PORTAGE COLLEGE

EXPLORE

INAUGURAL ISSUE

JANUARY 2026

APPLIED RESEARCH AT PORTAGE COLLEGE

A diverse portfolio of research projects that speak to the heart of our mission, serving the people, businesses, and communities of Northeastern Alberta.

WE ACKNOWLEDGE THAT PORTAGE COLLEGE'S SERVICE REGION IS ON THE TRADITIONAL LANDS OF FIRST NATION PEOPLES, THE OWNERS OF TREATY 6, 8 AND 10, WHICH ARE ALSO HOMELANDS TO THE MÉTIS PEOPLE. WE HONOUR THE HISTORY AND CULTURE OF ALL PEOPLE WHO FIRST LIVED AND GATHERED IN THESE LANDS.

PHOTO BY DONNA FELEDICHUK

A message from Portage College Vice President, Academic and Research

It is with great pride and gratitude that I introduce our inaugural applied research publication. This milestone reflects the remarkable progress we have made since launching our Applied Research Strategy in 2024. In just one year, our institution has secured more than $500,000 in grant funding and initiated a diverse portfolio of research projects that speak to the heart of our mission, serving the people, businesses, and communities of Northeastern Alberta.

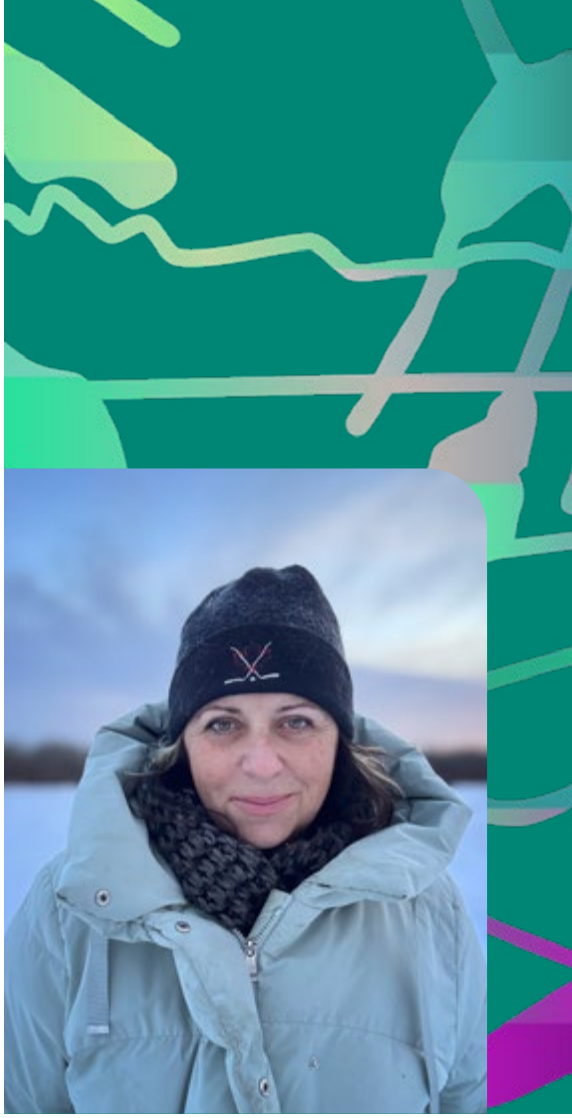
This rapid growth would not have been possible without the dedication and vision of our inaugural Research Chairs - Michael Schulz, Audrey Cochrane, Dr. Mohammed Mira, and Dr. Merlyn Foo along with our Director of Applied Research, Dr. Cristina Holguin-Pando. Their leadership, energy, and collaborative spirit have been instrumental in building the foundation of our applied research program. In a remarkably short time, they have helped transform our strategic vision into tangible action, mobilizing faculty, engaging students, and forging meaningful partnerships.

Our applied research efforts are rooted in collaboration, community engagement, and a commitment to addressing real-world challenges. Our projects reflect the breadth and depth of our strategic research pillars: Environment and Sustainability, Rural Economic Development, Mental and Physical Health, and Climate Resilient Agriculture.

This publication showcases the work of our faculty, students, and partners, each contributing to a growing culture of inquiry, innovation, and impact. Whether investigating the feasibility of terrestrial lichen transplantation, collaborating on military education recognition, or exploring cooperative health clinic models, our research is making a tangible difference. And our partners are as diverse as our projects, from First Nation communities to municipalities and the Canadian Armed Forces, applied research at Portage College is not just about generating knowledge, it's about working together to solve problems, share stories, and build a stronger, more resilient region.

As we await the outcomes of new proposals, including initiatives in climate-smart grazing and integrated paramedic mental health services, we remain committed to expanding our capacity, deepening our partnerships, and fostering a vibrant research ecosystem. This journey is just beginning, and we are excited to continue building a legacy of knowledge, resilience, and community transformation.

As we look ahead, we remain committed to expanding our research capacity, deepening our community connections, and continuing to explore innovative solutions to the challenges we face. This publication is more than a collection of projects, it is a celebration of what we can achieve when we work together with purpose. It is a reflection of our belief that small colleges can make a big impact. I invite you to explore the pages ahead and join us in celebrating the achievements of our researchers and the communities they serve.



DR. DONNA FELEDICHUK

Vice President, Academic and Research
Portage College

CONTENTS

Harvesting Change

Dr. Cristina Holguin-Pando knows first-hand the transformative power of research. Portage College's new Director of Applied Research can personally attest to the excitement of planting seeds, germinating ideas, the anticipation of discovery and, most importantly, the power to help people and communities thrive.

Born and raised in the state of Chihuahua in northern Mexico, Holguin-Pando can pinpoint when and where she first developed her passion for research and development: in 1995 on her grandpa's pecan orchard. With crop yields not being as plentiful as they once were, her Abuelito asked her to search the Internet for viable solutions. She quickly put on her detective hat and found not only a plausible reason for the reduced production but also secured some valuable help.

"I found out that Chihuahua was getting warmer and it was affecting not just pecans but a lot of other crops... Eventually, I found an investigator who was doing work out of Oregon state who was actually from Chihuahua so I got in touch with him," she explains. "And long story short, he agreed to come and use the orchard as an experimental farm to start doing research on the specific things the pecan growers were lacking at that time."

The initiative bore fruit (or nuts, in this case) almost immediately, with researchers developing a special fertilizer to be applied during a short window in September before the leaves fall off the trees. Pecan production, quality, yield and profits subsequently increased significantly, and the family was able to open a shelling facility and even start planting pistachios as well.

"Since then, I have been a passionate advocate for scientific and technological policy development that incorporates research and development as a foundation for social and economic growth," says Holguin-Pando.

The experience also sparked her own academic career path, as she finished a Business Administration degree and a Master of Finance while still in Mexico. In 2005, she was awarded a scholarship from the Mexican Council for Science and Technology (Conacyt) to complete a Master of Science program in interdisciplinary studies from the University of Saskatchewan, focused on technology transfer in developing countries.

"My grandpa was super proud because I had a Conacyt scholarship which was almost impossible to get," says Holguin-Pando.

> WE ARE UNIQUELY POSITIONED TO CONTRIBUTE MEANINGFULLY TO REGIONAL GROWTH AND ADDRESS PRESSING CHALLENGES

DR. CRISTINA HOLGUIN-PANDO

Director of Applied Research, Portage College

The journey was challenging—particularly, she jokes, in learning to pronounce "Saskatchewan"—and left her feeling like an imposter at times.

"But it was a very beautiful, very rewarding journey," she underlines. "I had to work really, really hard but then I had the opportunity to work both with Mexico and Canada so that was fun."

In 2023, she completed her Doctor of Philosophy at the same institution, specializing in innovation systems policy.

"I would definitely describe myself as a lifelong learner and very passionate about education, community and social development," says Holguin-Pando. "I wholeheartedly believe in the force that partnerships build."

She brings that passion and 17 years of experience leading research offices, building capacity for students and faculty involvement in research, to Portage College. Since her arrival in November 2024, the College has quintupled its research grants and established four research chairs. In her 11 months at the College, Holguin-Pando has been impressed by the institutional appetite and support for research, and the strong talent pool of researchers eager to collaborate with communities. Like her family's pecan orchard, she sees a lot of potential for growth.

"We are uniquely positioned to contribute meaningfully to regional growth and address pressing challenges," says Holguin-Pando, noting that the goal is to include more student involvement in research so learners can experience practical, real-world applications while they are studying. "We have unbelievable expertise in our institution which has yet to be fully utilized by stakeholders in our region...(We want) to be very well known in the region and in the communities. I see that it's going to be a very successful research program."

- **6 Students Funded Over 2 Years**
- **Future Opportunities in 2026**

RESEARCH STUDENTSHIPS STEER HEALTH STUDENTS TO SUCCESS

An innovative program is helping Portage College students take their first steps into the sometimes-intimidating world of research. The Summer Research Studentship (SRS) program, funded by Alberta Innovates, provides paid opportunities for post-secondary students to conduct supervised research for eight weeks in May and June.

In January 2024, Portage College was awarded $82,500 to offer SRS to students enrolled in nursing and pre-hospital care programs. Over the last two years, six nursing students have participated in the program, with more opportunities available in 2026.

Dr. Shun Li, the Dean of Health & Wellness at the College, helped to secure the funding. He noted that the program is particularly valuable at small institutions such as Portage because there can be a lack of funded research opportunities for students outside of urban university settings.

