UNIVERSITY OF REGINA RESEARCH MAGAZINE WINTER 2021

Discourse

Generation-II BioPETx: The future of plant imaging

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Detail from *All my relatives* by Larissa Kitchemonia.

Kitchemonia, an interdisciplinary master's student in Indigenous studies and visual arts in the U of R's Faculty of Media, Art, and Performance, says her piece represents lost familial narratives, and presents and celebrates matrilineal knowledge and interconnectedness. Informed by an Anishinaabe teaching, "I am all my relatives and all my relatives are me" (Vukelich, 2020), Kitchemonia says, "In other words, my ancestors are with me, and, especially as a woman, I, too, carry future generations within me."

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Discourse

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(On the cover) University of Regina physicist Zisis Papandreou holds a Gadolinium Aluminium Gallium Garnet (GAGG) scintillator, surrounded by a white light diffuser that mixes light uniformly inside of it. Immune to magnetic fields, GAGGs are used in modern clinical systems that have a PET (Positron Emission Tomography) scanner inside MRI (Magnetic Resonance Imagine) systems in hospitals.

Inside

DISCOURSE: THE RESEARCH MAGAZINE OF THE UNIVERSITY OF REGINA.

FEATURES

8
Digital connections
A new online resource helps child services workers support the mental health and well-being of vulnerable children and adolescents.

12
Physics and the principles of collaboration
Zisis Papandreou and his team have built one of the world's most advanced tools for looking inside living plants.

COLLABORATIONS

22
Tracking COVID's trash toll
Kelvin Ng is working with the City of Regina to develop a waste prediction model over the remaining waves of the COVID-19 pandemic.

23
In real time
Tarun Katapally is a patient-oriented research leader using citizen science to tackle COVID-19 in Indigenous communities.

DEPARTMENTS

Vice-President(Research)Message

"The saying *together we are stronger* has never been more accurate. I am confident in our resiliency and believe we will come out of these tough times stronger, more inclusive and empathic, and more collaborative than ever."

Adapting to the reality of COVID-19 over the past year has not been an easy task for the University of Regina community, but we have risen to the challenge in so many ways. I want to acknowledge the enormous pressure on all members of the campus community, the challenges the pandemic produced, the burden placed on many care givers, and the hardships experienced by many of our researchers as their work was interrupted. And while many of our scholars were able to resume their research programs, some were not. Research plans required modification, and in some cases, researchers were unable to start planned projects. Still, the University of Regina community – with the much-appreciated efforts of researchers, staff members, and students – has proven to be resilient.

Research in a COVID world means additional layers of safety protocols never before considered. Through the Council Committee of Research, return-to-research plans were developed and approved, including risk mitigation strategies, accommodations required of various research activities, and safety protocol training. For those researchers unable to work remotely, we developed unique safety protocols. I am proud to say that the more than 225 risk assessments we conducted enabled us to resume research activities, stay safe, and avoid potential COVID-19 outbreaks within our research labs and among community members.

Scholars worldwide have come together to fight COVID-19 in a race to find a vaccine and to address the socio-economic shockwaves the virus brought with it. Researchers have partnered to map out the genetic code of the virus, test potential treatments, and develop tests and vaccines, as well as study the effects of pandemic lockdowns and physical distancing on mental health, vulnerable communities, and the economy. University of Regina researchers have actively participated in many of these efforts.

Biochemist Dr. Mohan Babu has been working on developing a treatment for the virus and a faster way of testing for it, and microbial geneticist Dr. Andrew Cameron's work on genome sequencing is contributing to the global knowledge needed to defeat the pandemic. Drs. Lise Milne and Nathalie Reid, through the Child Trauma Research Centre, launched the Digital Connections Hub to provide evidence-based child-services best practices during a pandemic. At the same time, Dr. Tarun Katapally, a patient-oriented research leader, is partnering with the community of Île-à-la-Crosse, Saskatchewan, to develop a mobile phone application called CO-Away that will allow people to assess their own risk of getting COVID-19. Dr. Shelagh Campbell from the Hill and Levene Schools of Business examined the impacts of working from home during the pandemic, while psychologist Dr. Gordon Asmundson conducts ground-breaking research on the psychological impacts of COVID-19. Dr. Shela Hirani conducted research on breastfeeding mothers during the pandemic. These are but a few examples of how the University of Regina's research community is contributing to the local and global fight against COVID-19. While many of our researchers are contributing to the worldwide efforts to help combat COVID-19 and to understand the impacts of a pandemic, I also recognize that the pandemic's long-term impacts are not yet known.

Looking forward, we must continue to be vigilant when it comes to health and safety measures. However, the lessons learned over the past year will serve us well in the years to come. As a community, we continue to find new ways to connect and collaborate with colleagues, students, and partners. The saying *together we are stronger* has never been more accurate. I am confident in our resiliency and believe we will come out of these tough times stronger, more inclusive and empathic, and more collaborative than ever. D

KATHLEEN MCNUTT
Vice-President (Research)

StudentFocus

Empowering mothers living with schizophrenia

BY KATHERINE THOMPSON

More than half of all mothers living with schizophrenia will end up losing custody of their children, either to foster care or adoptions – something Amanda Mihalicz has experience with as an adult adoptee.

"When I was two and a half years old I was separated from my birth family, including from my birth mother who was diagnosed with schizophrenia," says Mihalicz, an experienced social worker and graduate student in the Faculty of Social Work at the University of Regina.

Mihalicz's personal connection to this social issue fuels her interest and motivation to explore, thirty years after her own adoption, whether society has made advancements in supporting families impacted by schizophrenia.

Currently, there is a lack of information focusing on how to best support this population of women in Canada, while the majority of literature that does exist focuses on the deficits of these mothers' parenting abilities.

Mihalicz says understanding the lived experiences of mothers living with schizophrenia is vital to truly grasping what they need.

"In Saskatchewan, there are gaps in the care provided by family services, health care, and community programs," says Mihalicz.

Having spent years as a frontline social worker, Mihalicz has also seen firsthand the stigma surrounding mental illness, particularly toward mothers living with schizophrenia.

"There are a lot of different connotations that come to mind when we hear the word schizophrenia, and it's often negative or fear-related," she says.

That's why Mihalicz says it's imperative to address the stigma related to parenting while living with mental illness, and allow clients to lead the research based on outcomes that will strengthen the individual's future.

Mihalicz says by empowering these women to share their lived experiences, society will better understand their maternal strengths so that enhanced services can be provided to this vulnerable population.

Amanda Mihalicz is exploring the lived experiences of mothers living with schizophrenia.

"We don't often hear their stories or have the opportunity to learn directly from them," she says.

By collaborating directly with women living with schizophrenia, Mihalicz says she hopes to get a better understanding of how they can best be supported by frontline workers, as the majority of professionals serving these mothers are trained social workers.

"Many times, services exist in silos, which results in programs that don't link together in ways that would best support these women," Mihalicz says.

Mihalicz aims to help create better understanding about the factors that impact the ability of mothers living with schizophrenia to parent, while also highlighting best practices and policy recommendations within the social work framework.

She is currently in the process of connecting with different agencies in the community, along with psychiatrists, case managers, and social workers to start working directly with mothers living with schizophrenia.

When speaking about her research with family, friends, and colleagues, Mihalicz says she is moved by how positive people are, and finds it interesting that once she is talking about it, people start openly sharing about their lived experiences with mental illness.

"This really points to people wanting to open up and not keep their mental health challenges a secret. It also shows me that in our society we can definitely do better at having these types of conversations," says Mihalicz.

Through her research, Mihalicz hopes to inspire more people to open up and have discussions about mental health and wellness.

"The more we talk, the more we can reduce stigma, and the more we can positively impact those who live with mental illness."

Nocturnal navigators

Biology student Joshua Christiansen talks bats with Madelyn and Judith Fix-Vall in their yard in July 2020.

"I like that they eat mosquitoes," says six-year-old Judith Fix-Vall, sitting in her Regina backyard dressed in a bat costume on a hot July afternoon.

Her sister, nine-year-old Madelyn, is surprised bats visit her backyard at all.

"We've never even seen any!" she exclaims.

But just because Judith and Madelyn, and perhaps many other Regina residents, haven't seen bats, doesn't mean they aren't swooping into their backyards all spring, summer, and fall.

"While we know bats are around, we don't know if urban noise impacts their nocturnal activities," says undergraduate biology student Carlie Hinz, who is working with fellow biology student Joshua Christiansen on this research project.

To find out how city noise affects bats, the researchers first sent an email through the University looking for backyards.

"Within hours, we received more than 100 responses from people all over the city who wanted to be part of the study," says Christiansen. "We then chose 42 sites based on location and paired up yards that were about 200 metres apart, where one was in a considerably noisier location than the other."

The Fix-Vall yard was one of the lucky ones that became part of the study.

"Theirs is a loud site because it borders two busy Regina streets. Their quiet paired location is a few blocks away. Both are between 50 and 100 metres from Wascana Creek," says Christiansen.

