red/green value and  $b^*$  the yellow/blue value) from a system with somewhat variable lighting and generic off-the-shelf colour cameras.

*“Your developed algorithms work well and the resulting libraries allowed us to add this capability to our product line without having to worry about the underlying complexities of the mathematics. Having true  $L^* a^* b^*$  measurements opened a new range of applications for our bench top vision system product. While this has not yet resulted in new sales, we expect it to in the near future.”*

– Andrew Scott, Sightline Process Control Inc.



# Environmental Science and Technology

## Small Scale Hydro-Distillation

ONTARIO: CENTENNIAL COLLEGE

Centennial College teamed up with Cyrus Borja to determine the feasibility of establishing smaller and more environmentally-friendly distillation laboratories. This project looked at extracting essential oil from Elemi resin, a product that is used by manufacturers in a variety of soaps and perfumes. The results confirmed that the extraction of Elemi oil through small-scale hydro-distillation is feasible and purity is not sacrificed in the process. This is a technologically and economically feasible process for small-scale independent manufacturers who can buy raw materials and undertake the distillation themselves. The project provided information on production parameters for Elemi essential oil distillation, including the yield vis-à-vis production period and bench line data for quality control. This project was funded by a Centennial College Applied Research & Innovation Centre Fellowship Grant.

*“The value of the project to me was in further developing my chemistry and analysis skills as well as seeing a project through all the important key components; hypotheses stage, preparation, performing, analyzing and conclusion.”*

– Emily Prowse, Student Research Assistant, Centennial College



## Water-based Finish: Combining Health, Quality, Competitiveness and the Environment!

QUEBEC: CÉGEP DE VICTORIAVILLE

Companies are reluctant to use water-based products although their quality has been proven, because changing processes entails costs. At EQMBO-Entreprises, the CCTT affiliated with Cégep de Victoriaville supporting Quebec's wood and furniture industry, researchers have demonstrated that use of water-based finishing products can generate savings.

In fact, using only products with low emissions deemed harmful to worker health, such as water-based finishes, allows lower exhaust ventilation speeds in spraying chambers. The more ventilation required, the greater the volume of harmful vapours expelled into the ambient air and the more incoming air that must then be tempered accordingly. In winter, this raises heating costs. By reducing fan velocity, we can reduce heating needs and generate substantial savings for companies of all sizes.

A kitchen cabinet manufacturer with 35 employees that uses three low-speed finishing chambers (2500 CFM) can achieve annual savings of about \$20,000 in heating alone and become more competitive!

This project was supported by the Quebec Ministère de l'Enseignement Supérieur, de la Recherche, de la Science et de la Technologie through the Programme d'aide à la recherche et au transfert.



## Mitigating Urban Stress on Aquatic Environments

ALBERTA: LETHBRIDGE COLLEGE

The impacts of urban living often lead to imbalances in the cycling of nutrients in aquatic systems. The aquatic stresses are often displayed as an excess of algae and/or plant production, reduced water clarity and aesthetics and increased incidence of unpleasant odours.

Lethbridge College has partnered with Advanced Water Technologies Inc. (AWT) to help improve the conditions of Henderson Lake, Lethbridge's most popular water body and park. AWT applies a bacterial product weekly to kick start the natural nutrient cycle processes and help digest any accumulating organic matter that builds up on the bottom. The College's Aquatic Research Centre provides the technical assistance, bacterial culture facilities and environmental monitoring expertise to enhance this project's value.



With three years of testing and now a fourth underway, Lethbridge College has helped AWT to facilitate and analyze its environmentally-conscious method that is designed to enhance aquatic system health and well-being.

*“From AWT’s perspective this is a symbiotic relationship since the college learners who work closely with AWT personnel are trained in environmental science, and therefore, they are applying what they have learned, while AWT has access to their growing expertise. At the same time, the strong scientific and limnology knowledge of the LC staff is unsurpassed. The relationships are positive and encourage open communication and well-documented research, a perfect outcome. Finally, the City of Lethbridge also benefits from a clean, clear lake, the jewel of the city.”*

– Phyllis DayChief, CEO, Advanced Water Technologies Inc.



## Recycling Used Antifreeze

QUEBEC: COLLÈGE SHAWINIGAN

In July 2012, the Regulation respecting the recovery and reclamation of products by enterprises took effect. Shawinigan's Société Laurentide had to plan for the implementation of this regulation, which promotes recovery and reclamation of used antifreeze.

