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Encounters with Wolves





Of these things I'm certain

Arthritis is having the dull teeth of a vampire living inside. And mental

illness, as everyone knows, is endless and rocking and the simple facts of many disappearances. It's having to smoke your fingers into the colour of cockroaches. You can't quite picture the donut shop by yourself someone needs to drive you there. It's stop, and turn

toward yesterday's headlights. The sink, you can't see yourself in the sink or any other surfaces.

It hurts to walk and the world's a space that finds you. If it doesn't rain, if it doesn't rain. And THEN, just beyond

the gas station, it's truer than anything that some children have chalked some stars on the sidewalk, a moon no one could believe in, a cardboard truck, and incredibly

these words floating over everything in simplest, impossible blue: We Know

by Michael Trussler, professor in the Department of English

This poem appeared in the Canadian Mental Health Association of Saskatchewan's publication, *TRANSITION*, in their fall 2018 "Best of" edition. Anxiety, Stress & Pain is an area of research strength at the University of Regina.





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All photos by The University of Regina Photography Department unless otherwise noted. Original design by Bravo Tango Advertising Firm Inc.

Discourse is published twice a year by the office of the Vice-President (Research) and University Advancement and Communications at the University of Regina.

The magazine is emailed or mailed to internal and external stakeholders of the University. Ideas and opinions published in *Discourse* do not necessarily reflect those of the editor, the office of the Vice-President (Research), or the University of Regina.

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🙆 (cover) Dianne Ouellette

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I am excited to help lead the charge as we all continue with the work that makes us a place that not only talks the talk of [equity, diversity, and inclusion], but also walks the walk. Research shows that inclusive teams make better decisions that deliver powerful results. Diversity ensures that people contribute different skills, ideas, perspectives, and methodologies, all of which enhance processes and drive innovation: key factors for good research.

To build and enhance a research ecosystem that embraces difference and removes barriers at universities across Canada, on May 9, 2019, the Honourable Kirsty Duncan, then Minister of Science and Sport, introduced a pilot program called Dimensions: Equity, Diversity, and Inclusion Canada.

The Dimensions program was created to recognize that many different perspectives, lived experiences, and the overall complexities of diverse individuals foster increased research excellence, innovation, and creativity within the postsecondary sector. This program also takes a multidimensional approach to equity, diversity, and inclusion to achieve a future research community where all can thrive.

Inspired by the United Kingdom's renowned Athena SWAN program, Dimensions contains three components: the Equity, Diversity, and Inclusion (EDI) Institutional Capacity-Building Grant; the endorsement of the Dimensions charter; and an application to participate in the pilot program.

The University of Regina successfully obtained funding for the institutional capacity-building grant and President and Vice-Chancellor Vianne Timmons endorsed the Dimension charter on May 10, 2019. The University of Regina became a program affiliate this fall.

What does it all mean?

At all levels, we will work harder to advance equality, diversity, and inclusion at the University of Regina. We will embrace our increasingly diverse workforce. We will recognize the numerous intersectionalities that exist, and develop policies and practices that will transform our culture. (Intersectionalities refers to the various forms of social identities such as gender, race, sexual orientation, disability, age, religion, education, employment, family structure, marital status, language, nationality, religion, income, and geographic location.)

Over the next year, the University's research enterprise will engage in a process that directs our attention to inequalities to ensure that EDI is a core consideration in all of our decision-making processes and will produce a shared understanding of inclusion and exclusion. We will focus specifically, but not exclusively, on five core groups, including women (in particular women in STEM), Indigenous peoples, visible minorities, people with disabilities, and LGBTQ2S+ individuals.

I am excited to help lead the charge as we all continue with the work that makes us a place that not only talks the talk of EDI, but also walks the walk.

As you read the stories in this latest issue of *Discourse*, you will see that many of our researchers embrace equity, diversity, and inclusion. And while we recognize that there is still work to do, as a university, we will continue to move forward and strive to do and be better.

Together we are stronger.

KATHLEEN MCNUTT

Interim Vice-President (Research)





Natalie Owl and her nine-year-old son, Isaac, who is playing a traditional drum and singing a prayer song for healing. Owl is holding a book she co-wrote with her mother, Maryann Owl, which features Isaac and teaches the *Nishnaabemwin* language.

Honouring the oral tradition of the Ojibwa language BY LYNETTE PIPER

When Natalie Owl was a girl living on the Sagamok Anishnawbek First Nation on the northern Ontario shores of Lake Huron, her parents – survivors of the Indian residential school and the day school systems – chose to raise their three daughters and son in a traditional Ojibwa life.

"We led healthy lives, picking berries, hunting moose, fishing, and working the trapline without electricity or running water," the University of Regina PhD candidate (ABD) recalls. "My parents were strict – no drinking, drugs, or cigarettes. My father didn't talk much about his time in residential school, and I think that he has yet to come to terms with that experience. My mom went to a day school, and as a result, she was able to retain more of the language because she spoke it at home every night. My mom has helped us keep our language alive."

Owl, who has three undergraduate degrees in history, native studies, and Oiibwa linguistics. focused her master's research on the impacts of the Indian residential school system and negative racist stereotyping on the Ojibwa language, known as Nishnaabemwin. Her current doctoral research is a multiphased, mixed-methods study that includes digital storytelling. The storytelling project examines Indigenous language education and two social determinants of health: cultural continuity (the transfer of traditional Indigenous knowledge between Elders and the younger generations), and self-determination (the ability for individual and community control of political, social, and education systems).

Owl cites her mother, late grandfather, and the late Ojibwa historian and scholar Basil Johnston for inspiring her passion for the regeneration of her language. "The introduction of written Nishnaabemwin is a recent practice, as it's primarily passed down orally through the knowledge keepers," she notes. "More research needs to be done to accurately reflect the spoken word within communities of speakers. We've already been informally teaching Nishnaabemwin without teaching certificates, like my mother did for us. These informal ways need to be acknowledged and can be integrated with Western teaching methods to maximize language retention. For example, through the digital storytelling project, Indigenous language resources are being developed by community members and traditional knowledge keepers."

The southern half of Saskatchewan has a strong presence of *Nishnaabemwin* (also referred to as Plains Ojibwa, Saulteaux, and *Nakawewin*). Owl is passionate about the survival of the language, noting that many Indigenous languages are critically endangered in Canada, with only Cree, Inuktitut, and Ojibwa expected to survive, although there is an overall increase of people learning Indigenous languages later in life. In an era of reconciliation, Owl's work is especially significant.

"It hits really close to home," Owl explains. "My daughters Anangoons (Little Star), who's 24, and Memegwaans (Little Butterfly), who's 22, are not as fluent because I was fearful they wouldn't do well in school growing up. This is a popular misconception, but it's something I was not able to unlearn until my daughters were older. A lack of immersion schools also hindered their language retention. But things are now different with my nine-year-old son, Isaac. He is homeschooled and *Nishnaabemwin* is a key part of his learning."

Owl is also trying to overcome the sad reality that many Indigenous boys and men are more likely to end up in jail than complete high school. "I'm hoping to help create a new path for him – one that's closely aligned with his language, culture, and identity."

Natalie Owl's research is supported by a Faculty of Graduate Studies and Research Indigenous Graduate Scholarship called kaskitomâsowak, a Faculty of Education Indigenous Graduate Students in Education Scholarship, and an AGEWELL NCE Graduate Student Award.

aen loo pawatamihk (Wolf Dream)

STORY AND PHOTOS BY DIANNE OUELLETTE

StudentFocus

Growing up on a Saskatchewan farm, I was always surrounded by an overwhelming presence of nature. The barn swallows swooped down as my little brother and I played in the barn and the mice scattered and the cats pounced as we jumped on hay bales. We spent afternoons capturing and releasing frogs.