To control for as many external factors as possible, and to allow the biologists to isolate noise as the main factor that might impact bat activity, they recorded both sites at the same time so each site had the same variables, such as moonlight and weather.

The researchers also put out a second set of detectors to collect base ambient noise in order to confirm if the chosen sites were as quiet and as noisy as they anticipated.

"Each detector was set up in a pair of yards for seven nights. We repeated this twice more for two months. Halfway through each week we went and downloaded data from the detector and ran it through our software program,

which lowered the sound frequency, allowing us to establish which bat species was being detected," says Hinz, who adds that while the program auto-identifies the bats, they double check for accuracy.

Christiansen notes that the detectors are set to only pick up high-frequency sounds, like the ones bats emit when they echolocate. Low-frequency sounds like the human voice weren't detected.

"Bats send out a high-frequency sound – one that is much higher than the human ear can hear. It's how they move around in the dark. Their sound bounces off of objects and back to them, which helps them commute to and from their roosts and back and forth from foraging areas," says Hinz.

City noises, particularly traffic, also emit high-frequency sounds that could make echolocation difficult for bats.

"A bat could, for example, receive an echolocation that isn't their call, but is rather a car or an air conditioner, and that could cut off their route to a food source. This would mean that urban noises could be negatively impacting how bats travel and find food," explains Hinz.

Prior to starting their research, the two hypothesized that more noise would lead to less bat activity.

"Our preliminary research provides support for our hypothesis that quiet sites would have more bat calls. But we haven't yet finished the analysis," says Christiansen.

Hinz says a lot of published research has focused on how highways in rural areas impact bats, but few studies have narrowed in on urban traffic noise. Other studies on noise have taken place in labs using simulated noises and conditions.

"One little boy asked if I was a scientist. When I told him I was, he asked where my goggles and big white coat were! One parent had her young daughter come out to meet me, a female scientist. That was really meaningful."

"Our project will add to research that pertains to bat activity within city limits, and within a natural urban environment with real traffic versus little to no traffic."

The researchers are proud that their work will be useful, and are excited that they found more than they were looking for while doing their field work.

"I couldn't believe how invested people were in our project, how much they wanted to chat and ask questions. And COVID-19 restrictions meant most people were at home and could engage with us when we came," says Christiansen

Hinz says kids that were home when they arrived added even more fun.

"One little boy asked if I was a scientist. When I told him I was, he asked where my goggles and big white coat were! One parent had her young daughter come out to meet me, a female scientist. That was really meaningful."

Something that amazed sisters Madelyn and Judith on the day Christensen came to collect data from their detector also surprised the researcher. "We're still working with preliminary data, but it looks like their backyard had more than 2,000 bat visits in one week alone!"

Hinz was also surprised that there were bats detected in every yard they tested.

"We detected bat calls in backyards in the suburbs, near the outskirts of town, and fairly far from a water source. We discovered just how present bats are in the city, and how few people know they're around."

Hinz says it's a good sign that bats are everywhere.

"Because even if you don't notice them," says Hinz, "having a healthy bat population indicates a healthy ecosystem."

Biology students Joshua Christiansen and Carlie Hinz prepare to set up a bat detector in a Regina home in July.

Jared Suchan, a doctoral candidate in environmental systems engineering, has developed a climate in a box which he calls the Bench-Scale Atmospheric Simulator.

Climate in a box

BY GREG BASKY

In Saskatchewan, with its semi-arid climate, developing a better understanding of how water evaporates from lakes and soils could have huge implications for municipal infrastructure, water management, and farming.

"For the most part, people treat evaporation like a black box," says Jared Suchan, a doctoral candidate in environmental systems engineering at the University of Regina. "They make vague assumptions about how water is lost through evaporation. It's definitely not something that we as academics in the field have nailed down."

A device developed by Suchan as part of his PhD promises to help move the science a significant step forward by bringing the weather into the lab. The Bench-Scale Atmospheric Simulator (BAS for short) is essentially a climate in a box. It not only simulates the four factors that drive evaporation – wind, temperature, humidity, and sunshine – but can also manipulate each factor individually while holding the others constant.

The BAS complements empirical and theoretical research by offering a way to run tests in a controlled environment. While simulation chambers have been around for a few decades, Suchan's version appears to be the first used to study evaporation from bodies of water and the first that allows individual factors to be adjusted independently.

Suchan is currently validating the performance of the device by comparing its predictions for evaporation from Lake Diefenbaker to those generated with widely used mathematical formulas – some of which were originally developed back in the early 1900s. Preliminary results look promising.

Once he's confirmed the unit's ability to accurately predict the impact of climate factors on evaporation from local bodies of water, Suchan will shift his attention to studying the more complex questions of evaporation from water containing high concentrations of salt (brine) and evaporation from different types of soils. The research is supported by a Discovery Grant from the Natural Sciences and Engineering Research Council (NSERC).

Shahid Azam, Suchan's PhD supervisor, says that in southern Saskatchewan the top three applications for this technology will be to find better ways to deal with the effects of Regina's gumbo clay on city infrastructure, the potential to manage water bodies, and the ability to predict soil moisture in agriculture. He estimates that the City of Regina spends between $1 million and $2 million annually to repair its 850 kilometres of aging, asbestos-cement water mains. "The breakage rate is increasing because of the shrink-swell movement of the soil," says Azam, an environmental systems engineering professor in the U of R's Faculty of Engineering and Applied Science. "I think each break costs the city about $50,000 to fix."

The ability to run various climate simulations in the unit could also help farmers determine what crops to plant.

"This may not be the silver bullet in terms of answering all their questions, but it could be one of the little pieces that helps inform things," says Suchan. "And it will be great if we can tell them that with more salt in your soil, or with a warmer climate, or with a drier climate, these are the effects we anticipate occurring with water coming and going from the soil." D

It's cheap, easy to obtain, and highly addictive. Crystal meth use on the Prairies has reached crisis levels.

Thanks to a new podcast project led by University of Regina researcher **Dr. Kara Fletcher**, young people who have lived the crystal meth experience will now take control of their own stories. Using their voices, the goal is to raise awareness, reduce stigma, and reveal what's needed to address the crisis.

It's happening here.

Feature

Digital connections

BY GREG BASKY **A new online resource helps child services workers support the mental health and well-being of vulnerable children and adolescents.**

When COVID-19 first struck, child therapy worker Alex Paiva and her colleagues at Child and Family Services of Western Manitoba felt like the rug had been pulled out from under them.

Committed to providing evidence-based support for children and youth who have experienced abuse or trauma, the team didn't know where to turn for information on how to continue carrying out their work under the new restrictions brought on by the pandemic. On top of its health risks, COVID-19 increased the risks of separation, isolation, and additional trauma for children, youth, and families involved with the child welfare system.

"It was just crazy," recalls Paiva, who is based in Brandon. "We wondered, what does this mean for us as individuals, for our workplace, and for the youth that we work with? There were a lot of unknowns and a lot of uncertainty. Things were changing day by day, minute by minute, especially at the onset."

INFORMATION GAP

It was precisely this information gap that the University of Regina's Nathalie Reid and Lise Milne sought to fill when they applied for and secured grant funding to rapidly scan and synthesize the evidence on child services best practices during a pandemic. Recognizing that professionals with heavy caseloads were already busy trying to figure out how to pivot to new ways of working, the pair wanted to quickly get the latest evidence out of the published and grey literature (materials and research produced by organizations outside of traditional commercial or academic publishing channels) and into the hands of people working with some of society's most vulnerable members.

"To have had to add this extra layer for them would have been really, really challenging," says Milne, an assistant professor in the U of R's Faculty of Social Work who herself worked in child welfare for 15 years. "Our ultimate goal was to make it so they could have a single point of access to a number of different topic areas that were relevant to their work."

With funding from the Saskatchewan Health Research Foundation (SHRF) and the Canadian Institutes of Health Research (CIHR), Reid, Milne, and their team have built and populated the Digital Connections Hub, a website rich with resources designed to help Paiva and other child-services professionals across the three prairie provinces do the best they can for their clients.

Alex Paiva is a children's therapy worker with Child and Family Services of Western Manitoba.

> "In this extraordinary time of COVID-19, it is very important to be able to understand the mental health impacts related to child welfare services for clients and staff so that future decisions can be based on evidence-based research."

The site is part of the Child Trauma Research Centre (CTRC), which opened at the U of R, with Reid as director, on March 10, days before Saskatchewan went into COVID lockdown. Reid and Milne believe the site is the only resource of its kind specific to child trauma and COVID-19.

DIGITAL CONNECTIONS HUB

After consulting with more than 70 stakeholders involved in child welfare and health, the CTRC team conducted a "socio-ecological scan" to identify factors contributing to childhood trauma. Reid explains that childhood trauma goes beyond what most people first think of – abuse or neglect – to include other determinants such as economic, climate, and food security. Four key themes emerged in the literature: mental health issues among children, youth, caregivers, and service providers; substance use among youth and caregivers; child protection issues; and effective communication strategies.

They distilled 300 of the most relevant sources into eye-catching, readable information briefs and workstation-ready posters on 40 topics, most of which have already been translated into French. The project was an exercise in rapid knowledge mobilization.

