INSPIRING INNOVATION

SASKATCHEWAN POLYTECHNIC

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Applied research is where ideas meet reality, delivering practical solutions to everyday problems. Applied research assesses a need, proves a concept and tests new products to refine them for market.

From agriculture to artificial intelligence, from biotechnology to biomechanics, our faculty experts will help you refine your question, set up a research program and even build your prototypes for testing. With dozens of program areas and some of the most advanced equipment in the province — we have the expertise you need.

Whether you're an aspiring entrepreneur with a big idea, or an industry professional with a challenge begging for a solution, Saskatchewan Polytechnic has the tools and expertise to help.

INNOVATIVE MANUFACTURING CENTRE WHERE INDUSTRY VISIONS BECOME REALITY

Saskatchewan has produced some of the most advanced technology in the world, a status Sask Polytech aims to continue to support through applied research at its new Innovative Manufacturing Centre (IMC) at the Regina and Saskatoon campuses.

"By working together on applied research partnerships, we can help ensure that Saskatchewan's manufacturing sector is able to adapt to the technological advancements and rapidly changing innovations of industry," says Jamie Hilts, Sask Polytech's dean of the School of Mining, Energy and Manufacturing and the School of Natural Resources and Built Environment.

"By doing so, we will allow for it to be competitive and productive on a local, national, and international scale."

After a significant overhaul and additions to the available facilities, the IMC is positioned as the most well-equipped machining and manufacturing facility in the province, which includes a full testing, prototyping and certification centre.

The IMC in Saskatoon also features a mature additive manufacturing (3D printing) program and facilities. These facilities offer the capability to rapidly produce prototypes and parts with plastic and carbon fibre composites. Soon, the facility will also be home to a 3D printer that can create products and items with metal.

For industry, the IMC is a resource like no other, available to start-ups, small- to medium-sized businesses and large manufacturers serving international markets.

Agricultural equipment manufacturers, for example, can access the latest tools, equipment and expertise to improve production methods and test new ideas, such as experimenting with bioplastics to make lighter, stronger, more environmentally friendly components for their products.

Photo of Grant Paul, academic chair for the school of Mining Energy and Manufacturing.

EQUIPMENT HIGHLIGHTS

Machining:

- More than a dozen new CNC lathes (including a robotic loading system)
- Welding robot
- Five-axis water jet cutting system
- Cart robotic system for machining integration
- CNC parts measuring machine with laser scanner
- Five-axis machining centre

Design and Prototyping:

- 3D printing (plastic, carbon fibre composite, metal)
- Injection and rotational molding equipment for plastics and composites
- Fibre cleaning and processing system (tumbler, picker, separator, carder, yarn and felt maker)
- Twine screw extruder
- Demonstration plant (includes hammer mill, freeze dryer and biomass pellet lines)

Testing:

- Chromatography (gas, liquid and solid analysis)
- Impact pendulum
- Impact drop tower
- Capillary rheometer
- Melt flow indexer

Companies needing prototyping can access many options, from using a water-jet cutting system, CNC lathes or thermoplastic injection using fibre support. Recent funding from Western Economic Diversification will add more molding equipment, biomass and fibre equipment, certification and testing capabilities to the mix.

"Right now, prototyping, testing and certification are services that are difficult to find and extremely expensive," says Dr. Satya Panigrahi, who holds the Sask Polytech research chair, Innovative Manufacturing. "We can make these services available to businesses that otherwise would not have had the ability to access them."

In addition to a PhD in Chemical Engineering, Panigrahi holds extensive experience and expertise in bioprocess engineering, with a special interest in bioplastics and biocomposites research and development in both academic and industrial settings. Bioplastics, which are a combination of plastics and natural fibres, exemplify the opportunities at the IMC to create value-added products.

The IMC benefits from significant industry donations, including $453,000 from the Gene Haas Foundation to establish the Gene Haas Manufacturing Technology Lab in Regina. Other donors include Skinner Thomas & Son Ltd, Sandvik Coromant Canada and Mitutoyo Canada Inc.

Across the hall from the Haas Lab is the Biomaterials Testing and Prototyping (B-TAP) facility, which focuses on custom prototype production. Its development will offer bioplastic production and expertise, including both injection and rotational molding plus testing capacity. This last is essential to determine strength and fitness of products to complete pre-sale certification – work that is now done mostly out of province or even out of Canada.

Panigrahi and his colleagues are currently working to find new purposes for used, recyclable grain bags by combining them with flax fibre, a largely under-utilized resource. Flax is a popular crop and the fibre from the plants is extremely tough and durable, but it often goes unused.

"By putting these grain bags and flax fibre into use in bio-plastics, we are recycling and reducing waste, while developing the capacity for jobs in Saskatchewan," Panigrahi says. "At this point we have two companies who will be doing projects that involve recycled grain bags being combined with flax fibre to create new products."