"Our students are basically two-year diploma students, so it is rare for them to have such emergent or important experiences conducting any type of research," said Li.

Convincing students to participate in research isn't always easy but it has many benefits, including better job opportunities and future educational pursuits, he added.

"I try to prove to my students that doing research is not as boring as you thought or as complicated as you thought. Doing research actually brings you a lot of fun and is a way human beings can advance our knowledge and our understanding about the world around us."

Portage Practical Nurse student Sheena Clyburn didn't need any convincing. At the end of the first year of her diploma program this past spring, she teamed up with Portage College faculty members Dr. Merlyn Foo and Lori Friesen to research the feasibility of setting up a

co-operative healthcare clinic in Lac La Biche. As part of the research, the team solicited the views of both healthcare providers and potential clients through online surveys.

"The studentship was an amazing opportunity to step outside my comfort zone and explore the research side of healthcare and the potential impact a healthcare co-operative could mean for the community ... I learned the importance and skill of creating survey questions that coincide with the data points that would meaningfully answer the research question," said Clyburn, adding that she also attended the Alberta Innovates-hosted Inventures Conference in Calgary and completed a research ethics course as part of the studentship.

Students, College and patients benefit from SRS program.

In addition to the recent healthcare co-operative project, students have also participated in research comparing a 3D-printer-created anatomical heart model to a traditional heart model, and identifying challenges faced by international nursing students in comparison to domestic students at Portage College. Li believes the studentships will benefit not only the students but also the College in the years to come.

"This is a great opportunity to increase the reputation of the program because I believe research – student-involved research – is a very valuable part of the program area," he said. "If we have research opportunities constantly available to students, it simply improves our reputation."

Additionally, along with student and College benefits, Clyburn sees opportunities for the community at large, including her future patients.

"This opportunity has increased my knowledge base around discovering credible sources to support my area of interest using evidence-based research," she said. "Practical Nursing highly incorporates evidence-based practice. I am always gaining current knowledge and skills to deliver the best care to my patients ... I strive to be a lifelong learner by delivering evidence-based care to my future patients alongside the heartfelt qualities of kindness, caring and compassion."

Portage College students in health programs interested in SRS should contact the Applied Research Office or their program for more information. Once projects have been approved and principal researchers established, a call will be put out for students to apply to participate.

> THIS IS A GREAT OPPORTUNITY TO INCREASE THE REPUTATION OF THE PROGRAM BECAUSE I BELIEVE RESEARCH — STUDENT-INVOLVED RESEARCH — IS A VERY VALUABLE PART OF THE PROGRAM AREA.
>
> — Dr. Shun Li, Portage College Dean of Health & Wellness

From Global Roots to Local Impact

DR. MERLYN FOO

Research Chair in Rural Economic Development

When Dr. Merlyn Foo left Brunei for Vancouver at the age of 17, she couldn't have known that her academic journey would one day lead her to the heart of rural Alberta. What began as an adventure in higher learning has evolved into a lifelong passion for education, research, and the kind of community-driven innovation that defines her role today as Portage College's Research Chair in Rural Economic Development.

> "I AM TREMENDOUSLY ENJOYING THE ABILITY TO INTERACT IN-PERSON WITH STUDENTS AND COLLEAGUES."

Foo, a current Business program instructor at the college, earned her Bachelor of Business Administration in Accounting and Finance, followed by a Master of Business Administration in Finance and Operations Management—with a minor in Economics—both from Simon Fraser University. It was during her MBA studies that she first stepped into a classroom as a Teaching Assistant, an experience that confirmed her calling to become a post-secondary educator.

Her pursuit of deeper knowledge took her to Queen's University in Kingston, where she completed a PhD in Business with a double major in Finance and Microeconomics. While completing her doctorate, she also taught as an adjunct instructor, gaining valuable experience that would shape her teaching philosophy: to make complex concepts accessible, meaningful, and applicable to real-world situations.

After earning her PhD, Foo joined Athabasca University as an Assistant Professor, where she spent 15 years teaching and developing courses in corporate finance, applied finance, derivatives and risk management, and financial econometrics. Although she thrived in the academic rigor of distance education, she eventually felt the pull to return to face-to-face teaching. In 2020—the year the world turned virtual - Foo joined Portage College, embracing the opportunity to connect

personally with students and colleagues. "I am tremendously enjoying the ability to interact in-person with students and colleagues," she says.

Beyond a passion for teaching quantitative subjects like mathematics, statistics, and finance, her research interests have evolved from corporate and behavioral finance to applied studies in financial fraud and ethics in business education. Today, as Research Chair, she is eager to explore how applied research in business can benefit local communities and economies, helping rural regions thrive through evidence-based innovation.

Dr. Merlyn Foo's goal is clear: to harness knowledge, experience, and collaboration to strengthen the fabric of rural Alberta, one project at a time.

Best Practices for Military Education and Training

Military training can save lives, change history, and halt oppression, but when members of the Canadian Armed Forces (CAF) leave the service and put that training towards furthering their education as a civilian, its true value can sometimes be unclear.

That is the issue being studied in an applied research project conducted by Portage College Associate Vice President Academic, Don Moore, and the Canadian Military Veteran and Family Connected Campus Consortium (CMVF3C). A national collaboration among representatives of post-secondary institutions, the Canadian Armed Forces, Veterans Affairs Canada, and supporting organizations, CMVF3C's mandate is to improve training and education opportunities for military members, Veterans, and their families.

The applied research project, "Best Practices for Military Education and Training within the Ontario Post-secondary System" intends to develop pathways for those entering or within the military to find equitable training in Canada's post-secondary education system, says Moore.

A researcher and educator at the northern Alberta college, a CMVF3C committee member, and the lead on a Military Training Equivalency sub-committee, Moore would like to see a more consistent approach for recognizing military experience in post-secondary settings.

"There have been questions about when folks leave, to what extent their training in the military can be recognized within a civilian environment. At the same time, there are questions about how well we can align things together for pathways into the armed forces," he said.

The project is being conducted with the assistance of Dr. Suzette Brémault-Phillips, a professor at the University of Alberta, and Principal Investigator and Chair of the CMVF3C. She sees the research as a win-win for people transitioning into and from military service.

"Leveraging post-secondary education in support of those in active service better equips the Canadian Armed Forces to respond when called upon. Supporting those transitioning into life after service enhances our civilian communities," noted Brémault-Phillips. "We need research, though, to identify best practices and pathways, and to inform policy and practice change."

Although Moore and Brémault-Phillips live and work in Alberta, her involvement with CMVF3C and Moore's experience with the post-secondary transfer system and building similar pathways for the Skilled Trades in Alberta drew attention from Ontario officials. With more than one-third of CAF members residing in Ontario, the researchers say it's a province that has a great opportunity to pair Canadian

Armed Forces training with post-secondary education. As shown in Ontario's 2024 Honouring Veteran's Act, it's also a province that has made a significant commitment to expand recognition of veterans.

With $150,000 in funding from the Ontario Council on Articulation and Transfer (ONCAT), the research project is aimed at understanding the mechanisms and practices that exist within the Ontario post-secondary system and beyond to pave the way for greater engagement between the post-secondary system and the Canadian military.

Canadian post-secondary institutions do offer some pathway connections between post-secondary and military training, but not on a systemic level. At Portage College, for example, the Practical Nursing program shares training alignment with an Operating Room Technician in the military. While Portage College and some other Canadian institutions offer credit equivalencies for many areas of military training, the process can be sporadic and institution-specific, with little consistency between institutions, much less at a national scale.

Similar systems linking military and education already exist in the US and Australia.

Moore, who has had generations of family serving in the military, spent time as a civilian employee of the Canadian Armed Forces himself, and currently has a career in a post-secondary setting, says the lack of a Canadian equivalent has been a challenge for many members and veterans. The issue of military training equivalencies has become a focus of several provincial and national committees he sits on, including the CMVF3C.

Don Moore and Portage College President and CEO Stephen Price at an open house event at the Portage College Cold Lake campus.

The research, Moore says, involves the exploration and review of which post-secondary institutions in Canada's most populous province provide credit recognition for military training, how they provide it, how it is made publicly accessible, and what current best practices are in place.

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>
> — Don Moore, Portage College Associate Vice President Academic

The goal for the research is to support greater post-secondary engagement with Military training, as well as consistency in the sector.

Moore and Brémault-Phillips expect to complete the initial phase of the project by mid-2026.

According to Canada's Department of National Defence, there are approximately 68,000 Canadians currently on active duty with the Canadian Armed Forces and 27,000 in reserve capacities. Each year there is a change-over of approximately 5,000 personnel, entering and leaving the Canadian military. Many of those leaving are looking to expand on their training, continue their careers or find new ones. Without a system in place, that process can be daunting for many.

"We're trying to look at it from a systems lens," said Moore. "Rather than focusing on one person in one situation, we want to build a system that's easily replicable for anyone coming out of the military."

While the results of the research project could create pivots and shifts in the general scope of the project, he says the overall goal remains the same—to give back to people who give so much to the country.

"The Armed Forces are such a critical component of Canada, and the more we can find ways for these kinds of systems to work easily, the better it is for our military members and the country as a whole."

Groups looking for more information about this project or wishing to discuss new research projects can contact Portage College's Director of Applied Research Cristina Holguin-Pando at 780-623-5520 or by email at **cristina.holguin@portagecollege.ca**. *More details on the Portage College Applied Research Department can be found in links to the Portage College Research Ethics Board at* **www.portagecollege.ca**.