The team started scanning the literature in mid-May and had soft-launched the Digital Connections Hub by September.

Throughout the editorial process, the Hub's development team always kept the knowledge users in mind. The goal, says Reid, was condensing all of the evidence into practical tools. "We wanted it to be supportive of the service providers and end users who don't have reams and reams of time," says Reid. "Here are the practical suggestions or possible responses; here are some actual scripts on how to speak to children about COVID-19. So, not just saying it's important to do it, but also, here are some suggestions on how to do it."

Mission accomplished, according to Paiva.

"The Hub doesn't just provide information or technical literature reviews. It's actually providing recommendations

Nathalie Reid, a former high school teacher, is the director of the U of R's Child Trauma Research Centre.

and practical tools. As a frontline worker, that's what you're always dependent on."

Saskatchewan's assistant deputy minister of child and family programs, Natalie Huber, agrees that the Hub is making a difference – especially right now.

"In this extraordinary time of COVID-19, it is very important to be able to understand the mental health impacts related to child welfare services for clients and staff so that future decisions can be based on evidence-based research," says Huber.

But while the researchers started out thinking their audience was professionals and caregivers directly working in child welfare, they quickly realized the information they were collecting would be useful to the entire "child-serving" sector, which includes education, mental health, community support, outpatient care, as well as recreation and community organizations.

"As we were conducting our scan, we were coming across situations where we were trying to think of who the knowledge user would be for a particular brief or bundle of information," says Reid, a former high school teacher. "And we were saying, well, it could be social workers, but you know what, this really is applicable to teachers and to nurses, too."

A ONE-STOP SHOP

With the second wave of the pandemic now a reality, it's clear that the current crop of resources on the Digital Connections Hub will stay relevant for the foreseeable future – a future that will likely include more pandemics and other global crises. Milne, Reid, and their CTRC team are already looking ahead to ways they can bolster the site's content. Reid says the team plans to add resources related to other topics, such as education in times of crisis, or mental health in rural and remote Indigenous communities. While the Hub's resources are currently targeted at professionals and caregivers, over time they want to add information that is geared specifically toward children and youth.

"My vision for the hub is that it will grow to have other layers," says Reid. "Some will be COVID-19 risk responses in terms of childhood well-being. There will be an education section with resources and knowledge mobilization products for different projects, so this really becomes a hub for child trauma research."

BUILDING AWARENESS AND KNOWLEDGE

Milne stops shy of labeling the Digital Connections Hub a silver lining to COVID-19. Still, after the worst of the health crisis is over, she says, they may look back and find the team's work "improved our services for certain populations, and really highlighted some of the needs that exist." She points specifically to the need to improve access to virtual supports such as telehealth for people living in rural and remote communities and for families who can't afford Internet and computers.


Nicole Romanoff

Lise Milne, an assistant professor in the U of R's Faculty of Social Work, is part of the Child Trauma Research Centre and has worked in child welfare for 15 years.

"Part of the process of being trauma informed is recognizing the multiple impacts that trauma can have on families."

And beyond the huge benefits from providing hands-on, how-to resources, the information the CTRC is sharing through the Digital Connections Hub is increasing awareness and knowledge of trauma among people working in the child welfare sector.

"Part of the process of being trauma informed is recognizing the multiple impacts that trauma can have on families.

"Just by virtue of us spreading information about how multiple experiences of trauma, adverse childhood experiences, and this pandemic can influence families, we are helping our service providers become more trauma informed, and that, in and of itself, is really important," says Milne. D

Feature

Physics and the principles of collaboration

BY LYNETTE PIPER

In a world battered by divisive politics and growing distrust, Zisis Papandreou is like a breath of fresh air.

The head of the University of Regina (U of R) physics department, Papandreou is an internationally renowned nuclear physicist whose insight and collaboration skills are in demand around the globe. He brings scientists together to address the growing impact of environmental degradation and climate crises.

"I love to collaborate – it fuels me," he says. "I love to find experts to complement what I know. It used to be that things were very proprietary, and some professors were even known to hide data from their students for fear of losing out on a great discovery. But that should be a thing of the past. Whether it's finding a vaccine for COVID or coming up with solutions to tackle climate change, we can't have guarded secrets."

Papandreou is like an open-source textbook, willing to share his expansive knowledge with the world and create a high level of cooperation and participation with others. For the past two decades, he has travelled back and forth from Regina, Saskatchewan, to his second home at the renowned Thomas Jefferson National Accelerator Facility in Newport News, Virginia. It's at Jefferson Lab where physicists study the inner workings of the atomic nucleus and where Papandreou participates in pure and applied lab research, collaborating in the advancement of scientific discoveries.

PHYSICS AND FOOD SECURITY

One of those discoveries is known as the Generation-II BioPETx nuclear imaging detector – one of the world's most advanced tools for looking inside living plants. Built at the U of R and soon to be housed at the Saskatchewan Centre for Cyclotron Sciences at the University of Saskatchewan (U of S), this detector is based on Positron Emission Tomography or PET. Most people have heard of PET scans in the medical field, where radioactive isotopes are used to detect cancers in the body. An exciting new field of science is now using PET technology to study how plants survive under varying conditions that mimic our changing climate.

"By 2050, there will be 10 billion people living on this planet, and we've virtually exhausted all arable land. So the question becomes, how can we make agriculture more efficient and come up with better yields safely and effectively? There is an urgent need to increase agriculture production – especially with drier climates becoming the norm," he says. "The ultimate goal is greater food security."

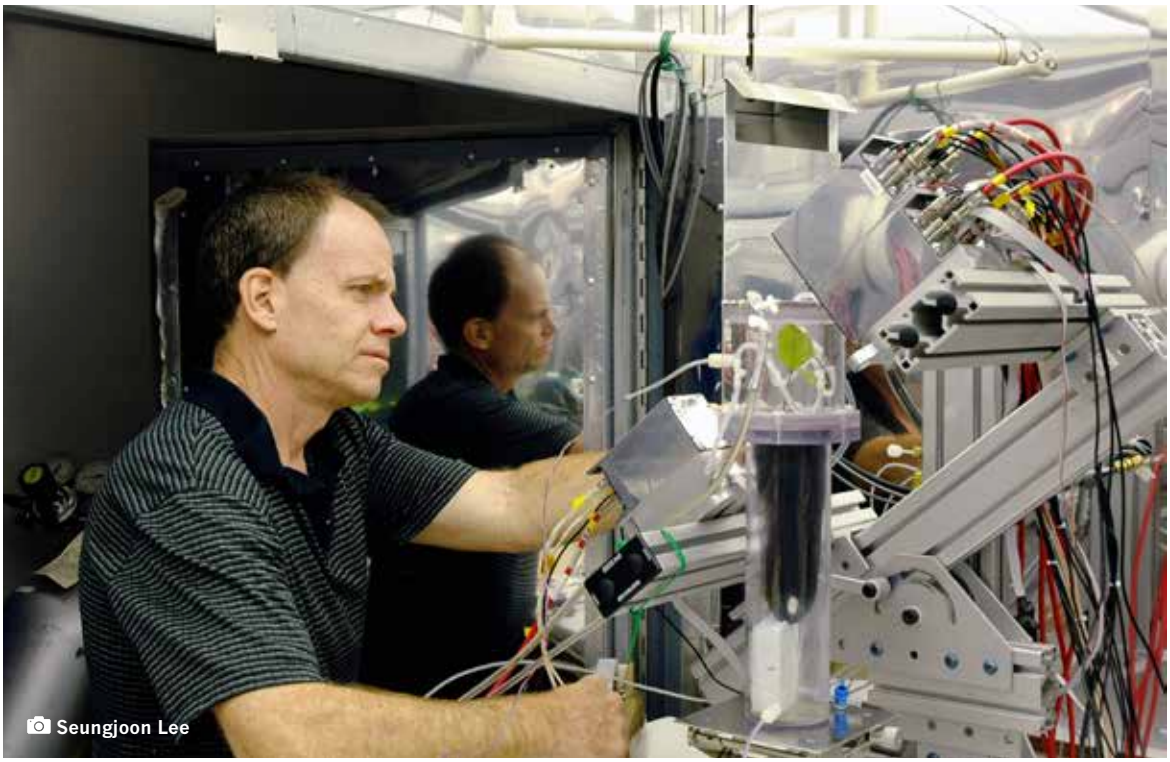
Jefferson Lab's chief technology officer, Drew Weisenberger, who also leads the Lab's Radiation Detector and Imaging Group, says he and his colleagues at Duke University were studying the transportation of carbon dioxide in plants (photosynthesis) using radioactive tracers. Papandreou thought the idea was "so cool" that he created a partnership with Weisenberger and his team to build something similar in Regina, using radiotracers to determine how climate change and environmental degradation are impacting plant structures.

"Zisis Papandreou is one of those rare scientists who has the ability to see big-picture connections," Weisenberger says. "A lot of scientists can spend their entire lives looking at their own particular problem or research area, but Zisis has this ability to find other ways to use a tool. He sees infinite possibilities and goes about collaborating to make his visions come to life, like the BioPETx to study a plant's life cycle above and below the soil. His ability to think outside the box and thrive on interconnections is what sets him apart."