The IMC is the physical hub of the new Innovative Manufacturing program, the result of a collaboration among Sask Polytech, industry and employers. It is geared toward providing students with broad knowledge and skills ranging from mechanical and CAD/CAM engineering, welding, machining, fibre, bio-plastic and composites experience, to project management, industrial design, quality control and assurance. Graduates will go on to manufacturing jobs in sectors such as industrial, agricultural, mining, textile, forestry and food processing. The program accepted its first students in fall 2017.

Partnering with Sask Polytech on applied research projects gives industry access to faculty expertise as well as opportunities for funding through federal agencies.

"Through collaboration everyone involved succeeds — our industry partners, our students and the future of manufacturing in Saskatchewan," says Dr. Susan Blum, associate vice-president of Applied Research and Innovation.

"WE CAN MAKE THESE SERVICES AVAILABLE TO BUSINESSES THAT OTHERWISE WOULD NOT HAVE HAD THE ABILITY TO ACCESS THEM."

Dr. Satya Panigrahi, Sask Polytech research chair, Innovative Manufacturing.

Photo of Tim Muench, B.E., M.Sc., P.Eng, Sask Polytech program head of Mechanical and CAD/CAM Engineering programs.

PARTNERING WITH THE COMMUNITY

APPLIED RESEARCH THAT PROMOTES INDIGENOUS FOOD SOVEREIGNTY

Saskatoon Tribal Council (STC) and Sask Polytech have partnered to create knowledge and teach students how to produce food for themselves and their communities.

Under a five-year memorandum of understanding, the partners have agreed to enhance training and applied research for Indigenous food sovereignty. They will also conduct research into the potential for new horticulture programs and identify key industrial and funding partners to support the initiative.

Dr. Susan Blum, associate vice-president of Applied Research and Innovation, explains the core concept. "It's the ability for Indigenous communities to have sovereignty over their food and land but to also be in a place where food production can enhance the community."

Projects could include new programs for students interested in rural and urban horticulture systems. Examples could include training, design and construction of horticultural facilities such as greenhouses. Other areas include growing food plants in greenhouses and community gardens and learning how to cultivate native plants that are part of traditional Indigenous diets. Business opportunities such as market gardens could also be part of the mix.

Jamie Hilts, dean of the School of Natural Resources and Built Environment, explains that the partners discovered they were moving in parallel directions. Sask Polytech was looking to implement an Agri-Food diploma program and STC was looking for training opportunities in these areas. "We realized we had something in common we could work on together."

"WE REALIZED WE HAD SOMETHING IN COMMON WE COULD WORK ON TOGETHER."

Jamie Hilts, Sask Polytech's dean of the School of Mining, Energy and Manufacturing and the School of Natural Resources and Built Environment.

CSI AT THE FOREST EDGE

David Halstead and colleague Leila Benmerrouche were documenting a mock crime scene in the forest ahead of their student investigators when the idea occurred: what if there was a way to get a 3D "snapshot," including aerial footage?

"This exercise made us realize conservation officers probably need environmental context more often than any other agency," says Halstead, a senior researcher and project manager within the School of Natural Resources and Built Environment in Prince Albert.

Halstead explains conservation and environmental protection officers work in wide open spaces, where evidence of movements and actions of perpetrators such as wildlife poachers must be interpreted in complex terrain, unlimited by walls, streets or buildings.

Having an overhead view would be extremely valuable. Using an approach called Structure from Motion (SFM), overhead images could be combined with those taken at ground level to create a 3D virtual version of the crime scene.

It seemed like a project tailor-made for Saskatoon-based Draganfly Innovations, a prominent manufacturer of unmanned aerial vehicles (UAVs also known as drones) for the international market. The idea fit well with the company's extensive expertise in applications such as accident reconstruction and search and rescue.

"Draganfly liked our pitch and had already been involved in some 3D SFM work," Halstead says. "This seemed like a no brainer to take the same technology they had helped to develop and apply it in their public safety wheelhouse."

The partners applied for and received an Engage Grant from the Natural Sciences and Engineering Research Council of Canada to pursue the research.

Sask Polytech brought a broad range of expertise to the table, including Halstead as UAV Operations manager and Benmerrouche, an expert in 3D imaging, remote sensing and GIS (geographic information science). Students worked as assistants and observers during field operations. Faculty members Nat Strom from Resource and Environmental Law and Ryan Galbraith from the GIS program rounded out the team.

Andrew Carson, sales lead at Draganfly, says it was Sask Polytech's technical expertise and hands-on knowledge of the working environments of conservation officers that attracted their interest.