DON MOORE

Associate Vice President Academic

Don Moore is the Associate Vice President Academic at Portage College. In addition to Don's ample expertise as a teacher, lecturer and professor, and in academic administration, his emerging areas of research expertise include post-secondary systems analysis, Prior Learning and Assessment Recognition (PLAR), community-based programming, alternative education, and Equity, Diversity, and Inclusion.

His current applied research project, "Best Practices for Military Education and Training within the Ontario Postsecondary System" is exploring pathways to equitable training in Canada's post-secondary schooling system for those entering or within the military. He hopes the research will support a greater adoption of military education and recognition.

A committee member of the Canadian Military Veteran and family Connected Campus Consortium (CMVF3C), and the lead on a Military Training Equivalency sub-committee, he too has spent time as a civilian employee in the Canadian Armed Forces and had generations of his family serving in the military. It is those connections that drive his passion to help military members find meaningful careers in civilian life and to help train civilians entering military service.

"The Armed Forces are such a critical component of Canada, and the more we can find ways for these kinds of systems to work easily, the better it is for our military members and the country as a whole," he says.

Don is currently enrolled in the Doctor of Education (EdD) in the Field of Equity, Diversity and Social Justice. His anticipated completion date is August of 2026. His research-based thesis is titled: "Supporting Student Persistence Practices for Equity-Deserving Groups in Rural Alberta Colleges." His other academic contributions include the conference presentation "Intervention Strategy for Boys: Examining Single-sex Classes Targeting At Risk Boys in Mathematics" presented at the Canadian Society for the Study of Education" (Waterloo ON, May 2012).

The Search for Climate Resilient Crops

The canola oil begins to simmer in the pan, and the stir-fry ingredients are poured in—perhaps some broccoli pieces, onions, red peppers and shelled edamame beans, cubed baby potato pieces are a nice addition too. As the oil does its work, you pour an ice-cold beer into a frosted mug and enjoy a moment as the meal simmers.

Little do you know as you sip and stir, but an expert in the field of applied research has probably helped with your food and beverage choice tonight.

The resiliency of canola, potatoes, barley, and soybeans to the environmental stresses of heat and drought are the focus of a new applied research project conducted through the Applied Research Department at Portage College.

Dr. Mohammed Mira, a member of the faculty at Portage is the Research Chair on the topic of Climate Resilient Agriculture. He is currently exploring several projects on the topic, including research into the resiliency of crops under combined stress conditions of heat and drought.

The important word in the current applied research project is 'combined.'

Mira, a leading expert in the embryonic study of plant breeding and productivity, says there is plenty of research on individual stresses affecting agricultural crops, like flooding, heat, drought and cold, but combining two factors in one study is "unique" in the scientific world.

The results could be game-changing in the global battle towards food security by providing seeds to crop producers and the agricultural industry that bring higher yields regardless of changing environmental conditions.

Grocery Prices to Famine

While the results could affect crop yields in under-developed areas of the globe where water sources are sparse and populations are already facing dire food scarcity, Mira says the effects of environmental stresses on crops can be seen much more locally.

In drought conditions we have seen in this region for example, most plants cannot withstand those conditions for more than a week, and if they can, the product will be significantly reduced,"

> WE KNOW THAT WE WILL BE IN A GLOBAL FOOD CRISIS BY 2050. AS THE WORLD'S POPULATION INCREASES, WE CAN'T INCREASE ARABLE LAND, AND WE CAN'T REDUCE THE POPULATIONS, ... THE ONLY WAY IS TO IMPROVE THE PRODUCTIVITY OF THE CROPS.
>
> — Dr. Mohammed Mira, Research Chair in Climate Resilient Agriculture

notes Mira, using the flowering stage of the canola plant as an example. "That stage is usually in July, which can coincide with drought and heat conditions. Farmers can lose up to 50 per cent of their yield."

Those kinds of reduced yields are having huge economic impacts for consumers, with grocery store prices spiking in recent years due to supply and demand issues.

"The increasing prices for groceries in the western world are a growing issue based on supply and demand. In other countries, the issue is food scarcity," says Mira.

While there have been advances in research over the decades resulting in crops performing better against individual stress conditions, the process can make those same seeds more sensitive to other stress conditions.

"So, our research is working on both heat and drought to find the best results for both conditions combined," he explains, adding that at the end of the research, the goal is to approach crop industry officials and farmers with the best options for increased productivity. "When we go to the farmers, we want to show them that from the many lines of seeds available, a certain one is best against heat, a certain one is best against drought, and a certain line is the best for both heat and drought."

The process involved in the research is slow, repetitive, and meticulous. The process must also be conducted within well-defined safeguards. While genetic modifications may be used in the research labs under extreme restrictions for comparative research, Health Canada restricts the production and sale of genetically modified organisms (GMO) unless they are approved by Health Canada scientists—an approval process that can take as long as a decade.

"It does delay the research, yes, but we know we have to be very careful. There are morals and ethics to be considered," Mira says, recognizing also that the term GMO is still received with trepidation by many consumers.

Instead, he deconstructs what information is identified in laboratory modifications to better understand the mechanisms and DNA of the plant as it encounters the environmental stresses. From there, the research works to achieve similar results through adaptation and selection. Mira describes it as a process where batches of seeds are exposed to the stressing elements in the field, then returned to ideal lab conditions, then back to the field, then back to the lab. It is a similar process as the plants grow, using controlled and dynamic variables with each batch to identify if stresses are

recognized in the flower, root, or stalk of the plants. Over time, the hope is that the seeds are trained to be more resilient.

It's a long process.

"You train them to resist. Over time, the hope is that the plant itself will figure it out," he says.

In the weeks and months to come, Mira hopes the research being undertaken by Portage College and its partners will result in a path towards more sustainable global food sources, whether its more available oats to feed livestock, more canola for cooking, or more barley for a cool one to celebrate the results.

"We have some busy times coming up. I am hoping my students enjoy being part of the process. I think it's important for them to know the challenges involved in getting more food to more people, and to feel the rewards of helping in that process."

While Mira's applied research project is expected to have funding for at least two years, he says there is a much more pressing deadline steering his research and similar projects around the world.

More information and updates on Portage College Applied Research projects can be found at the Portage College website.

DR. MOHAMMED MIRA

Research Chair in Climate Resilient Agriculture

When it comes to the topic of Climate Resilient Agriculture, Dr. Mohammed Mira is planting the seeds of applied research and education... and watching them grow.

A member of the faculty at Portage College in northeastern Alberta, Mira is also the Research Chair of Climate Resilient Agriculture within the college's Applied Research Department. His current project focuses on strengthening crop resiliency, with particular emphasis on how crops respond to combined stress conditions. Mira's research will document the resiliency of canola, barley, potatoes, and soybeans to heat and drought conditions. In his previous research, some of it published in more than 40 peer-reviewed publications, resiliency has been tested against only one stress factor at a time, be it drought, cold, flood or heat.

The research is timely, globally important, and an opportunity for students at Portage College to experience the rewarding field of research.

"I feel that the combination of this research and education ensures that the work being done through applied research projects like this advances the science of climate-resilient agriculture while also equipping students and growers with the skills they need to succeed in a changing agricultural landscape," Mira said.

Student Research

Teaching Biology and Genetics to the University Transfer students at Portage College while pursuing the current research project, Mira is dedicated to training the next generation of inquisitive learners – and even some future researchers. With a Ph.D. in Genetics and Molecular Biology, previous research and instructional credentials at the University of Manitoba and Brandon University, and a commitment to inclusive and equitable learning environments, Mira incorporates his own research principles into the curriculum to provide all students with applied, real-world learning experiences. In fact, part of the proposal to funding agencies for the resiliency project underscores student involvement.

"Part of our teaching course is lab work. Exploring hands-on learning helps to show our students real applications of their lessons. So, it was

"I BECAME CAPTIVATED BY PLANT SCIENCE DUE TO A DEEP CURIOSITY ABOUT THE INTRICATE WORKINGS OF NATURE AND THE ESSENTIAL ROLE THAT PLANTS PLAY IN SUSTAINING LIFE ON EARTH," HE SAYS. "THE BEAUTY AND COMPLEXITY OF PLANTS, THEIR ABILITY TO ADAPT TO DIVERSE ENVIRONMENTS, AND THEIR POTENTIAL FOR ADDRESSING GLOBAL CHALLENGES LIKE FOOD SECURITY AND CLIMATE CHANGE FUELED MY PASSION."

important that part of our proposal is that students will be integrated into this work," he said. "You teach them, you are working with them over the year, and this is promising for them, they work and learn and research. It helps them to apply what they are learning."

The instructor and researcher's own learning path into the molecular world of biology began at a young age growing up in Egypt.

"I became captivated by plant science due to a deep curiosity about the intricate workings of nature and the essential role that plants play in sustaining life on Earth," he says. "The beauty and complexity of plants, their ability to adapt to diverse environments, and their potential for addressing global challenges like food security and climate change fueled my passion."

That passion lead to his own higher education in plant science, exploring the genetic mysteries of plants.

Mira obtained a Bachelor of Science degree in Plant Science from the Faculty of Science at Tanta University in Tanta, Egypt in 2005. He continued to receive his Master of Science in Plant Breeding and Genetics in 2010. He completed his PhD in Genetics and Molecular Biology in 2015. Starting in 2020, Mira served as a Post-doctoral Fellow in Molecular Biology and Stress Physiology at the University of Manitoba in Winnipeg. Mira also held a research and instructional position at the University of Brandon before coming to Portage College in 2024.

