

# BUILDING COMMUNITY THROUGH RESEARCH

TRU Research and Graduate Studies  
2016-17



## RESPECT, HONOUR & RECIPROCITY IN RESEARCH

Indigenizing higher  
education at TRU

PG 6

## HEALTH RESEARCH GETS \$1-MILLION BOOST

PG 5

## RECLAIMING BIODIVERSITY

PG 18



**THOMPSON  
RIVERS  
UNIVERSITY**



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*Dr. Shelly Johnson, Canada Research Chair in Indigenizing Higher Education in the Faculty of Education and Social Work, says that stepping into this new role is the dream job she has been waiting for her entire life.*

# BUILDING ON OUR SUCCESS



*Dr. Will Garrett-Petts, Associate Vice-President of Research and Graduate Studies.*

Our university boasts a comprehensive set of assets — including trades training, Open Learning, TRU World, career and vocational laddering opportunities, and outstanding faculty in all the traditional academic areas. The interdisciplinary research potential of these assets continues to produce impressive results, including the creation of enhanced and often unique student training possibilities. On behalf of Research and Graduate Studies I am pleased to introduce this report on the continuing implementation of Thompson Rivers University's five-year Strategic Research Plan (SRP) — and to identify areas of focus for the coming year, as we work together to develop and maintain a vibrant research culture.

The SRP offers a shared articulation of our strategic vision for integrating research, scholarship and creative inquiry into all areas of the university. More importantly, the SRP is working. Since its launch, funding success has increased; our graduate programming has doubled; and our level of institutional support for research generally has expanded. A summary of some recent activities and new initiatives suggests how the SRP is scaffolding success in terms of faculty support, student training, graduate program development, knowledge mobilization, partnership development, and impact: During the last 12 months we organized 13 research training and compliance workshops for faculty; facilitated 73 one-on-one research

planning meetings; achieved a 44 per cent success rate in applications for external funding, securing an average of \$61,298 per researcher; provided administrative and compliance support for 205 ethics human subjects reviews, 35 animal care reviews, and eight biosafety reviews (representing approximately a 60 per cent increase over a two year period); organized and managed 21 adjudication meetings for awards, scholarships, fellowships and internal research grants; launched a new Faculty Research Mentors program; welcomed three new Canada Research Chairs; increased the number of paid student research assistants to 162; moderated a special national roundtable on undergraduate research training involving 57 universities at the SSHRC Leaders Meeting; supported the introduction of three new graduate programs; appointed a new Knowledge Mobilization Officer, cross-appointed and co-funded with the United Way and resulting in the development of 10 new community-engaged research projects; established a Community-Driven Research Fund; explored opportunities for increasing TRU's community-engaged research profile with BC's Social Innovation Branch, BC's Ministry of Rural Development, Wilfred Laurier University, Guelph University, the United Way, the City of Kamloops, and the City of Victoria; organized a CBC Radio summer research series featuring TRU faculty and students; generated 92 stories about research at TRU; organized TRU's participation in the BCTECH summit; negotiated a research MOU to form the Interior University Research Coalition (TRU, UNBC, and UBCO); initiated talks exploring possibilities for offering doctoral programs in collaboration with partner universities; and successfully nominated a new Royal Society College of New Scholars member.

In the coming year we will be building on these successes by maintaining the level of excellence in pre- and post-grant support; by working with our partner universities to increase research opportunities; by introducing graduate supervision workshops and by seeking to support further graduate program development; by enhancing our undergraduate research

training programming; by hosting national and regional conferences, including an international symposium on undergraduate research and an Interior Universities Research Summit on technological and social innovation; and by seeking to raise the profile and impact of our research.

The interdisciplinary ethos fostered by the relative absence of academic silos at TRU continues to inspire us, and our relationship to the communities we serve is equally remarkable. The people of the Interior of British Columbia see TRU as *their* university; and, in the spirit of inter-institutional collaboration, we are intent on developing research partnerships with neighbouring universities, enabling us to further mobilize our collective research capacity for the benefit of individuals, community groups and organizations, non-profits, Indigenous communities, cultural groups, businesses and industry.

This annual report is offered as a reflection on the last 12 months, on how the research efforts and accomplishments of our faculty, students, and community research partners are making a difference locally, regionally, nationally and globally.

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# WELLNESS RESEARCH BINDS COMMUNITIES TOGETHER

For 10 years, Dr. Lisa Bourque Bearskin has worked alongside a group of Indigenous women who are recognized as knowledge keepers, community leaders and grandmothers who uphold traditional knowledge practices for community wellness.

This group, known as Women as Sinew, or WASi Communities, is a research support network of women from across northeastern Alberta, and provided the inspiration for Bourque Bearskin's latest research project, "Indigenous Wellness Knowledge in Action: Evaluation of Research Protocol, Processes, Principles in Practice."

The project, which recently received a \$150,000 Catalyst Grant from the Canadian Institutes of Health Research (CIHR), aims to identify how traditional knowledge practices have been sustained, and how this knowledge is incorporated into ongoing community activities. This project acts like sinew, said Bourque Bearskin, as it binds Indigenous communities together by supporting the wellness of one another.

"I would love to be able to refer my clients to people familiar with traditional medicine, and have time and space to share this knowledge with our communities so that they are no longer hidden practices," said Bourque Bearskin, associate professor in the Faculty of Nursing, and member of the Beaver Lake Cree Nation.

"My experience in working with these communities is that there is already training happening. It has been happening a long time, with traditional medicines, songs and language," she said, but it's necessary to make this knowledge more accessible to health care practitioners and other professionals who work within these communities. Research shows an important part of healing for Indigenous people is having access to activities relating to their own culture.

The project involves three groups: WASi Communities, the Beaver Lake Cree Nation in Alberta, which focuses on projects specific to reclaiming traditional ceremonies and incorporating them into their health and education plans, and the Tk'Emlups te Secwepemc Nation, which has used its own form of healing using plants, and animals, ceremonies and songs for generations.

Bourque Bearskin will be joined in her research by Dr. Darlene Sanderson, an assistant professor in the School of Nursing, Jeffrey McNeil-Seymour, a sessional lecturer in the Faculty of Education and Social Work and community leader within the Tk'Emlups te Secwepemc, and Brittaney Katternick, a recent TRU nursing graduate, who will help to organize and host community events.

"I'm really interested in building community capacity to reclaim Indigenous peoples' right to health and wellbeing," said Sanderson. "We have the opportunity to take action to inform the



*Dr. Lisa Bourque Bearskin*

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wider community to the value of traditional knowledge."

The project's advisory team met to set the direction for the research project, with each community highlighting the work that is currently underway. Following a knowledge gathering phase, the project moves into a knowledge sharing phase. Finally, the team will prepare an application for a CIHR Foundation Grant.

The CIHR Catalyst Grant funds researchers who, in collaboration with the Indigenous community, will develop, evaluate and build on existing tools and methods to better incorporate Indigenous concepts of wellness in research designs.

"Even with all of this research, our people are still dying faster than ever. This is all a symptom of colonial violence and this project provides an opportunity to step up and to help our communities," said Bourque Bearskin.