Draganfly sells aerial solutions to law enforcement agencies around the world, including the knowledge on how to use them most effectively and efficiently.

"Our systems provide ease of use and automated data collection, allowing law enforcement officers to easily collect information and recreate those scenes, essentially preserving their crime scene so it can be measured and observed," Carson explains. "This is really important. When developing a UAV program, it's not just taking a drone out and flying it, but knowing and understanding the optimal work flow and sharing that with other officers."

So far, the research has demonstrated that UAVs allow an entire crime scene to be recorded without disturbing it. Investigators then go in on foot, capturing further video and still images. These are stitched together with software to create a "synoptic" view, capturing the whole of the scene, observed from many angles.

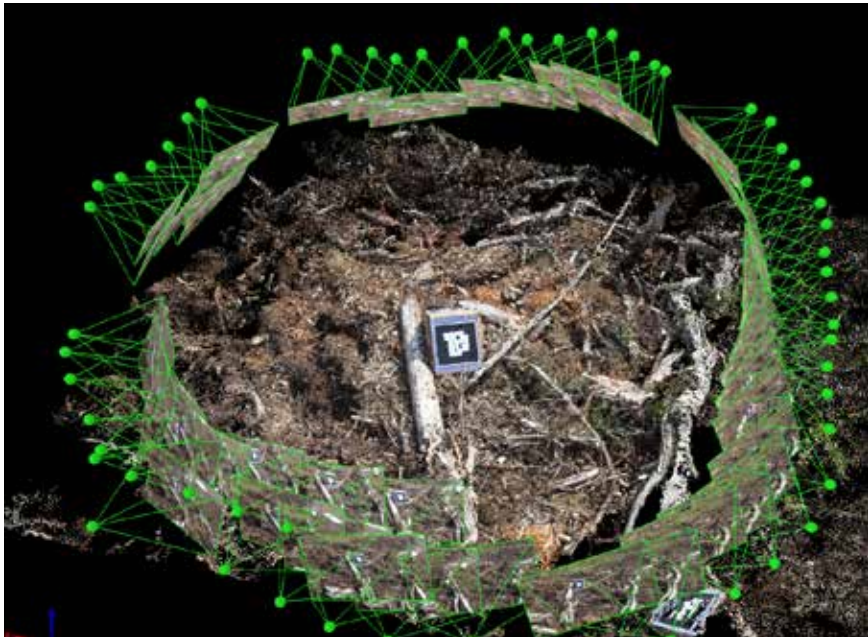
The 3D virtual model of the crime scene can also be used in ways not possible in real life. Forest canopy can be removed to see details below. The whole image can be tilted and rotated to, for example, demonstrate the line of sight the poacher may have used to down an animal a couple of hundred metres away.

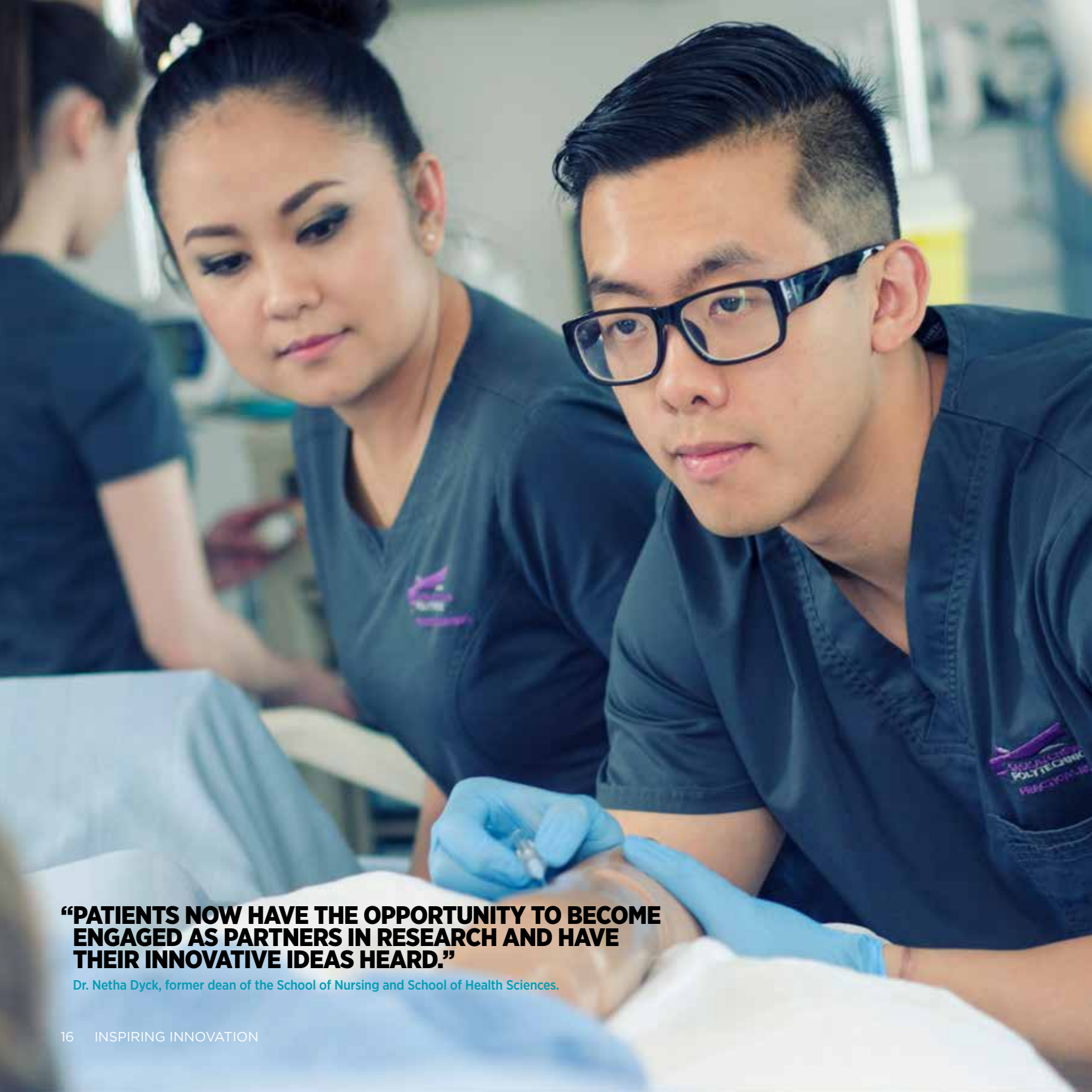
"3D technology could conceivably allow a juror to walk through a virtual depiction of the forest long after it's been harvested or destroyed by fire," Halstead says.