Inspired by success with other recycled products (paint, oil), the new regulation is based on a network of drop points where used antifreeze can be left, as well as a system to collect and ship the product to recycling sites.

To integrate this environmental dynamic into its operations and qualify with government authorities as an authorized recycler, Société Laurentide called on the Centre national en électrochimie et en technologies environnementales (CNETE) affiliated with Collège Shawinigan.

CNETE developed a specialized process that targets filtration membranes adapted to the product. The result is impressive: 50 percent of ethylene glycol—the essential component making up 97 percent of production of pure antifreeze—was recovered.

Société Laurentide is now one of only a handful of companies that have achieved complete competitive autonomy through recycled antifreeze. The project bolsters the company's image as a sustainable development player. Société Laurentide has achieved its ambitions by paying close attention to compliance with legislative and environmental measures in its field.

This project was funded by Quebec's Ministère de l'Enseignement supérieur, de la Recherche, de la Science et de la Technologie as part of the Programme d'aide à la recherche et au transfert.

***“Our applied research targets effectiveness and meets economic and environmental criteria. Our ambition is to satisfy our partner!”***

– Mohamed Rahni, Lead Researcher, CNETE



## Wastewater Warriors

ONTARIO: MOHAWK COLLEGE

Mohawk College's iDeaWORKS recently collaborated with Hydromantis Environmental Software Solutions, a leading global provider of water and wastewater simulation software and consulting services, on an eight-month project to develop a comprehensive analytical software framework for estimating greenhouse gas (GHG) emissions from water and wastewater treatment facilities.

To reduce emissions, it is important to be able to quantify emissions from these facilities under various operating conditions - and Hydromantis is developing a tool for doing just this. Once the framework has been developed, Hydromantis will integrate the analysis tool into its widely used process-efficiency analysis software (GPS-X™, CapdetWorks™). The integrated product will help decision-makers estimate the effect of different processes and develop operational strategies for GHG emissions.

Mohawk College students facilitated this innovation by researching current methods and models for calculating the carbon footprint of wastewater treatment processes and integrating the selected models into the framework. In addition to this work, a student in the 3-year software development program, played a crucial role in developing WaterUnits, the wastewater treatment industry's first mobile app for providing common unit conversion specifically for wastewater engineers. The app is available for download on the Android Market or at [www.hydromantis.com](http://www.hydromantis.com). This project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.

***“Hydromantis was the first company in the world to commercialize wastewater treatment modeling software, so it only makes sense that we are one of the first to launch a mobile application such as this.”***

– Oliver Schraa, President, Hydromantis

***“We collaborated with Mohawk College on a FedDev project to develop a Carbon Footprint modeling tool for wastewater treatment plants. We worked together with Mohawk students to research, develop and implement the models in our software tools. We were very impressed with the excellent skills and work methods used by students on this project. We were able to achieve the goals of the project and will be releasing the new product soon.”***

– Rajeev Goel, Vice-President Technology, Hydromantis

## Predicting Coastal Water Quality, Sustaining Communities

NOVA SCOTIA: NOVA SCOTIA COMMUNITY COLLEGE

Coastal area water quality is crucial to the economic viability of local communities. It can impact recreational beaches, shellfish harvesting areas, and aquaculture sites. NSCC with funding from the Atlantic Canada Opportunities Agency and the Nova Scotia Research and Innovation Trust, is collaborating with four business partners to develop innovative technologies for managing coastal water quality.

The project team has been researching and developing geospatial tools that provide real-time water quality forecasts (72-hour window) which will assist regulatory agencies and the shellfish harvesting industry to better predict the magnitude, extent and duration of contamination to assist with shellfish food safety decisions.

The ecosystem around coastal areas is very complex when factors such as extreme weather, tidal flows, wastewater treatment plant discharges, watershed runoff, and concentrated deposits of fecal matter from seabirds, cattle, or faulty septic systems are analyzed. These characteristics have been modeled to simulate their impact on coastal water quality. The industry partners are now exploring commercialization opportunities to capitalize on the potential applications of this technology.

*“We find that the community college system is a good business partner that brings us access to expertise that assists us develop a potential new line of business within our main focus of environmental services to government and private enterprise in Canada and internationally. Our access to the highly skilled professionals at NSCC has permitted us to provide higher value services to our existing client base and to expand our service offering.”*

– Mac MacLeod, President and General Manager, Scotia Weather Services Inc.

