



UNIVERSITY OF MANITOBA

ResearchLIFE

SUMMER 2019 | VOLUME 1

THE SPEED OF A RUMOUR

HOW INFORMATION TRAVELS

READING THE WORLD

The power of cultural narratives

A CRITICAL LENS ON LEGAL RECONCILIATION

PASSION PROJECTS

Is passion the key to a happy life?

MESSAGE

FROM THE VICE-PRESIDENT
(RESEARCH AND INTERNATIONAL)



As you read this issue, you are in the midst of summer, a time in which we bask in the warmth and the seasonal growth the sunshine and rain brings. We nurture what we are growing, watchful from the first plantings of seeds to tender seedlings to ensure steady growth and ultimately a bountiful harvest. Ensuring the future of growth of knowledge through research and scholarly and

creative activities warrants similar ministrations.

Planting the seed with today's young generation of learners begins in the early years of their education and continues through completion of post-secondary studies and on to careers inside and outside of academia.

I've chosen for this magazine issue to highlight early career researchers (ECR) at the University of Manitoba as well as other activities underway that encompass the entire career trajectory. You will learn about exciting research underway, new facilities, new experts who have joined us— 10 Canada Research Chairs and an internationally recruited Canada Excellence Research Chair who joins our established Arctic system science and climate change team—and award winners at every stage.

Michael Strong, new president of the Canadian Institutes of Health Research (CIHR) shares insights into CIHR's vision for supporting early career researchers through a lifecycle approach. The U of M provides supports to ECRs through start-up funds, specialized grants programs, reduced teaching loads and awards like the Terry G. Falconer Memorial Winnipeg Rh Institute Foundation Emerging Researcher Awards.

As you read this issue, envision the stage of growth at which the individuals highlighted are in their journeys of discovery. From the perspective of Banting post-doctoral fellow Christopher Pascoe to Hee-Jung Serenity Joo's exploration of cultural narratives to solving the speed of a rumour by mathematician Karen Gunderson to high school student Bryce Cadieux's experiences of one day of science, engineering and technology explorations, they represent the leaders of tomorrow.

—Digvir S. Jayas, OC, PhD, DSc, PEng, PAg, FRSC

ON THE COVER: Karen Gunderson's graphic representation of the spread of infection (*story on page 24*).





**University
of Manitoba**

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ResearchLIFE

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THE TEN

Ten Canada Research Chairs (CRCs) were awarded to our faculty members in fall 2018, valued at \$9.5 million, by the Government of Canada. Chair holders and their research improve our depth of knowledge and quality of life, and attract graduate students from around the world to Manitoba, helping drive our economy by fuelling discovery.

1 JANILYN ARSENIO (Internal Medicine)

Chair in Systems Biology of Chronic Inflammation

Studies the function of immune cells and how they develop into specialized cell types like immune memory cells or the killer cells that attack cancers.

2 TRUST BETA (Food and Human Nutritional Sciences)

Chair in Grain-Based Functional Foods

Conducts research in the area of functional foods, which are essential to allow development of accessible whole grain foods that will have a positive impact on the health of Canadians.

3 NEDILJKO BUDISA (Chemistry)

Chair in Chemical Synthetic Biology

Envisions creating artificial biodiversity with new genetic codes to elucidate life on a molecular level and to develop related technologies such as highly modular bio-inspired materials.

4 ANNETTE DESMARAIS (Sociology and Criminology)

Chair in Human Rights, Social Justice and Food Sovereignty

Advances research on the conceptual framework, practice, politics and potential of food sovereignty to build ecologically sustainable, socially-just and healthy food systems.

5 COLIN GILMORE (Electrical and Computer Engineering)

Chair in Applied Electromagnetic Inversion

Uses the art and science of applied electromagnetic inversion to 'see' the internal properties of objects and other inaccessible regions, like the interior of a grain silo.

6 NANCY KANG (Women's and Gender Studies)

Chair in Transnational Feminisms and Gender-Based Violence

Interrogates how Black, Indigenous, and Asian-descended women in Canada and the U.S. articulate their experiences with gender-based violence in situations of mass oppression, or what may be termed inter-ethnic/inter-racial nodes.

7 KIERA LADNER (Political Studies)

Chair in Miyo we'citowin, Indigenous Governance and Digital Sovereignities

Deepens the understanding of decolonization, Reconciliation, and resurgence within Canada and Anglo-settler societies, using theoretical and community-based approaches.

8 LORENZO LIVI (Computer Science)

Chair in Complex Data

Applies data-driven methods in structural biology and computational neuroscience for solving basic scientific problems having impact on society and healthcare.

9 LISA LIX (Community Health Sciences)

Chair in Methods for Electronic Health Data Quality

Develops methods to measure and improve the quality of electronic health databases for studying chronic health conditions and predicting disease risk, leading to better health information systems for healthcare decision-making.

10 SABINE MAI (Physiology and Pathophysiology, Research Institute of Oncology and Hematology, CancerCare Manitoba)

Chair in Genomic Instability and Nuclear Architecture in Cancer

Achieves novel and transformative personalized medicine solutions for cancer treatments by focusing on genomic instability and alternations in nuclear genome architecture.

