

Applied Research Comes of Age

Pleins Feux sur la Recherche Appliquée

November 2018
Novembre 2018

Brought to you by RE\$EARCH MONEY & Colleges and Institutes Canada
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FROM RESEARCH MONEY



Research Money is delighted to be partnering with **Colleges and Institutes Canada** to showcase the great work that CICan members are doing in applied research.

The work-related learning that colleges and institutes provide their students is invaluable for both student and company. Students help solve problems for the firm's customers and gain real-world experience that stands them in good stead for future employment.

We look forward to highlighting more of these important efforts to strengthen Canada's innovation economy.

A handwritten signature in black ink.

JEFFREY CRELINSTEN

Publisher & CEO
RE\$EARCH MONEY

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FROM

COLLEGES AND INSTITUTES CANADA



Over the past decade or so, Canadian colleges and institutes have emerged as true champions of innovation. Their practical approach to problem solving based on applied research has made them go-to partners for countless companies, big and small, looking for support to improve products, processes, and services. This was achieved with support from the federal government, matched nearly dollar for dollar by each private and not-for-profit partner. Now, in order to grow their capacity and increase the impact they have in their communities, colleges and institutes require access to stable research support funding.

Budget 2018's significant investment of \$140 million over five years for the College and Community Innovation Program (CCIP) recognized the distinct role that colleges and institutes play in the innovation ecosystem. It was greeted with enthusiasm by CICan members across the country and will go a long way to support new research partnerships. However, Budget 2018 also exposed an important gap in federal support that now constitutes the single biggest obstacle to building a sustainable applied research enterprise in colleges and institutes. Unlike other tri-agency programs, the CCIP is not eligible for the Research Support Fund (RSF), despite permitting a portion of the grants to be used to cover overhead and administrative costs.

For a more robust applied research enterprise at colleges and institutes, foundational funding is needed to identify research opportunities with prospective partners, build and maintain research capacity among faculty and students, and maintain a reliable research environment comprised of policies, procedures and state-of-the-art facilities. To realize this goal, colleges and institutes are calling for a new annual investment of \$40M in research support funding. This would

allow them to shift from a project-to-project planning horizon to focus on the longer-term. Applied research offices could then invest with confidence in their unique ability to draw new actors into regional innovation systems, particularly SMEs, young entrepreneurs and start-ups, and facilitate commercialization connections to other research players, such as universities and government labs.

Colleges and Institutes Canada has been working hard to support the growth of applied research at colleges and institutes, organizing symposiums that encourage the sharing of best practices and offering professional and leadership development opportunities for research leads.

We have witnessed a growing appetite to expand the research capacity of our institutions, not only from our members, but also from thousands of private and not-for-profit partners, as well as from students who see the chance to work on an applied research project as one of the best forms of work-integrated learning.

Last year alone, colleges and institutes led over 7,300 research partnerships that developed more than 1400 prototypes, 700 products, 500 processes, and 350 services. This helped drive Canadian innovation in a variety of sectors crucial to the Canadian economy. Just imagine what can be accomplished with sustained research support funding.

A handwritten signature in black ink that reads "Denise Amyot".

DENISE AMYOT

*President & CEO
Colleges and Institutes Canada*



Votre partenaire au cœur de l'innovation!
Your partner at the heart of innovation!

Contactez-nous / Contact Us

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Los Cabos Drumsticks and CCNB-INNOV, a fantastic partnership!

A great partnership between a company from Hanwell, New Brunswick, and CCNB-INNOV, the applied research network of the Collège communautaire du Nouveau-Brunswick (CCNB) which is set up to simultaneously run multiple projects from different industrial sectors, is contributing to *Los Cabos Drumsticks*' success on the world stage.

Los Cabos Drumsticks is a family-owned business that has been making drumsticks for almost 14 years. A few years ago, they were searching for a way to increase productivity. They invested in an early prototype machine, but it turned out that the machine was not of industrial quality. Problems appeared shortly after it was commissioned and there was little if any support provided thereafter, which turned out into extra-unforeseen costs and losses to *Los Cabos Drumsticks*.

With a little bit of research, the president of the company, Larry Guay, found CCNB-INNOV's Advanced Manufacturing and Welding division located in Bathurst, New Brunswick. Their experts provide several service in industrial and manufacturing processes diagnostics, advanced prototyping, automation, robotics, industry 4.0 diagnostics, system integration as well as metallurgy and welding engineering.

"We had a problem. We wanted a machine to print our logo, weigh our sticks and read their pitch. It's a very complex process. But it needed to be done, because we wanted to increase our productivity and always wanted only perfect pairs", said Mr. Guay. It was not an easy task, but the



With the help of CCNB-INNOV, *Los Cabos Drumsticks* was able to increase production by 60 to 65 %.

CCNB-INNOV team delivered a great machine two years ago, that gets the job done. The machine took roughly eight months to design and build.

"We did increase production by 60 to 65 %. CCNB-INNOV is great for small businesses, because we do not have engineers on staff. They were able to help us tremendously. That machine is the backbone of our business and we could not live without it. Before, we had to do everything by hand. It was labor intensive and it was a boring job. That machine was a breath of fresh air to our business!" said Mr. Guay.