## The Algae-Based Blue Revolution

QUEBEC: CÉGEP DE LA GASPÉSIE ET DES ÎLES

In 2011, the Centre d'innovation de l'aquaculture et des pêches du Québec (Merinov) affiliated with the Cégep de la Gaspésie et des Îles, and the Centre collégiale de transfert de technologie en oléochimie industrielle (Oleotek) linked up for a project to develop brown algae (laminaria). The project's goals were to 1) characterize and develop these oils, 2) extract free mannitol (natural polyol often used in food, nutraceuticals and pharmaceuticals), and 3) assess the potential of fibrous residue for the biomaterials market. This project, funded by the Quebec Ministère de l'Éducation, des Loisirs et des Sports technological research assistance program, compared algae from aquaculture operations with wild algae. The cultivated algae was produced in the laboratory then seeded at three marine aquaculture sites in the Gaspé Peninsula. The findings showed very low oil content and high mannitol levels in the cultivated algae, with differences between sites, and the potential for residue extraction to manufacture composites used as decorative or insulating siding materials. Two companies took part in the project: Les Gaspésiennes-Algues de Gaspésie which assisted with the cultivation at the marine site and developing the scientific protocol, and OrganicOcean which assisted with harvesting wild algae and drying/shredding before extraction. This project confirmed the potential for algal culture in Quebec and laid the groundwork for a future algae industry. This opens up several new markets, especially for extraction of molecules of interest, such as mannitol, naturally present in algae.







## Mass Environmental Accelerated Composting System

ONTARIO: FLEMING COLLEGE

In conjunction with Fleming College's Centre for Alternative Wastewater Treatment, MASS Environmental Services Inc. carried out research and development for the Rocket®, an accelerated composter that MASS was trying to bring to the Canadian market. The Rocket allows users to efficiently process and dispose of waste material on-site, with composting units ranging in size to suit volume requirements. It composts cooked and uncooked meat & fish, fruit & vegetables, garden waste and leaves and animal waste (including some types of bedding). As a result of this collaboration, the Rocket® was approved for sale in Canada and is now sold exclusively in Canada by MASS Environmental Services Inc. This project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.



***"MASS greatly appreciates the dedication and detail that CAWT provides. Your student Marcus was a tremendous asset exceeding our expectations."***

– George Brown, Mass Environmental



## Mapping the Bumps in the Road

YUKON: YUKON COLLEGE

The Northern Climate ExChange research team, part of the Yukon Research Centre at Yukon College, is partnering with the Department of Highways and Public Works (Government of Yukon) to conduct a project titled Mapping the bumps in the road: Vulnerability of the North Alaska Highway to climate change. Specifically, the project examines the thaw sensitivity of permafrost under the highway alignment to changes in climate. The Alaska Highway is a vital overland supply route for Yukoners and Alaskans that is underlain by extensive discontinuous, warm, potentially ice-rich permafrost. Understanding the potential impacts of climate change on permafrost under the highway is critical to ensuring its integrity as an important northern travel and supply route. This project characterizes permafrost conditions underneath the northern 200 km by pairing geophysical data, geotechnical reports, highway maintenance records and air photos with field investigations, including permafrost drilling.

***"Results from this project will help Highways and Public Works develop targeted, efficient and effective policies, engineering designs and maintenance plans that will provide transportation security for First Nations and Yukon communities. The work is being funded by Aboriginal Affairs and Northern Development Canada through the Climate Change Adaptation Program."***

– Paul Murchison, Director of Transportation Engineering at Highways and Public Works





## Performance of Environmentally-Safe Sansin Wood Stain Formulations

ONTARIO: CENTENNIAL COLLEGE

For 20 years, Sansin Corporation has pioneered the use of environmentally-friendly water-borne wood protection technologies that deliver outstanding performance. Their technology is inspired by a thousand year-old tradition that uses nature's own ingredients – resins and gums from the heartwood of trees – to deliver sustainable protection.



The Sansin Corporation and Centennial College collaborated to address research gaps related to the performance of new wood stains through a project funded by the Colleges Ontario Network for Industry Innovation. Efficacy of formulations against ultra violet light and mold fungi was checked and recommendations were made for improvements. Results showed that several coatings that were exposed to ultra violet light and later brought in contact with mold fungi in culture dishes showed excellent resistance to mould colonization.