# HEALTH RESEARCH GETS \$1-MILLION BOOST

An international network of Indigenous health researchers and knowledge keepers now have a home at TRU thanks to a \$1 million Canadian Institutes of Health Research (CIHR) grant, making this the largest health research grant in TRU's history.

Led by Dr. Rod McCormick (Kanienehaka), BC Regional Innovation Chair in Aboriginal Health, this network provides Indigenous graduate students and new researchers with opportunities to learn about traditional healing, fully preparing them to become leaders in their chosen fields. Funded through the CIHR's Institute of Aboriginal People's Health Indigenous Mentorship Network Program, TRU is now home to the international and represents the eighth branch alongside Canada's seven regional networks.

Called Ombaashi, an Ojibwe word meaning to soar upwards or to be lifted by the wind, this network of Indigenous research

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*"If you're going to work in Indigenous health you should have knowledge of traditional healing."*

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experts and mentors extends through Canada, Australia, Fiji, Mexico, Nicaragua, Norway, New Zealand, Samoa, Tonga, and the United States.

Through Ombaashi — the nation's international hub — Canada's regional networks will provide international Indigenous outreach, including online workshops in Indigenous healing, and workshops in Indigenous health research. The objective is to provide trainees and new investigators with the chance to learn about traditional healing knowledge and medicine, and to obtain guidance and support from traditional healers and knowledge keepers worldwide. A feature of the Ombaashi project will be the annual congress bringing together all eight branches of the Program.

The development of Ombaashi is in response to the Calls to Action in the Truth and Reconciliation Commission's final report, which asserts that in order to effect change, we must recognize the value of Indigenous healing practices, and calls on the government to increase the number of Indigenous professionals working in the health-care field.

"If you're going to work in Indigenous health you should have knowledge of traditional healing," said McCormick, explaining that this mentorship network will foster "cultural competency."



*Dr. Rod McCormick*

"This network won't train investigators to be traditional healers, but it will provide them with the opportunity to learn about traditional healing," he said, noting that there is a desire within Indigenous communities to ensure health care practitioners and researchers are knowledgeable and supportive of traditional medicines and practices.

McCormick, an international expert in First Nations mental health, has spent his career focused on research projects that involve Indigenous youth suicide prevention, Indigenous career and life planning, as well as Indigenous mental health and counselling. He has a long history of working with the CIHR, and has been the Primary Investigator or Co-PI totalling more than \$29 million.

The CIHR's Indigenous Mentorship Network Program is transformative and paradigm shifting by creating a national and international Indigenous Mentorship Network that meets the needs of First Nations, Inuit, and Métis health trainees and new investigators. This timely, unique program will accelerate the advancement of First Nations, Inuit and Métis new investigators in Indigenous health research.



# INTRODUCING TRU'S CANADA RESEARCH CHAIRS

TRU's research capacity was accelerated in 2016 with the appointment of four Tier 2 Canada Research Chairs (CRCs) in science, arts, tourism and education. It's the first time in a decade that TRU has had four CRCs in place simultaneously. Together, they represent a \$2 million investment from the federal Canada Research Chairs Program, along with an additional \$241,000 infrastructure investment from the Canada Foundation for Innovation.

Tier 2 CRCs are identified as exceptional emerging researchers, acknowledged by their peers as having the potential to lead in their field.

"All four of our Canada Research Chairholders are essential threads in the fabric of a research-informed university, and will create increased momentum for research at TRU," said AVP Research and Graduate Studies, Dr. Will Garrett-Petts. "They will elevate research training opportunities for our students and help answer questions of particular relevance to the communities we serve."



Dr. Shelly Johnson

## Respect, honour and reciprocity in research

In December, TRU announced that Dr. Shelly Johnson (Mukwa Musayett) would be joining the Faculty of Education and Social Work as the country's first Canada Research Chair in Indigenizing Higher Education.

"Stepping into this role is an honour," says Johnson. "It is the dream job that I have been waiting for my entire academic life."

The development of a CRC position in this field was driven by the recommendations of the Truth and Reconciliation Commission and by TRU's commitment to increasing intercultural understanding.

"The way Indigenous people approach research is like a ceremony, and within that are many protocols of respect, honour and reciprocity," Johnson says. "This is an opportunity to research and teach about our ways of knowing, being and doing."

Saulteaux from Saskatchewan's Keeseekoose First Nation, Johnson is a recognized leader in Indigenous research methods and leadership.

She took on her new role as CRC in January 2017 after more than four years as an assistant professor in the School of Social Work at the University of British Columbia. She currently holds \$3 million in research grants on projects to develop capacity in urban Aboriginal communities, with a focus on culture and language revitalization, child welfare and justice issues.

Johnson acknowledges that she's a visitor to the Secwepemc territory and, as such, seeks support for her research. "I plan to visit the Nations, meet with leadership and grassroots people and learn about research that could be meaningful to them," she says. "The creation of this role makes a critical academic statement to Indigenous peoples. It's a privilege and a responsibility to carry it forward in a respectful way."

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Dr. Heather Price

## The Child as Witness

As victims of, or witnesses to crime, children have a vital role to play in the criminal justice system.

Dr. Heather Price wants to ensure that when children are involved, the evidence they provide is as strong as possible.

"We haven't done a good enough job helping kids provide evidence, and if we don't do a good enough job, bad things may continue to happen to them," says Price, Canada Research Chair in Culture and Communities: Children and the Law in the Faculty of Arts. She is one of a handful of experts in North America on memory and children as witnesses within the legal system.

Price arrived at TRU in 2016 from the University of Regina, where she spent nine years as an associate professor of psychology. The primary focus of her research rests on basic memory, investigative interviewing and perceptions of children. Often, we expect children to be less truthful—more likely to be dishonest—than adults, but research shows that's not the case, says Price.

"What can we expect children to be able to recall? How can we get that memory out of them?" How we question children and how we evaluate the accuracy of a statement once we have it, are the questions that drive her research.

Price can often be found in her newly-developed Children and the Law Laboratory at TRU and expects to work with local law enforcement, social workers and teachers. In Regina, she worked with RCMP and Regina Police on how to effectively question

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children, and she anticipates continuing this focus in Kamloops. "Ultimately, we want to discover the type of evidence children are capable of providing, and help those involved in the legal system to obtain that evidence," says Price.

"In doing so, we can reduce the anxiety and fear children experience when they participate in the justice system."





Dr. Yana Nec

## An emerging leader in applied mathematics

An emerging leader in applied mathematics brings interdisciplinary vigour to TRU's research in engineering, big data, and optimization and decision science.

Dr. Yana Nec, Canada Research Chair in Applied Mathematics and Optimization in the Faculty of Science, focuses on the use of mathematics to find solutions to unconventional problems — including ecological issues faced by our region and nation. Nec joined TRU from New Brunswick's Mount Allison University. Specializing in partial differential equations, she develops mathematical tools to explain complex natural phenomena, from gas flow in landfill facilities to the dispersion of atmospheric pollutants, to signaling processes during immune responses. "Accurate mathematical modelling of natural phenomena allows for better understanding of the world around us, and consequently leads to informed choices about our interactions with the environment," says Nec.