DREAMS OF ICE

BY SUSAN PETERS



A NEW CANADA EXCELLENCE RESEARCH CHAIR has joined the U of M, adding to the university's expertise in the Arctic. Dorte Dahl-Jensen focuses on a discipline new to the university: glaciology.

Currently a professor at the Centre for Ice and Climate at the Niels Bohr Institute at the University of Copenhagen, Dahl-Jensen has been doing fieldwork on the Greenland ice sheet most summers since 1981, where teams of international researchers drill down to extract ice cores, trying to answer questions like how old the ice is, whether Greenland was ever ice-free, and what kinds of abrupt climate shifts took place in the past.

"It's very special to hold the deep ice cores with an age of around 1 million years. When I look at such an old ice core, I try to imagine what history it contains," says Dahl-Jensen.

Her main research has been in analysis of ice core data in conjunction with models to reconstruct the past climate and its impact on the Greenland ice sheet and our global climate. Her work also seeks to use the paleo records to inform us about contemporary and future climates, particularly processes leading to rapid rates of climate change.

Much of her work focuses on ice streams, the part of an ice sheet that moves significantly faster than the surrounding glacier, often with some water underneath to help the ice slide.

Dahl-Jensen spent much of her childhood in Switzerland, where her father worked at CERN (known for its particle collider), and where the young girl watched physicists make LEGO histograms. But her introduction to glaciology came via the outdoors, where she loved climbing and exploring glaciers. In 2001, she became the first female physics professor in Denmark.

She is excited about the new research opportunities opened up by the \$10 million in CERC funding from the Government of Canada.

"One of the first projects we will initiate is an ice-core drilling project through the Müller ice cap on Axel Heibergs in the very North. The project will form a collaboration between Canadian and Danish researchers and allow a reconstruction of the sea ice 10,000 years back in time."

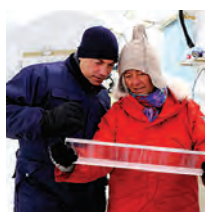
"It's very special to hold the deep ice cores with an age of around 1 million years. When I look at such an old ice core, I try to imagine what history it contains."

She plans to study Canadian Devon and Agassiz ice cores along with the Greenland ice cores to further her knowledge on paleo-information. The risk of future abrupt changes can be studied through research on paleo-climate, figuring out what kinds of abrupt climate changes took place in the past.

Ice research itself has changed during the 30-plus years of Dahl-Jensen's career: she jokes that drones are one new investigation tool that gets everyone excited, with their potential to map the edges of glaciers.

For the past 15 years, Dahl-Jensen has led a research group of 60 to 70 scientists, young researchers, technical and administrative staff in her department at the University of Copenhagen. Among her many awards, Dahl-Jensen is technically a knight: she received a medal from the Queen of Denmark proclaiming her a Knight of the Order of Dannebrog in 2010.

And on an occasion that may or may not have surprised the little kid who loved her grade-one physics lessons in Switzerland, she was invited back to CERN in 2014 to give a talk on how to communicate with the public about climate, at the same institute where she used to play with LEGO on the weekends. ■



ABOVE: Dorte Dahl-Jensen (right) with Minister for Research in Denmark, Tommy Ahler, looking at a piece of ice from the Glacial period.



THE CLINICIAN-SCIENTIST

HEALTHCARE HAS ENTERED a phase of major disruption associated with increasing focus on the internet and social media, electronic medical records, machine learning and artificial intelligence. Clinicians now have to deal with genomics and Big Data and the development of multiple new therapeutic ‘biologics.’ Never has there been as large a gap between ‘what we know’ and how medicine is practiced.

“It is increasingly critical to have clinicians directly connected with patients in order to help craft the most appropriate research questions and studies and to ensure that knowledge translated from the research effectively becomes mobilized to the best care for the individual patient and family,” says Dr. Allan Becker, the recipient of the 2018 Dr. John M. Bowman Memorial Winnipeg Rh Institute Foundation Award, presented annually to a U of M faculty member for outstanding contributions to scholarship and research in any field.


“The clinician-scientist is critical in ensuring an effective cycle from health assessment to improved healthcare,” says Becker, a professor of pediatrics and child health in the Rady Faculty of Health Sciences and scientist at the Children’s Hospital Research Institute of Manitoba.

A recognized international leader in pediatric allergy and asthma research, care and education, Becker’s primary research interest is the origins of allergy and asthma in early life. He credits the influence of Dr. Jack

Bowman, for whom the Rh award is named, in his approach to his own research and practice.

“Jack Bowman was the consummate clinician-scientist and I feel incredibly fortunate to have benefited from exposure to his approach to patient care and research,” says Becker. “I have had the pleasure and the luxury to work with exemplary clinicians, scientists and clinician-scientists. Those individuals were critical in helping me address the core question that has driven my research over the years: “What is it about our environment that has driven the epidemic of allergy and asthma over the past few decades?”

“Jack Bowman was the consummate clinician-scientist and I feel incredibly fortunate to have benefited from exposure to his approach to patient care and research.”

Becker’s accomplishments are many, including being elected a Fellow of the Canadian Academy of Health Sciences, founding member of the Canadian Network for Asthma Care and led development of national Certification for Asthma Educators (the first such national certification in the world), and member of the Scientific Committee of the Global Initiative for Asthma. 