Decades later, these connections to animals and the land are still central to my life.

Through my master's research project, aen loo pawatamihk: Inherited and Personal Memories Shared Through Storytelling and Mediated Interactions with More-Than-Human Beings, I am using photography and video to capture my encounters with animals and the land, and through this work I remember my family and ancestors and share our untold histories and trauma.

When I started my research, I had no intention of revealing hidden family secrets. I was in the throes of finishing a documentary that told the story of my brother falling to his death in a service rig accident. As I was grieving and working on my family's traumatic story, I realized it was also time to reveal more challenging truths.

This took me back to a major turning point in my life.

More than 25 years ago, my brother revealed to me that our biological grandmother, whom we never knew, was



Cree. He had learned this on a recent trip to visit our father, who did not raise us.

When I asked my grandfather about her, he told me a tale of her running off on an adventure to pursue her dreams in Hollywood. Through family, I learned that she had left him early in their marriage and that later in life she was brutally murdered. I was shocked when I discovered this traumatic family history, and I began to explore my Indigenous identity – a journey that has influenced my filmmaking practice for the last two decades.

In 2017, I began writing a series of short stories based on personal encounters with wolves and bison. During this





On multiple trips in Western Canada, I took thousands of photos and hours of video footage. Through this process I've come to understand that I have a spiritual connection with wolves and bison, and now my master's research centres on these photos.

time, on multiple trips in Western Canada, I took thousands of photos and hours of video footage. Through this process I've come to understand that I have a spiritual connection with wolves and bison, and now my master's research centres on these photos.

Initially shot in colour, I cover each photo with a duplicate layer that I convert to black and white. This layer represents a blanket – a powerful symbol in Indigenous storytelling and ceremony. I then erase selected sections of the photo, and bring the true colour back to the surface, revealing the original colour, which signifies the exposing of truths, and also represents colours in the Métis sash.

My research has allowed me to watch bison graze in the distance and roll in the dirt, and to walk next to an old great grey wolf as I listened, in awe, to his pack howl in unison. With my camera in hand, I have crouched in the dirt and grass. I have perched on rocks, and have climbed



to the edges of cliffs and outcropped trees to document these moments. Whether an animal wandered close to me, or was off on the horizon, whether a flower blew in the wind or a rock crowned from the ground, I acknowledge them as having spirit.

The act of capturing moments with these more-than-human beings has become my path to holistic well-being, as the deeply embedded trauma and inherited colonial wounds slowly begin to scar over. I gain knowledge of more-thanhuman spiritual connections by remembering, honouring, and giving voice to ancestors through my lens.

As I come to terms with my grandmother's murder, and losing my brother and others, I continue to search for deeper spiritual connections to more-than-human beings. I honour their memory by sharing narratives through video and photographic interactions with more-than-human beings, for my stories began long before I was born and will continue long after I am gone.







#SeePainMoreClearly: Helping end widespread pain in dementia patients

BY LYNETTE PIPER

The video is difficult to watch. An older man in a wheelchair is rocking and vocalizing, visibly agitated and upset. When two care workers come to his side to offer comfort and a glass of water, the man swats them away with his hands, yelling, "No!" It's obvious that care staff are trying their best to help him, but the senior's agitation is only getting worse. One of the nurses then bends down to eye level and says, "Bill, we have medicine to help calm you down."

Unfortunately, it's a scenario that is repeated far too often in long-term care homes across Canada and around the world, as confused older patients who have lost their ability to verbally communicate are given psychiatric drugs to calm their agitation, when they might have been better served by having their undiagnosed pain addressed.

It's a dilemma that has consumed the University of Regina's Thomas Hadjistavropoulos for much of his academic career. After decades of research and collaboration with stakeholders, researchers, and health professionals across Canada, he has recently launched a worldwide social media campaign to raise awareness about the assessment and management of pain in older patients living with dementia. The #SeePainMoreClearly campaign has quickly spread around the globe since going live on October 1, 2019. "In the first five weeks of this campaign, our hashtag received three million impressions on Twitter and more than 1.6 million unique users. The story has been picked up by media across Canada, while the hashtag has been used in 14 countries and the website has been viewed in 22 countries. We have support from the Alzheimer's Society of Saskatchewan, the AGE-WELL Network of Centres of Excellence, the Canadian Association on Gerontology, the Chronic Pain Network, and other organizations and influencers," says the homespun hero, who, along with his undergraduate honours student Louise Castillo, decided to use the power of social media to address a real and growing problem in society.

In the same way that a high-stakes rescue video of an abandoned, half-starved puppy goes viral on social media in a matter of hours, Hadjistavropoulos and Castillo knew that they could harness that same power for their compelling message on how to help vulnerable seniors.

"Our goal is simple: we want to get the message across that, too often, pain-related distress and agitation in older adults with dementia is misattributed to psychiatric problems," the psychology professor and director of the Centre on Aging and Health explains. "When we do this and pain problems go undiagnosed, they often get worse, costing the system

Feature

Louise Castillo, a psychology undergraduate honours student, in the Health Psychology lab at the University of Regina.



"In the first five weeks of this campaign, our hashtag received three million impressions on Twitter and more than 1.6 million unique users."

significant resources. With improved pain assessment, we would not only be improving quality of life for our seniors, but also reducing stress levels for care workers."

The #SeePainMoreClearly campaign is a natural fit for Castillo. As someone who grew up with social media, she's seen firsthand how it has revolutionized the way people communicate with each other. "We wanted to find a way that would take scientific findings, which are often exclusive to academics, and put them on a social media platform," the 21-year-old psychology student explains. "This way, the findings can be more accessible to the everyday public, including family members and caregivers."

Normally it takes 17 years from the time research is conducted to the time it makes it into widespread clinical practice. The #SeePainMoreClearly campaign is helping to bridge that gap. "We're getting our research findings out there to the general public in quick, digestible bites on social media," Castillo says. "We've created the video and other engaging content that people can share and use to strike up important conversations. Our hope is that this will help shape future policy when it comes to how we treat dementia patients." Hadjistavropoulos and former graduate students Shannon Fuchs-Lacelle and Sarah Chan, along with other collaborators, have developed and validated the Pain Assessment Checklists for Seniors with Limited Ability to Communicate scales, known as PACSLAC.

Healthcare professionals are encouraged to assess such markers as facial expressions (grimacing, tightening of the facial muscles), vocalizations (crying out, grunting, gasping for breath), body movements (flinching, thrashing, clenching fists), to name a few, as ways to assess whether a patient is in pain. "Right now, long-term care facilities are only mandated to assess a patient for pain once every three months, but we believe that everyone should be assessed for pain at minimum once per week to ensure the health and wellbeing of those with limited ability to communicate," says Hadjistavropoulos.

As many as 80 per cent of residents living in long-term care suffer from some kind of pain, which often can be excruciating. Frequently, responsive behaviours in dementia, from agitation to refusing to eat or shower, are due to unaddressed pain. Despite the best intentions of front-line staff, long-term care homes are often understaffed and underfunded. As the baby boomer population ages, and increasing numbers of older persons are diagnosed with dementia, there is often not enough time to do frequent pain assessments. But these frequent assessments can make a big difference. "In our research, we have found that nurses who use the PACSLAC on a regular basis have lower levels of distress and burnout than other nurses," he says. "In another study, we found that regular pain assessments can lead to reduced use of anti-anxiety meds (benzodiazepines) in seniors with dementia, which can increase the risk of falls and the risk of mortality in that population."

Currently, Hadjistavropoulos is collaborating with computer scientists and engineers to develop advanced technologies such as a tablet app and an automated vision system where cameras capture the facial cues of dementia patients using real-time video imaging to determine the level of pain a patient may be experiencing. These technologies help care staff better respond to the pain needs of their dementia patients.