Her expertise bridges mathematics and engineering, blending theory and applied knowledge—a rare combination in academia. "I like solving problems that are deemed conceptually unclassifiable within classic notions of either mathematics or engineering."

Nec says that her interests tend toward promoting "completeness" in its many forms. "It can be the investigation of pattern formation in settings that are often deemed esoteric. It can be utilization of data collected by an industrial company to their full research potential. It can be creating analogies or connections between things that are not usually compared." She anticipates partnering with local industry that work with flowing matter—from stack emissions to dam control; from dispersal of species to landfill gas collection.



Dr. Courtney Mason

## Answers to food insecurity found in traditional knowledge

Food security in Canada's north — when it makes the nightly news, it's generally described as tragic, often focusing on a lack of access to clean water, soaring prices of food shipped from the south, and the resulting ill health of those who call these remote communities home.

But there is hope, too, writes Dr. Courtney Mason in his recently published book, *A Land Not Forgotten: Indigenous Food Security & Land-Based Practices in Northern Ontario*.

"This is a book about education and health, and about using food as an entry point into those discussions. We wanted to know what communities are doing to solve food insecurity, and we found that it's really difficult to consider this question from any one place," said Mason, Canada Research Chair in Rural Livelihoods and Sustainable Communities.

The book contains chapters from Elders, economists, historians, geneticists, exercise physiologists and experts in Indigenous education. Together, they paint a comprehensive picture of food insecurity in Northern Canada, localized consequences, and the community-driven projects that are currently having an impact in sometimes remarkably creative ways.

The research, explained Mason, "provides potential ways to respond to the complexities of Indigenous health and food systems through a community-driven approach." He remains convinced that as difficult a problem as this is, community-driven solutions do exist.

"We asked the communities what they needed — we weren't there to tell them what they already knew. These communities are seeking partners and particularly partners who appreciate that community members are the experts on the ground and at grassroots levels."





## KNOWLEDGE MAKERS PROGRAM HAS IMPRESSIVE IMPACT

When the Knowledge Makers program launched in 2016, organizers hoped the program would inspire more Indigenous students to participate in research.

Now in its second year, the program has been more successful than organizers anticipated. Out of the 17 students in the inaugural cohort, four have been accepted into graduate school, one has launched a business, one completed an international internship, and two have been accepted to law school. Several of the returning students have applied for, or expressed interest in, the Undergraduate Research Experience Awards.

"We went into this wanting to develop more undergraduate Indigenous researchers, but we discovered so much more," said organizer Sereana Naepi, a TRU research fellow and Indigenous doctoral student working with Professor Airini, Dean of the Faculty of Education and Social Work.

During Reading Week (Feb. 20-24), 13 new Knowledge Makers were joined by Indigenous scholars and mentors, as well as elders. The addition of alumni created a richness to the program, and one Naepi says will only grow.

"It's so wonderful to know that the program meant so much to our students that they

return, and we hope that each year they'll come back and share with us."

Students developed e-portfolios, and spent much of the two-days working toward a research publication, with each student establishing his or her own unique project.

Hannah Fregin, a third-year Tourism Management student, was grateful for the experience.

**"We went into this wanting to develop more undergraduate Indigenous researchers, but we discovered so much more."**

"I grew up on Haida Gwaii. I know that in Kamloops I'm in an Indigenous community, but I didn't know how to place myself in it. It was so nice to find people with the same values and passions. We're all here trying to accomplish the same thing for our community and our lands.

"It's so nice to walk in with this level of understanding with people who respect the same things as I do," she said.

Mariana Troke, a third-year Nursing student, said her takeaway from the week



*Knowledge Maker logo created by alumni Levi Glass*

was in learning how Indigenous research methodologies differ from Western research methodologies.

"This is probably the first time I've heard voices speaking within a context I'm familiar with, and with the values I grew up with," she said.

Dolan Paul, a fourth-year Computer Science student, said that the mentorship provided throughout the two-day workshop will help him as he moves forward in his field.

"There's a lot involved when you're doing research and knowledge gathering within Aboriginal communities. It's a long process, and there can be an aversion — or reluctance — to technology, as well as a lack of infrastructure," he said, adding that he feels more supported and prepared to embark on his career path.

# UNDERGRADUATE RESEARCH SNAPSHOT

Undergraduate research transforms the student experience, and at TRU this hands-on learning is part of our DNA.

Today, there are more opportunities to engage in undergraduate research than ever before, meaning that every student has the opportunity to explore, ask tough questions, and be the author of his or her own academic journey.



## Danielle

TRU graduate Danielle Fauteux credits the Undergraduate Research Experience Award Program (UREAP) for pushing her out of her comfort zone and setting her up for post-graduation success as a building designer and entrepreneur. Fauteux, a Bachelor of Building Sciences grad, took a piece of vacant property and turned it into a research project, and a development opportunity. She designed plans for a multi-unit waterfront housing project, and engaged a local developer to consult on the design. “The relationships that I formed, the knowledge and experience that I gained going through the process, has all been a feather in my cap. The UREAP forced me to spend time on a subject I otherwise wouldn’t have had the courage to take on.”



## Gabe

Gabe Carpendale spent his summer on the BC music festival circuit as a scholar rather than a party-goer. While the Nelson, BC-native is no stranger to the festival scene, assessing them from this vantage point was an eye-opening experience. Carpendale, who completed his Adventure Guide Diploma before embarking on a Bachelor of Interdisciplinary Studies, said he hopes his research, which explores belonging practices, as well festivals’ engineering, will benefit festival organizers, who will be able to use this information to create better, richer events for participants.



## Colleen

Colleen Black planted her feet on Maui’s Ho’okipa Beach this summer, where she spent eight weeks as an undergraduate researcher, studying the impact that observing basking green sea turtles has on visitors, with the goal of creating more responsible tourists. “I’m able to study what I love,” said the fourth-year Bachelor of Tourism Management Student, who has previously volunteered for the Hawaii Wildlife Fund at Ho’okipa. “I was able to design a project that allows me to give back to an organization that has already given me so much.”



# GRADUATE RESEARCH SNAPSHOT

TRU is welcoming three new graduate programs, providing new opportunities for students to engage in research at the graduate level, and strengthening TRU's research capacity.

The Master of Science in Environmental Economics and Management, Master of Environmental Economics and Management, and the Master of Nursing join the long-standing Master of Business Administration, Master of Science in Environmental Science and the Master of Education programs currently available.

"Increasing our graduate programming contributes to our already active research culture, and helps us to recruit top faculty and to build the next generation of scholars right here in the Interior of BC," said Dr. Will Garrett-Petts, Associate Vice-President of Research and Graduate Studies.



## Gold medal research leads to PhD scholarship

When Polina Denisova left Moscow three years ago she had a plan: She would earn a Master of Education degree from TRU, and a promotion upon her return.

But plans changed at some point on the way to achieving the 2017 Governor General's Academic Gold Medal, and Denisova fell in love with research.

"Something went wrong with my original plan, or it went very right," she said. "I found out I really like research. I like academia, and I would like to go further with that."

The Governor General's Academic Medals recognize the outstanding scholastic achievements of Canadian students.