Sansin Corporation will use the results to improve their new wood stain formulation and will start commercial production of new environmentally-friendly wood stain.



## Dual Frequency Ice Penetrating Radar

YUKON: YUKON COLLEGE

Ice-penetrating radar is one of the most powerful geophysical tools used in glaciology, with applications ranging from ice-depth detection, to mapping the internal stratigraphy of ice-sheets, or inferring englacial and subglacial conditions. Such information is valuable for research, water resource management, and for natural resources exploration.

The Cold Climate Innovation research team, part of the Yukon Research Centre at Yukon College, partnered with Blue Systems Integration Ltd. to build a unit to assist co-workers at the Yukon Research Centre, the Northern Climate Exchange to conduct research on local glaciers.

Airborne ice-radar systems have been commonly used to survey ice-sheets and glaciers over extensive areas. In more complex terrain ground-based surveys are the method of choice for smaller feature identification and lower scale subsurface mapping.

This project focused on the implementation and field testing of a ground-based dual-frequency Ice Penetrating Radar (IPR) system. Working with different frequencies can reveal different ice properties and typically requires surveying the same area twice when two working frequencies are chosen. Being capable of operating with a dual-frequency system offers an operational advantage by decreasing survey time in half. Since most of these surveys take place in remote regions where access is impeded by weather conditions, it becomes critical to decrease the survey time to maximize the chance of a successful field campaign. It also allows the development of specific technology that can be transferred to related applications such as adaptive radar transmitter power useful for better signal detection where ice conditions show increased attenuation.

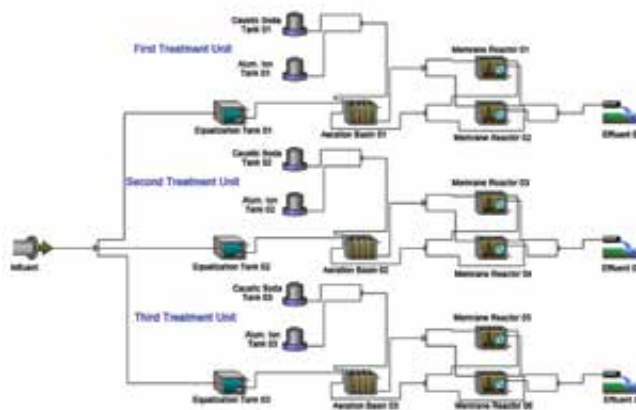


Photo Credit:  
Sarah Laxton

## Optimal Design and Operation Tool for Wastewater Plants

ONTARIO: LAMBTON COLLEGE

TEAM Aquatic Management Inc. (TEAM), a Sarnia-based company, is an operator of small water and wastewater treatment plants using different water treatment technologies. TEAM has been facing challenges operating its bio membrane reactor (MBR) based waste water treatment plants resulting in high operating cost and technical manpower requirements. Lack of an automation system has affected process performance. These challenges were investigated through a collaborative project between Lambton College's students and faculty. The result is a model-based tool for optimal design and operation of small wastewater treatment facilities. Various control systems were tested and additional water quality measurement sensors were installed for process monitoring in sites. An unforeseen benefit for the industrial partner: TEAM is using this new tool for marketing purposes to showcase process operation and its cost to clients. This tool was used to generate a model for a wastewater treatment facility in the North and enabled TEAM to supply concise information as part of a specific site assessment process with a favourable decision by the Ontario Ministry of Environment. This project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.



*“The successful implementation of this advanced monitoring and control system will open new and presently under serviced markets in increasingly sensitive and remote areas such as mining sites and First Nations communities.”*

– Dean de Jong, Operating Director, TEAM Aquatic Management Inc.

## Developing an Enviro-Friendly Substitute for Coal

QUEBEC: CÉGEP DE L'ABITIBI-TÉMISCAMINGUE

There is vast potential for developing and commercializing new products from biochar for power and fuel production to replace traditional sources of fossil fuel energy. These products could be instrumental in replacing traditional bituminous coal in specialized applications, such as the treatment of liquids and gas. Substituting biochar for fossil fuels will also help lower the industry's ecological footprint and reduce greenhouse gas emissions.