Patient advocate Mary Brachaniec of Moncton, N.B., is working with Hadjistavropoulos and his team to move research knowledge into the hands of those who need it. She believes effective pain management is a basic human right.

"My parents both suffered with Alzheimer's and passed away in 2018. The biggest fear that my sister and I had was that they would experience pain and not be able to tell us about it," Brachaniec explains. "This was the case for our mother after she fractured her pelvis from a fall in 2017. She spent 10 days in an acute care hospital where staff were very busy and didn't have time to consistently monitor or manage her pain. This was distressing as she couldn't tell us when her pain was too much. My sister and I recognized when her pain was increasing through facial grimaces or gasping, and we alerted staff. However, medication and other pain management measures were often not administered on time, causing much suffering for her and distress for us."

"In our research, we have found that nurses who use the PACSLAC on a regular basis have lower levels of distress and burnout than other nurses."

Brachaniec's story underscores the fact that even with family present, and staff doing their very best, the system is often constrained and pain can often be missed or underestimated and under-treated. Brachaniec says the consistent use of validated pain evaluation and management protocols for hospital staff would have gone a long way in easing her mother's suffering and reducing the family's burden.

"Once Mom was back in long-term care, staff worked closely with us to keep her comfortable, but even staff members who knew her well sometimes missed cues that her pain levels were increasing and she required further evaluation and treatment."

Nobody wants to see a loved one in pain and unable to communicate. When Hadjistavropoulos was a young boy living in Greece, he watched his own grandfather's decline with dementia. It left an indelible imprint on his life, but at the time, he didn't know it would help form his future life's purpose.



Mary Brachaniec with her parents, Aubrey and Audrey Bates, in their hometown of Moncton, New Brunswick in 2015.

Thomas Hadjistavropoulos poses for a selfie outside of the Montreal Museum of Contemporary Art. A poster of Leonard Cohen, his famous idol, is in the background.



"I first thought about coming to Canada after I became fascinated by a famous Canadian, the poet Leonard Cohen, who had spent several years on the Greek island of Hydra," says the registered doctoral psychologist. "I applied to 16 American universities for my undergraduate psychology studies and only one in Canada – McGill University – simply because I was hoping to bump into Leonard Cohen in Montreal where he was then living. I was happy when the McGill acceptance letter came, and I knew it was the right choice."

Not only did Hadjistravopoulos get to meet his idol at a book signing event right across from the university, but he also found the local food and culture of Montreal suited him. In spite of so many positives, Hadjistavropoulos admits it was lonely being so far away from his family and friends in Greece, and the isolation pushed him to study harder and make something of himself. "It was a huge sacrifice coming to Canada, and it cost me a lot emotionally. I knew I had to make school a success, and this would be one of the driving forces of my life."

Hadjistavropoulos moved west to Saskatoon to obtain his master's degree and his PhD. It was there that he met his future wife, Heather Hadjistavropoulos, a psychology undergrad from Swift Current who was "smart, beautiful, and made me laugh."

Kenneth Craig in the Douglas T. Kenny Building in UBC's Department of Psychology.

The couple married and had two sons, Nicholas and Dimitri, while continuing their academic careers. Heather Hadjistavropoulos became a prominent psychologist in her own right and a leading Canadian researcher in Internet Delivered Cognitive Behavioural Therapy (ICBT). Thomas ended up doing his pre-doctoral residency at the University of British Columbia Hospital, Vancouver. While in Vancouver, he met Kenneth Craig, a renowned clinical psychologist and Canadian researcher on the forefront of behavioural advancements in undetected pain in infants and children.

"It was a match made in heaven," Hadjistavropoulos laughs. "We realized that the problems of understanding pain in severe dementia patients and in infants posed similar challenges because they both have limited ability to communicate. It led to some exciting research and innovative collaboration."

Craig's affection and admiration for his friend is unwavering. "How can you not want to work with someone so friendly, bubbly, and generous. He's so driven to help seniors with dementia and so dedicated to his science and to professional scientific communities as a whole. He has developed a state-of-the-art program, and his passion and commitment to this project will be his greatest gift to others," says Craig.

Louise Castillo agrees. "Everything I've done with the #SeePainMoreClearly campaign is because of Thomas and his vision. I'm just so happy to be a part of all of this, helping to change so many lives."

Mary Brachaniec says the #SeePainMoreClearly campaign is causing important conversations to take place on a subject that is deeply personal and private. "We need to talk about this and change policy and practice so that dementia patients can live out the rest of their lives with comfort and dignity."

Hadjistavropoulos may not have been able to help his grandfather those many years ago, but today he is systematically making life better for aging parents and grandparents living with dementia the world over. And that will be his greatest legacy.













1. For the last 18 years, R. Nicholas Carleton's career has focused on understanding relationships between trauma, pain, and mental health. Now Carleton. psychology professor and scientific director of the Canadian Institute for Public Safety Research and Treatment, is helping Canada's public safety personnel (PSP) by developing and integrating a comprehensive system of mental health research and treatment across the country. His research activities focus on the prevention of, and early intervention for, mental health injuries among PSP. By creating and implementing innovative, technologically advanced, and potentially lifesaving mental health interventions, Carleton and his team are developing tools that could help protect and support the mental health of Canada's more than 300,000 PSP. For this significant work, Carleton has been named a Member of the Royal Society of Canada's College of New Scholars, Artists, and Scientists,

2. Merelda Fiddler-Potter, a doctoral student in the Johnson Shoyama Graduate School of Public Policy (JSGS), was awarded the prestigious Vanier Canada Graduate Scholarship, Her research will explore the media's role in helping Canadians learn the truth of past and present colonial policies and the impact on Indigenous peoples. She will also determine how current news stories are framed, how Canadians interpret Indigenous policy issues as a result, and how the media can compel people into action in order to keep reconciliation high on the public agenda. "My work as a journalist and as an academic has been to change the negative portrayal of Indigenous people," savs Fiddler-Potter. "We need to both learn and share our unique local histories, in order to build on the media's first draft of our shared Canadian history, and reclaim our culture and traditions to share with our communities."

3. A Government of Canada agroclimate report states that in 2017 the southern regions between British Columbia and the southeastern Prairies faced their driest summer in 70 years. That spring, a portion of the northern agricultural region in Alberta and Saskatchewan experienced extreme moisture conditions that caused substantial delays in spring seeding, crop development, and harvesting. These extreme climate events take a toll on the land, and, with a critical need to address them, in September the University welcomed Soe Myint, a Fulbright Canada Research Chair in Environmental Studies. His goal is to discover if and how environmental degradation, social and economic changes, and land-use dynamics influenced ground and surface water changes in central and western Canada between 2002 and 2017. His study is designed to provide transformative options for future water use and policy changes for sustainable resource management.

4. Every year since 2015, Yiyu Yao, a professor in the Department of Computer Science, has been ranked one of the most highly cited researchers in the world in his subject field. He received his 2019 ranking in November. Web of Science, the world's largest research intelligence platform, annually recognizes world-class researchers selected for their exceptional research performance, demonstrated by production of multiple highly cited papers that rank in the top one per cent by citations for field and year. Since early December, Yao has authored or co-authored 292 publications and was cited 10,092 times. His most highly cited paper, "Relational interpretations of neighborhood operators and rough set approximation operators," was published in the journal Information Sciences, and has been referenced in 558 published papers.







Little field station on the Prairies

BY KRISTA BALIKO

Although it was 30 years ago, Mark Brigham still remembers what he thought the first time he laid eyes on the University of Regina's research field station in the Cypress Hills.