The machine is worth around \$250 000, funded partially by government grants, and takes a room of 20x40 feet.

"We have businesses in New Brunswick that like to innovate and we sure can

help them do so. The owners of *Los Cabos Drumsticks* are really dynamic and it was a perfect match for us", said Dr. Sylvain Poirier, Executive Director of CCNB-INNOV.

Los Cabos drumsticks are distributed in 28 countries and are played by many well-known artists like Mike Sleath, drummer for Shawn Mendes, and Ben Bradley, drummer for Brett Kissel.

"It's very comforting that a team like CCNB-INNOV can help a family business like ours. They build a very reliable and sturdy machine. Hats off to Sylvain Poirier, his Advanced Manufacturing and Welding team, as well as CCNB. He is an excellent negotiator and when he got involved, the pieces of the puzzle started to fall in place. He gave us a lot of confidence", admitted Mr. Guay.

Humber College is taking a bold step to help shape the future of industry in Canada

Humber College's groundbreaking Barrett Centre for Technology Innovation (Barrett CTI), which is expected to open in early 2019, will pioneer new solutions to technological and innovation challenges in advanced manufacturing and Industry 4.0. The centre, which is located at Humber's North Campus in Toronto, will allow industry to work with faculty and students to drive adoption of new technologies Canadian companies need to succeed in a rapidly changing economy.

The Barrett CTI will be a hub for developing strategies for industry to work with the postsecondary education system.

Once complete, the five-storey, 93,000 square-foot space will feature a state-of-the-art data centre, cyber-physical factory, automated guided vehicles, prototyping labs, makerspaces, interactive technology zones and digital media studios.

In 2016, Humber received the largest donation in its history from the Barrett Family Foundation, which enabled the college to start work on the Barrett CTI. The federal government also provided funding through its Post-Secondary Institutions Strategic Investment Fund.

"Working with Humber is a natural fit," said Robert Barrett, president and CEO of Polytainers Inc. and co-founder of The Barrett Family Foundation. "Our organizations have many shared values and we're both committed to providing students with an education that will lead to

meaningful jobs. We look forward to enhancing students' experience and interaction with technology."

The college's vision is resonating with industry who are providing significant resources to support the initiative. As of early October, five-year agreements have been signed with Cimetrix, Cisco Canada, Festo Didactic, SEW-EURODRIVE, DMG MORI Canada Inc., Kuka Canada and Rockwell Automation, to form Humber's Advanced Manufacturing Skills Consortium. More partnerships are being formed as word gets out.

The Cisco Canada initiative will engage students, faculty and companies in maximizing the opportunities presented by cyber, network communication and collaborative digital technologies.

Cisco will provide more than \$4 million of equipment and infrastructure to help build and support Humber's applied research network.

Festo's partnership addresses the skills gap between industry needs and educational programming. Students and employees of advanced manufacturing companies will receive hands-on training to learn the Industry 4.0 skills necessary to succeed in an evolving economy.



The Barrett Centre for Technology Innovation is slated for completion in early 2019. Rendering of the completed Barrett CTI (first), construction progress as of August 2018 (second).

SEW-EURODRIVE will work with Humber to provide leadership in automated guided vehicles, with an agreement designed to provide training and applied research opportunities.

The DMG MORI collaboration will focus initially on industry 4.0 enabled 5 axis CNC technology (vital to automotive and aerospace manufacturing), and broaden to support outreach initiatives related to education in science, technology, engineering and mathematics.

The KUKA Canada partnership focuses on bringing to Humber the latest in industrial robotics technology and working on robotics systems integration applications. Humber will receive two state-of-the-art robots.

Another exciting agreement is with Rockwell Automation. It will address skills gaps in the advanced manufacturing sector and equip students for careers of the future.

Last, but not least, Cimetrix will bring the consortium leadership in additive manufacturing technology.

*For more information, please contact:
askbarrettcti@humber.ca*

Celebrating 15 years of innovation at Red River College

RESEARCH PARTNERSHIPS & INNOVATION AT RED RIVER COLLEGE (RRC)

is helping students, researchers and industry create award-winning results that build our communities and enhance our prosperity here in Manitoba and around the world.

Red River College is working with industry to drive innovation:

- Green public transit – developing four battery-operated transit buses that are now in daily service in Winnipeg and reducing greenhouse gases by 160 tonnes per year.
- New food products – working with more than 40 food and agricultural producers to bring new foods to market such as a hemp macaroon and fava bean flour.
- Clean water – using cattails and floating bio-platforms to tackle an overabundance of algae in Lake Winnipeg, one of the largest freshwater lakes in the world.
- Healthy children – integrating RRC's leading Science of Early Child Development curriculum into more than 40 countries across the globe.
- Energy efficient buildings – testing air-tightness for over 50 large commercial and industrial facilities, resulting in a new construction standard, and a process for identifying building defects and corresponding renovations.
- Winter-proofed cars – converting Toyota Prius cars to plug-in hybrid electric vehicles and ensuring high performance in cold weather, including on the streets of Churchill, Manitoba.
- LEEDing by example – collaborating on Manitoba Hydro's state-of-the-art HQ, one of the most energy-efficient office towers in North America.
- Less food waste – finding creative uses for agricultural by-products such as converting spent grain from local microbreweries into a tasty, multi-purpose miso paste.
- Fewer chemicals on our roads – working with Cypher Environmental to create Dust Stop® Municipal Blend, an environmentally-friendly product that eliminates dust from unpaved roads.
- Aerospace and manufacturing – establishing five major state-of-the-art facilities worth in excess of \$30M to support innovation, technology evaluation and development, applied research, and industry and student training programs.