With funding from a CCI Applied Research and Development grant, the Centre technologique des résidus industriels (CTRI), affiliated with Cégep de l'Abitibi-Témiscamingue, launched a research program to develop value-added products from residual forest biomass, in partnership with FP Innovations and the Quebec Consortium for Industrial Bioprocesses Research and Innovations. The aim is to optimize the process of converting forest biomass into biochar. The project will consolidate and diversify the forest products transformation field in Abitibi-Témiscamingue. It will also open new opportunities in the field of carbon and fossil energy development.

*“Torrefaction of biomass will allow us to produce a material (biochar) comparable to mineral coal, which can be used directly in existing burners/atomizers without major modifications or investments. Furthermore, many more added value byproducts can be produced. Industries are now searching for options to reduce their energy expenses and torrefaction seems to be an interesting economic solution.”*

– Airex Energie

CENTENNIAL COLLEGE

## Turn-key Teaching Kits to Improve Environmental Education Programs

ONTARIO: CENTENNIAL COLLEGE

Over the course of 11 months, Environmental Bio-detection Products Inc. (EBPI) partnered with Centennial College's Applied Biological and Environmental Department to develop four turn-key teaching kits for use in high school, college or university biology labs. An Industrial Microbiology student worked closely with faculty to develop two simulated and two biological teaching kits to demonstrate the effects of toxicity and mutagenicity in the environment.

EBPI previously marketed these products to small companies and aims to streamline the kits and development process to reach a greater audience. The kits were developed to work well in various classroom settings, in relation to timing, materials, supplies and safety regulations. EBPI is refining the production process of kit development for mass marketing. This project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.



## Automated Remote-field Goniometer

QUEBEC: CÉGEP DE LA POCATIÈRE, CÉGEP ANDRÉ-LAURENDEAU AND CÉGEP JOHN ABBOTT COLLEGE



Technostrobe manufactures position beacons to mark elevated structures that pose a potential air navigation hazard. This company markets systems for windmills as well as telecommunications and broadcast towers.



Technostrobe has a long-standing partnership with the Centre collégial de transfert technologique en optique-photonique (Optech) affiliated Cégep de La Pocatière, Cégep André-Laurendeau and Cégep John Abbott College. The first project to design and prototype an LED beacon, marketed in 2011, recently won a 2012 award from the Association pour le développement de la recherche et de l'innovation du Québec.

Optech recently conducted a goniometer automation project specifically adapted to Technostrobe applications. This project involved the testing of the optical performance of beacons manufactured by Technostrobe over a complete hemisphere. The special characteristic of this goniometer is its ability to characterize large-scale samples such as beacons.

This project, funded by Technostrobe, produced a tool for characterizing its product and confirming that it fully meets all regulatory requirements.





## One Slick Idea - The ROC Barrier

ONTARIO: FLEMING COLLEGE

It's one slick idea, and it signals a cost-effective shift in the way oil spills are managed.

Researchers at the Centre for Alternative Wastewater Treatment at Fleming College are working with Murrenhil Corporation to test their product, a specialized laminate film, called the ROC Barrier, that corrals and contains oil in open water.

Not only does the barrier contain the oil, it does so economically and with great speed. The barrier can be deployed using any sized watercraft, at speeds in excess of 57 km/hr, preventing oil from contaminating shorelines and sensitive wetlands. It's also portable – a standard 1,000-foot roll of product is only six inches in diameter and requires one-twentieth of the storage space required by similar materials currently used in the oil spill control industry. In addition to its compact storage capability, the film is capable of absorbing the spilled oil it is intended to contain.

While the barrier could revolutionize marine emergency spill response, it could also be used on small and large scales to contain damage to marine environments all over the world. With Fleming's help, the company plans to start developing the next generation of the barrier and get it to market for anyone's use. This project was funded by the FedDev Ontario Applied Research and Commercialization Initiative.



## Developing Forest Carbon Management Tools

BRITISH COLUMBIA: SELKIRK COLLEGE

Selkirk College was awarded a CCI Innovation Enhancement grant to address forest carbon management opportunities in partnership with local businesses. The grant has enhanced the profile of the College within the forestry and technology business sectors.

This project achieved a number of important milestones, including: creating a decision-support collaborative steering committee, carrying out a user needs survey, holding an internationally-attended conference, developing proof of concept web-based decision support tools, starting an forest carbon offset project, and creating a web portal to share this information with businesses considering forest carbon management options.