In his free time, when he's not collecting research for his field of study, or studying data from actual fields of crops, Mira can be found on another field—this one with sidelines and goalposts—as he enjoys a game of soccer.

Advocating for Rural Social-emotional Care

PROVINCE-WIDE FINDINGS FROM COLLABORATIVE PORTAGE COLLEGE RESEARCH

Portage College research projects can sometimes be conducted with collaborating partners, including other post-secondary institutions. The partnerships can expand data collection and information distribution, strengthening the value of the research projects. In 2024, researchers from Portage College and Northern Lakes College completed a comprehensive two-year study focusing on the roles of Social Workers in Health and Senior Care across Alberta. The findings highlight a significant disparity in the availability and training of social workers between urban and rural settings.

"I am exceedingly proud of the study that Portage College and Northern Lakes have completed. While there are often anecdotal examples of disparities that can occur between rural and urban services, having concrete data is the first step in bringing forward the issues in a way that can foster meaningful dialogue and hopefully bring forward change," said Dr. Donna Feledichuk, Vice President Academic and Research at Portage College.

Researchers surveyed social workers employed in health and senior care settings throughout Alberta, shedding light on their roles in supporting the social and emotional well-being of patients and residents. They also surveyed managers of health and senior care facilities across Alberta to determine who provides social/emotional care to patients, residents, and their families.

"The results of this study have implications for social work education, particularly for what we consider to be generalist social work education. They also have implications for rural social work practicums and the need to work with practicum sites to understand the roles that social workers can fulfill," explains Dr. Tracy Orr, the Research Lead, of the Portage College Community Social Work project.

Rural areas were more than twice as likely to have **no access** to social workers in health and senior care.

Key findings from the study found that in urban healthcare settings, social workers predominantly link patients to resources, participate in multidisciplinary teams, provide psycho-social assessments, offer counselling, and support patients with chronic illnesses.

In urban senior care settings, social workers play a crucial role in linking residents and families to resources, providing psycho-social assessments, manage transitions in care, handle caseload management, support residents with dementia and their families, address financial and legal issues, and educate staff on chronic disease management, transitions in care, and end-of-life issues.

In rural health and senior care settings, the roles that social workers typically fulfill in urban areas are often carried out by staff members who lack the necessary training. Alarmingly, in rural senior care settings, social workers are virtually nonexistent. Managers from these settings cited lack of funding as the primary obstacle to providing professional social-emotional care for patients.

Recommendations from the study call for immediate action to prioritize social and emotional care, supporting the mental health of individuals in health and senior care facilities in rural Alberta.

"At a provincial level, advocacy for supporting mental health in rural health and senior care facilities is crucial to ensure that social work graduates can contribute to their communities in these service sectors," said Dr. Orr, who thanked her local research team members, made up of faculty in the Community Social Work program and college staff, Lac La Biche FCSS and the Rural Development Network for support with the project.

> WHILE THERE ARE OFTEN ANECDOTAL EXAMPLES OF DISPARITIES THAT CAN OCCUR BETWEEN RURAL AND URBAN SERVICES, HAVING CONCRETE DATA IS THE FIRST STEP IN BRINGING FORWARD THE ISSUES IN A WAY THAT CAN FOSTER MEANINGFUL DIALOGUE AND HOPEFULLY BRING FORWARD CHANGE.
>
> — Dr. Donna Feledichuk, Vice President Academic

AUDREY COCHRANE

Portage College Community Social Work program instructor and first Research Chair in Rural Health in the College's Applied Research department

Audrey Cochrane always knew what she wanted to be when she "grew up." It was her parents who weren't so sure.

All through high school, the call to social work kept ringing in her ears and coursing through her veins, but Mom and Dad tried to steer her in other directions.

"They were just very worried about me getting burned out as they saw it as a very stressful career and kind of advocated for me to do something else," says Cochrane, who is now ... SPOILER ALERT! ... a Portage College Community Social Work program instructor and first Research Chair in Rural Health in the College's Applied Research department.

On her initial educational path, however, Cochrane took the advice of her parents, starting an undergraduate science degree at Dalhousie University in Halifax. But she quickly discovered her heart wasn't in it and switched to an arts degree.

"Out East, you had to do an undergrad first before you could do a Social Work degree," explains Cochrane, who finished her Bachelor of Arts degree in 2005. "At the time there were no four-year social work degrees out there, so I did an undergrad in History with a minor in Law and I focused on Canadian legal and social history with the plan to take that into social work afterwards."

It was during her BA as she volunteered at a crisis line that her career path became crystal clear. Her high school aspirations were becoming reality.

"I really knew at that point that his is what I want to do," remembers Cochrane fondly. "I like working with people."

After a two-year stint managing the crisis line, she completed a post-degree Bachelor of Social Work from St. Thomas University (STU) in Fredericton. Continuing to follow a road less travelled, she worked doing policy analysis for a political party as part of her practicum. After graduating she worked as a research assistant before taking a position with a non-profit counselling centre.

Spirit on the Move

Using the term "road less travelled" is perhaps a misnomer, as Cochrane has never settled anywhere for too long, given her spouse's military career. But wherever the mother of three has been in Canada, she has embraced the opportunity for new experiences and a desire to leave her mark wherever she goes. At CFB Trenton, she worked for the Family Resource Centre on the base while also completing her Master of Social Work online through Dalhousie University. It was during her master's studies that she had the opportunity to work as a teaching assistant for a professor who had mentored her earlier in her career. Cochrane had always had an affinity for teaching but had never had the opportunity to teach post-secondary students. Part of this role required her to travel to Halifax for the students' on-site learning experience.

"We taught the class face to face for two weeks," she says. "My role as TA was helping and supporting folks as they were practicing their counselling skills and helping with grading. That experience solidified that I really, really enjoyed teaching."

With her family posted back to Fredericton in 2014, Cochrane had the opportunity to work as a sessional instructor at STU, before lining up a full-time job at Portage College when her husband was posted to Cold Lake in 2017.

"There was a job ad at Portage for a CSW instructor that had closed three days before I started looking and I thought, I'll send in my resume anyway. They called me within two hours for an interview!"

Eight years later, now calling Winnipeg home, Cochrane is still part of the Portage family, teaching courses, serving as a research chair, and pursuing her doctorate from Memorial University. As Portage College continues to expand its applied research department, she is particularly excited about the possibilities that her rural health chair position creates for learning opportunities in rural communities that come from rural-minded planners. She observes that most programs and services in rural areas tend to be designed by people in urban centres and may not reflect the reality of rural life.

"I would like to hopefully influence designing services with a rural context in mind, where people can go and have their needs met," says Cochrane.

The issue has already led to a Portage College-driven research project highlighting disparities between urban and rural areas when it comes to the availability of trained social workers in health and senior care settings. Cochrane and other Portage faculty and staff took part in the two-year project, helmed by retired Portage College instructor Dr. Tracy Orr.

Research Helps Students

Just as important as supporting communities through applied research, is the ability to provide Portage social work students with valuable research opportunities during their second-year practicums.

"These practicums should really drive home for students the connection between research and practice ... And really, research is what supports evidence-based practice, and serves our communities well in the long run," says Cochrane.

> THESE PRACTICUMS SHOULD REALLY DRIVE HOME FOR STUDENTS THE CONNECTION BETWEEN RESEARCH AND PRACTICE ... AND REALLY, RESEARCH IS WHAT SUPPORTS EVIDENCE-BASED PRACTICE, AND SERVES OUR COMMUNITIES WELL IN THE LONG RUN.
>
> — Audrey Cochrane, Portage College Community Social Work program instructor and first Research Chair in Rural Health

You could say interest is ‘mushrooming’ around a Portage College applied research project that will use fungus to reduce wildfire risks in Alberta forests.

The project will study the decomposition of deadfall, and the fungus types that can best create the process. Michael Schulz, an Environment Technologist program instructor at Portage College in Lac La Biche, is leading the research.