These efforts will continue to grow with RRC's new \$95-million Innovation Centre, now under construction. The Innovation Centre will be the latest addition to RRC's cutting-edge student learning, research and technology labs, which include:

- MotiveLab – a vehicle test facility with a climatic chamber that can reach temperature highs of +50 C or lows of -40 C, no matter the outdoor temperature.
- Culinary Research Centre – a culinary idea and innovation lab, now under construction, that will enable researchers, faculty and students to collaborate with the food and agriculture industry on the creation of new products and services.
- Building Envelope Technology Access Centre – serving the construction sector by improving the energy efficiency of new and existing commercial buildings.
- Smart Factory – an applied research space that combines emerging technologies and builds on RRC's Technology Access Centre for Aerospace and Manufacturing.
- Technology Access Centre for Aerospace and Manufacturing – serving the aerospace and manufacturing sectors by providing access to new and emerging technologies, applied research expertise and specialized training.
- Industrial Campuses – Centre for Aerospace Technology and Training and Centre for Non-Destructive Inspection – unique facilities serving regional innovation needs.
- Vehicle Technology & Energy Centre – driving applied research in vehicle technology and development; supporting the transportation industry on energy conservation and alternatives (i.e. electrification), cold-weather testing and technology integration.

For more information, please visit rrc.ca/research



Laurel Thompson, Crop Research Scientist

Lakeland College began small-plot crop research nearly 3 years ago. In year 1 (2016), the program launched by growing 300 plots for two partner organizations. By 2018 (year 3), the crop research program had grown to accommodate 1500 plots with more than ten partner organizations. The current research is a mixture of Lakeland-led projects and collaborative projects with organizations such as the University of Alberta, Alberta Agriculture, producer organizations, and private industry.

The crop research program has reached capacity in every year of operation and continues to grow in personnel, equipment, and land use to meet the increasing demand for public and private commissioned small-plot research.

Having rigorous research representation in the Vermilion region is important for two reasons. Lakeland's crop research scientist, Laurel Thompson, explains: "We know that agronomic and varietal performance really depends on environment. Growers in this region

Filling a void: Crop research in the North East Alberta Highway 16 Corridor



need to have pertinent data available on which to base high value on-farm decisions. They also need to have access to extension and learning events such as field days in their back yard".

Dr. Sheri Strydhorst, research scientist with Alberta Agriculture and Forestry, adds, "There is a huge collaborative benefit for working together with Laurel. She is in an environment that has unique soil conditions, unique environmental conditions, and when we combine her research with ours we get a really good picture of what is happening in diverse environments".

A pertinent example of regionally applicable research that the College

is delivering is the Regional Variety Trials. These trials are performed by a network of research organizations across the province to provide farmers and industry with variety selection information, culminating in the annual Varieties of Cereal and Oilseed Crops for Alberta and Varieties of Pulse Crops for Alberta, both published by Alberta Agriculture and Forestry. The 2018 field season was the second year that the College grew these trials as part of the provincial network, which tests individual varieties of wheat, barley, oat, triticale, peas, faba beans, soybeans, and lentils. Over 100 varieties were trialed and shown to producers in the field, giving important representation of variety performance in the region.



Dustin Babij - Crop Research Technician

Lakeland College is well positioned to respond to this need for agronomic and varietal crop research. In addition to filling a geographic void, the College is also well connected to a network of alumni who are now farming or working in the agriculture industry. As Thompson explains, “Our extension messages reach further and have a significant impact because the College is so connected at the farm- and industry-level through our students and alumni”.

The crop research program has focused on cereal and pulse crop research from 2016 to 2018. Future plans include expanding the program to include canola/oilseed and ag technology research.”



NORTHERN STUDENTS TO TAKE PART IN SATELLITE CONSTRUCTION AND LAUNCH

Students from Aurora College, working with Yukon College and the University of Alberta through the Aurora Research Institute (ARI), will team up to design and construct three miniature satellites, or CubeSats, with a grant of \$250,000 each over 4 years from the Canadian Space Agency (CSA). This partnership is one of 15 college and university collaborations building tiny satellites that are inexpensive, lightweight, easy to launch into orbit, and better for the environment upon re-entry.

Launched in April 2017 by the CSA, The Canadian CubeSat Project (CCP) offers post-secondary institutions the opportunity to engage students in STEM, particularly in space domains, develop their expertise, and give students hands-on experience through applied research to prepare them for a competitive job market.

While each set of college and university partners has different goals for their projects, in this case, the project was designed to reflect both scientific and cultural/artistic aspects. The primary objectives of the project will include conducting research and gathering data from the CubeSat on earth's upper atmosphere, and sharing and transmitting northern art, games, and stories in Indigenous languages to amateur radios across Canada.