HOW IT ALL BEGAN

How Papandreou became such an innovative physicist is a story that starts with humble beginnings in Estevan, Saskatchewan, where he was born into a Greek immigrant family. His parents moved the family back to Greece when

Zisis Papandreou is a professor and head of the University of Regina's physics department.



Drew Weisenberger, Jefferson Lab's chief technology officer, who leads the Lab's Radiation Detector and Imaging Group, studying a poplar seedling using the Jefferson Lab PhytoPET system at the Duke University Phytotron.

young Papandreou was just eight years old. Of that time, he fondly remembers his love of chemistry sets and "almost setting my dad's office on fire" with an experiment that went awry.

He studied hard in high school, and initially went into topographical engineering design, when he was lured to the U of R by a scholarship established by a philanthropic Greek expat who was eager to bring Greek students to Saskatchewan. Papandreou studied under professors emeritus Giorgio Papini, a theoretical physicist known for impressive math calculations, and George Lolos, an experimental physicist. He had an opportunity to work at TRIUMF, Canada's particle accelerator centre in Vancouver, and wound up doing his post-doctorate at Utrecht University in Holland, learning Dutch along the way.

"I was working at Jefferson Lab in Virginia while on tenure track at George Washington University, when an assistant professor position opened up at the U of R. It was a homecoming of sorts, and a great opportunity to take all of my contacts with me and build something special in Saskatchewan," he says.

A CLOSER LOOK

Unravelling the science behind the Generation-II BioPETx nuclear imaging detector, and the earlier 2017 Generation-I device known as PhytoPET, takes a little explaining.

"What nuclear physicists do to look at the nucleus inside an atom is to crack its outer shell by smashing the atom with an accelerator near the speed of light," he says. "The nucleus is made up of protons and neutrons. The accelerator lab's light source is an intense beam of high energy photons that bursts the protons into the tiniest microparticles called quarks. By size comparison, Papandreou explains, an atom is the size of Toronto's fifty-thousand-seat SkyDome, a nucleus is the size of a pea, and a quark is a fraction of a pin prick.

"When, for example, two vehicles are involved in a serious collision, you often have glass and debris being propelled in all directions," he says. "Just as an accident reconstructionist can determine speed and angle of impact, the nuclear accelerator at Jefferson Lab is able to study the building blocks of matter, helping to understand the nuclear forces or 'glue' that binds them, and ultimately our world, together. The microparticle applications of nuclear physics have a variety of uses, from testing and treating cancer, to energy production, to space exploration. In our work, we use microparticles in agriculture to enhance our understanding of plants, which can benefit food production."

Papandreou, along with his U of R colleague and co-collaborator Aram Teymurazyan, worked closely with Jefferson Lab to help design and build the nuclear plant imaging system at the U of R. By inserting nuclear isotopes into plants, the physicists get an inside look at a plant's functional behaviour in much the same way that isotopes are used to see inside a human body to detect cancer.

Teymurazyan says understanding a plant's tolerance to drought and disease is only one aspect of the amazing BioPETx. "The first prototype that we launched in 2017, working in collaboration with the soil science department at the U of S, used radiotracers to study how bacteria can be used to break down hydrocarbons in the soil – compounds

"The BioPETx is allowing us to study any physiological process in plants, with global implications. Our imagination – like the sky – is the limit."

that form the basis of crude oil, natural gas, coal, and other energy sources. This has enormous implications for cleaning up contaminated oilfield sites."

Designing and building the second-generation BioPETx took an incredible amount of international teamwork.

"A lot of the techniques we're using here, we learned at Jefferson," explains Teymurazyan. "A nuclear lab facility is very custom – you just can't buy it off the shelf or purchase it from a manufacturer. It needs to be constructed piece by piece."

THE SKY'S THE LIMIT

Similar in principle to Jefferson Lab, the U of S's Cyclotron is an accelerator of charged protons, able to produce medical isotopes to detect cancers. Radioactive sugar is ingested into the human body, and then moves to where it needs to go to create energy. Because cancers replicate quickly, the radioactive sugar immediately goes to the cancer site to form a heat map. In conjunction with a CT scan, hidden tumours can then be found.

"The Cyclotron has had a huge impact on the health of the people in Saskatchewan," explains Papandreou, "but it has also benefitted physicists, like myself, who have access to these isotopes. Thanks to our unique partnerships and the support of our funders, we're taking that medical knowledge and advancing it for plant science."

The PhyoPET – which are the four silver boxes – nuclear imaging a canola plant. The small scintillator detectors – which are wrapped in reflecting aluminum – count the amount of radiation and indicate if the radiation is moving up or down in the plant.

While Papandreou and Teymurazyan are both hard-working scientists, Papandreou, with his outgoing personality, naturally falls into the role of global collaborator and communicator. The more reserved Teymurazyan is most at home in his lab, logging the exciting discoveries taking place.

Born and raised in Armenia, Teymurazyan got his PhD at the University of Kentucky, where he also worked closely with Jefferson Lab. He then moved to Toronto in 2009 to perfect his skills in nuclear medicine. His partnership with Papandreou brought him back to the field of nuclear physics research, an area he loves. "In nuclear medicine, you can see results of your research within a year, but with the work I'm now doing in nuclear physics, it can take years, almost a decade, to see results, so it takes patience and persistence," he says. "The BioPETx is allowing us to study any physiological process in plants, with global implications. Our imagination – like the sky – is the limit."

For Teymurazyan's current research, he and the team are putting radioactive sugar in a plant, studying its movement under varying atmospheric conditions (mimicking heat, drought, wind, and temperature fluctuations), and then studying how this impacts the root system, which is very sensitive to the microbiome.

"If we cut below the leaf of a canola or lentil plant, for example, the radiotracer moves to the vascular system. But if we cut the stem, the plant recognizes it as a danger and will do everything it can to survive. Essentially, it dumps all of its resources to the root system, which is incredible to see. When our detector looks at the root system, it lights up the cameras in a blinding fashion, as if we pointed the camera to the sun."

U of R physicist Aram Teymurazyan worked closely with Jefferson Lab to help design and build the nuclear plant imaging system at the U of R.

Master's student Shweta Sharma assembles the modules for the BioPETx.

In the past, such studies on the root system had to be conducted on many different plants, effectively killing each plant to obtain key information. Now, that information can be obtained while the plant is still living. "We can do multiple studies in a non-destructive way to the same plant, with the ultimate goal of finding and engineering plants that are best suited for today's changing climate," Teymurazyan explains.

Currently, the BioPETx is being refined at the U of R, and will be permanently housed at the U of S.

Teymurazyan's master's student Shweta Sharma, from Punjab, India, has been helping to assemble the modules for the BioPETx, working to ensure the detector gets the best-quality plant images possible, which she then analyzes.

The global significance of her work is not lost on the aspiring PhD candidate. "Ensuring food security is a part of human survival, so we must address the challenges the food industry faces," she begins earnestly. "I never imagined myself working in a lab like this, all the way across the world. It gives me great joy to come to work each day. This is such a great opportunity. My parents are so proud."

Sharma speaks glowingly of her supervisor, whose approachability, patience, and passion for physics have made her feel right at home. Sharma's own passion extends to educating people about the importance of nuclear research. "When I mention that I work with nuclear isotopes, people often think of bombs and missiles," she laughs. "But my work is safe, as long as you follow standards and safety protocols. I feel so proud because we are using nuclear research for good. Climate change is impacting global food production, and we already see that with droughts. Our work will ensure food will be plentiful in the future."

THE POWER OF TEAMWORK

Papandreou's ability to assemble such an exceptional team for the common good is inspiring. "Collaboration and healthy competition are needed in this field to bring people together to talk and find commonalities. I'm always looking for ways to work together, especially when it comes to interdisciplinary collaboration. I really enjoy finding biologists and agriculture partners to help bring about important innovations that have the power to change the world," he says. "We accomplish so much more by working together."

It's a credo our beleaguered world could use a little more of, and one that sets Papandreou apart as a man on a mission.

He and his colleagues, along with their many collaborators around the world, believe that real change is within reach, impacting humanity's ability to feed itself as climate changes and population grows. All of this exciting scientific discovery has come about through Papandreou's natural team-building instincts.