While at TRU, Denisova studied in her third of five fluent languages, and her story is one of personal achievement, but also speaks to the experience of international students at TRU generally, and the richness they bring to our programming.

Denisova is now enrolled in the Educational Leadership and Policy doctoral program at the State University of New York (Albany), and has received a full tuition scholarship plus living expenses for three years.

## Awarded for excellence

Three outstanding graduate students were awarded \$17,500 each through the Canada Graduate Scholarship – Master's program.



Jackson Baron, Master of Science, NSERC Alexander Graham Bell Scholarship: Baron's research focuses on using remote sensing and machine learning methods to identify, detect, and map invasive plant species.



Dominique Hazel, Master of Science, SSHRC Joseph-Armand Bombardier Scholarship: Hazel's research focuses on the sustainability of music festivals, environmentally and socio-culturally.



Kelsey Boule, Master of Science, CIHR Joseph-Armand Bombardier Scholarship: Boule's research explores the barriers to physical activity and health in urban Indigenous communities.

**Brian Heise** presented *Ecology and control of invasive Northern Pike in the Columbia River, Canada*, during the International Conference on Aquatic Invasive Species, Winnipeg, MB.

**John Hull** delivered the keynote, *Preserving fragile environments for sustainable tourism: Best practice tools from Canada and Iceland*, for the Icelandic Tourist Board, Akureyri, IS.

**Raymond Cox** presented *Drivers of US bank failures during the financial crisis*, at the International Academy of Business Disciplines, Las Vegas, NV.

**Victoria Handford and Ulrich Scheck** presented *Roundtable presentation and discussion of trust and benevolence* at the Canadian Congress of the Humanities and Social Sciences, Toronto, ON.

**David Hill** presented *Here come the drones: How consumer electronics are changing how we monitor the environment*, during an invited talk at the University of Delaware, Newark, DT.

**Cynthia Ross Friedman** delivered the keynote, *The little bang theory: Explosive seed discharge in dwarf mistletoe* at the International Union of Forest Research Organizations in Ashland, OR.

**Iain Stewart-Patterson** was invited to present, *Avoiding the illusion of validity: #nothingbadhappened*, at the Wyoming Snow and Avalanche Workshop, Jackson, WY.

**Ginny Ratsoy** presented *The Songs of the land project: Transcending time through Indigenous collective creation*, at the Canadian Association for Theatre Research, Calgary, AB.

**Sharon Brewer** was invited to present, *Making the case for remote instruments as (almost) open educational resources to innovate the chemistry laboratory*, at the Canadian Society for Chemistry annual meeting in Halifax, NS.

**Noeman Mirza** presented *Using animations to promote nursing students' reasoning abilities*, at the Western & Northwestern Region Canadian Association of Schools of Nursing Conference, Victoria, BC.

**Tina Block** was invited to present, *Exploring journeys to unbelief in Canada, 1950-1975*, at the International Society for Historians of Atheism, Secularism, and Humanism, London, UK.

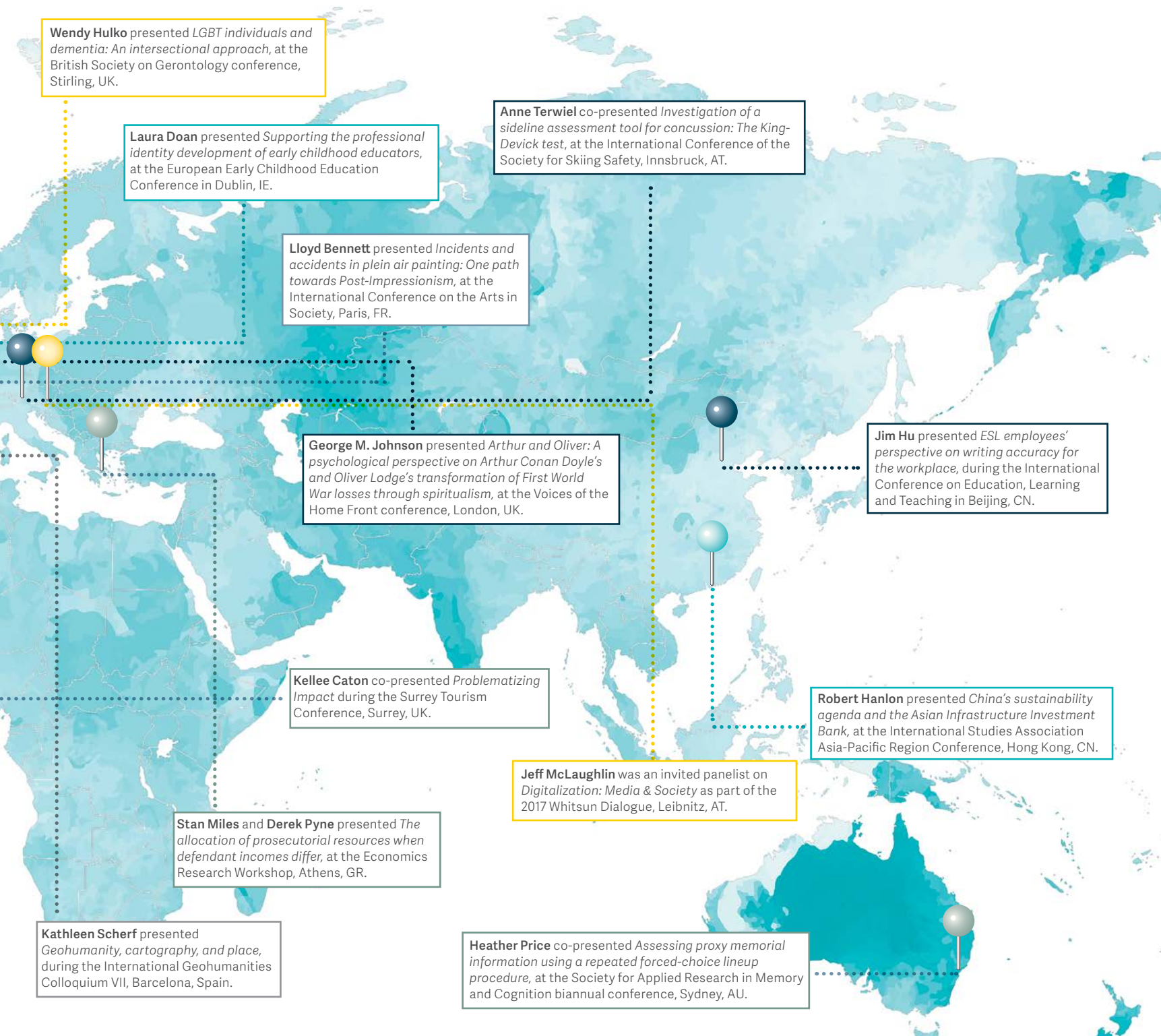
**Jenni Karl** co-presented *How do the factors of personality and social categorization interact to influence unconscious cooperative behaviour in humans?*, at the Canadian Society for Brain, Behaviour, and Cognitive Sciences' annual meeting, Regina, SK.