"Why is it painted green on one end? Is it ever small. And, oh my, is it ever beautiful – it's out of the way, and it will serve my purposes absolutely fabulously."

The late George F. Ledingham, the former head of the University's biology department, established the spot in 1973. Located in the middle of nowhere, 65 kilometres southwest of Maple Creek in the West Block of the Cypress Hills Interprovincial Park, the field station sits on 260 hectares of native prairie and forest on land leased by the University from the Province of Saskatchewan.

Accessing the field station means taking a trip through the Fort Walsh National Historic site – the property immediately adjacent to it. Its proximity is the reason half the trailer was painted green. Brigham later found out that Fort Walsh staff asked the U of R to paint it so that the trailer wasn't as evident from the Fort's Interpretive Centre.

"Its isolation – which, while it makes it the perfect spot to conduct field work – doesn't mean it's always easy to access. But, that's also what makes it the perfect spot," laughs Brigham, a University of Regina biologist who specializes in bat research.

"The first time I tried to go was on October 10, 1990. I had just been hired at the University and I immediately wanted to go out and see it. I hopped into a truck and headed west."

But he didn't make it.

"I got about 10 kilometres from the field station and couldn't go any farther. It had been snowing and the roads are impossible to drive on in those conditions so I turned around and headed home. I finally made it there seven months later."

The Cypress Hills are about 600 metres above the prairies and are one of only a few places not completely covered by ice during the Wisconsin glaciation period, giving it a unique climate and habitat. The vegetation is a mixture of fescue grassland and lodge pole pine, white spruce, and trembling aspen – making it the perfect research location for biologists of many stripes. Every year for the last 25 years, Brigham spends a week in August at the field station with about a dozen undergraduate biology students from his upper-level animal behaviour course. "The field component is really valuable, and for many of the students, it's the first time they have spent that much time in nature, collecting and processing data." They also all live, eat, and work together – getting to know Brigham and each other.

Sometimes this close contact results in more than research.

The field station – three almost-50-year-old ATCO trailers attached together – has housed hundreds of budding biologists and established faculty members over the last five decades, and it has supported work that's led to internationally significant discoveries. It's even been the catalyst for love and marriage.

"I'm up to nine partnerships, with 10 children produced from those partnerships. And what I'm most proud of is that none of those relationships have dissolved. And some are going on 25 years," says Brigham with a smile.

THE BATS, THE BIRDS, AND THE BEES

The partnerships that started at the field station, and the children born of those relationships, have even been memorialized on a special plaque.

The "Bats/Birds & Bees" plaque has two columns of names: "Pair Bonds" and "Fitness Units." In biology, a pair bond is a relationship that develops between a mating pair for the purpose of reproduction and parental care of offspring. Fitness is a measure of an animal's ability to produce offspring.

Of course, great research is another outcome of the field work conducted in the Cypress Hills.

Close to 100 journal articles, publications, conference talks, and manuscripts have emerged from the work done at the field station. A dizzying number of topics have been studied: from birds to bats, bull snakes to red squirrels, beavers to coyotes, from forest succession and plant communities, to resource management, drought, and environmental and climate changes on the Prairies.

In his field of bat research, Brigham says the work that he and his students have done has left an impression on people.

The University of Regina field station in the Cypress Hills.

Feature

Left: Mark Brigham, who has an international reputation for his work with bats, helping a student take a bat out of a mist net in South Africa.

Right: The Bats/ Birds & Bees plaque that hangs in Mark Brigham's lab.



"The field station has allowed our scientists to explore the Cypress Hills in a way that couldn't be done as easily in other places. We've been able to study the same place over a long period of time, which allows us to continually keep building on our research," explains Brigham, who acknowledges that he and his students have an international reputation for their work on how bats cope with tough environments.

Brigham says that one of his first grad students, Matina Kalcounis-Rueppell – who is now the dean of science at the University of Alberta – started collecting data at the field station for her master's degree in June 1993. The data required that she catch bats. But for months she didn't catch a single one.

"She worked at it every single night. She set up nets, walked a huge number of kilometres carrying equipment, put in a lot of effort, and effectively got nothing from it. It was just bad luck," he remembers. "It was hard for her and she wondered if she would have to change projects if she couldn't catch anything, because if she couldn't catch anything, she had no data, and with no data she couldn't write a thesis. Then, on the August long weekend, she caught two bats. Those two bats led to others, which led to an important paper on how bats choose particular trees to live in."

In the intervening 25 years, Brigham says a lot of the research that he and students have conducted has focused on how bats use and move between trees, and what they do when all the trees fall down or there's a storm.

"Only by having people continually looking into these relatively simple questions have we been able to find the answers. I had no inkling when we started that we would have this kind of longevity of place with which to do research."

It's why people from all over the world who hear the words 'Cypress Hills' and 'bats' know the work has originated with Brigham and his students.

"The Cypress Hills is on a worldwide map, and that makes me really proud. It's well known because of the very good work that comes out of there and virtually all credit goes to the students who have worked there."

ANIMAL BEHAVIOUR

Kerry Hecker smiles in her pick-up truck as she gazes out over the native prairie at a buffalo rubbing stone at the Last Mountain Lake National Wildlife Area where she lives and works.

"The University of Regina's field station changed my life," says the wildlife area manager.

She says that while the tentacles of a possible biology career started to grab hold of her after her high school biology teacher took her class on some camping and canoeing trips, it was the field station that strengthened the grip.

"Ultimately, it was Mark Brigham's animal behaviour class, with the field station component, that really set the course for my life. I feel like it was the bow and I was the arrow because that class, and the University of Regina biology program, are what got me launched in the right direction."

Hecker's first field job was in the summer of 1994. She was a second year student, and responded to a job posting for a field assistant to master's student Matina Kalcounis.

"I went from doing bat work at the Cypress Hills field station with Matina, almost directly to Mark Brigham's biology class."

Hecker remembers watching the van full of students pull up to her granny's house in Maple Creek, where she stood with a pile of veggies from the garden's summer harvest.

"I was the last student to be picked up, and the only place to sit was beside this rather nice looking young man whose name was Lowell Strauss. He thought it was hilarious that I brought a bag of cucumbers with me," laughs Hecker remembering that hot, August day.

Four years later, she ended up marrying Strauss. Their names – and their "Fitness Units," Daniel and Jesse – are now etched into the infamous plaque.

"It was a really fun summer. And that course was my first taste of conducting field work for my own project. I had to work out all the logistics of trying to make something scientifically accurate, of isolating that one little thing that I wanted to test amidst the myriad things happening in the environment."



From there, Hecker took full advantage of being a field assistant and spent her remaining undergraduate summers studying bats in the upper Carmanah Valley and the southern-most point of Vancouver Island, as well as studying phytoplankton and zooplankton communities in alpine lakes in Banff National Park.

"I didn't mind working my buns off because I got to go to cool place and do amazing things," says Hecker.

"My time at the University of Regina was exciting. I was even first and second author on a few refereed papers, which isn't an opportunity an undergraduate student would probably get at a larger university."

Hecker now manages both the Last Mountain Lake National Wildlife Area and Migratory Bird Sanctuary (Canada's oldest bird sanctuary) and the Stalwart National Wildlife Area for a combined total of more than 16,000 hectares of federally protected land.

Her work managing the area protects and supports water and grassland birds and other wildlife, as well as their habitat, which includes the habitat for millions of migrating shorebirds and many at-risk species, including the ferruginous hawk, the piping plover, the whooping crane, and the peregrine falcon.

Hecker is passionate and enthusiastic about her work and the role she plays in conservation. She also knows that she wouldn't be where she is today if the summer of 1994 didn't play out the way it did.