TOP: Allan Becker

INNOVATION LEADERS

The 2018 recipients of the Terry G. Falconer Memorial Rh Institute Foundation Emerging Researcher Awards are U of M faculty members in the early stages of their careers who display exceptional innovation, leadership and promise in their chosen fields.



Qiuyan Yuan
(Civil Engineering)
Applied Sciences

Her research helps to divert waste from landfill and ease the burden on the environment, and promotes economic benefit for the waste treatment industry by generating revenue through the production of valuable products.



Emma McGeoug
(Animal Science)
Applied Sciences

Her research focuses on areas related to forage-based livestock production including overwintering strategies for extending the grazing season for beef cattle in Canada, as well as life-cycle assessment and carbon foot printing of beef and dairy production.



Daniel McCafferty
(School of Art)
Creative Works

McCafferty is an interdisciplinary graphic designer, whose work uses print, video, publishing, collaboration, data, mapping and code, to explore relationships between communication and systems of power.



Meghan Azad
(Pediatrics and child health;
Children's Hospital Research
Institute of Manitoba)
Health Sciences

A Canada Research Chair in Developmental Origins of Chronic Disease, her research team studies how breast-feeding and human milk shape the infant microbiome and contribute to infant growth, child development and lifelong health.



Chengbo Yang
(Animal Science)
Natural Sciences

He conducts research that addresses the gut health issues in livestock, seeking to develop antibiotic alternatives that can improve gut health and reduce gut diseases that will support sustainable livestock production.




Changmin Jiang
(Supply Chain Management)
Interdisciplinary

His major research involves various issues and aspects in the transportation sectors, such as competition and cooperation between the aviation and the rail sectors, airline strategic alliance, network-regional airlines relationships and airport pricing.



Johnson Li
(Psychology)
Social Sciences

He is developing new measurement and statistical models for use by researchers, teachers, and psychologists, such as exploring learning-skills in Canadian students and finding engaging ways to teach students statistical methods through the use of real-world examples and simulated data. 



TRACKING BIODIVERSITY IN CANADA'S NORTH

BY JO DAVIS

WHEN YOU FIRST MEET CHEMISTRY professor Jörg Stetefeld, it's obvious that he's what you might call a 'people person.' That quality served him well when it came to forging a unique partnership with the Kivalliq Inuit Association (KIA) in Baker Lake, Nunavut.

Stetefeld is co-director of the Centre for Oil and Gas Research and Development (COGRAD) with fellow Faculty of Science chemistry professor Gregg Tomy. COGRAD is a state-of-the-art accredited testing facility at the university, committed to bridging the gap between academia and industry in the fields of analytical and environmental chemistry, and using industry partnerships to develop new tools to monitor bodies of water and the creatures that call them home.

"Gregg Tomy and I started COGRAD in 2014 [with funding from Western Economic Diversification] and the original idea was to look at pipelines where they transport crude oil and do environmental monitoring for certain chemical compounds called PAH or PACs (polycyclic aromatic hydrocarbons)," said Stetefeld, Canada Research Chair in Structural Biology. "But when we went to these places, many people approached us and said, 'Why aren't you doing more biodiversity screening?'"



ABOVE: COGRAD lab sample.

Photo: Kira Koop

TOP LEFT: Pegasus GC-HRT 4D, in the COGRAD lab.

"We had arrangements with gold mines and [the Inuit] in this area. We went there to take samples from lakes and characterize for and with them the nature of biodiversity, how habitat is changing due to mining activities and as a result of climate change."


Luis Manzo, KIA's director of lands, oversees the vast area involved in COGRAD's screening. The two met at a conference where Stetefeld was presenting a new eDNA (e = environmental) metabarcoding system for understanding biodiversity. Metabarcoding involves taking samples from surface water, sediments and soil and isolating the DNA within them. The DNA is then extracted and sequenced, which results in the base codes of the material.

"This funding will allow us to combine a unique strategy, in-depth water quality assessment with eDNA metabarcoding technology."

The data collected will inform the Inuit at Baker Lake not only on the state of their environment currently, but to predict what will happen to it in the future. The goal is to add to and enhance traditional Inuit knowledge.

"Dr. Jörg and Dr. Matthew [McDougall] have been very helpful in supporting [our] ideas and all the work that needs to be done," said Manzo. "KIA will continue the cooperation agreement [signed with the university] to make sure the two institutions help each other. Dr. Jörg's team is the most proactive team I've ever come across in my professional career."

Additional resources were recently added to COGRAD, with a further \$1.1 million from Western Economic Diversification to purchase highly specialized equipment that will enable the customized eDNA techniques.

"This funding will allow us to combine a unique strategy, in-depth water quality assessment with eDNA metabarcoding technology," said Tomy. "Our approach addresses urgent questions about the impact of climate change and of industry activities on Inuit peoples in the Canadian Arctic." 