Speaking from his office in Inuvik, Northwest Territories, ARI's Manager, Technology Development and principal researcher on the project, Matthew Dares explained that the scope of the project allows for students interested in both technical and artistic aspects to be involved.

Dares hopes gathering the region's unique art, history, culture, and stories to transmit from the CubeSat will engage and inspire the community while also providing others with meaningful information about the north.

STUDENTS FROM AURORA COLLEGE AND YUKON COLLEGE WILL SOON BE INVOLVED IN THE DESIGN, CONSTRUCTION, AND LAUNCH OF MINIATURE SATELLITES INTO ORBIT AROUND THE EARTH.

This partnership is currently in the Mission Concept Review and outreach phase of the project; they launch from the International Space Station (ISS) in August 2021.

Harnessing the power of data to enhance business competitiveness and productivity

Seneca has established its Data Analytics Research Centre to help partners translate data into powerful tools to enhance business competitiveness and productivity.

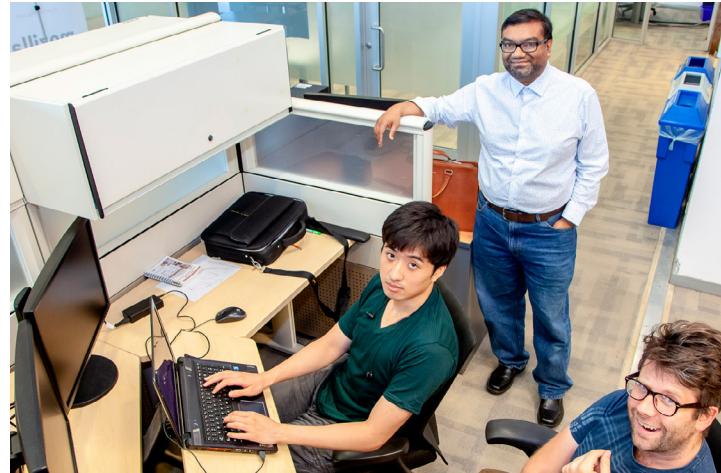
As one of Canada's largest, comprehensive colleges, Seneca's cross-disciplinary research expertise in technology, business and design enables Seneca researchers to provide solutions to business and technical challenges in all areas of data analytics, including data engineering, data modelling and analysis, and data visualization.

For example, Toronto-based Clausehound, a legal-tech company with a disruptive, web-based platform that effectively and efficiently finds and resolves problems during contract drafting and negotiation, identified an opportunity to significantly improve its technology. The Clausehound platform is driven by natural language processing techniques, which find, match and compare text. Clausehound turned to Seneca to access specialized expertise to increase the accuracy of text extraction and retrieval, as well as matching speed, from their existing document library.

"Accessing Seneca's deep expertise in machine learning and natural language processing has been invaluable to us in achieving high levels of accuracy and speed of language and text processing, matching, extraction and retrieval, as we develop and optimize our platform, and grow as a business," said Rajah Lehal, CEO of Clausehound.

In addition to natural language processing and machine learning, researchers at the Data Analytics Research Centre have broad expertise in deep learning, artificial intelligence, data science, data security and data presentation, and can address challenges ranging from exploratory data analysis to predictive, descriptive and prescriptive analytics. As the only college member of SOSCIP, Canada's advanced computing R&D consortium, Seneca researchers have ready access to high-performance computing infrastructure and technical expertise. Seneca also brings unique sector-specific knowledge to collaborations, in areas including health, technology and aviation, amongst others.

All applied research projects are conducted by students, under the guidance, supervision and mentorship of expert faculty, and in collaboration with business partners. Seneca's academic programs, including diplomas, degrees and graduate certificates support research partnerships, including bachelor's degree programs in Information and Security, Software Development, Technology Management, and Data Science and Analytics, as well as diplomas in Interactive Media and Graphic Design, and Fintech and Business Analytics Graduate Certificates.



Pictured from left to right, Seneca student research assistant Thomas Luu, Seneca Principal Investigator Dr. Tanvir Alam and Joshua Koudys from industry partner Clausehound.

In 2019, the Data Analytics Research Centre will move to Seneca's new, \$85M Centre for Innovation, Technology and Entrepreneurship located in Toronto, Ontario, bringing applied research, commercialization, specialized training and entrepreneurial activities under one roof. The Data Analytics Research Centre will have dedicated space for student and faculty researchers to collaborate with industry partners.

From main street businesses looking to improve decision-making processes, to disruptive technology companies looking to collaborate on R&D initiatives to develop and advance their emerging technology platforms, Seneca's Data Analytics Research Centre is here to help partners realize their business goals.

To learn more about collaborating with Seneca, please contact arie@senecacollege.ca

Closing the gap between education, clinical practice and research at The Michener Institute of Education at UHN

In early 2016, The Michener Institute of Applied Health Sciences integrated with University Health Network (UHN), which encompasses four Toronto teaching hospitals. This idea of a school for health sciences within a hospital system is a first for Canada.