**Hasnat Dewan** presented *Finding effective strategies to fight terrorism: A comprehensive review of the theories and models*, at the IAABR International Multidisciplinary Conference, Key West, FL.

**Nina Johnson** delivered the workshop *Building community through the labyrinth*, at the Labyrinth Society's annual conference, Houston, TX.

**Josie Fischer** presented *Graphic language: Using graphic novels to illustrate contemporary manifestations of language, culture items and ideas in the Spanish language classroom*, at the AATSP conference, Miami, FL.





## World-class research at work

One of the main objectives of TRU's Strategic Research Plan (SRP) is to support and build upon existing and emerging research strengths to develop national and international leadership in those areas, with the goal of making a real difference to the world, both in terms of providing excellent opportunities for attracting and training the best students, and through the application of research in ways that improve the quality of life for all.

Another overarching goal of the SRP is to facilitate the development of partnerships with communities, scholars, cultural organizations, industries and institutions, and to do this on a global scale. This map highlights just a few of the many ways TRU scholars are actively mobilizing their knowledge nationally and internationally, and in the process, developing partnerships and connecting with colleagues and students from around the world.



### High-tech mapping

*Dr. David Hill (geography) has partnered with Lizzie Bay Logging Ltd., to investigate the use of Unmanned Aerial Vehicles to map sections of the forest as an alternative method of surveying. The results of this analysis may provide a more affordable method of assessing timber value and scheduling harvesting.*



### Access to education: A legal remedy

*Margaret Hall (law) explores whether the current human rights remedy is the appropriate solution to ensure children and families using the public education system are not discriminated against on the basis of learning disabilities. Her research aims to ensure access to education for all.*



### Comics, graphic novels enhance understanding

*In his latest book, Graphic Novels as Philosophy, Dr. Jeff McLaughlin (philosophy), explores the concept of comics and graphic novels as tools for learning about the world, and using entertainment to make a point. This book is a sequel to his earlier work, Comics as Philosophy.*

## WILD SHEEP AT RISK: How do we protect wild sheep from domestic flocks?

Decades ago, scientists noticed declining populations of bighorn sheep, but the organism responsible for the loss of entire flocks eluded researchers until recently.

It is now known that *Mycoplasma ovipneumoniae* (Movi) plays a major role in the development of pneumonia in wild sheep, and puts them at risk of other pathogens. It is also known that domestic sheep are often the carriers of this organism, and when put in close proximity to their wild cousins, the results are catastrophic.

As a result of Dr. Scott Mann's recent Investment Agriculture Foundation of BC-funded research, we know how vulnerable BC's wild sheep population exists, and that the prognosis is more promising than anticipated.

One out of 10 flocks in the South Okanagan, three out of 10 flocks in the Kamloops Region, and six out of 10 flocks in the East Kootenays tested positive for the organism.

"Similar surveys in Western Washington have found that 80 per cent of the sheep tested were actively shedding the virus, so in our case, it's significantly less," said the clinical veterinarian and senior lecturer in the Animal Health Technology Program.

This means that while BC's wild sheep are still at risk, there's an opportunity for containment, which is what Mann continues to investigate.

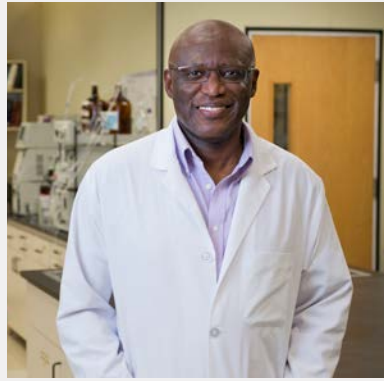






### The tenure journey

*Dr. Victoria Handford's (education) co-edited book, The Academic Gateway: Understanding the Journey to Tenure features 16 personal stories of education faculty members from across the country, and provides unique insights into the complexities of higher education institutions that are in a constant state of change.*



### Towards efficiency in mining

*Dr. Kingsley Donkor (chemistry), has partnered with New Gold's New Afton mine to develop a chemical technique for use during the mine's processing operations that aims to increase efficiencies that will contribute to a more sustainable mining industry.*



### Sqlelten7úw'i — Red Salmon — Sockeye

*Through her exhibition, Eileen Leier (visual arts) explored the Adams River estuary as a landscape that contains a complex set of socio-political and historic issues as well as environmental concerns, coinciding with public interest and media focus of the welfare and fate of the sockeye salmon.*

## PUTTING AN END TO WORKPLACE HARASSMENT

Nurses are known for being compassionate, level-headed and hard-working.

But according to research, they're also known for being bullies, with many new nurses and nurses-in-training becoming victims of workplace harassment.

Thanks to a grant from WorkSafe BC, nursing faculty members Dr. Florriann Fehr and Michelle Seibel will expand on their research into the use of Cognitive Rehearsal Training (CRT) as an educational tool for nursing students, arming them with the skills they need to navigate a complex workplace.

This WorkSafe BC study will expand their 2014 research project, bringing it to nursing schools nation-wide.

"Bullying really is a pattern of behaviour, where the victim feels harassed, their confidence goes down and their competence is affected," explained Fehr.

Cognitive Rehearsal Training (CRT) empowers new nurses to take a step back, stop, reflect on the behaviour, and respond. The role-playing is essential, as it inspires rich discussion, and gives participants the necessary confidence and courage to respond to workplace harassment. Each nurse that takes part in CRT receives a laminated lanyard card that pinpoints the most common types of bullying and appropriate responses.

"As nurses, we've been socialized to some degree to expect this

type of behaviour, but it can't continue," said Seibel, who added that workplace bullying leads to lower job satisfaction, which results in increased medical leave and attrition.

"We need to take care of each other so these young nurses stay in the job. The first few years are critical," she said.



Michelle Seibel & Dr. Florriann Fehr



## Drones monitor avalanche threat

*In partnership with Sun Peaks Resort, Dr. Tom Pypker (Natural Resource Science) is using Unmanned Aerial Vehicles to developing an innovative tool for monitoring snow pack depth over large tracks of complex terrain at ski resorts in effort to mitigate avalanche threats.*



## Art and science

*Local artist and nurse Maureen Smith, and microbiologist Dr. Naowarat Cheeptham (biology) collaborated to produce The Human Milk Project, part of the touring Breastfeeding Expo. The artwork consisted of Scanning Electron Microscopic imagery of breastmilk, to explore what is not visible to the human eye.*



## Legalities of 3D printing

*As a disruptive technology, not unlike like MP3 players, the Internet and even photocopiers, the advent of 3D printing poses important legal questions. Tesh Dagne (law) explores how intellectual property law can change to benefit Canadians and sustain the future of 3D printing.*

# ROMA WOMEN AND GIRLS ENGINEER THEIR OWN FUTURES

Dr. David Scheffel (anthropology), a leading voice in the study of East European Roma, contends that government policies created to facilitate inclusion, have instead pushed a disadvantaged population further to the periphery.

The Roma are experiencing the fastest population growth in all of Europe leading to policies that emphasizes integration. "Forgotten," said Scheffel, "is that some Roma have refused to integrate and assimilate."