To learn more visit cograd.ca

THE LEADERS OF TOMORROW

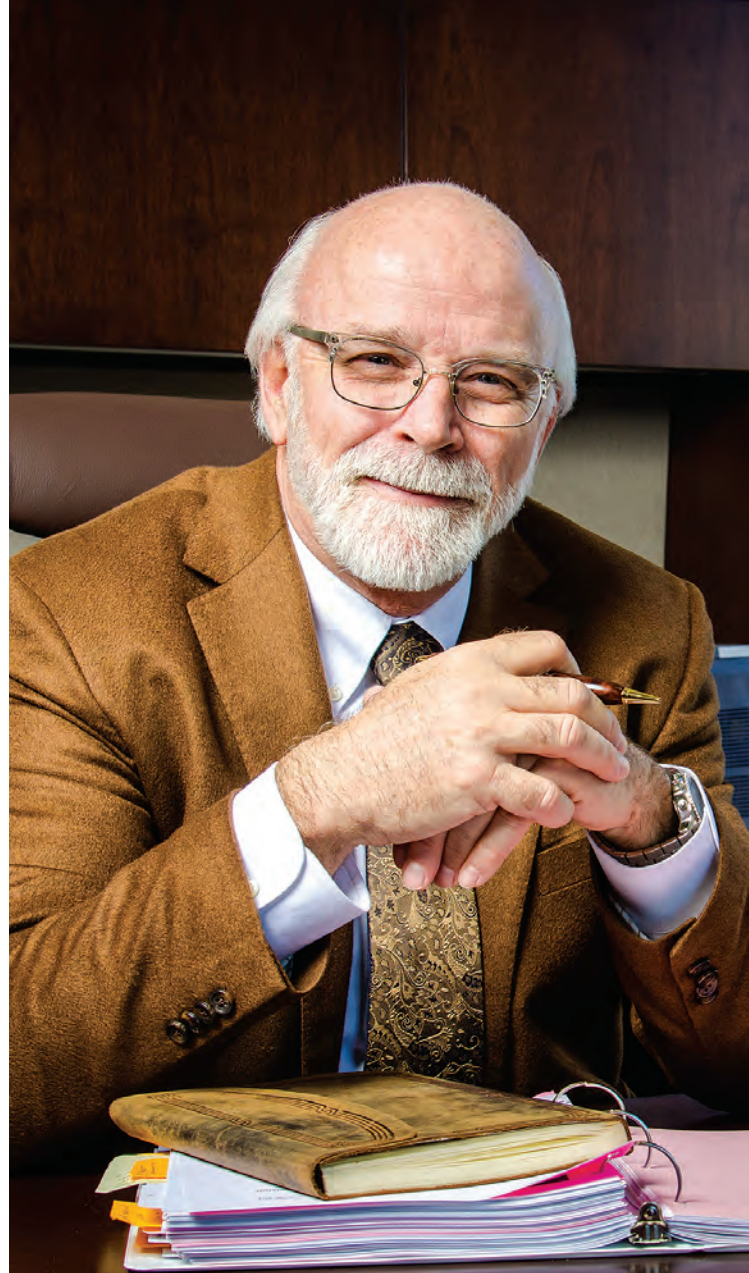
SUPPORTING EARLY CAREER RESEARCHERS THROUGH A LIFECYCLE APPROACH

BY MICHAEL STRONG, MD
PRESIDENT, CANADIAN INSTITUTES
OF HEALTH RESEARCH

The Canadian Institutes of Health Research (CIHR) building the capacity of the health research community is part of our legislated mandate. More than a goal or an aspiration, it is an integral part of our “raison d’être” and central to our mission.

As we now embark on the process of developing a new strategic plan for CIHR, we will be exploring ways to improve capacity development at all career stages, as part of our efforts to ensure the sustainability of Canada’s health research enterprise.

As such, I believe it is critical that we engage in a meaningful national discussion about supporting our researchers across the “lifecycle” of their careers, so that we can support our best and brightest across their entire professional trajectory.



T HIS CONCEPT OF A “LIFECYCLE” APPROACH explicitly includes an evaluation of how researchers move through their careers – from the first interests as an undergraduate, through doctoral trainees and post-docs, early career and mid-career researchers and, finally, to seasoned veterans. What is the most logical and affordable way to support this evolution so that Canada maintains a steady pipeline of researchers into the future?

This is the conversation that we need to have and it is one of the many reasons that CIHR is now leading a national dialogue with the research community and our partners in the health research funding ecosystem. Naturally, this exercise would be much simpler if we had unlimited resources, but this is not the case. CIHR,



“I BELIEVE IT IS CRITICAL THAT WE ENGAGE IN A MEANINGFUL NATIONAL DISCUSSION ABOUT SUPPORTING OUR RESEARCHERS ACROSS THE “LIFECYCLE” OF THEIR CAREERS, SO THAT WE CAN SUPPORT OUR BEST AND BRIGHTEST ACROSS THEIR ENTIRE PROFESSIONAL TRAJECTORY.”

like all research funding agencies, has a finite amount of dollars that it must use to address a nearly infinite number of challenges.

While the challenge of limited resources remains an important variable, the Government of Canada (including the Tri-Agencies and the Canada Research Coordinating Committee) has demonstrated a clear commitment to

providing meaningful support to the next generation of scholars.

At CIHR, we are contributing to this effort by carefully considering how to best support career paths for exceptional leaders, both within and beyond the realm of health research. Based on extensive consultations with the health research community over the last few years, several key principles have arisen that are helping to guide this process.

First, there is an acknowledgement that Canada’s future trainees must be research leaders of tomorrow – individuals who are capable of leading high-impact, interdisciplinary research in a rapidly evolving environment of advancing technologies and globalization.