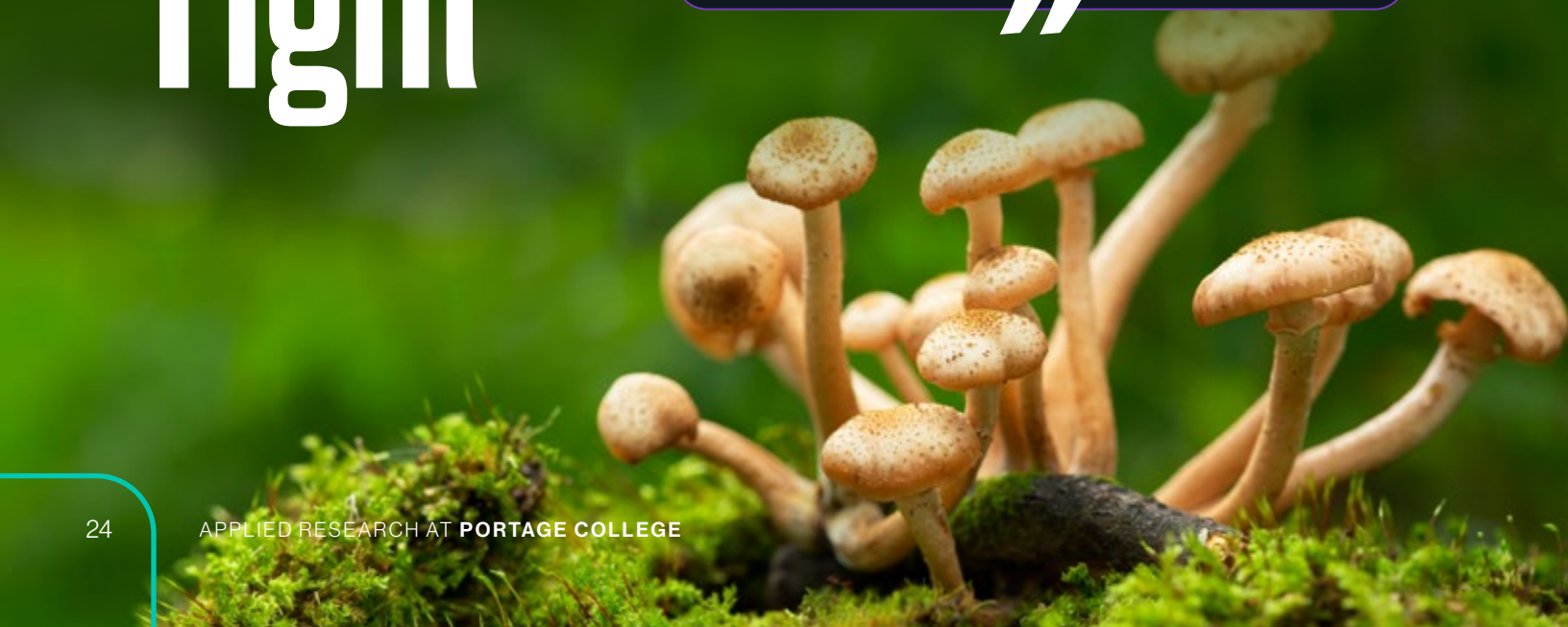
Schulz, who holds a Master degree of Science in Ecology, is one of Western Canada’s leading experts in all things fungi — and he's hoping this research will be a 'mould' for future wildfire prevention strategies. Results of the research project could also help to keep important nutrients in the ecosystem.

The research will take place in the Fox Creek area of northwestern Alberta over the next three years, but it impacts could have a much wider effect, says Schulz. He is supported on the project by the Alberta government, municipalities, educational institutions, environmental and ecological organizations along with representatives of Alberta’s commercial and industrial sectors.

The project will locate the best wood-composting species of fungi and inject them directly into forested areas where man-made slash piles, waste wood or deadfall is burned intentionally during commercial logging operations and development. The same wood piles can also become significant fuel sources during a forest fire if left to decompose.

Fungi in the Fight

> “THERE IS A HUGE DIVERSITY IN FUNGI FOR ALL KINDS OF FUNGAL GROUPS THAT CAN DECOMPOSE WOOD IN OUR ECOSYSTEMS.”



Filing all that Fungus

"Our research using wood-decomposing fungi is trying to do something that has very practical applications," says Schulz, who has spent his professional career studying fungi and lichens, their biodiversity, and decomposing abilities. In recent years, he has performed conservations assessments and data collection for Environment and Climate Change Canada's Wild Species Reports on all 4,635 species of macro-fungi in Alberta, Saskatchewan and Manitoba.

Many of those species are already stored in a specially created 'fungarium' that was recently built at Portage College through a partnership with the Alberta Mycological Society. The fungarium is a one-of-a-kind Alberta catalogue of fungi that is already used for research, education and data collection.

"There is a huge diversity in fungi for all kinds of fungal groups that can decompose wood in our ecosystems. Knowing who is doing what, and why they are in the habitats they are in is the practical application we hope to find in this project," Schulz said.

The plan for the project—which is to span at least three years—is to collect species of fungi from a research area of the forested lands near Fox Creek, bring the fungi samples back to the Portage College Environmental Sciences labs, catalogue them and examine their individual wood-decomposing abilities in ideal laboratory conditions.

A "top 10" collection of fungi with the best results will then be put back into the forest areas, targeting slash piles and areas where waste wood has been collected.

Adding Moisture to the Forest

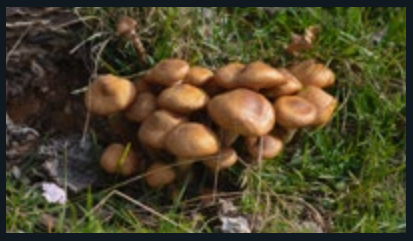
Schulz says the fungi create moisture in the wood as the decomposition process takes place, reducing the flammability. The decomposition process also converts the wood into the biomass of the fungi itself, which can be a source of nourishment for small insects and other members of the food chain.

DID YOU KNOW?

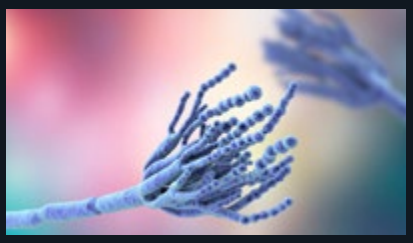
More than **80 per cent** of the energy used in the **terrestrial food chain** takes place at the **decomposition and fungal** level. Less than 20 percent of energy in the food chain comes after vegetation is consumed by the first animal.

Portage College in Lac La Biche is home to the province's only **Fungarium**, a vast storage repository of fungus species. The fungarium is used for data collection, education and research.

The largest organism in the world is a fungi. The **"Humongous Fungus"** uses its network of mycelium fibres to cover an underground area of 931 square hectares (about 900 CFL football fields) in rural Oregon.



Fungi are common allies in global **healthcare**, producing compounds like penicillin which comes from Penicillium mold.



Fungi can be used in the production of products like cotton, paper and biofuels, **replacing chemicals** that may react more harshly.

Fungi can take the shape of not only mushrooms, but yeasts and molds as well. Fungi are also shaped as jellies, crusts, cups, rusts, smuts and clubs. One species, known as the Jelly Ear Fungus has the shape of a human ear, another, nicknamed **Dead Man's Fingers**, can look like a hand emerging from the soil.

"The hope is that with inoculating the wood with the right fungi, it will help to retain moisture, more-so to reduce the flammability as soon as the fungi start to grow and colonize... but also a lot is turning into the biomass of the fungus itself, and that biomass is going to be eaten by critters and mites and what not, which are then eaten by larger prey. That's how most of the nutrient cycle in terrestrial ecosystems starts, through that de-compositional food chain."

Using the fungal decomposition process instead of simply burning the wood piles, says the research project director, offers a win-win from standpoints of ecology and safety.

"We see his research as helping to promote that ecosystem function, rather than putting the deadfall and waste wood into piles and burning it," he said, explaining that the burning process—when done correctly—can be safe, but rapid combustion doesn't return as much nutrient value back to the ecosystem.

"It creates carbon that otherwise would go back into the ecosystem, but instead is lost to the air as greenhouse gasses," he said, adding that the fungal decomposition process—not surprisingly, is a slower process that steadily replenishes the land. "The nutrients flow more slowly rather the explosive, rapid release of a burn."

The research project, which began in early 2025 has been receiving interest and praise from many sectors.

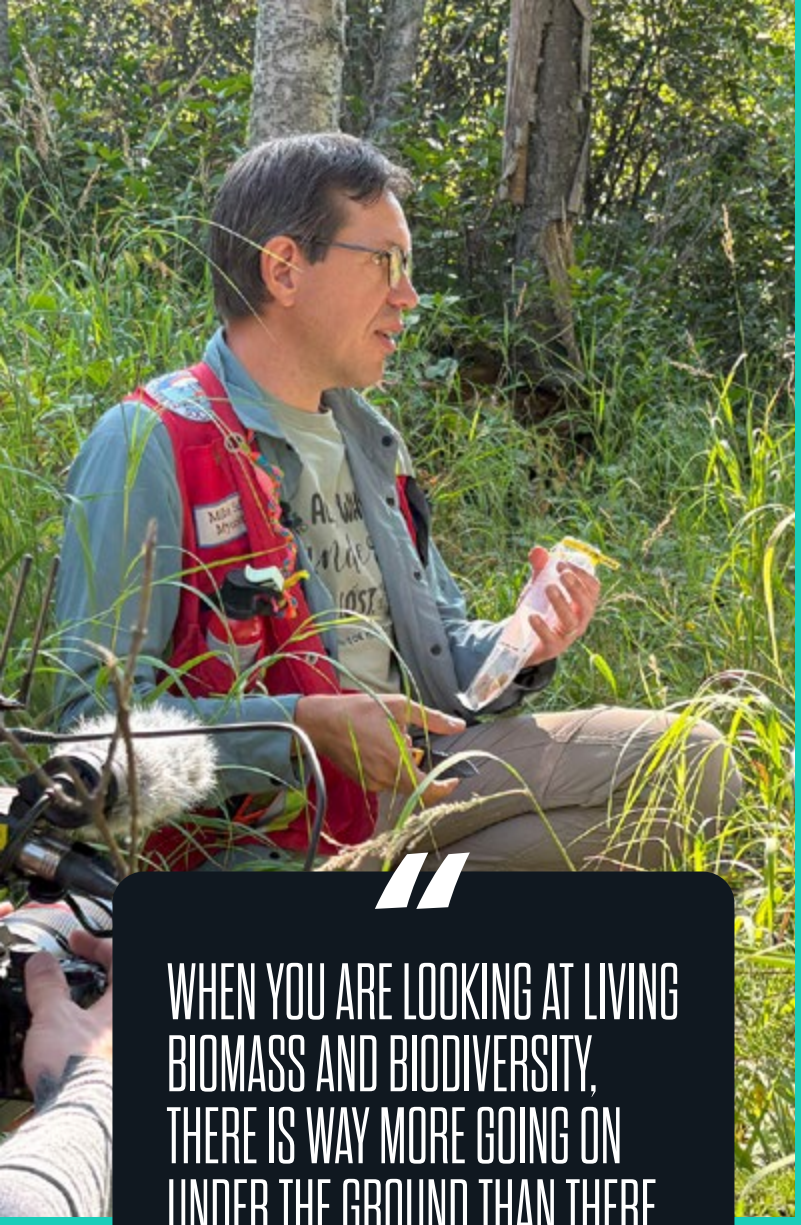
When asked about the significance of the project, Alberta's Minister of Forestry and Parks Todd Loewen was quick to make a 'dad joke' about the mushroom being the 'fun-gi' at the party—but also identified the importance of the research.