"The field course, doing research with Matina, and meeting the husband – bam, bam, bam – all those things in quick succession really set the course of my life. And here I am," she says with a satisfied smile.

INTERNATIONAL AFFAIRS

This past summer, Paco Vega spent his week at the field station conducting research into the foraging behaviours of chickadees. Like Hecker, and the hundreds of students before him, Vega was excited to be conducting his own field work in Cypress Hills.

"I am a field biologist, so when I thought about my study abroad year, I decided to take an animal behavior course. When I looked at all the places that my home university had agreements with, the University of Regina, with its field station, was my first choice," says the fourth year undergraduate student on exchange from the Universidad Autónoma de San Luis Potosí in Mexico.

Vega says looking at a completely different ecosystem than at home in Mexico was only part of what made for such a rich experience.

"Part of the course involved a public presentation at the Cypress Hills Centre Block, which was a great opportunity to talk with the public and for me to improve my English.

"And staying at the field station helps you to really get to know your classmates. We had a lot of time to exchange ideas and chat," says Vega. "Our projects evolved because we provided each other with feedback. Plus, we had the opportunity to have almost all of our meals together – and sharing a meal is always a great way to start bonding."

Vega was also quick to point out that it was a bonus to have the chance to talk with more experienced students, because both master's and PhD students were on site during the animal behavior course.

Set to head back to Mexico in December, Vega says that experiencing different cultures and learning from them was something he wouldn't have gotten if he hadn't made the trip abroad. "And participating in an exchange also makes you appreciate what you miss. I miss my family...and the food," he laughs.



Undergraduate students during the field component of Mark Brigham's animal behaviour course in August 2019 in the Cypress Hills. (L to R) Paco Vega, Todd Pilon, Ariel Jenson, and Kevin Maxeiner

Kerry Hecker leading a prescribed fire for prairie restoration at the Last Mountain Lake National Wildlife Area.

Feature

An aerial photo of trembling aspens taken by Adam Sprott's drone in the Cypress Hills.



IN THE TREES

Like Vega, Dana Green says it was almost a given that she would travel north to the University of Regina from her home state of Missouri to complete her PhD.

In 2015, when Green was still an undergraduate student, she travelled to the American Society of Mammalogist conference where she met Erin Baerwald, who, at the time, was a postdoctoral fellow working on bats with Brigham.

"I later met Mark Brigham, came up with a great project idea, and given that the University of Regina has an international reputation for its bat research...here I am," says Green.

The field station also played a critical role in her decision to choose the U of R.

"It's nestled in a bowl surrounded by rolling hills of grassland and shrubland, aspen and spruce. And while the field station doesn't look like anything special, once you go inside and see the walls covered with the signatures of researchers who worked in the field station before you – people whose papers you've been citing for years – and you see that this is where they did their research, well, it's very magical," says Green, adding that it's rare to have such accommodations for students (the field station has a bathroom, kitchen, and six bedrooms with bunkbeds).

Adam Sprott checking bat detectors in October 2019 in the Cypress Hills. "Knowing that there is a place where researchers – from undergrads to faculty members – can stay and interact with the environment and wildlife, and simply have a place to call home while actively doing our field work is extremely enticing." In the summer of 2019, Green started her work on discovering more about bats' ability to orient themselves, research that scholars around the world are only now starting to dive into.

"We know how birds do this, but not bats."

Green says her research will involve catching bats in nets, feeding them "oodles and oodles of meal worms," then releasing them the following night. Her hypothesis is that when they are full, instead of flying to find food, they will fly for migration purposes, as has been shown in other species.

Green is also working closely with master's student Adam Sprott, whose work is building upon all of the work that's been done at Cypress Hills over the several last decades.





"My main goal was to work – using drones – with forestry and wildlife," says Sprott, who works closely with both Brigham and his supervisor, University of Regina forest ecologist Mark Vanderwell.

Sprott is studying how water limitation affects biomass in trees, as well as how bats use different habitats.

"For me it's about pushing the limits of new technology," says Sprott. "I've been really excited to use a drone that's affordable and accessible – it's off the shelf and you can take it anywhere, which means it could go to any country and people could see how their forests are developing for their management plans. But I also use a fancy drone that looks at thermal and infrared aspects."

Sprott says that drones brought him to the University of Regina because Vanderwal was using them in his research. "Using drones in their infancy for this type of research is exciting. Being able to look at and build on research with bats since 1995, while also bringing new technologies and innovation to that field, is also exciting."

Sprott says that the field station has allowed him to do far more in-depth research than somewhere without such a facility, which really puts the University's biology department's research on another level.

"It's a natural laboratory that lets me collect a great volume of data. Plus, I feel as though we are like a bunch of astronauts way out in a field, in a remote area, in a field station where we all eat together and work together. It's a little microcosm. And here we are, in the middle of a beautiful, amazing place – an isolated little pocket of scientists."

BULLSNAKES

Beyond that pocket are acres and acres of land cared for by ranchers who have a deep respect for the land and the animals that live on it.

Chris Somers, a University of Regina biology professor, says that, from his experience, ranchers are often conservation minded.

"Their living comes from the land they manage so they don't want to take missteps that would cause their land to be less productive or reduce their ability to graze livestock. They often take great pains to keep their native grasslands functional, which involves keeping native species and communities intact. So a lot of them have a great fondness for animals you wouldn't predict – like bullsnakes."

Somers and his students appreciate ranchers' care for the snakes because their research is on those constrictors, the largest snake in Canada (bullsnakes in Saskatchewan will grow to roughly 2 metres in length, with the biggest bullsnake Somers has encountered weighing in at about 3 kilograms).

"The bullsnake is at risk of being driven out of Canadian territory," says Somers. "But they are living and thriving in the Cypress Hills region, and not in other areas of the province, and we are trying to understand why."

Unlike many of the other researchers whose work keeps them relatively close to the area around the field station, Somers and his team –including Ray Poulin, the curator of vertebrate zoology at the Royal Saskatchewan Museum – conduct their research further afield.

"We rely extensively on the goodwill of landowners because we tend to find a lot of bullsnakes in the areas around Maple Creek," says Somers. "Most of the ranchers we work with are keen to have the snakes on their land, and we love that, because half the battle our team faces is helping people see them as animals that are worth something. So if the people who own and live on the land already understand that, we're in a position to start sharing knowledge with each other."

Somers says one of the great things about bull snakes is that they are non-venomous, so people aren't as afraid of



Dana Green in the Cypress Hills with a hoary bat (Lasiurus cinereus).

Chris Somers with

a bullsnake.

A wall in the field station covered with the signatures of researchers who have worked there.



them as they are of rattle snakes. Moreover, because they eat small mammals, they are great pest control – hence the love affair ranchers have with the bullsnake.

"If a rancher has a shed full of mice, there's nothing better to take care of them than a big ol' bull snake. And, if you happen to have 20 bullsnakes on your property, your problem is gone," laughs Somers.

Despite not working in the area directly near the field station, Somers says the U of R's ATCO trailers still play an important role in their research.

"Besides being a cheap place for students to stay, the field station gives them access to that beautiful native prairie country," says Somers. "Plus, because a bunch of students and scientists stay there, students have the chance to interact with folks who have different perspectives. They bounce ideas off of each other, discuss statistical techniques and data collection methods, and really form a community that they otherwise wouldn't have access to. It's the community learning aspect that goes above and beyond the idea that the field station is simply a place to sleep."

A PRAIRIE HOME

Brigham smiles when he says that he could talk about the field station forever, and freely admits that the greatest impact has been its role in bringing together the amazing people with whom he has worked.

"There are just some extraordinarily bright and capable people who have felt, similarly to me, lucky to be able to spend time, or their entire summers here, doing the research they have done, and doing it very, very well."