"We believe this kind of research can have huge implications for sustainable management of our resources and for helping with environmental files such as chemical spills and industrial contamination," he says. "We are always looking for ways to further the research."

David Halstead, MSc, BSc, senior researcher and project manager, School of Natural Resources and Built Environment.

Evidence Tie Point marker (ETP marker) setup in mock crime scene investigation identifying spent bullet casing.





“PATIENTS NOW HAVE THE OPPORTUNITY TO BECOME ENGAGED AS PARTNERS IN RESEARCH AND HAVE THEIR INNOVATIVE IDEAS HEARD.”

Dr. Netha Dyck, former dean of the School of Nursing and School of Health Sciences.

PATIENT-DRIVEN INNOVATION

SASKATCHEWAN CENTRE FOR PATIENT-ORIENTED RESEARCH (SCPOR)

If customer feedback is crucial to success in business, it's absolutely essential in health care, where the "customer" is the patient and the consequences affect life and limb.

Getting this patient feedback – including direct participation – is the mission of the Saskatchewan Centre for Patient-Oriented Research (SCPOR) in Saskatoon. SCPOR is one of eleven provincial/territorial units led by the Canadian Institutes of Health Research (CIHR) to build provincial and national capacity for patient-oriented research.

"Patients now have the opportunity to become engaged as partners in research and have their innovative ideas heard," says Dr. Netha Dyck, former dean of the School of Nursing and School of Health Sciences. "SCPOR connects patients directly with researchers and values their contribution within the multidisciplinary research teams."

Launched in Saskatoon in the spring of 2017, SCPOR's goal is to connect patients, caregivers and researchers to address pressing issues in health care. It is funded by Sask Polytech and CIHR, along with nine partner organizations including the provincial government, health authority, and other health research funding agencies.

By making the patient the focus – and even part of the team – SCPOR opens research up to perspectives of their lived experiences.

For example, First Nations and Métis patients could contribute ideas from cultural practices and traditions as well as more pragmatic issues of accessing health care in rural and remote communities. Nursing faculty researcher Jan Cochrane is using the new technology electroretinography to screen people in rural and remote communities for retinopathy, a leading cause of vision loss among people with diabetes.

"The goal is to close the equity gap in health services and patient outcomes by ensuring findings translate into practices and policies that have been led and sustained by Indigenous communities," Dyck says.

Recent immigrants and refugees are also sharing their experiences of the hurdles they face from language and culture.

"The community identified that refugees experience several obstacles involving social connections, which, in return, can affect their mental health and well-being," says Dr. Sarah Kostiuk-Linford, one of three Sask Polytech research chairs working through SCPOR.

Kostiuk-Linford holds the Sask Polytech research chair in Refugee Health. She is a faculty member in the Saskatchewan Collaborative Bachelor of Science in Nursing (SCBScN) program and adjunct professor at the University of Regina.