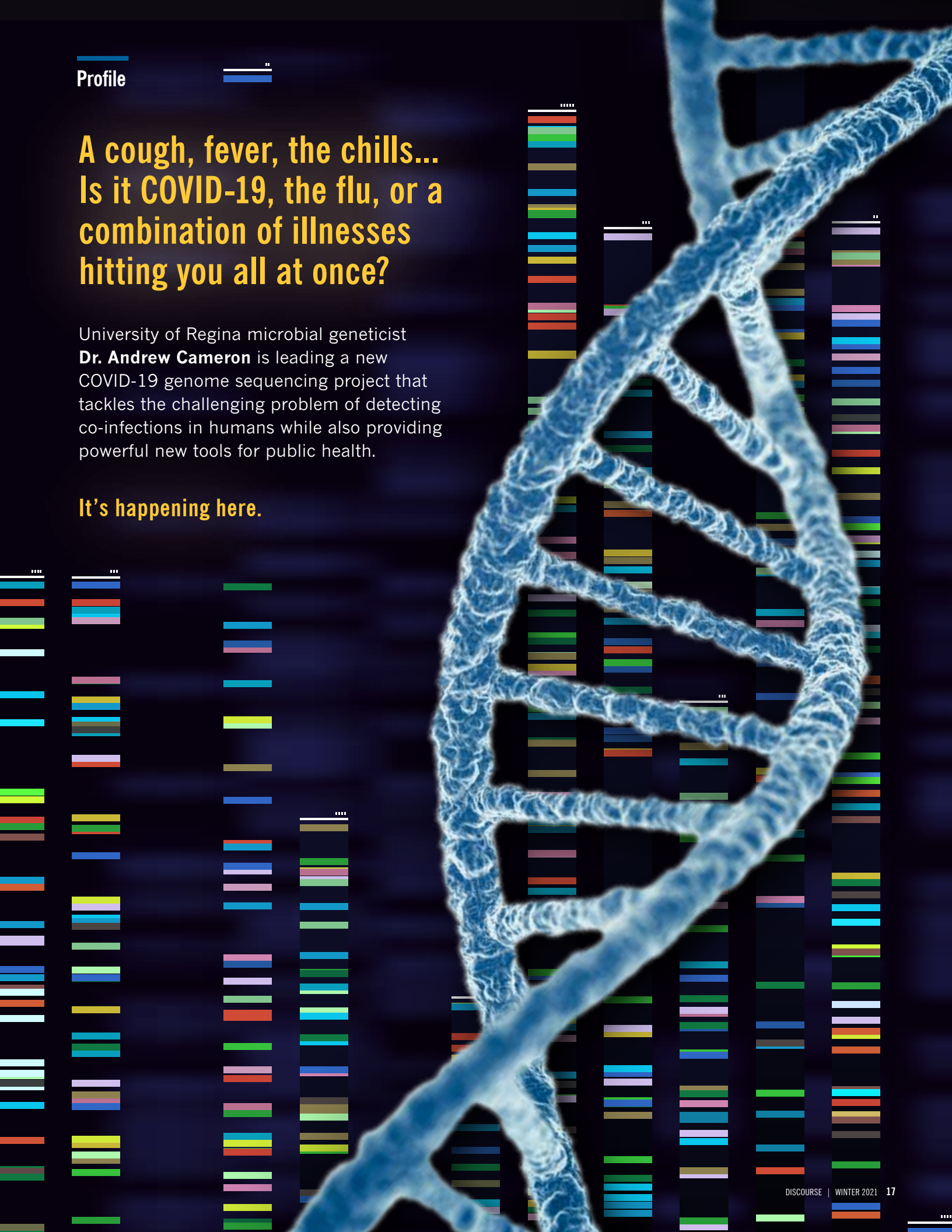
"My ultimate vision is to combine the BioPETx nuclear imaging detector to similar efforts at facilities in the U.S., Germany, and Japan, so we can create tangible food security solutions on a global scale," he says confidently. "Once the BioPETx moves to Saskatoon later this winter, we will keep advising for up to a year, while simultaneously working to develop new nuclear imaging detectors to respond to a host of complex global issues. We'll also be collaborating with particle accelerator facilities across North America to pool data and help develop even more discoveries."

With Papandreou's collaboration skills at play, and his team's collective drive, passion, and expertise, the future looks bright. D

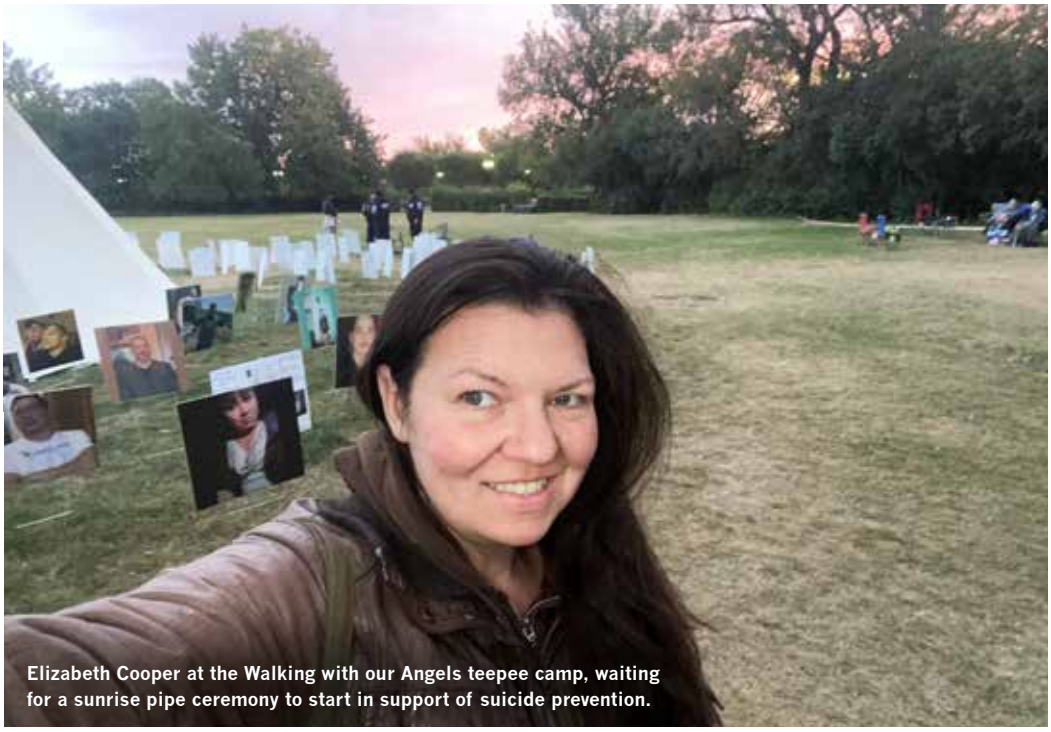
A cough, fever, the chills... Is it COVID-19, the flu, or a combination of illnesses hitting you all at once?

University of Regina microbial geneticist **Dr. Andrew Cameron** is leading a new COVID-19 genome sequencing project that tackles the challenging problem of detecting co-infections in humans while also providing powerful new tools for public health.

It's happening here.



Funding



Elizabeth Cooper at the Walking with our Angels teepee camp, waiting for a sunrise pipe ceremony to start in support of suicide prevention.

1. **Canadian Institutes of Health Research (CIHR)**

CIHR Project Grant

Lifestyle choices that bring positive outcomes in men's lives can be found in many activities, particularly when they take place within a supportive community. The conversations that happen while fixing a car, camping on the land, playing hockey, or creating music videos can make a difference in men's lives, and young, Indigenous men are no exception.

Creating opportunities for young Indigenous men to talk about health and mental wellness in order to promote healthy lifestyles is the goal of a University of Regina research project.

"We know very little about the health of Indigenous men in Canada," says project lead **Elizabeth Cooper**, assistant professor in the Faculty of Kinesiology and Health Studies. "By bringing together Indigenous men between the ages 18-34, and having them connect while engaging in strength-based activities, they will be able to explore mental wellness and healthy behaviours in a supportive environment and work towards meaningful changes in their communities."

In July, Cooper received $119,911 from the Saskatchewan Health Research Foundation. Now, with an additional $673,200 in funding from CIHR, she is able to expand the project to include more participants.

2019 Novel Coronavirus (COVID-19) Rapid Research Funding Opportunity

In response to the worldwide outbreak of COVID-19, CIHR launched this grant to contribute to the global response to the pandemic. The following University of Regina researchers responded to the urgent call and received CIHR funding.

Psychology professor **Gordon Asmundson** was awarded $399,700 for his COVID-19 work, including to support the launch of www.coronaphobia.org, a website for individuals facing stress and anxiety related to COVID-19.

Visitors to the website can take a confidential self-assessment to see where they score in terms of COVID-related distress or depression and anxiety when compared to the general population. Once completed, they can see where they score on an interactive COVID Stress Scale and get tailored recommendations for how to best look after their mental health based on their results.

The site also has a list of available mental health resources for the public and for professionals.

Mohan Babu, an associate professor of biochemistry, received $937,950 to tackle the therapeutic and diagnostic gaps associated with the novel coronavirus.

"This CIHR funding is an important step towards helping a team of dedicated scientists to effectively and rapidly detect and contain the virus," says Babu, who is collaborating with scientists and researchers across the country.

Babu says his research is focused on peptide therapeutics, which, using certain molecules called peptide inhibitors, can block the virus from entering the human host.

"These peptides don't prevent someone from contracting SARS-CoV-2, but they could prevent the virus from entering or replicating in the body."

Current diagnostics can be unreliable with asymptomatic and mildly symptomatic people – something that can be seen right now with the rise of community transmission numbers.