“CANADA’S FUTURE TRAINEES MUST ALSO BE LEADERS ACROSS KNOWLEDGE SECTORS. THIS MEANS THAT THEY MUST BE ABLE TO APPLY THEIR SCHOLARSHIP AND TALENT TO LEAD INNOVATION ACROSS DIFFERENT SECTORS OF CANADA’S KNOWLEDGE-BASED ECONOMY.”

Understanding that career paths are changing (85% of PhDs do not secure a tenure-track position), Canada’s future trainees must also be leaders across knowledge sectors. This means that they must be able to apply their scholarship and talent to lead innovation across different sectors of Canada’s knowledge-based economy.

Finally, given that expertise in critical areas is lacking (e.g., data-intensive research, Indigenous health research, health-professional scientists, patient-oriented research, entrepreneurship), our future trainees must be experts in critical priority areas. We need early career researchers who can provide specialized expertise to fill gaps in Canadian priority areas and, ultimately, advance the frontiers of science.

While these principles provide a helpful starting point, it should be noted that this conversation is just getting started. I strongly encourage Canada’s health research community to participate in this important national dialogue; your experiences and insights will be invaluable as we strive to develop a support system that positions early career researchers for long-term success. ■

FEATURE

READING THE WORLD





THE POWER OF CULTURAL NARRATIVES

BY SHARON
CHISVIN

Baton Rouge and books haven been instrumental in shaping Hee-Jung Serenity Joo's life and career.

Joo lived in many different places as a child, but it was the time that she spent in Baton Rouge, Louisiana, and the time that she spent in libraries – “learning English and becoming a bookworm” - that most impacted how she sees the world and her research agenda.

ABOVE: 126 Sherbrook
Street by Sandeep Johal.

“B **EING ASIAN AND ATTENDING PUBLIC SCHOOLS** in a southern city with its legacies of slavery and segregation, gave me a distinct position to think about where I fit into this scheme of Black-white relations. I learned at an early age how Asians are both subjected to racism in the U.S. and benefit from anti-Black racism.” Joo says.

That thinking and questioning, combined with an impassioned reading of Toni Morrison’s novel *Beloved* when she was 12-years-old, led Joo to an undergrad degree in French and English literature from Louisiana State University and then a PhD in comparative literature from the University of Oregon.

“I LOOK AT HOW WRITERS AND ARTISTS OF COLOUR IMAGINE THE WORLD IN THEIR TEXTS, AND I AM INTERESTED IN HOW IMAGINATION CAN BE AN INCREDIBLY POWERFUL AND NECESSARY TOOL OF RESISTANCE, SOLACE AND POLITICAL TRANSFORMATION.”

Joo is an English, theatre, film and media professor in the Faculty of Arts, teaching and researching ethnic American literature and speculative, science and disaster fiction, as well as critical race studies and queer studies. Much of Joos’ research focuses on how people of colour navigate the structural and historical workings of white supremacy and colonialism through literature and the arts.

BELOW & RIGHT: 116 Sherbrook Street by Real Fresh Canvas Co (Trevor Peters & Annaliza Toledo) with Hee-Jung Serenity Joo.

FAR RIGHT: 126 Sherbrooke Street by Nereo Eugenio. (Nereo II)





"I look at how writers and artists of colour imagine the world in their texts, and I am interested in how imagination can be an incredibly powerful and necessary tool of resistance, solace and political transformation," she explains.

"When the state does not recognize you," Joo continues, "culture becomes a crucial site to express who you are. It's a different understanding of culture. For people of colour, culture is the site of struggle and existence."

Like many humanities scholars, Joo is committed to the idea that the pursuit of knowledge is never complete. Although she disseminates her research in all the conventional ways, including via peer-reviewed articles, book chapters and book reviews, she does not distinguish between her research and her teaching. Her classroom - whether she is teaching a survey course on American literature or a queer theory based course on racial futurities - is also a place of research. Her research, teaching and academic service are all connected and all equally vital to her ongoing pursuit of knowledge.

Joo also considers everything that she reads to be research.

"Popular culture is often dismissed as superficial, but it holds immense power. Everything I read and consume, on Instagram, in newspapers, on Netflix,

in ads on buses, and on the back of a cereal box, is a potential site of analysis and research," she says. "Cultural narratives are everywhere around us, and it's important that I teach my students the skills of cultural literacy so that they can better understand not only literary texts, but also the world they live in."

"POPULAR CULTURE IS OFTEN DISMISSED AS SUPERFICIAL, BUT IT HOLDS IMMENSE POWER. EVERYTHING I READ AND CONSUME, ON INSTAGRAM, IN NEWSPAPERS, ON NETFLIX, IN ADS ON BUSES, AND ON THE BACK OF A CEREAL BOX, IS A POTENTIAL SITE OF ANALYSIS AND RESEARCH."

Although Joo is never at a loss for topics to study, much of her recent attention has been taken up by science and disaster fiction.

"Science fiction historically was a genre of colonialism," she explains. "It was about the discovery of new worlds and new people and conquest and exploration, and so I am really interested when artists of colour reclaim science fiction and do new things with it."

Whereas African Americans and Indigenous peoples are generally denied any role at all in traditional science fiction outside of being discovered or impeding conquest, Joo continues, Asian Americans are often typically represented in the genre as robots or techies.