All these years later, Hecker also feels fortunate for the field station.

As she walks around the Last Mountain Lake Wildlife Area on a crisp November morning, Hecker reflects upon her career as a biologist. "In many cases, people who get into biology almost have a vocation. It's something they're passionate about, either for altruistic reasons, or simply because they see the conservation side of it as necessary. That focuses people and it encompasses their whole lives, not just what they do for a living. I certainly feel that way.

"And if I hadn't taken those few steps in the right direction in my University of Regina days, I wouldn't have had the skills I needed to do the work I'm doing. So, when opportunity knocks, you have to be able to open the door. I had the tools to open that door, and ended up here – at home, in the deepest sense of the word. I can honestly hold up having had access to the field station, the biology department, and Mark Brigham as responsible for that."

Quite a legacy for a little field station on the Prairies.



George Ledingham (far left) standing with Arnold James (who, at the time, was part of the University's science education program) and others in the field station in the late 1970s.

Profile

Scientists look to the stars to find answers to fundamental questions about our Earth.

Sifting through the star dust of our universe, University of Regina physicist **Gwen Grinyer** and her team of researchers recreate and study stellar explosions, helping to untangle the mysteries of the Cosmos. **D**

It's happening here.





Adverse Childhood Experiences

Using Evidence to Advance Research, Practice, Policy, and Prevention

> Gordon J. G. Asmundson Tracie O. Afifi



1. Performing Turtle Island: Indigenous Theatre on the World Stage (University of Regina Press, 2019) investigates theatre as a tool for community engagement, education, and resistance. Co-edited by Jesse Rae Archibald-Barber, associate professor at the First Nations University of Canada, and Kathleen Irwin, associate dean in the Faculty of Media, Art, and Performance, the multidisciplinary contributors emphasize that reconciliation between non-Indigenous and Indigenous peoples is neither straightforward nor easily achieved. The collection also offers diverse perspectives that consider performance as a means to self-empowerment and self-determination, while placing Indigenous performance in dialogue with other nations, both on Turtle Island and the world stage.

2. Contributors to Back to Blakeney: The Revitalization of the Democratic State (University of Regina Press, 2019), argue that former Saskatchewan premier Allan Blakeney believed in government as a force for good and promoted social justice through government intervention in the economy and the welfare state. In this collection, co-editor John Whyte, professor emeritus in the Department of Politics and International Studies, writes a chapter on Blakeney's contribution to constitutional reform, while a diverse set of scholars reflect on Blakeney's achievements, his constitutional legacy, and the challenges facing democracy today.

3. Co-edited by psychologist **Gordon Asmundson**, Adverse Childhood Experiences: Using Evidence to Advance Research, Practice, Policy, and Prevention (Elsevier, 2019) examines the high-profile issue of adverse childhood experiences (ACEs): the negative, stressful, or traumatizing events that occur before the age of 18 and often lead to health risks across a person's lifespan. Aimed at a wide range of professionals who work with children and families, this comprehensive, evidence-based resource provides a summary of the past 20 years of ACEs research, as well as guidance for the future directions for the field. James Gacek's *Sexual Regulation and the Law* explores the many facets of sexual governance in Canada in engaging, innovative, and sometimes deeply unsettling ways.



4. Nakón-i'a wo! Beginning Nakoda (University of Regina Press, 2019) is for beginning learners of Nakoda (also known as Assiniboine). The workbook is arranged thematically and provides Nakoda/English lexicon, vocabulary, a table of kinship terms, a glossary of linguistic terminology, and exercises to do after each lesson. Edited by **Vincent Collette**, sessional instructor at the First Nations University of Canada, the book was made possible with the assistance of Elders and Language Keepers of the Nakoda Nation. The main consultants were Armand McArthur and Wilma Kennedy, with additional contributions from Pete Bigstone, Leona Kroscamp, Ken Armstrong, and the late Freda O'Watch.

5. The Grounded Instruction Librarian: Participating in The Scholarship of Teaching and Learning (The Association of College and Research Librarians, 2019) engages the scholarship of teaching and learning using various perspectives while providing an overview of the diverse ways it's currently being conducted in academic libraries across North America and Europe. Co-edited by **Cara Bradley**, University of Regina research and scholarship librarian, each section discusses central questions, highlights important theories and literature, and includes work at local levels, from case studies to reflections on individual participation in teaching and learning scholarship.

6. Using a wide and diverse range of legal case studies and perspectives, *Sexual Regulation and the Law: A Canadian Perspective* (Demeter, 2019) explores the many facets of sexual governance in Canada. **James Gacek**, assistant professor in justice studies, co-edits this collection that includes contributions from highly regarded academics and researchers who provide engaging, innovative, and sometimes deeply unsettling explorations of sexual(ized) topics, which fill gaps and deficiencies in existing literature while extending the examination of sexual governance beyond what has been previously understood about sex and sexuality in Canada.



Edited by Richard Jochelson and James Gacek

Sexual Regulation and the Law A Canadian Perspective





1. University of Regina researchers are dedicated to improving the lives of people in Saskatchewan, Canada, and beyond. Their work is often bold and courageous. In May, the federal government highlighted \$4,404,750 it provided to 32 of the University's science and engineering researchers to support 33 research projects through the Canadian government's Natural Sciences and Engineering Research Council (NSERC). Ralph Goodale, former Minister of Public Safety and Emergency Preparedness, on behalf of the Honourable Kirsty Duncan, former Minister of Science and Sport, announced this substantial funding at the University to a large crowd that included many of the NSERC award recipients.

"Research and innovation drive progress in our society. Today, I

am proud to announce a significant investment in the University of Regina's researchers to make discoveries that have the potential to solve today's challenges, from resource extraction to water filtration. Our government is pleased to support this worldclass research coming out of the University of Regina," said Goodale.

The funding supports science and engineering researchers in many different areas, including engineering, natural sciences, psychology, geology, mathematics, and computer science. The award recipients include both faculty and students.

One of the funded researchers who spoke at the event was biologist **Britt Hall**, an associate professor in the Faculty of Science. Her NSERC Discovery Grant will help support her research, which looks at contaminants in the environment resulting from human impacts.

"I am so pleased to receive federal funding supporting my scholarship on understanding the impact of climate change on neurotoxic mercury in our valuable Prairie wetlands. This NSERC Discovery Grant will also provide resources that will allow me to train our next generation of scientists, increasing our capacity for research that contributes to protecting these critical wildlife habitats," said Hall.

Doctoral student Nicole Lerminiaux, recipient of the Alexander Graham Bell Canada Scholarship, is conducting research centred on understanding and fighting antibiotic resistance, which the World Health Organization calls one of the biggest threats to global health, food security, and development today. "NSERC support allows me to fully concentrate on my studies. As a result of being able to focus solely on my research, I've been able to contribute to multiple projects in bioinformatics, DNA sequencing, environmental sampling, and microscopy, as well as conduct research abroad," says Lerminiaux.

2. A unique partnership between the University of Regina, the Government of Saskatchewan, and Statistics Canada has resulted in the opening of the Regina Research Data Centre (RRDC).

The RRDC, located in a secure facility at the University of Regina, allows approved researchers to access confidential data sources on issues such as population, household services, and health.

"This partnership with Statistics Canada and the University of Regina represents the first time a "The RRDC is a valuable resource for researchers in Regina as we now have access to national-level microdata in our city," said Harminder Guliani, associate professor of economics.



provincial government has entered into an agreement like this," said Correction and Policy Minister Christine Tell. "We're proud to be part of this innovative project, and look forward to seeing how the research done through the data centre can help better inform future government policies and programs, such as the provincial Centre of Responsibility and local Hub tables."