Another SCBScN research chair, Pamela Farthing, is leading research to support young adults with diabetes as they transition to managing their condition on their own. Through consultation with young diabetics, their families and health care providers, Farthing and her team aim to change existing policies and practices to help young adults with diabetes protect their health and lives.

The third SCBScN research chair, Dr. Madeline Press, is looking at end-of-life care. She is focusing on community-based, interprofessional end-of-life care for patients with chronic disease, dementia or frailty.

Dyck explains that SCPOR research is all about improving the quality of care and ensuring the right patient receives the right intervention at the right time – and that this work is aligned with provincial health priorities. The research projects range from smartphone apps designed to self-manage mental health to measures to reduce emergency wait times and protocols to allow seniors to "age in place."

"SCPOR provides a very unique service that is specific to Saskatchewan health care," Dyck says. "It is a very effective way to offer services and resources and connect researchers, patients, knowledge users and decision makers for the improvement of patient care."

READY TO GET STARTED?

Sask Polytech's applied research partners have access to exceptional facilities and faculty expertise, funding for research and development, and a wide network of connections. By partnering in innovation and testing we enable companies to capture new opportunities, solve everyday problems and contribute to economic growth and job creation in Saskatchewan.

SASK POLYTECH DELIVERS SOLUTIONS TO INDUSTRY PROBLEMS

Applied research projects at Sask Polytech are steered by industry, business and the community. Through a collaborative applied research approach Sask Polytech can help industry adapt to technological advancements, respond to changing needs and contribute to creating a stable economy.

SASK POLYTECH CAN HELP INNOVATE AND DEVELOP PROTOTYPES FOR INDUSTRY PARTNERS

Sask Polytech has the in-house capacity to conduct experiential development, business validation, and technology adoption and provides the resources industry needs to innovate. Faculty and staff combine their expertise with a wide spectrum of leading-edge technology such as 3D printers, water and laser-jet cutters, and computer numerical control (CNC) machines to assist research partners with the capital-intensive components of the product development process.

SASK POLYTECH INVOLVES STUDENTS IN APPLIED RESEARCH AND INNOVATION

Students participate in applied research projects that offer team work and problem-solving experiences to solve real business challenges. The benefit of student participation is dual: businesses get access to an additional resource and students build their skills, ensuring graduates are ready to contribute on the job on day one.

SASK POLYTECH GETS RESEARCH AND DEVELOPMENT FUNDING

From start-ups to established industries, Sask Polytech knows where to find financial support. Whether you are looking to start a new project or take your business to the next level, Sask Polytech will put our knowledge to work connecting researchers and their industry partners with the funds they need.

CREATE CAFÉ

Create Café was a small 3D print shop in Saskatoon when Randy Janes walked in with some big dreams as owner and operator of a Printron – the largest indoor 3D printer in North America and the only one in Canada. Viewable in the café, the machine measures more than 8.5 metres long and more than two metres in width and height.

It presented both challenge and opportunity for Create Café's founder and CEO Dustin Maki.

"When dealing with a machine the size of Printron, there really is not an online store to stock up on parts," he says. In particular, the high-flow nozzles they needed simply didn't exist.

"We needed nozzles that fit our vision of what we were going to be printing."

Create Café approached Tim Muench with the challenge. Muench, program head of Sask Polytech's Mechanical and CAD/CAM Engineering programs took on the project with Lorne Diakow, a faculty member who did the CNC programming and machining.

"Assistance from Sask Polytech is exactly what innovative companies need to look for when they are taking on big projects," Maki says. "Programs like these put you three to six months ahead."

The collaborative project produced a variety of Printron nozzles capable of extruding 10mm output (the largest commercially available produce 6mm).

"We have achieved line widths of 10mm, creating a very strong structure in very little time," Maki says. "This has allowed us to venture into unchartered 3D printing waters as we attempt to get some very large scale pieces out of the printer."

Of course, large-scale projects are only part of Create Café's business. For those new to the field of 3D printing (also known as additive manufacturing when used in an industrial setting), Create Café provides hands-on workshops. Or you can stop by the café for a coffee to learn more about 3D printing.

Those already in the know, such as industry customers, can access rapid prototyping backed with expert help.

"We have been able to provide businesses with completely custom parts they ordered in the morning by lunch time," Maki says.

Inventors also benefit from Create Café's expert support. Maki explains customers can arrive with back-of-the-napkin sketches or a clearly defined vision of their product with dimensional drawings. The goal is to work with inventors to develop a detailed design and get a 3D printed model in their hands as quickly as possible.