"This project is about inviting mushrooms to the party—not just because they are the 'fungi', but also for what they do in breaking down the debris on the ground," he said. "Sometimes the smallest part of the forest can make the biggest difference."

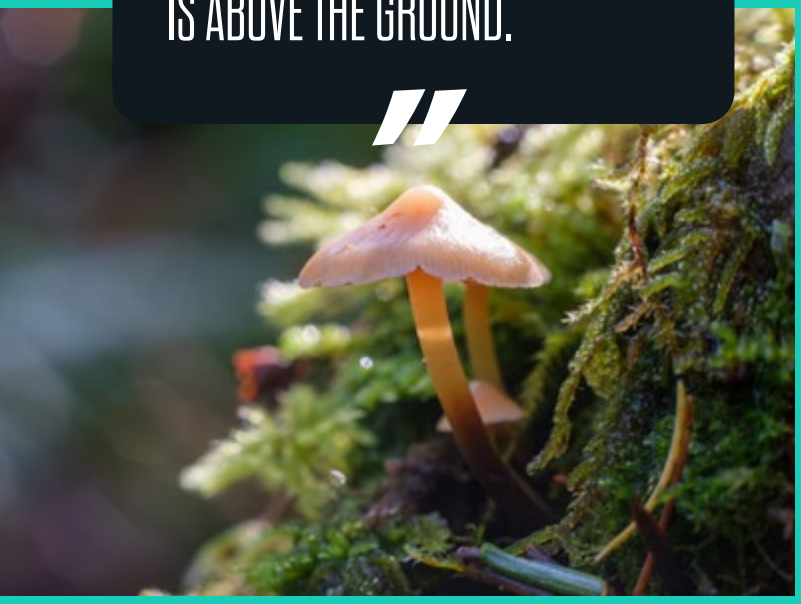
In communities where forest fires have made significant impacts, the research project is getting very close attention.

Fox Creek's Emergency Management Coordinator Samantha Benton calls it a game-changer.

"Each year we see the impact that wildfires have on our town and across Alberta," she said, drawing statistics from 2023 that showed more than 2.2 million hectares of Alberta land scorched by wildfires, forcing thousands of people to evacuate, destroying ecosystems, and costing billions in damages and restoration. "These fires are getting bigger, they are burning hotter, and they are spreading faster ... So, this is more than a research project, this is a potential game-changer for wildfire prevention."



> WHEN YOU ARE LOOKING AT LIVING BIOMASS AND BIODIVERSITY, THERE IS WAY MORE GOING ON UNDER THE GROUND THAN THERE IS ABOVE THE GROUND.



MICHAEL SCHULZ

Research Chair in Environment and Sustainability within the Boreal Forest

Michael J. Schulz, M.Sc., P.Biol. is a professional biologist with a broad skillset. The instructor in the Environmental Technologist Program at Portage College has a passion for learning.

He received his Bachelor of Science from Trinity Western University in Langley, BC, his Master of Science in Ecology from the University of Alberta and is member of the Alberta Society of Professional Biologists. He is a leading expert on the topic of fungi and lichens, a member of the Alberta Mycological Society for the past 25 years, an environmental consultant, and has assigned conservation ranks for all the macrofungi in Alberta and Saskatchewan for the 2020 and 2025 Wild Species Reports for Environment and Climate Change Canada. How many macrofungi are there across the Prairies? Schulz knows. He's classified all 4,635 of them.

The majority of his professional work has been in the area of plants, including rare plant surveys, plant and lichen identifications, and wetland and ecosystem mapping. He has recently worked with the Alberta Native Plant Council on the second edition of the Rare Vascular Plants of Alberta book.

In his own words ... "I've been a nature nut since childhood ... my life goal is to be able to go out into the woods and identify everything I see."

Schulz is using his vast knowledge and experience in a Portage College applied research project exploring the relationship between fungal decomposition of wood and forest fire severity. He hopes his findings will not only help communities facing wildfire threats, but also help the forestry industry to better dispose of waste-wood, and help the forests to thrive as well.

He sees this research project as small but vital step in better understanding the surrounding world – especially the fungal world beneath our feet.

"When you are looking at living biomass and biodiversity, there is way more going on under the ground than there is above the ground," Schulz says, explaining it as a world where more research is needed. "It's a world we have only the slightest bits of knowledge about. It's a whole world that we are just at the tip of the iceberg of understanding."

HE HOPES HIS FINDINGS WILL NOT ONLY HELP COMMUNITIES FACING WILDFIRE THREATS, BUT ALSO HELP THE FORESTRY INDUSTRY TO BETTER DISPOSE OF WASTE-WOOD, AND HELP THE FORESTS TO THRIVE AS WELL.

Opening ceremony to launch the collaborative project between Town of Fox Creek, Alberta Wildfre, Portage College, Alberta Mycological Society, and industry partners like Keyera Crop, to enhance Alberta's resilience to forest fres with mycological research.

(below) Michael Schulz and the fungarium housed at Portage College.

The Unlocking Potential Project.

AN APPLIED RESEARCH PROJECT HAS BACKED UP ANECDOTAL EVIDENCE THAT SAYS EDUCATIONAL TRAINING DELIVERED BY PORTAGE COLLEGE TO FIRST NATION AND MÉTIS COMMUNITIES IS HITTING THE MARK.

After six months of study, data collection, interviews, and historical research, lead investigator and Portage College Humanities instructor Dr. Kevin Solez, says the programming that provides employment training courses continues to "change lives for the better."

The research project, titled *Unlocking Potential: Researching Foundational Learning Pathways for Indigenous and Northern Workforce Integration*, includes data collected over the last year from first-hand interviews with residents, Elders, students and teachers at First Nation and Métis communities within the northeastern Alberta college's service area.

But the results are more than just a well-documented pat on the back for the college and the communities, says Solez. Using Portage College as an example, he says the research findings could help all post-secondary institutions to better collaborate with Indigenous communities – and provide better opportunities for Indigenous learners when it comes to education, training, and workforce integration.

"This research can influence the attempts by post-secondary institutions to form the kinds of relationships that Portage College already has," said Solez. "The final research findings will be able to inform the policy and the strategies for other post-secondary institutions as they seek to build stronger relationships with Indigenous communities."

As an instructor with experience teaching at post-secondary institutions across Canada, Solez has seen first-hand the challenges and stigma faced by Indigenous students.

"For a lot of them, when they came to my classroom, I learned that they had had experiences with the education system that had not been ideal. It's a system not tailored to them and can make them feel excluded," he said.

The research project explored the effectiveness of training programs currently offered by Portage College and delivered in the Indigenous communities to address those issues. The research focused on programs like Pathways to Employment and Career Exposure and Job Readiness. Beginning in May and wrapping up at the end of September,

> THIS RESEARCH CAN INFLUENCE THE ATTEMPTS BY POST-SECONDARY INSTITUTIONS TO FORM THE KINDS OF RELATIONSHIPS THAT PORTAGE COLLEGE ALREADY HAS.
>
> — Dr. Kevin Solez, Portage College Humanities Instructor

the research looked at the people taking the programs, those providing the programming, and the results. The research also explored historical relationships between Indigenous learners and the education system.

Solez, who is also a scholar of Indigenous and ancient civilizations, looked to traditions, mythology and customs that could influence the current methods to provide equitable learning in Indigenous communities.

Time-honoured Traditions

One result from that historical research created some food for thought ... literally. Community feasts regularly hosted by Portage College in the Indigenous communities are seen as strong relationship-builders.

"From the interviews, the people report that the Portage College approach and the style of making contact with them, of being present, is a very good style," said Solez. "They say we do things in a very good way, and that has a lot to do with the feasts."

From the current project and from his previous academic research, Solez says community feasts continue to be a place to better connect with Indigenous groups, strengthen bonds, and to discuss important matters.

"I already had data that says if you want to get things done in an Indigenous community, you host a feast, invite the community, the leaders, have lots of nice food, music ... you can have a nice time and also talk about deals and work ... you can get things moving."

The current research also highlighted the "above-and-beyond" work done by Portage College staff and executive members, like recently retired President and CEO Nancy Broadbent and Pathways program coordinator Carla Neumeier.

"They identified Nancy as someone who is good at speaking to people and showing she really cares—not just about chief and council, or politics, but about the whole community. Many in the interviews said it was Carla's faith in them that got them where they are."

The high praise was shared with other College employees and staff members from the Indigenous communities working with the outreach programming.

"It was said often that the staffing, the success coaches, the instructors—they keep with the students like they are members of their family."