That, she explains, is known as the model minority myth. It is based on the idea that Asians are the good racial minority and that other racial minorities should attempt to emulate them.



ABOVE: Poster remnants on hydro pole.

"This is a classic tactic of colonialism, to divide and conquer," Joo continues, "as this supposedly positive image of Asians is promoted to keep other minorities down. At the same time, model minority Asians are presented as aberrant—they are freakishly good at mundane tasks and multiple-choice exams, and there are 'too many' of them in university, in the neighbourhood, on the planet. All of this together helps to secure whiteness as the norm."

"SCIENCE FICTION HISTORICALLY WAS A GENRE OF COLONIALISM, 'IT WAS ABOUT THE DISCOVERY OF NEW WORLDS AND NEW PEOPLE AND CONQUEST AND EXPLORATION, AND SO I AM REALLY INTERESTED WHEN ARTISTS OF COLOUR RECLAIM SCIENCE FICTION AND DO NEW THINGS WITH IT.'"

As part of this research, Joo is currently writing a paper on representations of Asians as robots and cyborgs. She is also in the midst of researching the racial politics of disaster, thinking through what gets classified as a disaster and by whom, and also thinking about the colonialist timelines of global warming and climate change as mass disasters. And then there's her research cluster on collecting, citing and curating; her collaboration on a local grant on the rights of incarcerated people; and her intention to offer U of M courses on the inside at the Women's Correctional Institute in Headingly, Man. where she currently volunteers.

As a literary scholar who cares deeply about culture, racial politics and the future of humanity, Joo views the entire world as her laboratory. And in that laboratory, the quest for knowledge is never ending. **IN**

HUMANITIES HUB



SOMEHOW, IN SPITE OF THE RESEARCH

she's pursuing, the papers she's writing, the courses she's preparing, the graduate students she's supervising and the countless books and tweets and other media that she is reading, Hee-Jung Serenity Joo finds time to dedicate to the U of M's Institute for the Humanities (UMIH). Joo began a three year term as the institute's director last summer.

The UMIH was created almost 30 years ago to promote cross-disciplinary research in the humanities and allied social sciences, and sponsor public programs, lectures, workshops, colloquia and conferences to highlight that research.

"We function as a hub for scholars in the humanities to come and share their work," Joo explains. "We provide resources and support to help researchers do what they are already doing, better, and help link people with others who may be interested in similar ideas and research."

Currently, that research is concentrated in two main clusters. One of those clusters is connecting humanists to health sciences scholars. The other cluster - one which Serenity co-organized long before being named institute director - is focused on collecting, citing and curating, and brings together academics, archivists and artists of colour.

"I love that I get to work with visual artists," Joo says, "as my work is bending toward the visual arts more and more as a medium that can express certain problems in ways that narrative often can't."

The institute also sponsors affiliates who, at the present time, are delving into topics as diverse as hyper-empathy in Romantic era literature and the contemporary obsession with psychopaths.

"The best part about being director is I get to attend talks on a wide range of topics," Joo says. "It stretches my brain in so many directions [and is] incredibly stimulating."

EXPEDITION CHURCHILL: A GATEWAY TO ARCTIC RESEARCH



(e-book, University of Manitoba, 2018)

The free e-book is available to download by visiting expeditionchurchill.ca


FOR DECADES, UNIVERSITY OF MANITOBA researchers have studied how Arctic systems react to, and drive, ecological change. The world's largest sea-ice research team investigates everything from microscopic creatures living in ice, to predators roaming the land, sea and air. For the first time, they and their collabo-

rators have synthesized their work into a comprehensive and interactive format: Expedition Churchill: A Gateway to Arctic Research, an e-book app available in mobile and tablet (iOS and android) that you can download and explore anywhere.

This unique public outreach program that enlightens us on the region's scientific significance and the changes underway, provides the context for us to understand how we can collectively meet the challenges and opportunities that climate change affords the region and the world.

The world's largest sea-ice research team investigates everything from microscopic creatures living in ice, to predators roaming the land, sea and air.

The U of M launched this in late 2018 with its partners—VIA Rail, the Town of Churchill, the Churchill Northern Studies Centre, Assiniboine Park Zoo and Travel Manitoba—it did so at the train station in Winnipeg because Expedition Churchill involves a wrapped Via Rail dining car [exterior and interior] that promotes the e-book app to travelers, virtually allowing scientists to inform and entertain while en route to Churchill and beyond.

A variety of media resources complement the e-book chapter content, including videos, audio clips and interactive infographics. A resource section, acronym index and acknowledgements are included at the end of the e-book. 



ABOVE: Researcher under an ice sheet in the Arctic.

FEATURE

A

CRITICAL

LENS

ON LEGAL

RECONCILIATION



BY ANDREA
DANELAK

**“I LOOK FORWARD TO
FURTHERING MY INVOLVEMENT
ON INDIGENOUS RIGHTS AT
AN INTERNATIONAL LEVEL,
PARTICULARLY IN THE
GLOBAL NORTH.”**

Dr. Jeremy Patzer credits his early interest in law, in part, to a duck. Near the family farm on the outskirts of the Lake Manitoba First Nation, Patzer [MA/08] and his cousin were approached by a game warden for hunting a duck two days out of season. That encounter marked a pivotal moment for Patzer, spurring a lifelong interest in Métis hunting rights. “It is something that had stuck with me for a handful of years until 2003, the first time the Supreme Court of Canada recognized that Métis rights could be and should be recognized under Section 35 of the Constitution Act, 1982,” recalls Patzer, who is Métis, Saulteaux and German.