But it was a homecoming of sorts. Sixty years ago, a young PhD biochemist named Diana Michener started a medical laboratory science program in the basement of the Toronto General Hospital as a way to create best patient outcomes by standardizing practices and teaching protocols for hospitals. Today, the Michener Institute of Education at UHN includes not just the school of applied health sciences that evolved from Dr. Diana Michener-Schatz's original design, but all education activity across UHN's extended hospital network. This new model of education, led by Dr. Brian Hodges, Executive Vice President of Education and Chief Medical Officer at UHN, seeks to close the gap between education, clinical practice and research by bringing learners, educators and researchers together in physical and virtual spaces, aligned around authentic problems and opportunities facing health care today.

To further close the gap between education, practice and research, Michener has launched a new **Research Institute of Health Care Education**. Increasingly, the



intentional use and creation of knowledge and innovations to advance practice and improve patient experience and the health system are emerging as shared expectations across all professions. Quality improvement, research and innovation are emerging as essential competencies of health professionals. It is important that colleges and institutes step into this opportunity and responsibility to prepare today's learners for tomorrow's workplace; and, to find innovative ways for health care workers to continually learn and adapt to the changes imposed by influences such as automation and artificial intelligence. In a time of rapid technological and social innovation, it is paramount that we connect, collaborate and innovate

across sectors, locally and globally, for the purpose of designing solutions to the pressing and complex issues facing education and health care. The new Research Institute of Health Care Education invites you to collaborate with us to help build capacity and transform the way we think, learn and innovate today and in the future.

To find out more about how to get involved with the Research Institute of Health Care Education and the Michener Institute of Education at UHN, please visit <https://michener.ca/research-institute/> and www.michener.ca.



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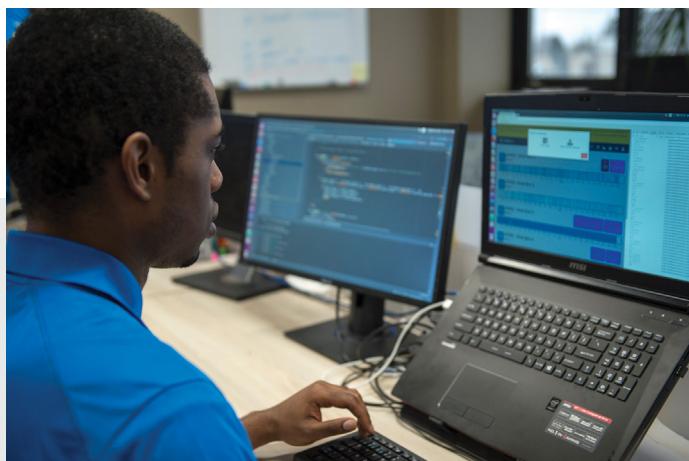
Fanshawe's Centre for Research and Innovation (CRI) serves as the central point of liaison for industry, business, and community groups wishing to connect with Fanshawe researchers to develop new and innovative research projects or programs. We provide many services including assistance from proposal development through to the funding application and project administration.

Engaging our partners:

Fanshawe engages in many forms of research including applied, creative, scholarship and community based. We facilitate projects in areas such as technology, the arts, humanities, social sciences and health.

We work with partners in a variety of ways:

- Curriculum integrated projects
- Capstone collaborations
- Externally-funded collaborations
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www.fanshawec.ca/research

Students develop online repository of solutions to food insecurity



Georgian College Human Services and Community Safety students tackle tough social challenges in the Community

Impact Lab in Orillia, Ontario. They work with local non-profits and community partners to develop solutions to issues like homelessness and youth disengagement.

Most recently, students tackled the issue of food insecurity through a project called #NOURISH. They worked with non-profits to examine the issue through the lens of their clients and ideated possible solutions.

Their work resulted in starvethestigma.ca, a collection of ideas and initiatives that individuals and organizations can pilot or adapt in their own communities.

Included in the repository are eight projects completed by the students. Among them, a pre-school social story kit, digital food map, and an ethnic food wayfinding system. The students shared these projects at Research, Scholarship and Innovation Day – an annual event held each spring at the college to celebrate the work of students and staff.

“The goal of the repository is to start local and regional conversations about

food insecurity and to inspire people to take action,” says Nicole Norris, one of the instructors who oversaw the project. “You can adapt a project, mash up a few or share what you’re

adds Nicole. “Our hope is to effect positive change through these kinds of projects, and innovative research and curriculum.”



doing to starve the stigma in your own community.”

This year, students will focus their efforts on social isolation.

“Our goal is to produce grads who are changemakers, able to use social entrepreneurial skills to transform their workplaces and communities,”

Georgian is Canada’s first and only changemaker college, designated by Ashoka U. Learn more about what students are up to at GeorgianCollege.ca/changemaker.

THE CEGEP DE VICTORIAVILLE TACKLES FOOD SECURITY, SUSTAINABLE DEVELOPMENT, AND AGRICULTURAL TECHNOLOGY THROUGH SOCIAL INNOVATION APPLIED **RESEARCH**

In Chisasibi, on the eastern shore of James Bay, one of the applied research projects CISA has been working on involves developing innovative solutions food security issues in the region.

With partners including the Chisasibi Business Service Center and the Cree Council of Health and Social Services of James Bay, the project looks to capture traditional Indigenous knowledge as it relates to food supply and find the best method of preserving and proliferating the often-intangible cultural heritage in order to support sustainable and culturally appropriate food systems in the region.