While he is excited to share the general positive outcome

DR. KEVIN SOLEZ

Portage College Humanities instructor

of the research, specific details of the full report will only be released after it has been reviewed by Indigenous leaders whose communities were part of the study. The report has also been given to colleagues at Portage College and the project's funding partner Future Skills Canada.

Solez hopes to turn the full report into two academic articles, one about the specific style that Portage College exhibits when partnering with Indigenous communities, and the other about fusing more Indigenous culture into contemporary education programming.

The applied research project is one of several currently undertaken by Portage College faculty. The Portage College Applied Research department is actively seeking project ideas, partnerships, and sponsorships.

The Unlocking Potential project is one of 35 proposals accepted by the Future Skills Centre Skills Horizons Program from a Canada-wide submission pool of 780 ideas. The applied research project received $248,000 in funding from Future Skills Canada.

Canada

Future Skills Centre | Centre des Compétences futures

Delving into Untapped Growth

PORTAGE COLLEGE APPLIED RESEARCH PROJECT HOPES TO TURN LAKE BLOOMS INTO FARM FERTILIZER

PHOTO BY DONNA FELEDICHUK

Portage College instructor and Environmental Technologist Diploma program Coordinator Al Bertschi believes the lakes and farmlands of northern Alberta may hold the key to helping each other. As the principal investigator of an innovative applied research project conducted through the college, Bertschi is exploring whether the same blue-green algae—also known as cyanobacteria—that scums up local lakes each summer, could transform into a valuable fertilizer for farmers' fields.

The project, which began in the summer of 2024, links back to his master's research where he studied the potential of using fly ash, a byproduct of wood and coal-fired boilers, as a soil amendment. Through studies, he demonstrated that fly ash could benefit the agricultural sector. The success led Alberta Environment to recognize it as a viable soil additive.

Now, Bertschi is applying that same circular logic to one of Alberta's most visible environmental challenges—algal blooms.

Each summer, nutrient-rich lakes like Lac La Biche, a recreational hot-spot and Alberta's seventh-largest lake - erupt in green scums of cyanobacteria. The blooms feed on phosphorus, a nutrient that enters lakes through natural runoff, decaying vegetation, and, historically, sewage or agricultural inputs. Over time, this buildup has pushed many lakes into what scientists call a hypertrophic state, meaning they're overloaded with nutrients, and bloom year after year.

"These lakes were probably always eutrophic—naturally nutrient-rich—but we've pushed them past that," Bertschi explains. "Now they bloom every year. They smell, they look bad, and they're not healthy for swimming or wildlife."

The study of cyanobacteria outbreaks is not isolated to Bertschi's current research; it's a common research topic garnering wide-reaching attention. In Alberta, there are several ongoing studies, including a large-scale project conducted through the University of Alberta. In other parts of North America, certain strains of blue-green algae are harvested by specialized industrial equipment and used in the cosmetic manufacturing process. Bertschi's research may be small-scale by comparison, but he says any research that can create possible outcomes and solutions to the issue is valuable.

He also says, with a smile, that while his research could help environmental and agricultural sectors at a global level, the home-grown process being conducted under the Portage College banner is deceptively simple.

"I do it myself. I live right at Lac La Biche Lake. I can see the research area from my backyard. When I see blooms, I am

right there. I use a fine mesh dip net to skim the bloom from the surface. I put it into a bucket, drive to work at the college and I'm ready."

At the college, the collected algae is weighed and then mixed with soil samples at varying percentages. Wheat and barley seeds are added to the treated soil and grown for 90 days to mimic a typical growing season.

The project runs entirely through Portage College's greenhouse and lab, with in-kind support from the institution and assistance from environmental technology students who water and monitor the plants.

Early results have been promising—the wheat and barley, common crops in the region, responded positively to the inoculation of lower percentages of algae-based amendment. That's encouraging, says the researcher, since phosphorus is one of the most valuable nutrients for plant growth.

The research is still early, as Bertschi and Portage College join other researchers exploring ways to reverse eutrophication without adding more chemicals to fragile ecosystems.

"Can we collect enough of the bloom to actually lower the phosphorus levels in the lake?" Bertschi asks. "If we can, it's a win-win. We help the lake recover and help farmers improve their soil."

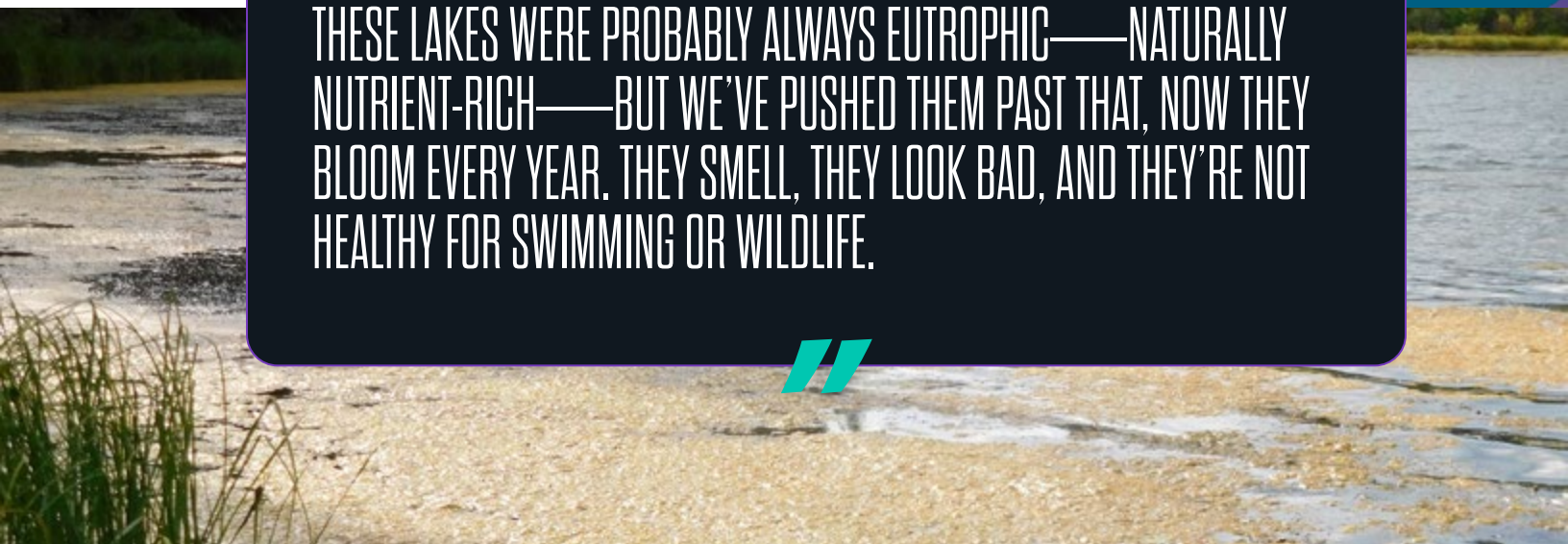
As he moves into his next round of trials, Bertschi plans to refine application rates, identify the specific strains of cyanobacteria in his samples, and, eventually, scale up to field-level testing.

If successful, his project could transform one of Alberta's persistent environmental headaches into a homegrown resource—proof that sometimes, the solution to pollution really can grow from the ground up.

AL BERTSCHI

Program Coordinator & Instructor,
Environmental Technologist Diploma,
Portage College

> "THESE LAKES WERE PROBABLY ALWAYS EUTROPHIC——NATURALLY NUTRIENT-RICH——BUT WE'VE PUSHED THEM PAST THAT, NOW THEY BLOOM EVERY YEAR. THEY SMELL, THEY LOOK BAD, AND THEY'RE NOT HEALTHY FOR SWIMMING OR WILDLIFE."



Recovering Critical Range:

Caribou Habitat and Lichen Restoration Research

PORTAGE COLLEGE RESEARCH AIMS TO RESTORE CARIBOU HABITAT AFFECTED BY FIRE AND DEVELOPMENT

How do you restore valuable food sources in woodland caribou habitat that may bring back the diminishing caribou populations, and also restore the ecosystem? And how do you do it in landscapes burned by wildfires or carved by increasing industrial development? Those questions are at the heart of a research project conducted by the Northern Alberta Institute of Technology (NAIT) in partnership with the Portage College Applied Research Department.

The project, Examining the Feasibility of Terrestrial Lichen Transplantation and Seeding Technology for Woodland Caribou Habitat Restoration, has just wrapped up its six-year initial phase. The project originally began with a conversation between NAIT officials and Portage College Environmental Technologist Diploma instructor Michael Schulz, a leading Canadian expert on lichens. and fungi.

"I talked to someone from NAIT about an idea I had to hydroseed lichens, and we created the proposal together," Schulz said.

The team's goal has been to explore whether reindeer lichen, a vital winter food source for woodland caribou in northern Alberta, can be effectively transplanted and re-established at a large scale in ecosystems altered by industrial development and natural disasters.

PHOTO BY JEFF MALBEUF

Existing studies from around the world about lichen replenishment show that lichen communities—particularly the reindeer lichen—have declined significantly. The reasons are numerous, including forestry operations, oil and gas development, expanding urban footprints, and in more recent years, increased wildfires.

Reindeer lichens are especially slow to recover after fire, says Schulz, explaining that it can take 100 years or more for natural lichen communities to return to burned sites.

"We found forestry cut blocks where at least one species had come back after 30 years. But after a fire? Nothing comes back on its own for a long time" he said.

The shrinking availability of lichen, whether from natural events or industrial development, restricts caribou movements and further exposes them to predators.