WHILE COMPLETING HIS master's degree at the University of Manitoba and doctoral degree at Carleton University, Patzer dived into the topic even deeper, taking a critical lens to how the courts

handle Indigenous rights, title and treaty rights, and critiquing their approach to resolving colonial dispossession.

"While my master's looked specifically at Métis rights and Métis hunting rights, I opened it up wider for my dissertation, asking the larger questions around how the courts try to reconcile and resolve very controversial histories that come out of colonial dispossession," he says.

When it came time to look for a teaching job, Patzer looked specifically for universities hiring in areas that specialize in Indigenous issues. And so, in 2016, he moved back to the Prairies after accepting a position as assistant professor in the U of M's department of sociology and criminology.

"I LOOK WITH A CRITICAL EYE TO SEE HOW THE LAW HANDLES THAT AND WHAT IT IS ABLE TO DO – AND NOT ABLE TO DO – WHEN IT'S TRYING TO RESOLVE THOSE HISTORICAL CONTROVERSIES."

ABOVE: Indigenous scholar, Jeremy Patzer.

"(Manitoba) is where I still have that farm with my family. I still exercise my Section 35 Indigenous rights to go hunting and fishing. I knew I wanted to stay (in Manitoba) if I could," he says.

Outside the classroom, he continues to publish about Aboriginal law, which denotes the body of law in the Canadian legal system that deals with issues in traditional areas like treaty rights, Indigenous title and duty to consult, as well as issues surrounding Métis rights (see sidebar).

"Treaty rights come out of treaties that are signed... Indigenous Peoples can still claim before the courts and seek to have recognized rights that aren't mentioned in treaties, which is what Métis [people] have to rely on," he explains. "Aboriginal title is largely an issue that pertains to Indigenous groups who didn't sign a historical treaty of any sort,

like going out to British Columbia and up to the North. The same areas where they would deal with land claims sometimes actually deal with Aboriginal title cases.”

Patzer has also focused his research on contemporary topics like the United Nations Declaration on the Rights of Indigenous Peoples – which marked the 10th anniversary of its adoption in 2017 – and was recently published in *The International Journal of Human Rights* for his work on the topic.

“I look forward to furthering my involvement on Indigenous rights at an international level, particularly in the global North,” he says.

“A LOT OF THIS IS UNKNOWN TO MY STUDENTS – STUDENTS WHO WERE BORN AND RAISED HERE IN MANITOBA AND STUDENTS WHO COME FROM AFAR ALIKE,” HE SAYS. “TO BE ABLE TO OPEN STUDENTS’ EYES TO (THESE ISSUES) IS A REWARDING ENDEAVOUR.”

Most recently, Patzer’s research has focused on how the courts have handled controversies around Residential Schools and the nearly 20,000 Indigenous children taken from their families in the Sixties Scoop. His research aims to shift how similar court cases, settlement agreements and Indigenous rights issues are handled in the future.

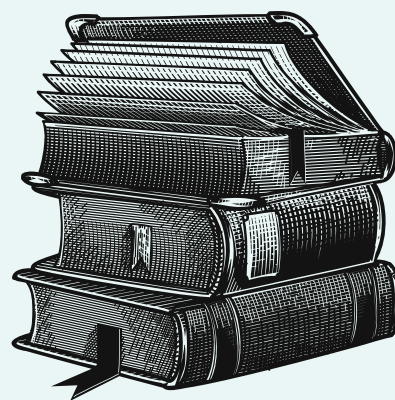
“For me, broadly speaking, these are all historical grievances. These are infamies from our colonial past, very negative and harmful things that the courts – and the law in general – have difficulty trying to reconcile and resolve, even today,” he says. “I look with a critical eye to see how the law handles that and what it is able to do – and not able to do – when it’s trying to resolve those historical controversies.”

Teaching that legal and political history to students – while relating it to contemporary issues in Canada – has been especially fulfilling for Patzer since he returned to the U of M. “A lot of this is unknown to my students – students who were born and raised here in Manitoba and students who come from afar alike,” he says. “To be able to open students’ eyes to (these issues) is a rewarding endeavour.”

The next chapter for Patzer? A book project proposal focusing on a critical sociological analysis of Aboriginal law as related to the Canadian legal system.

“I’m interested in the idea of putting together a project that critically examines the limitations of the law for resolving historical grievances like we have in Canada,” he says. “A larger project that can examine the successes – or the strategies used – and also the difficulties of having the law try to resolve these historical grievances and these forms of harm that Indigenous Peoples have suffered historically. ■

AN IMPORTANT DISTINCTION



WHEN THE CONSTITUTION ACT, 1982

was established, ‘Aboriginal Peoples’ came into popular usage as the collective noun for First Nations, Métis and Inuit peoples in Canada, and became more widespread when it was adopted by government and other groups across the country.

In recent years, however, language has shifted, recognizing First Nations, Métis and Inuit peoples as ‘Indigenous Peoples’ to align with the language used in the United Nations Declaration on the Rights of Indigenous Peoples.