Having access to the data at the RRDC will enable researchers and analysts to identify common factors, gaps, and overlaps in service.

Researchers must visit Research Data Centres in person in order to access data. Prior to the opening of the RRDC, the closest Research Data Centre was housed in Saskatoon. A University of Regina researcher who previously had to make that trip is excited by the research possibilities that are now feasible thanks to the new Regina-based centre.

"The RRDC is a valuable resource for researchers in Regina as we now have access to nationallevel microdata in our city," said **Harminder Guliani**, an associate professor of economics. "This rich data source truly opens up the possibilities for faculty and graduate student research, while having these data sets at my fingertips also means I can incorporate experiential learning into the classroom, enhancing educational opportunities for me and my students."

Research Data Centres follow strict privacy guidelines and adhere to the Statistics Canada Act. All researchers accessing the RRDC require security screening. All data is de-identified to remove personal details. There will also be a full-time Statistics Canada employee at each site to screen the information being accessed to ensure compliance with confidentiality policies and procedures.

3. The Truth and Reconciliation Commission of Canada's call to action number 34 asks for different levels of government to "to undertake reforms to the criminal justice system to better address the needs of offenders with Fetal Alcohol Spectrum Disorder (FASD)."

In September, Public Safety Canada's Indigenous Community Corrections Initiative (ICCI) funded a three-year research project to respond to the over-representation of Indigenous individuals with FASD in the justice system. Goodale announced \$978,272 for the University's **Michelle Stewart** to implement the program, called "Navigator-Advocates: Integrated Supports for Justice-Involved Indigenous Youth and Adults with Fetal Alcohol Spectrum Disorder (FASD)."

"Our Government is working to help reverse Indigenous overrepresentation in Canada's criminal justice system by supporting culturally relevant interventions by community-based organizations," said Goodale. "This partnership with the University of Regina will increase FASD-affected Indigenous offenders' level of engagement and understanding of the system and of their disability, helping reduce their contact with the criminal justice system and make our communities safer."

Funding will flow through the University to support frontline





workers and peer mentors in Regina, Saskatchewan, and Whitehorse, Yukon. Stewart, project lead and associate professor in the Faculty of Arts, will oversee and evaluate the program. She will work with Kwanlin Dün First Nation and the FASD Network of Saskatchewan, the community partners who will deliver the evidence-based programs at local levels.

Stewart said the goal of the project is to demonstrate that person-centred and proactive supports can help achieve better justice outcomes for Indigenous individuals in the justice system with FASD. She adds that the program builds on the strengths of existing relationships between frontline programs, justice programs, and agencies.

"The Truth and Reconciliation Commission's 34th call to action was an invitation to rethink how justice is done in Canada. This funding allows the University of Regina – and our partners at Kwanlin Dün First Nation and the FASD Network of Saskatchewan – the opportunity to do just that," said Stewart.

Stewart explains that frontline workers and mentors with traumaand FASD-informed training will advocate for Indigenous offenders in Saskatchewan and the Yukon, helping to better meet the needs of justice-involved individuals and bring about real-world change in the lives of Indigenous people with FASD.

"This low-barrier approach is but one of many responses needed if we are going to change the justice system and address ongoing inherent structural inequalities," said Stewart, who is the director of the University's Community Research Unit and a researcher with the Saskatchewan Population Health and Evaluation Research Unit.

4. This summer, University researchers received Social Sciences and Humanities Research Council (SSHRC) Insight Grants (IG) and Insight Development Grants (IDG) worth a total of \$688,755.

Rebecca Genoe from the Faculty of Kinesiology received an IG to research innovation in retirement transitions among baby boomers. This longitudinal exploration will study the effect of new leisure activities on baby boomers' quality of life.

IG recipients **Jeanne Shami** from the English department and **Anne James** from Luther College will focus their research on early modern manuscript sermons and sermon notes with the goal of building a community of shared scholarly interest with access to a comprehensive database.

Luther College assistant professor **Kaila Bruer** received an IDG to research the process of questioning children in Canadian courtrooms. These findings will aid Bruer in developing an educational program for attorneys on how to question child witnesses.

Christine Massing from the Faculty of Education received an IDG to study cultural teaching and care practices of immigrant early childhood educators and newcomer families in partnership with the Regina Open Door Child Care Centre.

Associate professor of geography and environmental studies and recipient of an IDG **Vanessa Mathews** will delve into the sociocultural and economic effects of craft beer on small-town Ontario.

Funke Oba and **Amanda Gebhard** from the Faculty of Social Work received an IDG to investigate schooling experiences of black youth in Saskatoon in an effort to promote equitable educational outcomes.

Education's Gale Russell

received an IDG to research the kinds of knowledge and ways of knowing being valued and used in mathematics classrooms by students and teachers.

Justin Feeney from the Faculty of Business Administration will use his IDG to study ways to increase gender diversity and rates of enrolment recommendations among Canadian Forces applicants.

Profile

As the Earth's temperature increases — even by half a degree — so do the risks to our current ways of life.

Working with 107 experts from 52 countries, climate policy expert **Margot Hurlbert**, Canada Research Chair in Climate Change, Energy, and Sustainability Policy at the University of Regina, is the only Canadian Coordinating Lead Author chosen to contribute to the UN's Special Report on *Climate Change and Land*.

It's happening here.





Cameron Mang, Ali Khan, Paige Mackie, and Allan Johnson in the U of R gym.

ENRICHING LIVES

It may start as a small tremor in an arm, but gradually movements slow and muscles begin to stiffen, making even simple tasks difficult and time consuming. Speech can become slurred, and writing hard or impossible. These are only a few of the symptoms of Parkinson's disease, a progressive nervous system disorder.

A recently launched community-based program at the University of Regina, called Enrich, is helping adults living with Parkinson's disease, as well those with other the chronic neurological conditions, such as strokes, acquired brain injuries, and spinal cord injuries.

"A concept exists in neuroscience called enriched environments, which is the idea that the brain is more plastic or malleable when exposed to environments full of opportunities for physical activity, social interaction, and cognitive stimulation," says Cameron Mang, an assistant professor in the Faculty of Kinesiology and Health Studies.

The Enrich program provides clients with individualized exercises and task-oriented movement training activities

that people perform in everyday life, such as reaching and grasping, handwriting, walking, and stepping up and down stairs.

"The aim of the program is to enrich clients' life experiences through personalized rehabilitation training delivered in a group setting," explains Mang. "Exercise and task-oriented movement training can help to increase brain plasticity and build new neural pathways. Over time, we hope to improve people's quality of life and increase their ability to be more engaged in their communities."

Mang is working with a team of undergraduate and graduate students. Each participant is paired with an undergraduate student who has volunteered their time to work with a client one-on-one, twice a week. The students help clients remember exercises, set weights, and generally be a buddy.

As part of the Enrich program, and with support from kinesiology professor Kim Dorsch, Paige Mackie is conducting neurological testing using a neurotracker to monitor symptom improvements. A neurotracker is a cognitive training device designed to challenge attention, spatial awareness, and memory. "This program, with Khan's guidance, takes me through exercises that focus on my hand mobility, which are slowly returning my ability to write. I did not expect this."

"On the first day, the clients had the biggest smiles on their faces. They were excited to be there, and to be working on the same types of challenges as other participants," notes Mackie, a kinesiology master's student supervised by Mang. "They were hopeful – a powerful catalyst in rehab work where having a neurological condition can be quite debilitating."

Mang says that one of the keys to the success of the research and the program has been making connections with people affected by neurological conditions and those who support them.