CISA's agricultural social innovation focus extends to working with Gesterra, a company specializing in global management of waste materials, on a project to evaluate the social, environmental, and economic impacts of using composted materials in areas such as municipal landscape design and urban agriculture.

Another of CISA's recently wrapped-up projects involved the development of a navigation system for a self-driving off-road agricultural vehicle.

One of 59 College Centres for the Transfer of Technology (CCTT)

designated by the Quebec Ministry of Higher Education, CISA is an example of the type of facility that allows colleges and institutes to spearhead innovative research that benefits both industry and society.

Government of Canada investments in education infrastructure through the Post-Secondary Institutions Strategic Investment Fund (SIF)

Agriculture and Local Farming (CETAB).

The need for cutting edge infrastructure is only increasing, but if we see additional support in future federal budgets, colleges and institutes will have the capacity to tackle more challenges and expand the impact of their innovative solutions.

**AT THE CENTRE FOR SOCIAL INNOVATION
IN AGRICULTURE (CISA) AT THE CEGEP
DE VICTORIAVILLE, STUDENTS, STAFF,
AND FACULTY WORK WITH INDUSTRY AND
COMMUNITY PARTNERS TO FIND PRACTICAL
SOLUTIONS VIA APPLIED RESEARCH FOR THE
AGRIFOOD INDUSTRY THAT BENEFIT SOCIETY.**

have supported a large number of college and institute applied research facilities across the country, including the Cegep de Victoriaville who, last year, received \$4.28M for the cegep's Centre of Expertise and Knowledge Transfer in Organic

Research project provides energy efficiencies for mill and leading-edge skills for Georgian grad

Samuel Cooney, recent graduate of the [Mechanical Engineering Technology](#) program at Georgian College in Barrie, Ontario, is wrapping up a research project that's impacting how a saw-mill in cottage country operates.

He began the project as a student through an eight-month co-op with Georgian's Department of Research and Innovation Cooney teamed up with faculty lead Dan Brooks and Research Analyst student Alec Dare on an extensive review of [Rayonier Advanced Material's](#) (RYAM) primary band saw operations in Huntsville.

The goal was to improve the mill's cost base, product quality and energy efficiency.

Brooks oversaw the project and lent his technical expertise, Dare crunched numbers and provided complex data analysis, and Cooney conducted a large portion of the research.

Robert Kelly, a professor in Engineering and Environmental Technology, also provided guidance on the project.

"Our work has resulted in multiple recommendations that could help the company increase quality, improve yield, and decrease energy consumption at their mill," Cooney says. "It was pretty neat to do research that can have a direct impact not only on a business but the environment."

The project was tackled in two phases — the first, evaluating the

mill's debarking process to ensure optimization in cold weather. De-barking quality decreases as temperatures dip in colder months. Cooney and the team made recommendations on how to enhance the quality of de-barked logs for processing and the wood chips sold to pulp mills.

The second phase focused on improving energy efficiency of the bandsaw and angle of its teeth. Cooney was heavily involved in this phase and redesign of the blade. He used several sophisticated analytical and design techniques to optimize the blade geometry, such as [Finite Element Analysis](#) and computerized simulation.

Cooney says a large portion of the research project dealt with topics and areas of study he hadn't yet covered in any of his courses.

"It really gave me an edge," he notes. "I learned a lot about the field but also tips and tricks on process improvement, and best practices for conducting and validating tests and research. I think one of the biggest things that helped was the presentation skills Dan taught me."

Thanks to the team's recommendations, RYAM's head office is ex-



Samuel Cooney

ploring the opportunity to roll out the project at multiple sites. They also intend to hire more of Georgian's co-op students.

"It was really satisfying to see the synergies among needs of the company, the learning outcomes for Sam, the ability for CARI to facilitate funding contributions from various sources, and RYAM's interest in future co-ops," states Brooks. "The technical success of the project is a great testament to the quality of our curriculum and calibre of our graduates."



Southern Ontario Network for Advanced Manufacturing Innovation

We are a network of top colleges and universities dedicated to serving the manufacturing industry

SONAMI is making an impact on industry in Southern Ontario. Thanks to funding from the Federal Economic Development Agency for Southern Ontario, 103 companies have worked with our 7 institutions on 129 projects, developing 336 prototypes.

At the same time, 164 students, research leads and faculty have gained current advanced manufacturing experience.

SONAMI has created 160 jobs and 78 products have been commercialized.



Post-secondary institutions in partnership with industry = IMPACT



Sheridan

For more information, visit:
ncinnovation.ca/sonami

Funding support provided by:

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Saskatchewan Polytechnic's Digital Integration Centre of Excellence (DICE) is getting ready to help industry partners across Canada conquer the digital world of the future and take on the challenge of the Internet of Things (IoT). With extensive capacity to partner with industry to conduct applied research involving digital technology and big data, Sask Polytech aims to lead the way when it comes to applying

Saskatchewan Polytechnic is open for business

scientific advancements to meet changing industry needs.

For the mining industry in particular, DICE is exploring cutting-edge technology that will change the way mining happens in Saskatchewan and across Canada. Advanced sensor technology that paves the way for autonomous mining machines is being combined with the capability of the IoT to provide access to decision making-data.