"The Roma are largely seen by the people and the systems in power as negative and deviant," he said, adding that as an ethnographer, his research has moved in unexpected directions, including teenage pregnancy and juvenile prostitution.

While women across the European Union are delaying childbirth, the average age of first birth among Roma in some rural communities is 16. Many of those who do not become mothers fall into juvenile prostitution.

Scheffel interviewed more than 100 young Roma women and girls. The evidence from the interviews exposes the Roma not through the "prism of victimhood and deprivation, but rather as imaginative bricoleurs whose encounter with the social engineers of integration has led to creative solutions of unappreciated consequences," he explains in his paper, "3rd Class Slovak Roma and Inclusion: bricoleurs vs. social engineers," which will appear in *Anthropology Today* this fall.

"These girls are deprived of opportunities taken for granted in more affluent settings."



*Dr. David Scheffel*



# THE FUTURE OF RANCHING: SMART COWS?

We've got smart phones, smart TVs and smart apparel, and during the 2017 #BCTECH Summit at the Vancouver Convention Centre, Dr. John Church unveiled smart cows.

"We're moving cows into the Internet of Things," said Church, who was invited to participate in the Game of Drones panel session during the conference.

Dr. Church's research has been featured heavily in national media over the past year, from CBC news, Maclean's and the National Post, to trade publications including Canadian Meat Business, Alberta Farmer Express and the Western Producer.

Church was joined at #BCTECH by Drs. Musfiq Rahman, David Hill, and Faheem Ahmed, who are collaborating with him on his precision ranching research. The research has evolved almost as quickly as the technology itself.

"We can find cattle on the range through the use of the drone and the RFID (Radio Frequency Identification) tag, but what we can't do is get that data to stream online in real time. Now, our new drone has a SIM card built in, so we have the potential to track cattle in real time using a cell network and a GPS enabled RFID tag," explained the BC Regional Chair in Cattle Industry Sustainability.

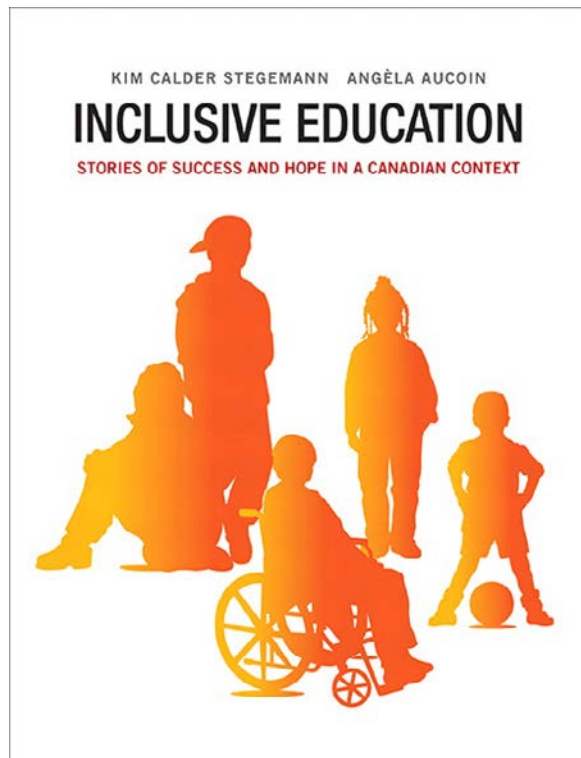
"We've got solar-powered RFID tags, but if we can get the GPS



Dr. John Church

coordinate along with the individual animal ID from the RFID data stream, we would know where our cattle are at all times," he said. Another possibility is to add an accelerometer to the tag, which would measure movement, allowing ranchers to perceive threats — including the presence of predators — on the range.

"We're discovering new uses for combining these technologies all the time."



## THE PROCESS OF INCLUSIVE EDUCATION

When it comes to inclusive education, there are some who are ardent in their belief that each child, regardless of ability, must be included in the classroom at all times. This reflects the political ideology of the Full Inclusion Movement (FIM), which is now mandated by most educational jurisdictions.

But Dr. Kim Calder Stegemann, an expert in inclusivity in the Canadian classroom, cautions that it is not about 'place,' but rather about a process where all members of the educational team (including parents) make adjustments so that children and youth with learning challenges can be included in meaningful ways.

Calder Stegemann, lead author of *Inclusive Education: Stories of Success and Hope in a Canadian Context*, said she was inspired to write the book three years ago while attending a national conference.

"While there I encountered several inclusionists, who were adamant that every child belongs in the classroom regardless of need, but I've been a classroom teacher and I know that this is not a reality for some students," she said. Full inclusion is an issue of social justice, but we must ensure that it offers the best educational opportunity for the child.

"Yes, we need to open the doors to as many students as possible, but we must do so in a way that is best for children of all abilities. Inclusive education is a process, not a place."



*Dr. Lauchlan Fraser*

## RECLAIMING BIODIVERSITY

Unlike most companies, mining operations must first make plans for the end of business, long before the first ore is extracted from the ground.

Mining operations are legally required to deposit a bond as a security that remediation and reclamation will take place following the mine's closure, but despite advances in technology, there are still gaps in the guidelines for successful ecosystem reclamation.

Thanks to a \$250,000 grant from Genome BC's Sector Innovation Program, Dr. Lauchlan Fraser will employ genomic tools to better understand ecosystem biodiversity, with the goal of establishing ecosystem recovery benchmarks.

Fraser, a renowned community and ecosystem ecologist, will work alongside Dr. Jonathan Van Hamme, a microbiologist who operates TRUgen, the first high-throughput genomics sequencing lab outside of BC's Lower Mainland. Together, they'll examine samples from mine sites throughout the BC Interior, including New Afton, Highland Valley Copper, Bralorne Gold Mine, and Mount Polley Mine.

"Reclaiming biodiversity is the goal for returning the land to sustainable targets, but the term biodiversity is so overreaching," Fraser explained.

"With these genomic tools we're able to rapidly, efficiently, and economically achieve a goal and monitor and track development of plant communities, invertebrate communities and microbial communities," he said. This enables researchers to understand the complete picture of ecosystem health within these heavily disturbed sites. Microbes in the soil, in particular, are critical to

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With these genomic tools we're able to rapidly, efficiently, and economically achieve a goal and monitor and track development of plant communities, invertebrate communities and microbial communities."

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soil health, and therefore critical to the ecosystem as a whole. Research is already underway, with Fraser and his team in the field collecting soil, invertebrate and plant samples. Those samples will be brought back into the lab for genomic barcoding analysis and genome sequencing, as well as mineral analysis on the soil. All of the sites are at varying stages of restoration, and samples will also be taken from undisturbed areas in close proximity to the mines to develop benchmarks for biodiversity.



# HIGH-THROUGHPUT SEQUENCING LAB A FIRST FOR THE BC INTERIOR

Thompson Rivers University is now home to the first high-throughput genomic sequencing lab in BC outside of the Lower Mainland, thanks to a \$291,000 investment from Canada Foundation for Innovation's (CFI) John R. Evans Leaders Fund.