"The most common way we test for COVID-19 is to use an invasive nasal swab, but this technique doesn't always provide an accurate diagnosis," explains Babu. "But our saliva also contains SARS-CoV-2-specific biomarkers. Part of our research is to continue to work on developing testing for the virus through saliva – which could provide results within minutes."

Babu received an additional $200,000 from the Canadian Foundation for Innovation (CFI) for equipment needed to do this important work.

Lise Milne, assistant professor in the Faculty of Social Work, received $47,342 for her project *Translating Knowledge for Child Welfare Organizations Across the Prairies: Managing the Impacts of COVID-19 on the Mental Health of Children, Families, and Workers.*

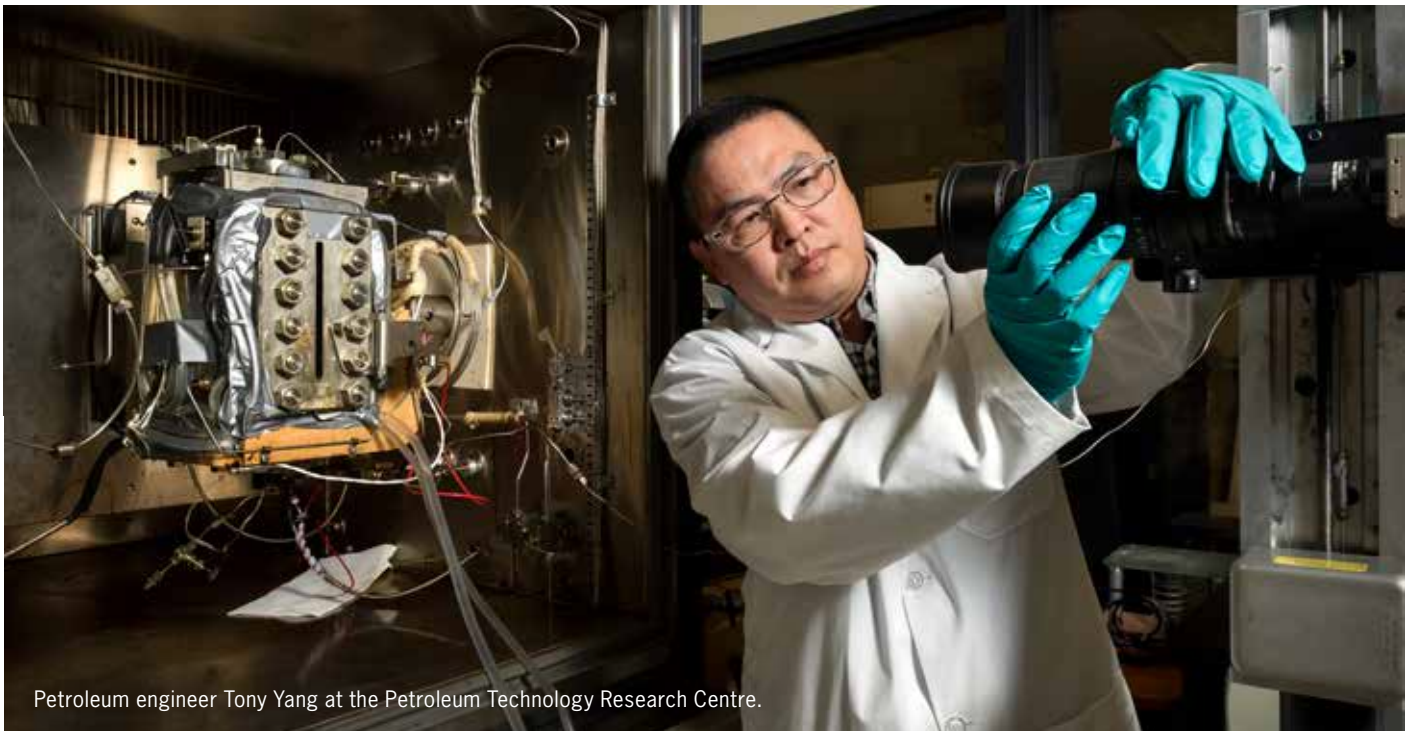
Read more about Milne's project in this issue of *Discourse*.

2. **Natural Sciences and Engineering Research Council (NSERC)**

Collaborative Research Development Grant (CRD)

In Western Canada, a non-thermal primary production process

"Our research team will also evaluate the possibility of safely storing carbon dioxide to offset the environmental footprint of these recovery processes."



Petroleum engineer Tony Yang at the Petroleum Technology Research Centre.

called cold heavy oil production with sand (CHOPS) is the most common method to recover heavy oil. Typically, this method only recovers about 5 to 15 per cent of the oil contained in an oil reservoir, making it necessary to develop new post-CHOPS enhanced oil recovery (EOR) techniques.

Petroleum engineer **Daoyong (Tony) Yang** received a CRD grant for his research project to enhance heavy oil recovery processes. Partnering with Thermal Recovery Technologies Inc., Yang received $295,666 of support from this industry partner and $591,334 from NSERC for a total of $887,000.

Yang says that his industry partner manufactured an efficient direct contact steam generator (DCSG), referred to as Submerged Combustion Vaporizers (SCVs), capable of generating a mixture of high-quality steam and combusted flue gases from untreated produced water for EOR use in post-CHOPS reservoirs.

"Using pilot tests, we will add alkane solvents to enhance steam and flue gas performance in post-CHOPS reservoirs," says Yang.

"Our research team will also evaluate the possibility of safely storing carbon dioxide to offset the environmental footprint of these recovery processes."

This project has the potential to provide Canadian and international oil industries with viable techniques for efficiently and effectively recovering heavy oil from post-CHOPS reservoirs, making full use of energy in the DCSG steam and combusted flue gases, minimizing use of freshwater, and mitigating methane and CO2 emissions.

NSERC Discovery Grants

Discovery Grants support ongoing research programs with long-term goals rather than a single short-term project or collection of projects.

This year, nine University of Regina researchers received a total of $1.2 million in funding to support research ranging from studying wastewater to understanding the architecture of our planetary systems, to investigating the cognitive mechanisms related to facial recognition.

"We often remember the faces of people we know or are familiar with, but recognizing and identifying unfamiliar faces is a more challenging and nuanced task that varies a lot from person to person. Yet, we don't fully understand the mechanisms that support or interfere with retrieving faces from our memory," explains **Kaila Bruer**, an assistant professor in the psychology department and a Luther College faculty member.

Bruer received $132,500 for her efforts to better understand why identifying faces that are unfamiliar to us is such a challenging task.

"My NSERC-supported research program will focus on understanding what the individual differences in cognitive development are in this retrieval process, providing much-needed insight into why some people, but not others, may struggle more with identifying the faces of strangers."

Bruer says that while her work naturally has applications in the legal system, specifically related to eyewitness memory reliability, it will also have substantial implications for understanding how memory recognition operates more generally.

"What we learn can be used to develop methods to help people who are required to identify faces in high-stakes situations, and, ultimately, this research may also help develop new approaches to bolstering general memory performance."

Other Discovery Grant recipients:

Liming Dai, professor in industrial systems engineering, received $160,000 for his project *Solving and Analyzing Nonlinear Multibody Dynamic Engineering Systems with a Piecewise Linearization Approach.*

Funding

Historian Donica Belisle was awarded $91,826 by SSHRC to delve into Canadians' love affair with sugar and its consequences.

Jennifer Gordon, Canada Research Chair in Women's Mental Health, received $190,000 for her project *Clarifying the Mechanisms Underlying Estradiol's Effect on Human Behaviour*.

Chun-Hua Guo, professor in math and stats, was awarded $90,000 for his project *Equations and Tensor Problems*.

Paul Laforge, associate professor in electronic systems engineering, received $140,000 for his project *Surrogate-Based Automated Tuning of Microwave Devices and Systems*.

Samantha Lawler, assistant professor of astronomy, was awarded $120,000 for her project *Understanding the Architecture of Complete Planetary Systems*.

Donald Stanley, professor in math and stats, was awarded $120,000 for his project *Functors in Homotopy Theory*.

Fernando Szechtman, professor in math and stats, was awarded $90,000 for his project *Indecomposable Lie algebra representations*.

Jinkai Xue, assistant professor in environmental systems engineering, was awarded $130,000 for his project *Fundamental Studies on Dynamic Membrane Bioreactor-Based Processes for Wastewater Treatment in Cold Regions*.

3. **Social Sciences and Humanities Research Council's (SSHRC) Insight Grants**

This federal program provides stable support for long-term research initiatives that enable scholars to address complex issues affecting individuals and societies. The following researchers received Insight Grants.

SUGAR

According to health experts, sugar is the leading cause of type 2 diabetes and obesity and has been linked to heart disease, kidney failure, Alzheimer's, cancer, tooth decay, and gout. Historian **Donica Belisle** says that despite these negative health consequences, Canadians show little interest in decreasing their intake of the sweet food.

How did Canadians become such avid sugar consumers? And, what have been the consequences of such consumption?