*“Our partnerships with SMEs, non-governmental organizations (NGOs), and local public sector groups enabled us to reach a wide range of people. Forest Carbon Management, what it means, its context in the province and country, and how to get started on an offset project are poorly understood.”*

*“This grant has changed the way our faculty think about options for sustainably managing landscapes, and in turn, these options, or tools, are passed on to our students who become engaged in the carbon monitoring work. By having more trained professionals available for business community interaction, we will greatly increase the extension of these tools in the local market sector as it starts to grow. We also believe that it is important to tie our R&D in this developing market area to other entities (e.g., NGOs, rural development, and technology institutes) that can leverage community awareness and interest.”*

– Dr. Brendan Wilson, Principal Investigator



## The Green Building Centre Project

ONTARIO: GEORGE BROWN COLLEGE

The Green Building Centre Project is the next step in allowing Canada to take its place as a world-class driver of innovative research in sustainability and green technology. The project is located at the Centre for Construction and Engineering Technologies on the Casa Loma campus of George Brown College. The Centre conducts applied research in partnership with local businesses while training students in advanced construction systems, green energy and computer-enabled, efficient buildings.

Key research activities focus on construction practices that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition. The Green Building Centre Project, funded by the FedDev Ontario Prosperity Initiative, leverages Canada's research and education capacity to deliver a new generation of highly skilled, technology-savvy graduates ready to advance the entrepreneurial and competitive edge in national and international markets.



## ACCC Member Colleges and Institutes

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Douglas College  
University of the Fraser Valley  
Justice Institute of British Columbia  
Kwantlen Polytechnic University  
Langara College  
College of New Caledonia  
Native Education College  
Nicola Valley Institute of Technology  
North Island College  
Northern Lights College  
Northwest Community College  
Okanagan College  
College of the Rockies  
Selkirk College  
Vancouver Community College  
Vancouver Island University

### Yukon

Yukon College

### Alberta

Bow Valley College  
Grande Prairie Regional College  
Grant MacEwan University  
Keyano College  
Lakeland College  
Lethbridge College  
Medicine Hat College  
NorQuest College  
Northern Alberta Institute of Technology  
Northern Lakes College  
Olds College  
Portage College  
Red Deer College

### Northwest Territories

Aurora College

### Manitoba

Assiniboine Community College  
University College of the North  
Red River College  
École technique et professionnelle, Université de Saint-Boniface  
Winnipeg Technical College

### Nunavut

Nunavut Arctic College

### Saskatchewan

Carlton Trail Regional College  
Cumberland Regional College  
Great Plains College  
North West Regional College  
Northlands College  
Parkland College  
Saskatchewan Indian Institute of Technologies  
Saskatchewan Institute of Applied Science and Technology  
Southeast Regional College

### Ontario

Algonquin College  
Collège Boréal  
Cambrian College  
Canadore College  
Centennial College  
La Cité collégiale  
Conestoga College Institute of Technology & Advanced Learning  
Confederation College  
Durham College  
Fanshawe College  
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Mohawk College  
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Université de Guelph, Campus d'Alfred  
University of Guelph, Kemptville Campus

### Quebec

Cégep de l'Abitibi-Témiscamingue  
Collège Ahuntsic  
Cégep André-Laurendeau  
Cégep de Baie-Comeau  
Cégep Beauce-Appalaches  
Champlain Regional College  
Cégep de Chicoutimi  
Dawson College  
Cégep de Drummondville

Collège Édouard-Montpetit  
Cégep Garneau  
Cégep de la Gaspésie et des Îles  
Collège Gérald-Godin  
Heritage College  
Institut de technologie agroalimentaire  
Cégep John Abbott College  
Cégep de Jonquière  
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Collège Lionel-Groulx  
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Cégep de Sept-Îles  
Collège Shawinigan  
Cégep de Sherbrooke  
Cégep de Trois-Rivières  
Vanier College  
Cégep de Victoriaville  
Cégep du Vieux-Québec

### New Brunswick

New Brunswick College of Craft and Design  
New Brunswick Community College  
Collège Communautaire du Nouveau-Brunswick

### Newfoundland and Labrador

College of the North Atlantic  
Marine Institute  
Centre for Nursing Studies

### Nova Scotia

Cape Breton University  
Canadian Coast Guard College  
Dalhousie Agricultural Campus of Dalhousie University  
Nova Scotia Community College  
Université Sainte-Anne - Collège de l'Acadie

### Prince Edward Island

Holland College  
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