The result has the capacity to maximize operational assets while lowering maintenance costs, bringing the mine of the future closer to reality.

As a hub of research and learning, Sask Polytech's DICE is a centre with

experienced professionals who are ready to help with all aspects of IoT and big data.

From mining and smart construction to wellness and food security, we can help our partners apply the technology of the future today.

Do you have a research idea, prototype or project you'd like to explore with Sask Polytech?

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Advancing water technologies at Fleming College

Fleming College and nine Ontario universities make up the academic partners of the Southern Ontario Water Consortium (SOWC). Since 2016, with support from the Federal Economic Development Agency for Southern Ontario, the SOWC's Advancing Water Technologies program has funded 13 college-industry water technology development projects at Fleming College, valued at \$2M.

"The collaborative research we've done in the program has meant successes for our industry partners and for us" said Dr. Barbara Siembida-Losch, the Manager and Senior Scientist for the college's [Centre for Advancement of Water and Wastewater Technologies](#) (CAWT) "Some of the technologies are quite innovative, so we've all

learned a lot. We are excited to see our partners achieving their goals."

The goal of several of the CAWT's industry partners, such as UV Pure, was to take their nearly commercial-ready technology to the validation stage. "The focused product development and validation program that we have implemented with support from CAWT and SOWC are enabling us to meet our business and sales goals," said Kevin Loiselle, Chairman of UV Pure's Board of Directors. "For an Ontario water technology company to achieve this level of globally-recognized performance validation at home is hugely valuable."

Founded in 2002, Fleming College's CAWT is ISO/IEC 17025 accredited and provides the water sector with



applied research services that include technology development, piloting and demonstration, laboratory analysis, validation, verification, and certification. Thanks to funding from NSERC, the CAWT is also a designated Technology Access Centre.



Our lab is now open!

NBDC's containment level II laboratory has been expanded and updated with state-of-the-art equipment:

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#1 in Canada
for Applied
Research*



Lambton College is a national leader in Applied Research & Innovation

OVER 200 PROJECTS IN 2017

The Applied Research, Entrepreneurship & Innovation department at Lambton College specializes in working with small to medium sized businesses (SMEs) as well as organizations through a strong network of research partners, offering high quality labs, facilities and an exceptional research team that suit a multitude of research projects.

*Based on Research Infosource Inc. annual list of Canada's Top 50 Research Colleges 2018

VIU's Canada research chair focused on "future proofing" shellfish

Climate change is one of the biggest threats to shellfish populations and sustainable shellfish farming in Canada and worldwide. In British Columbia, ocean acidification caused by climate change is recognized as a key threat. That's one reason why Dr. Timothy Green, Vancouver Island University's new Canada Research Chair in Shellfish Health and Genomics, will be researching whether Pacific oysters possess the evolutionary capacity to adapt to a rapid pace of ocean change.

An internationally recognized aquaculture expert with a strong emphasis on aquatic animal health and immunology, Green aims to help "future-proof" the international shellfish industry by researching ways to make shellfish more resilient to climate change and the diseases that are linked to it. He just received a Natural Sciences and Engineering Research Council (NSERC) of Canada grant to help pursue this research.

As VIU's Canada Research Chair, Green's project will specifically quantify genetic and epigenetic (a biological mechanism that switches genes on and off) changes that occur in both oysters adapting to ocean acidification, and disease-tolerant shellfish.

"His research is investigating how shellfish evolve to new conditions in the environment – such as climate change," says Dr. Daniela Fischer Russell, Associate Dean, Science and Technology. "In his role at VIU, he will be focusing on a new area – whether or not shellfish are genetically able to meet the challenges

or changes brought on by the rapid pace of climate change."

Disease caused by viruses is the biggest threat to global production of food from aquaculture. New viruses are emerging in the environment due to climate change, expansion of aquaculture, and increasing international trade and shipping. The evidence to support this is found in incidences of a new herpesvirus killing billions of oysters and causing considerable socio-economic losses in Europe, Asia and Australia.

Green has already delved deep into research based on addressing how to "disease-proof" oysters against herpesvirus infection. Through his research Green discovered a way to "vaccinate" oysters, as well as the offspring of "vaccinated" individuals, so they are less susceptible to this disease.

"This discovery has the capacity to revolutionize oyster farming worldwide," says Green. "An individual oyster can produce millions of offspring, so aquaculture hatcheries only have to treat a few oysters to produce millions of disease-resistant oyster larvae. I'm looking forward to expanding my research to develop new technologies for breeding shellfish resilient to ocean change and disease."



Green will be based in VIU's Centre for Shellfish Research and the Deep Bay Marine Field Station, which are focused on supporting interdisciplinary research in sustainable shellfish production to strengthen BC's shellfish industry in a way that is compatible with the social and cultural values of coastal communities.

"Vancouver Island University provides one of the best environments for this type of research in Canada," says Green. "The success of VIU in the discipline of aquaculture and shellfish research stems from the University's commitment to state-of-the-art infrastructure, including the Centre for Shellfish Research and Deep Bay Marine Field Station".



Gail Bowkett

By Gail Bowkett

In spring 2018, the Government of Canada announced support for work-integrated-learning opportunities for college students. Mitacs, a not-for-profit organization that has run successful industry research internships for almost 20 years, expanded their program to support students from colleges and polytechnics.