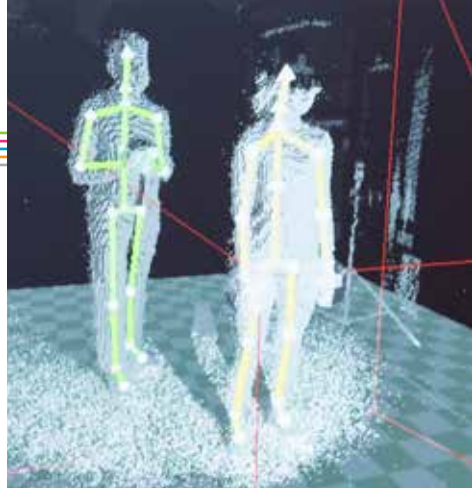
As the business grows, Maki sees potential for future applied research projects with Sask Polytech.

"We have been in talks about doing a student-run research program," he says. "As well we are looking to the students at Sask Polytech as potential hires in the upcoming year."

"ASSISTANCE FROM SASK POLYTECH IS EXACTLY WHAT INNOVATIVE COMPANIES NEED TO LOOK FOR."

Dustin Maki, founder and CEO, Create Café.


CRAVEN
SPORT
SERVICES



THE VIRTUAL COACH

As a physiotherapist, coach and trainer, Bruce Craven's prescriptions depend on repetition – performing the right motions, in the right way, at the right speed until they become second nature.

"It's a person doing a skill with purpose, then receiving feedback to tell them whether they are achieving that goal," says Craven of Craven SPORT Services in Saskatoon. The company serves a wide range of clients, from Olympic athletes to people wanting to enjoy pain-free gardening or be able to play with their kids.

Getting an exercise prescription right takes both practice and expert guidance. That guidance can't be available all the time, especially if the athlete or client lives out of town. What was needed was a way to pack up a physiotherapist-coach-trainer in a box to take home.

Craven brought up the idea with Dr. Susan Blum, associate vice-president of Applied Research and Innovation at Sask Polytech.

"I had an open discussion with Susan about how something could be developed," Craven says.

In short order, he met with Sask Polytech applied research experts to get started, mapping out the project, creating a framework and applying for a grant from the Natural Sciences and Engineering Research Council of Canada.

The idea is to build a virtual coach, capable of observing and analyzing motion and providing instant feedback on what the person is doing right and what they need to refine and improve.

"It's a user-based kinematic system that will enable the client to get real-time feedback on their prescribed exercises," Craven says.

Such systems will be familiar to players of console-based video games, and indeed Craven explains their solution is based on similar off-the-shelf technology. He envisions the solution will be portable and used on a tablet, computer or television monitor. The project is now in a pilot stage, and he expects to recruit athletes to develop it further.

"The difference with Sask Polytech is they're solving the problem, not just researching the problem."

"To be honest I don't think it could have been done without Sask Polytech," he says. "They were the driving force behind it."

"THE DIFFERENCE WITH SASK POLYTECH IS THAT THEY'RE SOLVING THE PROBLEM, NOT JUST RESEARCHING THE PROBLEM."

Bruce Craven, M.Sc., B.Sc.(PT), DIP. SPORT(PT),B.S.P.E.,CSCS, director of training, Craven SPORT Services.

REFRESH WELLNESS APP

Nick Kochar didn't set out to make a mental wellness app, but when he spotted an unusual tattoo on the wrist of a good friend and colleague, he got to thinking.

"She showed me a tattoo on her wrist; it was a semicolon," says, Kochar, owner of Saskatoon brand and digital marketing agency Refresh. His friend explained the punctuation mark has been embraced as a symbol of suicide and self-harm prevention.

"She said to me, like a semicolon, a sentence is supposed to end but continues."

But why the symbol, he wondered? Why the code? When it comes to physical wellness, there is a wealth of information, tools and professional support offering advice on everything from the usual aches and pains to how to recover from a broken limb. But for mental wellness, supports are harder to come by.

For Kochar, who holds an MBA and a degree in computer science, the wheels started turning. Smartphone apps for physical health put the power in the user's hands.

Could an app give people the power to manage their mental health too?

Coincidentally, within days of the semicolon conversation, Kochar was invited to attend a networking event at Sask Polytech's School of Nursing. There, Kochar met Dr. Terry Peckham, senior research associate at Sask Polytech.

It was the first of a series of conversations that turned the initial concept of a mental wellness app into a research and development project for Peckham, colleagues Cyril Coupal and Kelvin Boechler and two students under their supervision. They applied for and received an Engage Grant from the Natural Sciences and Engineering Research Council of Canada (NSERC) for the work.

"THE RELATIONSHIP WAS VERY COMPLEMENTARY."

Nick Kochar, chief strategist & CEO, Refresh.

"The relationship was very complementary," Kochar says. "They brought the tech know-how, I brought the broad strokes. The actual knowledge and skills of how to get it done using the fundamentals of modern software development, that came from Sask Polytech."