The Applied Genomics Laboratory, or TRUgen, is under the direction of microbiologist Dr. Jonathan Van Hamme, with a primary focus on advancing knowledge of environmental remediation and waste treatment, as well as within the agricultural industries, including Canadian food, beverage and nutraceuticals.

This past December, Van Hamme was also awarded a \$190,000 grant from Genome BC for a project that assesses the long-term impacts of biosolids on soil microbial communities during mine tailings reclamation.

"We got our first sequencer in 2012," Van Hamme said of the lab that has seen steady infrastructure growth to match the increased demand for sequencing services.

"This grant expands our facility. We can add more sequencing equipment, additional quality control measures, as well as some automation, including sample-preparation robots. All of this will allow us to acquire more data in a shorter amount of time, and allow our technicians to use our sequencing tools more fully," he said.

This infrastructure funding supports Van Hamme's current research in environmental remediation and land reclamation, which is critical for the continued development of new resources and environment improvement.

"We really want to focus on helping other industries get the most out of their data."



Dr. Jonathan Van Hamme



Dr. Nelaine Mora-Díez

## AN IMPORTANT DROP IN A VERY POLLUTED OCEAN

Perfluorinated alkyl substances have been detected worldwide in a range of environments, but little experimental data is available to determine how pervasive these persistent organic pollutants have become and how they can be degraded.

By calculating equilibrium constants related to these chemicals, Dr. Nelaine Mora-Díez hopes to aid those who are developing environmental modelling software, and provide greater understanding of their toxicological effects, bioaccumulation and transport.

While the computational physical organic chemist refers to the results of her work as "a drop in the ocean," she and the undergraduate and graduate students working with her, are motivated to create efficiencies, saving time and resources for those working in the lab, and facilitate understanding.

The initial studies focus on the various structural isomers of perfluorooctane sulfonic and carboxylic acids. Future studies will deal on other families of persistent organic pollutants. This research, which is funded by an NSERC Discovery Grant, adds to the growing body of research into the elimination of these chemicals, and provides greater understanding of how different types of organic pollutants accumulate and might eventually degrade through chemical or microbial processes.

"One of our objectives with this project is to establish more reliable data that can then be used in modelling software, and see if there are trends in the data structure. You can add a little piece of knowledge, but it is very helpful to the whole," she said.

# MONEY CAN BUY BETTER EDUCATION OUTCOMES

According to new research, if you want to reduce inequality you have to spend more money on public education.

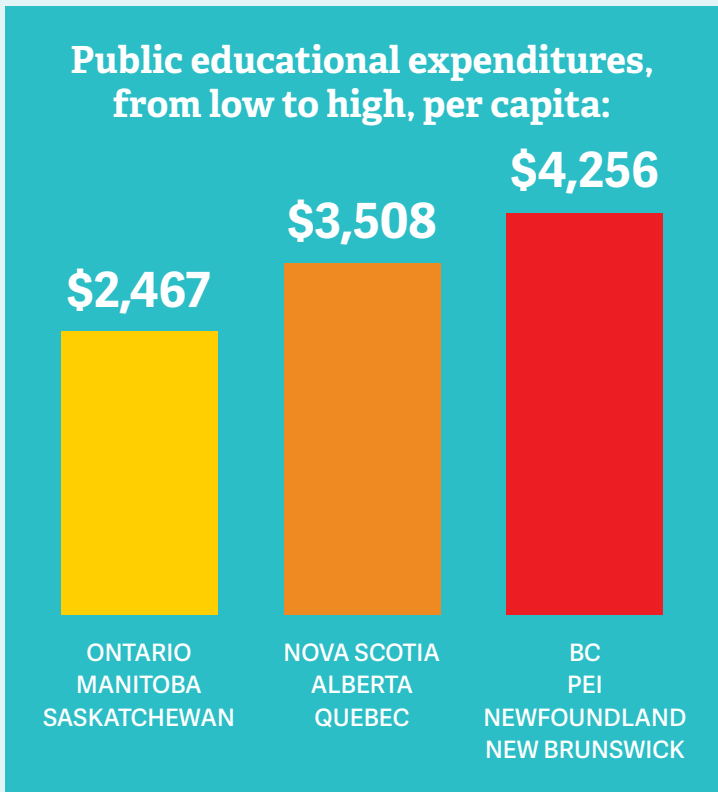
There has always been a strong correlation between a parent's education and the education and subsequent career success of their children, but new research suggests that when provinces invest more money in public schools, that connection weakens.

Lead researcher and TRU economist Dr. Ehsan Latif said he was motivated to consider this question as a method of reducing income inequality in Canada.

Latif focused his study on youth aged 13-17, and placed each province into a category of low, middle or high public education spenders. The study covered individuals born between 1976 and 1986 (aged 25- 35 in 2011). What he found was statistically significant, in that public education spending positively affects intergenerational educational mobility.

"Normally what we see is that if a parent has more education, the children also are more educated and higher education means greater income. If the parents have a low education, their income will be lower and we see what we call an intergenerational persistence.

"All the time we see these inequalities passed down," said Latif, explaining that this research, published in *Economic Papers: A journal of applied economics and policy*, shows there is a way to break the cycle.



Dr. Matt Reudink

## NORTHCOTE AND BRINK PROFESSORSHIP

Dr. Matt Reudink, associate professor of biology, has been awarded the prestigious Northcote and Brink Professorship. The Professorship is awarded for three years, and is valued at \$10,000 annually.

Reudink said he is honoured by the distinction, and by the opportunities it affords his research program, which focuses on understanding the impact of events that occur throughout the year on migratory birds for the purpose of conservation.

"We tend to have a good understanding of the conservation issues that face birds that are breeding in our area, but these birds only spend a small fragment of their lives here. What we try to do is understand how factors that occur throughout the year — including migration and winter — can influence breeding and the status of a population," he said.

"The Professorship provides me with extra funds so I can support more student research. It allows me to put more graduate and undergraduate researchers in the field, investigating the birds in our local grasslands. It also allows me to push the limits of my research a bit more and try new things that I wouldn't otherwise be able to do."

The professorship is funded by the Dr. Tom Northcote and Dr. Bert Brink Endowment, established in 2005, and honours the contributions of Northcote and Brink to ecology in British Columbia. The purpose of the professorship is to expand knowledge of the connection between restoration of ecosystems and the social benefits to communities.



## LET THE CARS DO THE TALKING

We're 10 years away from having 100 per cent of vehicles speak to each other through the Internet of Vehicles, Dr. Ning Lu predicts, but to get there, basic foundations must be built, which is where his expertise comes in.

The assistant professor in computing science is supported by an NSERC Discovery Grant in his research project, *Real-Time Scheduling for Internet of Vehicles*. The technology his work supports is application oriented, but Lu is starting at the ground level, developing algorithms that will improve vehicle safety, transportation scheduling, traffic control, and energy conservation.

"With this data actions can be taken to avoid crashes and reduce sudden braking to prevent successive collisions," he said, naming just a few examples of how this technology can be employed.

Traditional algorithms are unable to cope

with the full complexity of the Internet of Vehicles, or adequately predict system behavior and challenges that arise from the high mobility and the diverse nature of vehicles and traffic.

"We want to focus on the algorithm layer, and based on the algorithm, we provide more services and information to the application layer of this technology," Lu explained.