Linear disturbances such as roads and seismic lines also make it easier for predators like wolves and bears to navigate once-remote areas of the boreal forest where caribou cow-calf pairs have historically sought shelter.

Because of the focus on caribou habitat and ecosystem effects, most industrial or commercial developments planned or operating within known habitat areas must complete rigorous environmental checklists to safeguard the animals and the ecosystems.

How Do You Re-Grow Lichen?

Reindeer lichens are not plants and do not produce seeds. They are a partnership between fungi and algae and reproduce mainly through fragmentation.

MICHAEL SCHULZ

Research Chair in Environment and Sustainability within the Boreal Forest

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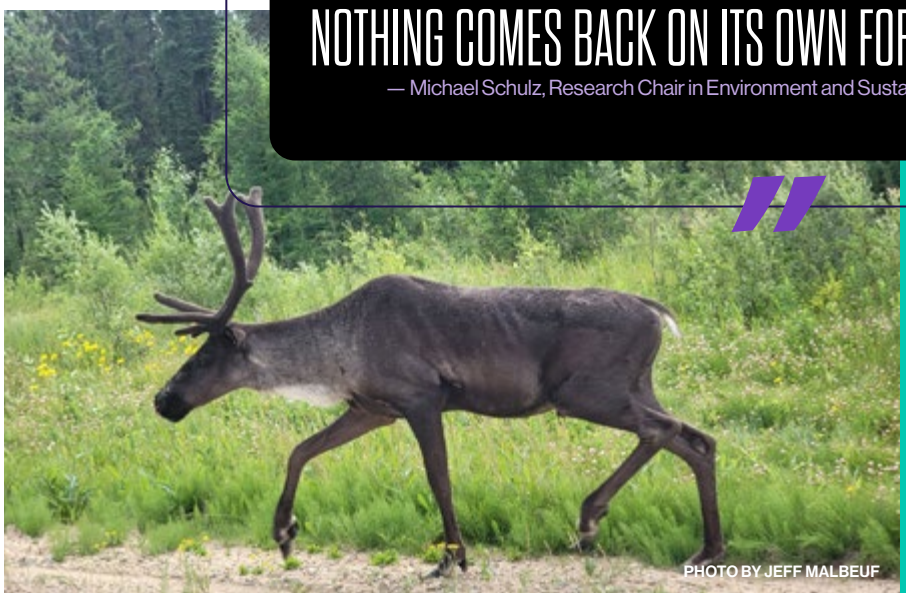

PHOTO BY JEFF MALBEUF

Throughout the research project, the team experimented with methods of spreading or planting various fragment sizes of lichen at test plots in northern Alberta and inside the greenhouse at the NAIT Boreal Research Institute in Peace River. Larger fragments—up to about eight centimetres in length—generally performed best when transplanted by hand. Researchers also explored the viability of mixing smaller pieces of lichen into a slurry and spraying it through hydro-seeding equipment onto a landscape. Schulz says distribution from the air using specially equipped drones is also an idea that should get more study.

"I'd love to design a hopper system that a drone could carry—a fleet of drones programmed to disperse fragments across a site," he said. "It's absolutely something I'd like to pursue."

Funds to Continue

Another aspect of the project was spent re-visiting previous research sites. Schulz said because lichen re-growth takes such a long time, many previous projects didn't have the funding to monitor their experiments for decades.

Findings from the initial phase of the current study are promising, says Schulz, but more work is needed before industry can adopt standardized restoration methods. He says the continuation of the project is important for the environment and industry, and will require long-term, multi-year funding.

"This could easily be a career-long project," Schulz said. "Even if we received funding for a large-scale study, the monitoring would take years. And there would always be ways to improve the methods as technology evolves."

As funding partners are sought, Schulz emphasizes that the objective is not simply to feed caribou, but to restore entire lichen communities and woodland areas.

"If we're trying to replace a community of lichens, it's important to try to get all the members of that community," he said. "Not just the ones caribou eat most."

Funding and Project Scope

The lichen study began six years ago with three years of funding from the Alberta Regional Caribou Knowledge Partnership, which is funded by forestry companies. The team then secured an additional three-year federal science grant. While Schulz appreciates the funding support so far, the nature of the research means that many more years of funding are required to keep the research going.

For now, the project offers a hopeful step forward in the effort to restore critical caribou habitat—one small, slow-growing fragment at a time.

Project Funding: Collaborative Applied Research Project with NAIT, funded by NSERC.

NAIT

Natural Sciences and Engineering Research Council of Canada | Conseil de recherches en sciences naturelles et en génie du Canada

Canada

PHOTO BY JEFF MALBEUF

Applied Research at Portage College 2024-2025

4
Research Chairs Established

- Environment & Sustainability
- Climate-Resilient Agriculture
- Rural Economic Development
- Rural Health

$500,000+
External research funding secured since launching our Applied Research Office.

40+
Students Engaged
Through summer studentships, applied research practicums, lab based projects, and field placements.

12
Municipal & Industry Partners
Including municipalities, First Nations, Métis communities, Alberta Innovates, NAIT, CMVF3C/CAF partners, forestry and energy sector collaborators.

45+
Community Based Interviews Conducted
To understand healthcare gaps, rural social-emotional care, Indigenous learner pathways, and military learner experiences.

6
Key Sectors Supported

- Agriculture
- Forestry & Wildfire Management
- Health & Wellness
- Indigenous Education & Workforce
- Military/Veteran Pathways
- Environmental Sustainability

1,000+
Lab and Field Hours Logged
Field hours have been part of data collection and observations in crop trials, fungal decomposition studies, cyanobacteria soil experiments, and lichen restoration test plots.

The only FUNGARIUM in Alberta
Cataloging **4,635** macro fungi across Alberta and Saskatchewan.

Why partner with Portage College?

Together, We Turn Regional Challenges into Practical Solutions

Portage College helps industry partners, communities, and public agencies accelerate innovation by blending on-the-ground expertise with applied research and student talent. From wildfire risk reduction and caribou habitat restoration to climate-smart crops, rural health, and workforce pathways, we co-design projects that deliver measurable outcomes for northeastern Alberta and beyond.

The Portage College Applied Research department offers expert-level academic and industry-focused research and a talent pipeline utilizing studentships and practicums to place motivated learners onto projects and into the workforce. We offer field and on-site lab work, preliminary consultations with partners to de-risk ideas before major investment, prototype and test validation, and a rooted focus on rural, community-based studies.

Our unique and talented roster of researchers and contacts provides informative and efficient results.

When it comes to funding navigation for projects, we work closely with our partners to assemble competitive proposals and budgets that consider sole sponsorship, co-funded agreements and external fundraising.

Areas Where We are Actively Collaborating

- **Environment & Sustainability**
  Fungus-based wood decomposition; cyanobacteria fertilizer; caribou range recovery.
- **Climate-Resilient Agriculture**
  Canola, barley, potatoes, soybeans under combined stresses.
- **Rural Economic Development**
  Fraud/ethics, SME analytics, community co-ops.
- **Mental & Physical Health**
  Co-operative clinic models, paramedic mental health integration, rural social-emotional care.
- **Workforce Pathways**
  Military training equivalencies in post-secondary; Indigenous foundational learning.

Have an idea worth exploring?

We partner with municipalities, industry, Indigenous communities, producers, and public agencies to turn local challenges into applied solutions.

Contact the Portage College Applied Research Office
cristina.holguin@portagecollege.ca | 780-623-5520

How Collaboration Works

1. **Start the Conversation**
   Email cristinaholguin@portagecollege.ca or call 780-623-5520 with a brief description of your challenge, desired outcomes, and timeline. We'll then schedule a 30-minute scoping call.

2. **Co-design a Proposal (2–3 pages)**
   We clarify objectives, methods, milestones, roles, budget, data terms, and success metrics. If appropriate, we identify external funding options and prepare submissions together.

3. **Launch the Project**
   Kickoff & ethics/REBOARD (if human participants). Field/lab setup (e.g., greenhouse trials, forest plots). Student placements to build capacity.

4. **Share Results and Scale**
   We deliver a concise report (methods, findings, recommendations) and, when relevant, help you scale to larger pilots or production workflows. We can co-publish non-proprietary learnings.

PARTNER READINESS CHECKLIST

- Challenge statement & desired outcomes
- Site or data access (if applicable)
- Internal lead/point person
- Indicative budget range and timeline

EXAMPLES OF COLLABORATION

- **Municipality:** Reduce wildfire risk by inoculating slash piles with top-performing wood-decomposing fungi; track moisture and flammability changes seasonally.
- **Ag producer:** Identify seed lines resilient to combined heat+drought; field trials with extension support.
- **Health co-op:** Feasibility study + community survey + governance model; implementation roadmap.
- **Industry/forestry:** Long-term lichen restoration methods for caribou habitat; drone-based distribution pilots.

Let's Build Solutions—Locally, Credibly, and Together

We are ready to work with you on your next project.

Visit portagecollege.ca > Applied Research

or contact the Applied Research Office to explore ideas.

OUR FUNDING PARTNERS

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ONTARIO COUNCIL ON ARTICULATION AND TRANSFER (ONCAT)
Supporting pathways between military training and post secondary education.

ALBERTA INNOVATES
Funding student research opportunities and innovation in health, sustainability, and technology.

NSERC — NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL OF CANADA
Supporting discovery, innovation, and multi-year environmental research collaborations.

FUTURE SKILLS CENTRE (FSC)
Advancing workforce development and Indigenous community-based learning pathways.

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