The collaboration yielded the Refresh Wellness app, designed to allow users to monitor their own mental wellness, evaluate how different activities and strategies affect this wellness and connect people into a community.

Kochar envisions the app will also be able to connect users with providers of services such as yoga and tai chi, or products such as full-spectrum lights and beds.

While the Refresh Wellness app is designed for personal use, Kochar brought it to several health care professionals, who immediately identified its potential to help them serve their patients better. The app captures much richer information than they can get from their usual intake forms.

"You could actually choose to share your log with your mental health professional," Kochar says. "That professional could have three months or half a year's data – it would give them a real leg up."

The Refresh Wellness app is expected to be available in 2018 for both iOS and Android platforms.

DALMATIAN BY VIKING INNOVATIONS LTD.

You're right to worry if you left the stove on – unattended cooking is the number one cause of household fires in Canada, says Jackie Martin of Viking Innovations Ltd. in Saskatoon. The company invented and manufactures the Dalmatian Smart Fire Prevention™ system, which shuts off power to the stove and kitchen counter plugs if smoke is detected.

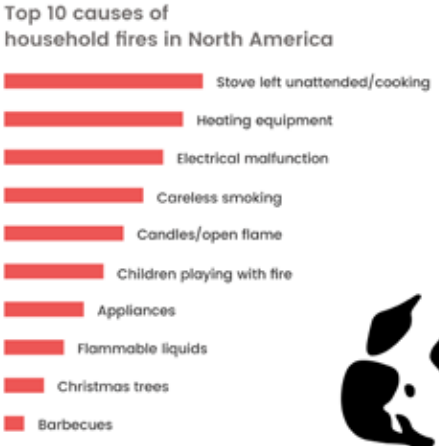
Viking is working with Sask Polytech on a custom-designed case for their second-generation system, using computer-aided 3D modelling and printing to enclose the prototype device. Once printed, the case will be presented for certification. Martin anticipates several rounds of feedback, adjustment and further 3D prototypes to achieve a final design before going on to mass production.

"I was really impressed with the willingness to work with industry and the expertise Sask Polytech demonstrated every step of the way," Martin says. "We have a working prototype but our relationship with Sask Polytech will help us commercialize our new product in a timely fashion and within budget."

The second-generation system is designed to be easily installed. It will offer features such as system notifications and the ability to observe and shut the stove off remotely via a smart phone. Sask Polytech and Viking are also pursuing funding through the Natural Sciences and Engineering Research Council of Canada to develop a smartphone app and other components.

"OUR RELATIONSHIP WITH SASK POLYTECH WILL HELP US COMMERCIALIZE OUR NEW PROJECT IN A TIMELY FASHION AND WITHIN BUDGET."

Jackie Martin, vice president,
Viking Innovations Ltd.



Source: Dalmatian by Viking Innovations Ltd.

ORA BY KASIEL SOLUTIONS

Kasiel Solutions of Saskatoon is working with the Digital Integration Centre of Excellence (DICE) at Sask Polytech to expand the capabilities – and markets – of ORA, their personal safety device. Originally designed for seniors, ORA can be worn as jewelry and programmed to call a customized list of contacts and transmit the senior's location via their cellphones in the event of an emergency. If their designated contacts don't respond, the system calls 911.

ORA is also very attractive for lone workers, such as taxi drivers and realtors. In fact, it is already being adopted and endorsed by the Saskatchewan Taxi Cab Association. This new market means expanding ORA's capabilities to serve organizations with hundreds of employees, where a single supervisor may receive alerts from a dozen or more staff.

"WHEN YOU GO TO A REPUTABLE ORGANIZATION LIKE SASK POLYTECH, YOU KNOW WHAT YOU'RE GETTING."

Serese Selanders, founder and CEO, Kasiel Solutions.

"ORA was created as a direct consumer product," says Kasiel Solutions founder and CEO Serese Selanders. "We needed a way to manage an enterprise solution and we needed help."

Selanders explains the company had existing links with Sask Polytech through summer student placements and a personal relationship between Dr. Terry Peckham of Sask Polytech's DICE and ORA's vice president of Software, Andre Doucette. An NSERC Engage Grant has been received to develop a new interface for Ora's expansion into the lone worker market.

Selanders explains that Sask Polytech offers affordable access to expertise.

"When you go to a reputable organization like Sask Polytech, you know what you're getting," she says.

"As a start-up we have limited resources and this was a way to get research and development help without putting out a significant amount of money, although we did spend some of our own internal resources. It's a huge help."

biktrix
electrify your ride

"THIS HAS NEVER BEEN DONE BEFORE WITH SUCH DYNAMIC RANGE."