Belisle was awarded $91,826 to delve into these sweet queries by exploring the production, distribution, and consumption of cane and beet sugar between 1890 and 1960 to understand why Canadians, in the 1960s, became among the top per capita consumers of refined sugar in the world.

EYE TRACKER

English professor **Christian Riegel** and psychology professor **Katherine Robinson**, both of the U of R's Campion College and Fellows of the Royal Society for the Arts (UK), received $204,304 in funding to harness the power of eye trackers. Eye-tracking technology allows eye movements to move objects on screens, or to control software programs or wheelchairs and assistive devices.

"With a long-standing interest in eye-tracking technology, our team will now work to develop accessible digital art-making tools for individuals with limited mobility," says Riegel.

The team will further develop software and hardware solutions prototyped under a previous SSHRC grant to maximize accessibility and usability. They will also gather data on what aspects of the mind are engaged – and in what ways – when art is created using eye movements only, generating a novel and strong data set for best practices in art making that uses eye tracking.

PEACE INITIATIVE

In his final months as Prime Minister, says historian **Raymond Blake**, Pierre Trudeau launched an important Peace Initiative with the laudable goals of improving East-West relations and reviving arms control negotiations between the U.S. and the USSR.

"It was a high-profile Canadian foreign policy initiative, and Trudeau's interventions captivated Canadians, though most realized that success was unlikely given the heightened tensions between the two superpowers after 1980," says Blake, a member of the Royal Society of Canada.

Blake and his research team received $98,826 to examine the Peace Initiative from a Canadian perspective, arguing that Trudeau believed Canada had a currency more potent than might: the power of ideas and persuasion to save the world from nuclear annihilation.

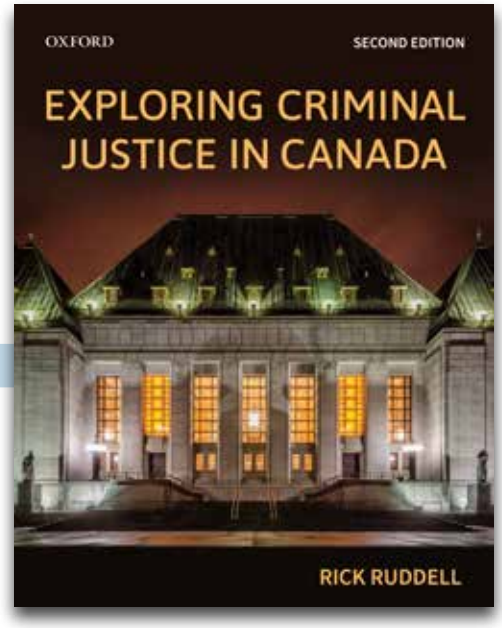
FAKE NEWS

It's difficult to escape the proliferation of fake news and the consequences of its spread. But what can be done to stop the dissemination of disinformation?

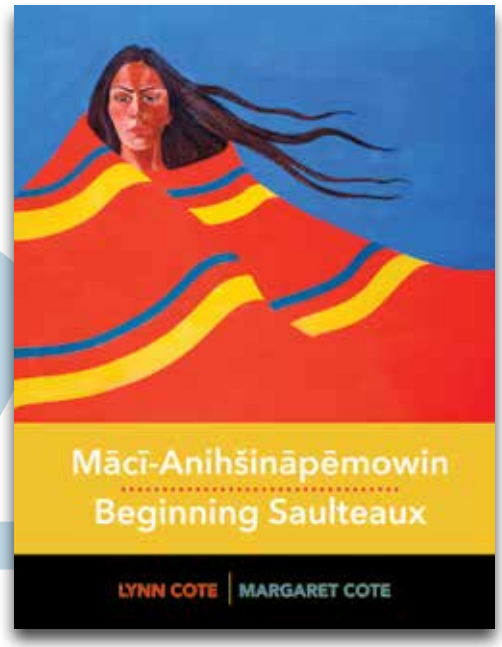
Gordon Pennycook, an expert in reasoning and decision making, received $316,160 to better understand why people believe and spread disinformation online and to help find ways to inoculate the public against false and misleading content.

Read more about Pennycook's research in this issue of *Discourse*. D

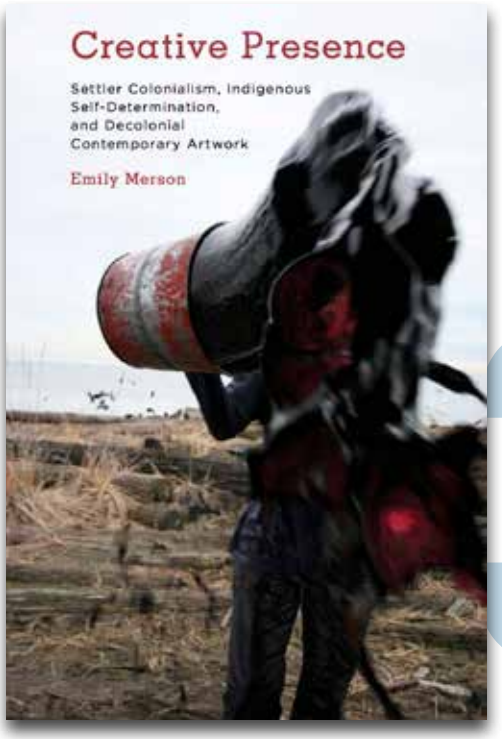
ByTheBook



1. *Exploring Criminal Justice in Canada, 2nd edition* (Oxford University Press, 2020) is an accessible examination of the Canadian criminal justice system. Introducing readers to the realities of criminal justice in today's world, author **Rick Ruddell** – justice studies professor and Law Foundation of Saskatchewan Chair in Police Studies – draws on case studies, media issues, and controversies to examine the organization and function of the criminal justice system and the individuals, social values, and legal systems that shape Canadian criminal justice institutions. Throughout the book, Ruddell addresses commonly held beliefs about the justice system and explores the evidence to support or refute those beliefs. While the book is focused on Canadian issues, Ruddell uses global comparisons to help readers understand criminal justice both in Canada and around the world.



2. Lynn Cote, a faculty member at First Nations University of Canada (FNUC), along with Margaret Cote, a former teacher with FNUC, provide an introductory look at one of the most widely spoken North American Indigenous languages, Saulteaux, known regionally as Ojibway, Ottawa (Odawa), Chippewa, and Algonquian, in their book *Mācī-Anihšināpēmowin/Beginning Saulteaux* (University of Regina Press, 2020). This easy-to-use and easy-to-read series of lessons is designed for self-study or for use in the classroom. The text sheds light on the Saulteaux worldview while guiding students through the language's grammatical structures and spelling systems, as well as everyday terms and phrases grounded in both traditional and contemporary contexts. *Beginning Saulteaux* is an invaluable resource produced in consultation with Elders, Language Keepers, and community members.



3. The canonization of particular artworks, aesthetic theories, and even the way that art has historically been displayed in museums and galleries has played a powerful role in shaping how Canadian settlers view themselves and the nation. In *Creative Presence: Settler Colonialism, Indigenous Self-Determination and Decolonial Contemporary Artwork* (Rowman & Littlefield, 2020), author **Emily Merson**, politics and international studies sessional lecturer, examines archival and contemporary images of artworks to make the case that Indigenous artists Rebecca Belmore's and Brian Jungen's selections of materials, media forms, and placemaking in their exhibitions and performances call attention to the foundational violence of settler colonialism. Merson argues that these artworks introduce political possibilities for decolonization and participate in Indigenous reclamations of lands and waterways in world politics. D

Collaborate

U of R environmental engineer Kelvin Ng has partnered with the City of Regina to develop a waste prediction model over the remaining waves of the COVID-19 pandemic.

TRACKING COVID'S TRASH TOLL By Greg Basky

Even beyond its health impacts, the COVID-19 pandemic has caused major upheavals in our daily lives. Schools shut down and students were sent home. Many offices asked employees to work remotely. And we were all cleaning more and masking up to cut down on the spread of the virus.

But what impact have these changes had on the amount of garbage we are throwing away? Are we generating less solid waste since mid-March, more, or about the same? And what about the composition of all that trash?

Kelvin Tsun Wai Ng, a professor in environmental systems engineering at the U of R, figures there are lessons to be learned from what we are sending to the landfill. With support from an NSERC Alliance Grant, Ng and his colleague Golam Kabir, an assistant professor in industrial systems engineering, have teamed up with the City of Regina to develop a model for predicting the amount of waste likely to be generated over the remaining waves of the current pandemic. The model will also help with planning for other catastrophic events down the road.

While there are plenty of models out there for estimating waste volume based on such factors as population and economic activity, if successful, this would be the first for projecting a pandemic's impact on trash.

Shayne Tracey, senior engineer with Regina's Water, Waste & Environment department, says the City was keen to partner, as they are interested in how the pandemic will affect quantities of waste coming into the landfill, and how that could impact their costs and revenue. "We also wanted to see how this type of situation would affect staff, their working hours, and the landfill's hours of operation."