"We're going from zero to 100 per cent of the vehicles on the road being able to speak with one another, which is so important because right now the vehicle is an island without any connection to the others around it."

This technology has specific implications for the transportation sector, as it will allow transport trucks to share information that will create ideal vehicle distance and plan optimal routes to save fuel and time.



Dr. Ning Lu

## CIVIL LIBERTIES AND ONLINE COMMENTARY



Dr. Daphne Jeyapal

How does Canada manage the tension between national security, all while maintaining civil liberties? It's a question Dr. Daphne Jeyapal will spend the next two years trying to answer through her SSHRC-funded project, "Anti-terrorism or anti-activism? Examining public and policy discourses on Canada's Anti-Terrorism Act (2015) and its implications for transnational resistance."

The assistant professor in social work is joined on the project by the University of Toronto's Dr. Chandni Desai. The scholars hope that through their work, policy-makers will be better informed, and better able to balance the nation's security while still respecting civil liberties of migrant activists.

The introduction of Bill C-51 — which emphasizes state protection and criminalizes activism — is problematic for those migrant Canadians who, using digital technology, have maintained and created communities connected to their homelands, and who are now faced with

greater risk as a result. Parameters for freedom of speech, privacy and national security have been redefined, said Jeyapal. "We see this occurring in more overt ways since 9/11. Certain migrant groups are targeted as potential enemies, and Bill C-51 really highlighted this tension.

"Are we criminalizing terrorism or resistance?"

The research will be informed by a close examination of the news articles written about C-51, and the accompanying commentary by readers. Jeyapal and Desai will analyze online discourse to better understand how the public views this struggle.

"People are speaking about this online and we want to know how they're making sense of this. This is the space where people can have anonymous conversations, which allows a certain virulence, and this is an area that we really need to pay more attention to."



Dr. Jenni Karl

## PREHENSION CONTENTION

Dr. Jenni Karl’s research aims to rewrite the story of how humans acquired the ability to perform skilled hand movements — a story that’s been widely accepted for more than 30 years.

Scientists have long believed that vision was central to a human’s ability to reach and grasp objects, also called prehension, whereas Karl’s research finds that touch plays a vital role. Though her Discovery Grant-funded research project, *Dual Sensorimotor Channel Theory: Implications for the Development and Neural Organization of Prehension*, the assistant professor of psychology hopes to transform the way we currently understand how skilled hand movements evolved, develop, and are organized in the human brain. The results of this research could change the way robots and prosthetic limbs are engineered to better reflect the developmental and neural processes that enable skilled hand movements in humans.

“This has impact for brain organization in general, and for how you would treat people with brain injuries. The research is basic science, but it has wide-ranging impacts,” she said.

Traditional view holds that skilled hand movements are unique to primates — and were enabled by the fact that primates are relatively unique in having evolved both forward-facing eyes and a bipedal stance. This supposedly allowed them to use vision to observe their hands, which in turn led to the evolution of more dexterous hand movements. But the research Karl has already conducted suggests that animals earlier than primates performed skilled hand movements, albeit in a different way.

“I argue that the brain is actually organized very differently from the way we previously thought that it was. If I’m a physiotherapist trying to re-train someone with a brain injury to reach and grasp, then which story I believe will determine the approach I take to their rehabilitation.”

## TRACKING EMOTIONAL RESPONSES IN EVERYDAY LIFE

Emotional responses to highly-charged situations drive Dr. Catherine Ortner’s research project, “Feel good now or later? Preferences for immediate versus delayed rewards underlying emotion regulation choices.”

The SSHRC Insight Development Grant-funded project explores how the way people respond to their emotions is influenced by the extent to which they consider the consequences of their actions. Most of Ortner’s research has been conducted in the lab and informed by questionnaires completed by undergraduate students. Now, however, she’s gone beyond the lab, working with computer scientist Dr. Haytham El Miligi to develop an app designed to find out what people do on a daily basis to regulate their emotions.

“We can manipulate emotions in the lab. We can have people think of an unresolved conflict, then distract themselves, or

ruminate, or reappraise the situation, and we can measure their change in reaction,” she said.

Those who distract themselves may feel better for the short term, but haven’t processed the conflict effectively. Their negative feelings return when they think about the conflict again. Those who ruminate — or stew over a problem — also don’t come to a resolution, and tend to be more likely to struggle with anxiety and depression. Reappraisal, or the ability to step back and reflect on a situation in a different way, has more enduring effects in diminishing anger.

“If we can understand what helps people to regulate their emotions, then ultimately, we can help all people improve,” she said. “Regulating emotions seems to be about balancing our immediate needs with our future goals, but that’s not a simple thing to do.”



Dr. Catherine Ortner





The City of Kamloops



Danalee Baker



Natalie Clark

## BRINGING THE UNIVERSITY TO THE COMMUNITY

Small, community-driven research projects may not always achieve international acclaim, or warrant press conferences, but for the groups that benefit from the results, the impacts are considerable.

TRU researchers have a rich history of engaging in community-based research initiatives, but this year that engagement was given a formal boost with the launch of the Community-Driven Research Fund. The goals of the fund, which provides 10 \$2,500 grants annually, are to support research opportunities that encourage community-to-university collaborations, create meaningful student training, and promote shared funding opportunities.

“This is a team-based approach to solving community issues,” said Danalee Baker, Executive Director of the Thompson, Nicola, Cariboo United Way. “This is one way to solve community issues, and to get everyone around the table working together. The best way to solve a problem isn’t always about more money, it’s about finding a solution that works,” she said.

The City of Kamloops has also been actively working with TRU on the development of a Memorandum of Understanding that effectively encourages

greater collaboration between researchers and the municipality.

“If we have topics or ideas that need to be explored we want to be able to mobilize ourselves here at the City and work with the university researchers who can add significant value to the lens we place on issues of greatest importance,” said Jennifer Casorso, Social and Community Development Supervisor with the City of Kamloops.

This team-based approach has already made a difference for the Kamloops Brain Injury Association. Executive Director David Johnson was one of the first to take advantage of the Community-Driven Research Fund, partnering with Dr. Jenni Karl, assistant professor of psychology, with the help of an undergraduate research assistant.

The project was small, he said, but the results have been useful.

“The single biggest finding was that the rate of head injury in rural areas is much higher. We’ve always known, anecdotally, that we have more injuries and fewer resources, per capita, but now we have some proof of that,” he said, adding that his team doesn’t have the capacity to

conduct research.

For Natalie Clark, associate professor of social work, community-based research is at the heart of all her work as an Indigenous scholar. She is currently partnered with Kamloops’ Family Tree Centre to evaluate its programming. The results of the evaluation should determine

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The best way to solve a problem isn’t always about more money, it’s about finding a solution that works.”

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how the programming supports clients, which will inform other grassroots, peer-led programs nationally.

“We have a lot of case-based evidence, but how do we really know? How can we evaluate this program to understand why programs like it are important in our communities,” Clark asked, adding that when complete, the project should identify methods for future data collection.





**Office of Research and Graduate Studies**

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[tru.ca/research](http://tru.ca/research)

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