High-quality internship opportunities provide obvious advantages for

Why college research internships make good sense for Canada

students. They gain work experience and develop valuable skills they'll need in their careers.

For businesses, these interns offer applied research expertise that advances R&D at a time when Canadian companies face shortages of research talent. College and polytechnic students provide an essential pool of more than 700,000 skilled students in large and small communities across the country. They can address a range of needs, from a project's early development to its late-stage components and management.

The ability to draw from a variety of talent helps businesses put together efficient research teams. Glacier Farm Media, for example, which runs large agricultural trade shows, is working with researchers and students from Saskatchewan Polytechnic to develop

an app that can support trade shows in rural areas with limited internet and electrical connectivity.

College and university interns can also work alongside each other to share expertise and move projects forward. In central BC, students from Camosun College and UBC Okanagan are working with Conair Aviation to help aerial firefighters. They're developing wearable technologies that can monitor pilot fatigue and stress to improve safety.

College and polytechnic students learn valuable applied research skills. The sooner they can bring those skills to the workplace, the better — for both our present and future.

Gail Bowkett is the Director, Innovation Policy at Mitacs, a not-for-profit organization that fosters growth and innovation in Canada.

Holland College supports economic development in PEI and across the country

The Applied Research department at Holland College supports economic development in Prince Edward Island by solving industry's technical and business challenges using the college's expertise, equipment and facilities. A key part of Holland College's Applied

Research capacity, Canada's Smartest Kitchen (CSK), is a globally recognized food product development centre. Its multidisciplinary team combines culinary creativity, food science expertise, and market insight to bring food product ideas to life. Located on Canada's Food

Island, Prince Edward Island, CSK's state-of-the-art facility houses a fully-equipped bench-scale R&D kitchen, consumer science and sensory evaluation lab, as well as a food styling and photography studio.

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WORK-INTEGRATED LEARNING AND THE STUDENT EXPERIENCE

When Jacob Woods enrolled in a 2-year Energy Sustainability Engineering Technology diploma program at Nova Scotia Community College (NSCC), he did so looking for a rewarding and stable career in Canada's energy sector. Amid changes in the oil and gas sectors, Woods turned to renewable energy and sustainability.

To fulfill the research requirement of his final year, Woods undertook an applied research project with Rexel Atlantic, a regional branch of global electrical equipment supplier Rexel, during which he was tasked with field testing and analysis to gain insight into how electric vehicle battery storage can be used to both reduce greenhouse gas emissions and support the electrical grid itself.

Being able to work with high-performance buildings, electric vehicles, and cutting-edge technology has set him up for success, says Woods, already the recipient of the first-place prize awarded by the Canadian Technologist Accreditation Board for the report submitted at the end of his research placement. In fact, he is now employed with NSCC's Energy Research Team.

Energy, including developing both new energy technologies and new methods of collecting and analyzing energy data, is one of the five main areas of focus for NSCC's Applied Research team.

"We know that one of the main challenges within the field of renewables is the issue of energy storage — we can extract energy from

solar, wind, geothermal and tidal, but how do we hold onto it? Through the innovative work of researchers like Jacob and his colleagues in NSCC's Applied Energy Research (AER) Lab, we're uncovering reliable, cost-effective solutions to this very issue," says Jeff Taylor, Associate Vice President of Applied Research & Innovation at NSCC.

"This kind of research has the potential to transform the world's energy technology sector."

Working to find innovative solutions to real-world problems, the college has partnered on research projects with local businesses including Rexel, Solar



George's limited growing season, students involved in the project experimented with using heating panels to reduce the germination period for vegetables such as radishes, beans, and kale.

ACROSS THE COUNTRY, STUDENTS INVOLVED IN APPLIED RESEARCH PROJECTS ARE SOLVING PRESSING REAL-WORLD ENERGY PROBLEMS.

Global Solutions (SGS), a renewable energy company specializing in the design, supply, and construction of high quality solar power and energy storage systems; and Neothermal Energy Storage Inc., a clean energy start-up working to provide lower-cost home heating solutions.

Similarly, across the country at the College of New Caledonia (CNC) in Prince George, BC, a research team, including two students, worked with Endura-Form Plastic Solutions Ltd to develop and test energy-efficient methods of heating greenhouses in cold-climate regions. Given Prince

The project involved both testing the panels as a reliable solution to boost germination as well as assessing the feasibility of the panel heating with regard to energy consumption, said Sorin Pasca, Director of CNC's Applied Research and Innovation office.

By helping develop solutions to extend the growing season – and to eventually achieve year-round food production – projects like these could help significantly improve sustainable economic development and local food availability in the region.

Solutions for Industry

With funding support from various regional, provincial and federal agencies, students and graduates are hired to work alongside faculty researchers to assist industry partners leap forward in the marketplace. We conduct many projects for local companies.

For example, in recent months we have:

DEVELOPED SOFTWARE
to process 13 years
of historic climate data



for long-term
farm planning

CREATED
173
FOOD & BEVERAGE
PROTOTYPES
from 6 categories
resulting in
19 PRODUCTS

DEVELOPED
key e-business
solutions
for dozens of
Niagara SMEs



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