Tracking Trash

Using City of Regina data on waste disposal rates for 2018, 2019, and 2020, Ng is establishing a baseline amount that takes into account seasonal variation. (Spoiler alert: overall rates are down for 2020, but household rates are up.) Then he'll be analyzing data on COVID case counts from other countries to see how the virus behaved elsewhere. For example, did other places experience a single peak or were there multiple waves?

By mapping the number of active cases of COVID in Regina against the amount of additional waste generated at the corresponding points in time, Ng will get a picture of the impact locally. Then he'll build scenarios to predict what our local trash totals will be, depending on whether the virus spreads as it has in Brazil, Sweden, and the U.S. "So if we have, for example, 10 active cases, we can expect to see X amount of added solid waste," explains Ng. "Using whatever country scenario, we can then better predict our solid waste generation during a pandemic."

The Regina Model

Ng is confident the project will yield a model the City of Regina can use to better plan and manage its landfill operations. Equally important, though, the collaboration will advance the knowledge base in this field and provide a methodology that can be used and built upon elsewhere.

"I really hope that different groups of researchers in different places can use what we've done to build similar models, and, in the end, we can compare and combine model predictions, giving us, for example, a Regina model, a Toronto model, a New York model," says Ng. "By working together, we may be able to create a more robust waste generation model that captures the essence of the problem."

“The community needs CO-Away. The Advisory Council is excited to engage with the citizens as they clearly see the advantages of being able to address health risks and issues in near real-time.”

IN REAL TIME By Kathryn Thompson

In the year or so since the first case of COVID-19 was reported in China, Indigenous communities have faced unique health risks and challenges, underscoring the need for Indigenous communities to assess their own health risks so that they can make better decisions about their communities.

That is what Tarun Katapally, a patient-oriented research leader and professor at the University of Regina’s Johnson Shoyama Graduate School of Public Policy, is seeking to accomplish through the development of a mobile phone application called CO-Away.

“The CO-Away app allows people to assess their own risk of getting COVID-19,” explains Katapally. “It's not a contact tracing app, but one that interacts with people based on their behaviour, and tells them what their risk level is.”

Katapally is partnering with the community of Île-à-la-Crosse, Saskatchewan, to co-create and pilot the app. The overarching goal is for Indigenous communities to use big data and digital health innovation for Indigenous self-governance, determination, and data sovereignty.

In healthcare, big data—which is large amounts of information—can be analyzed to provide knowledge about a population or an individual to enhance patient care, research new advancements, reduce costs, and even cure or prevent the onset of diseases.

“Our work with Dr. Katapally’s team is bringing cutting-edge innovation to our municipality. CO-Away is a first step in how we want to transform Indigenous governance using big data," says Île-à-la-Crosse’s Mayor, Duane Favel.

Through ethical surveillance, Katapally engages with participants as citizen scientists so that they are contributing to the research process. Collecting this type of data supports the development of evidence-based strategies for risk mitigation and policy and behaviour interventions.

“Basically, it’s about how we can use big data so that Indigenous leaders can make better decisions for themselves and their communities,” says Katapally.

Together, they’ve established the Île-à-la-Crosse Citizen Scientists Advisory Council to help understand the specific needs of the community and guide the development of CO-Away.

The Advisory Council is made up of the town’s mayor, the director of the school division, two Elders, a social worker, and four high school students, including the junior mayor of the community.

“It's not science for the sake of science. It's communities participating in it and helping us shape it,” says Katapally.

Katapally notes that not much is yet known about the indirect effects of COVID-19, such as on mental health, substance misuse, and domestic violence. But through this research, his team discovered that the community wanted to address food insecurity. They’ve now created a mechanism for citizens to report their lack of access to food.


Dave Stobbe

Tarun Katapally is a patient-oriented research leader and professor at the University of Regina’s Johnson Shoyama Graduate School of Public Policy.

Katapally believes this platform has many more uses than for only communicable diseases. “I think it’s going to have a bigger impact,” says Katapally, “The big question is, how can we use citizen data for health or social innovation.”

While the project officially started in June, the concept is essentially a scaled-up version of Katapally’s existing Smart Platform, a digital epidemiological and citizen science platform for ethical surveillance and real-time interventions. Based on this platform, Katapally developed the global digital citizen science policy to tackle pandemics like COVID-19. Currently they are in the prototype stage, but so far the community reception has been great.

"The community needs CO-Away," says Favel. "The Advisory Council is excited to engage with the citizens as they clearly see the advantages of being able to address health risks and issues in near real-time.”

Katapally emphasizes that the project wouldn’t materialize without the partnership with Île-à-la-Crosse, and funding support from the Lung Association of Saskatchewan, the Saskatchewan Health Research Foundation, and Mitacs. D

Accolades

1. We can barely look at our phones, turn on our TVs, or listen to our radios without hearing about fake news. It seems that disinformation is everywhere, all the time.

Thankfully, **Gordon Pennycook**, a leading researcher in the psychology of disinformation, reasoning, and decision-making, is helping us get a handle on what's true and what's false.

His research has helped reveal the underlying mechanisms of human reasoning, changing the way many psychologists think about thinking, and has showed the many ways that analytic thinking impacts our everyday lives. His most recent work leverages these insights to help people both understand and combat disinformation.

An assistant professor of behavioural science in the U of R's Hill and Levene Schools of Business, some of Pennycook's earliest research focused on understanding a key component of human reasoning: what are the factors that trigger people to think in a more analytic and reflective way, as opposed to relying on intuitions and gut feelings?

A common assumption in the field was that when people felt *internal conflict*, it was often between their intuitive gut feelings and more reflective and reasoned thoughts. Pennycook instead argued that conflict between intuitions is what actually triggers reflective thinking. Culminating in a 2015 paper in the journal *Cognitive Psychology*, Pennycook and his co-authors proposed a new model of analytic thinking, a theoretical approach that has been widely adopted in the field.

For this timely and important work, Pennycook has been named a Member of the Royal Society of Canada's College of New Scholars, Artists and Scientists.

2. **Marie-Eve Bradette** is the University's newest Banting Postdoctoral Fellow.

"My postdoctoral research will explore the violence inflicted on Indigenous cultures, bodies, minds, and spirits in residential schools, with a focus on the gendered violence endured by Indigenous women and girls," says Bradette, a settler scholar working with the U of R's Michelle Coupal, Canada Research Chair in Truth, Reconciliation, and Indigenous Literatures.

Bradette says that since the 1900s, and with a resurgence since the 1970s, Indigenous women have narrated their residential school experiences through autobiographies, novels, drama, and poetry.

"Women's residential school literature occupies a unique but under-researched field of Indigenous literatures," explains Bradette. "I intend to addresses this gap in scholarship while reclaiming, redressing, and reconstructing agency, which was often denied to Indigenous women and girls during their time in Indian residential schools."

A Francophone scholar, she also hopes to do the crucial work of translating residential school narratives into French, which has only been done for a limited number of texts.

Nick Carleton and his team have been working hard to provide the public safety sector with the research needed to improve the mental health of public safety personnel.

Bradette's fellowship is funded by the Social Sciences and Humanities Research Council and totals $70,000 per year for two years. Her fellowship began in the fall 2020 term.

3. The University of Regina welcomes **Andres De Los Reyes**, a psychology professor at the University of Maryland at College Park, as the University's 2020-21 Fulbright Canada Research Chair in Mental Health.

More than nine per cent of youth living in British Columbia, Saskatchewan, and Manitoba are dispensed at least one medication intended to treat a mood or anxiety disorder.

Yet, De Los Reyes says, there are many discrepancies in how diagnostic data and treatment assessments are interpreted.

For example, a teacher might see disruptive behaviour in a child which their parents do not see, and a parent may report a child showing levels of hyperactive behaviour which other people may not observe.

"Understanding these discrepancies is a key issue in the delivery of mental healthcare services," says De Los Reyes, who, for close to two decades, has worked to figure out how to use discrepancies as a tool for understanding where to target treatment services and monitor treatment progress.

4. In November, U of R psychology professor **R. Nicholas Carleton** was named the 2020 winner of the Royal-Mach-Gaensslen Prize for Mental Health Research.

The Prize is awarded annually to an outstanding rising star researcher in the field of mental health to recognize, encourage, and support them as they pursue their research interests and goals. The award is worth $100,000.

Carleton, who has demonstrated excellence in research as well as the ability to work collaboratively with his peers and research teams in other disciplines and institutions both within the University of Regina and across Canada, is also the scientific director of the Canadian Institute for Public Safety Research and Treatment (CIPSRT).

"My team and I have been working hard to provide the public safety sector with the research needed to improve the mental health of public safety personnel," says Carleton.

"This award is a strong validation of that work and encourages the team to redouble our efforts to address post-traumatic stress injuries, providing much-needed support to public safety personnel and their families."

Florence Dzierszinski, president of the Royal's Institute of Mental Health Research, says Carleton exemplifies the innovation, collaboration, and excellence that the Institute seeks to encourage with the award.

"Not only has he contributed significantly to our knowledge about the impact of trauma on mental wellness, he has effectively translated this knowledge into solutions that improve the lives of individual public safety personnel and their families," says Dzierszinski. D

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