Barb Butler, the Regina chapter representative of the Saskatchewan Brain Injury Association, explains that her organization sees a strong need for and fit with Mang's work, with five of her clients participating in Enrich. "While physical exercise is important, it is the social aspect we see having the greatest impact on our clients," says Butler. "Brain injury survivors are often isolated and their world becomes small. Connecting and interacting with others enhances the rehab process."

Ali Khan, a third-year kinesiology student, is one of the undergraduate volunteers. He says Enrich has taught him about the importance of the social aspect in rehabilitation. "The client does not have rehab done to them, but rather is in a relationship with the volunteer. It has reshaped my definition of rehab."

Khan is working with Enrich client Allan Johnson, who lives with Parkinson's disease and had lost his ability to write.

"This program, with Khan's guidance, takes me through exercises that focus on my hand mobility, which are slowly returning my ability to write. I did not expect this," says Johnson.



Ali Khan working with Allan Johnson as he does leg presses in the gym at the University of Regina.

The promising changes he has seen since starting the program proves what the Enrich program assumes.

"If you provide an enriched environment, the brain will develop," Johnson says.

Mang is now working to grow the Enrich program so more clients have the opportunity to benefit from this powerful work.

The Enrich program will accept new clients in January. To find out more, please call 306-585-4004 or visit the University of Regina's online Enrich Neurorehab information page.

This research is supported by an anonymous donation for research at the University focusing on brain health and quality of life.



Paige Mackie wearing the 3D glasses needed to work with the neurotracker.



Esam Hussein with his 2019 Outstanding Achievement Award from the Association of Professional Engineers and Geoscientists of Saskatchewan.



NUCLEAR POWER POSSIBILITIES FOR SASKATCHEWAN

By Suzanne Bowness

Saskatchewan doesn't yet use nuclear power, but in light of the growing international demand for cleaner energy options and the province's coal dependency, exploring the feasibility for such operations is an exercise in planning and preparedness. It's also a way to train graduate students for potential future opportunities in the nuclear power field.

Esam Hussein, University of Regina dean and professor of engineering and applied science, is leading a project to delve into those options. The research project, which will be completed in 2020, includes a team of 14 researchers from five faculties and departments at the University of Regina and University of Saskatchewan, as well as a host of graduate and postdoctoral students, for a total of 37 researchers.

The Sylvia Fedoruk Canadian Centre for Nuclear Innovation – a not-for-profit corporation that invests in programs and projects related to nuclear research, development, and training – provided \$1.1 million for the study. Hussein says the team intentionally stayed technology-neutral and did not seek industry funding.

John Root in the Atrium Building at Innovation Place in Saskatoon, outside the head office of the Fedoruk Centre.

"The research focuses on exploring the practical and regulatory viability of nuclear power, with the end goal of creating maps of potential sites best suited for small modular reactors (SMRs), which produce less power than traditional reactors," explains Hussein.

Traditional reactors produce more than 600 megawatts of power, whereas SMRs produce under 300 megawatts. SMRs can also be built in factories and shipped to sites for installation, which reduces construction time and cost. SMRs also integrate well into the grid as a stable, emission-free source of power that protects against the intermittent nature of renewables, like wind and solar.

The researchers explored geographical and geological factors, water resources, connectivity to and stability of the electric grid, transportation routes, and climate, social, and infrastructure factors. Based on this and other criteria, the team then mapped prime locations for the SMRs.

Hussein says the criteria they've created for SMR sites is valuable beyond this project.

"Any jurisdiction that undertakes a significant project has to go through a siting study, from a hospital to a university campus. The population, transportation, environmental surroundings, and so on, all must be examined," says Hussein. "We are essentially developing a model that can be used to conceptually plan any mega project, with the idea of producing maps based on different criteria to enable educated decisions based on the guidelines that decision makers think are most important." Hussein says the project is also reflective of the multidisciplinary nature of nuclear itself, which requires engineering and mechanical expertise.

"The project brought together collaborative insights from academics from geography, geology, and engineering. We also incorporated a legal perspective to investigate the responsibilities and considerations required with regard to Indigenousrelated dimensions, such as the duty to consult, as well as the federalprovincial division of power and the jurisdiction of municipalities." Hussein explains this is because while energy production is a provincial matter, SMRs are licensed by the federal government and municipalities may have their own local restrictions.

John Root, executive director of the Fedoruk Centre, says that the Centre's Board of Directors was unanimous in support of the project. "We agreed that the project would strengthen Saskatchewan's awareness and participation in nuclear research, development, and training," he says, adding that the training aspect of the project was especially important. "We hoped to encourage many young people to reinforce their learning by applying their know-how to think about the special challenges of nuclear technologies. So, if Saskatchewan ever wishes to consider nuclear power in a mix of energy options, there will be people in our community already capable of offering expertise and advice for prudent decision-making."



Eman Almehdawe, associate professor of operations management, had the opportunity to see her research in action when her work helped Access Communications to accomplish their goals (and more).

REAL-WORLD COLLABORATION PROVIDES INSIGHTS FOR ALL

By Suzanne Bowness

With over 50 technicians on service calls in over 300 communities across Saskatchewan, cable television and telecommunications provider Access Communications knows that innovating its systems to improve routing and scheduling can save money and lead to better customer service. Their recent partnership with Eman Almehdawe, associate professor of operations management in the Faculty of Business Administration, helped the firm accomplish these goals and more.

"We wanted to ensure that we had the most efficient routes for our technicians to take as they travel to different communities," says Access chief operating officer, Carmela Haines, adding that the company splits the province into five working areas, each with a depot.

After successfully applying for a National Science and Engineering Research Council (NSERC) Engage grant, which funds collaborations between companies and universities, Almehdawe kicked off the project in March 2018 by hiring postdoctoral student Ehsan Pourjavad to help her explore the company's scheduling challenges and develop an optimization model.

To make recommendations for scheduling technicians' working days, Almehdawe and Pourjavad took into account elements such as driving time between service calls, length of calls, the number of technicians available (and the expense of using outside contractors), plus human factors such as sick days.

An added goal was to improve customer service by using service time windows, which was incorporated into the optimization model. Some suggestions to reduce driving costs included paying for technicians to stay overnight in some communities so they could start working in a neighbouring community the next morning, as well as weighing the costs of paying overtime to techs to stay



longer for an extra call against the costs of having them drive out to that call again.

To help determine the best options for each complex day's worth of hundreds of calls and routes, Almehdawe and Pourjavad created an algorithm to connect Google Maps with the company's current routing system to calculate distances, compare all possibilities, and provide the best answers to maximize employee productivity.

Once they developed the mathematical model and proved that the concept worked, Almehdawe applied for another NSERC Engage Plus grant (where companies pay half of the funds) to extend the project by six months so Access could begin to integrate the model with their actual booking and dispatching systems. Today the company is testing the integration with a planned launch immanent.

For Almehdawe, whose major research focus has been on optimization, queuing theory, and analytics in various sectors – including emergency medical services, agriculture, and financial technology – the realworld component of working with a client made this project particularly engaging. "What's interesting about the Access collaboration is that we were able to develop the tool and then take it back to the company, then see what adjustments we needed to make," she says. "I do research, but I don't usually get to see it live, so that was very interesting and rewarding."

Pourjavad, who has now moved on to a second postdoctoral fellowship at Polytechnique Montréal, agrees. "This project helped me to understand how we can apply operations research techniques to actual industry problems where we cope with a lot of special conditions that scholars do not consider or address in their research projects. In fact, actual concerns and conditions of this project opened new research windows for me," he says.

Haines is looking forward to seeing the new system in action very soon, and says the collaboration was a productive one for Access. "It was a very good experience and we would definitely do another project with University of Regina researchers." Carmela Haines, Mike Norman – the systems analyst at Access Communications who undertook all of the IT development for the research project – and Eman Almehdawe at Access Communications.



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