Roshan Thomas, founder and CEO, Biktrix.

BIKTRIX

You might call it The Hulk project: create an electric bike that's a mild-mannered commuter that transforms into an off-road beast when things get gnarly.

"We are making a new class of vehicle," says Roshan Thomas, founder and CEO of Biktrix in Saskatoon. "We want to give the customer the flexibility of riding 200-plus kilometres on a charge as a pedal assist bike – the largest range ever on an ebike – or switch to off-road mode and ride it as the most powerful electric dirt bike."

Thomas is working with Tim Muench, B.E., M.Sc., P.Eng, Sask Polytech program head of Mechanical and CAD/CAM Engineering programs. The project is to design, prototype and test the numerous parts of the bike that must work in concert, from frame and saddle to brakes and power system.

Biktrix's existing line of pedal-assist bikes deliver a maximum of 500 watts. The goal is to be able to switch on the fly to dirt bike mode, with 5-10 kilowatts – 10 to 20 times the power.

"This has never been done before with this much dynamic range," Thomas says.

Backed with funding from the National Research Council's Industrial Research Acceleration Program, initial prototyping work will take advantage of Sask Polytech's 3D printer and CNC lathe capabilities.

PEOPLE HIGHLIGHTS

EXPLORING SUSTAINABLE ENERGY SOLUTIONS

Every year, graduating Sask Polytech students get a chance to apply what they've learned to an applied research project that engages their passion and creativity.

For Architectural Technologist Jasmin Peters, that passion is sustainable energy to heat buildings through Saskatchewan winters. As her capstone project, she explored the feasibility of using pellet boilers in a very specific application: a four-season kiosk washroom facility in Moose Jaw's Wakamow Valley park. She presented her work at the annual Student Applied Research Showcase at Sask Polytech's Regina campus.

"I felt it was a good opportunity to share the things I had learned, on a topic I actually find quite fascinating," she says. "The implications of converting from natural gas to a mainly biomass heating system, even if only in residential applications, would have an incredible impact nation-wide on both Canada's economy and on a more sustainable world as a whole."

Peters' presentation included a poster with historical and economic facts (for example, 90 per cent of Canada's wood pellet production is currently exported to Europe). She did the calculations for the plumbing, mechanical, electrical and building envelope, produced a full set of working drawings and budget – everything needed to construct the building. She also built a detailed scale model with a removable roof so visitors to the showcase could see all details of her design including the mechanical room with pellet storage, boiler and hookups.

Wood remains part of Peters' daily life as she applies her skills as a roof designer and estimator with Gang-Nail Trusses and Building Components, in Pilot Butte, SK.

"I am hoping to stay more involved in the renewable resource sector throughout my career."

BRING ON THE BUGS: HARNESSING SYNTHETIC BIOLOGY FOR CLEANER INDUSTRY

When Dhinesh Periyasamy graduated from Sask Polytech he left a legacy: a way to harness synthetic biology to clean up industrial waste.

“I am continuing on the development of the technology,” says Blaine Chartrand, head of the BioScience Technology program. “It was done in-house as an extension of Dhinesh’s capstone project.”

Periyasamy’s hometown in southern India, famous for its brilliantly dyed cloth – but infamous for the toxic effluent from that same industry, was the inspiration behind this research project.

“Ten years ago, the dying factories dumped textile effluent straight into the river and it poisoned and polluted part of the river in our town,” he says.

Government regulations were enacted to stop the indiscriminate dumping, but smaller textile producers couldn’t afford to clean their effluent.

Periyasamy wondered if there might be a way to harness synthetic biology to come up with a new, low-cost way to treat industrial effluent. Synthetic biology modifies existing natural systems to produce useful products such as medicines and biofuels, or processes to, for example, extend the shelf life of beverages.

“What we did in the lab is we grew the bacteria in a textile effluent,” Periyasamy explains. “It actually worked in a tube to use the live culture to clean up the dye. There was a 40 per cent degradation after four days.”

Sask Polytech is determining proof of concept for the technology and is looking for an industry partner to explore scalability and additional applications.

Chartrand’s lab is the only Saskatchewan member of iGEM, the International Genetically Engineered Machine Foundation. He explains that the BioScience Technology program uses the latest technology to train students and work with industry partners both in his own lab and at the BioScience Applied Research Centre.

“We do a lot of recombinant DNA and transformation of E.coli; we also have capacity to transform yeast and are looking at cyanobacteria as well,” he says.

Photo of Dr. Terry Peckham, senior research associate at Sask Polytech working on the Craven SPORT Services applied research project.

CONTACT US

Do you have a research idea, prototype, or project that you need help with?
Contact us with as much detail as you can. This information will be kept confidential and will help us to determine if we have the resources to meet your needs.

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