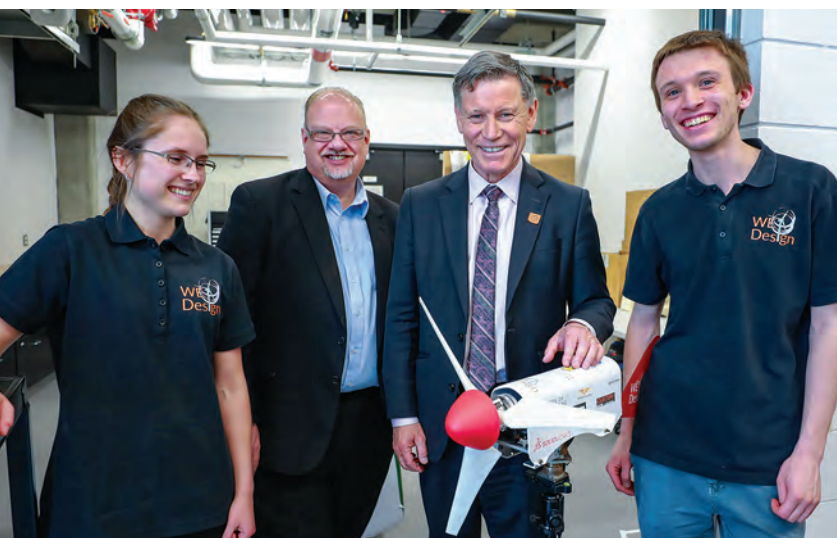
Despite the shift in language, ‘Aboriginal law’ and ‘Indigenous law’ both still play a role in Canadian vernacular – with an important distinction. Aboriginal law denotes the body of law that concerns various issues related to Indigenous Peoples, such as treaty rights and duty to consult, whereas Indigenous law refers to the traditional customs and practices of Indigenous Peoples.

“My research in Aboriginal law performs a critical examination of the work of the settler state courts – not of the laws of Indigenous Peoples themselves,” says Patzer.

GENERATING INNOVATION



TOP: Cutting the ribbon on the new Stanley Pauley Engineering Building (l-r) Marcia Friesen (U of M), Digvir Jayas (U of M), Terry Duguid (MP for Winnipeg South), The Honourable Kelvin Goertzen (Minister of Education), Sarah Guillemard (MLA for Fort Richmond), U of M President & Vice-Chancellor David Barnard.



MIDDLE: Students showcase their prototype to Minister Goertzen and MP Duguid in the Price Innovation and Prototyping Centre.

BELOW: NSERC Design Chair Marcia Friesen with Digvir Jayas at the ribbon cutting.

THANKS TO A JOINT FEDERAL-PROVINCIAL INVESTMENT, a new engineering facility officially opened its doors in June 2019: The Stanley Pauley Engineering Building. It will help to better train students for the jobs of today and tomorrow. The 46,000-square-foot building is named in honour of engineering faculty alumnus Stanley Pauley [BSc(EE)/1949]. The building expands lab and student-support facilities across engineering disciplines.

“The Government of Canada’s investment in this building is creating the right conditions for innovation and long-term growth, which will keep the Canadian economy globally competitive,” said Terry Duguid, Parliamentary Secretary and Member of Parliament for Winnipeg South.

Students, professors and researchers will work in state-of-the-art facilities that support experiential education and advance the country’s best research. Many of the spaces will facilitate collaboration between industry partners that support lifelong learning and skills training. By working in close proximity, discoveries will turn into products or services while creating high-value jobs of the future.

“The Province of Manitoba is proud to invest in facilities that fuel growth in innovation and address the current market demands for trained engineers in all disciplines,” said The Honourable Kelvin Goertzen, Minister of Education and Training.

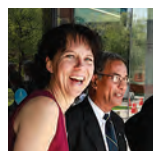
“This facility will not only help us attract industry partners, retain highly skilled students and researchers, but it also supports collaboration among innovative problem solvers.”

The building houses a wide complement of engineering related programs and laboratories, including the Price Innovation and Prototyping Centre used by student design teams, Co-operative education space and the Internationally-Educated Engineers Qualification program.

In addition, several research laboratories are located in the new facility including that of professor Ani Gole, who holds a sponsored Industrial Research Chair in Power Systems Simulation. His chair is sponsored by the Natural Sciences and Engineering Research Council, Manitoba Hydro, the Manitoba HVDC Centre, RTDS Technologies, Electranix, Teshmont and TGS.

“This facility will not only help us attract industry partners, retain highly skilled students and researchers, but it also supports collaboration among innovative problem solvers,” said David Barnard, president and vice-chancellor at the U of M.

Funding for the facility was provided by the Government of Canada Post-Secondary Institutions Strategic Investment Fund (\$12.1 million), and the Province of Manitoba (\$4 million), with the university’s Front and Centre campaign donors providing the remaining costs. ■





ARE ARTIFICIAL SWEETENERS PUTTING KIDS AT RISK FOR ASTHMA?

BY CHRISTOPHER PASCOE, PHD

ORIGINALLY SYNTHESIZED IN 1879 by Ira Remsen and Constantin Fahlberg, saccharin was the first artificial sweetener discovered. Fast forward to today and the artificial sweetener industry is booming with annual revenues exceeding \$2 billion and numerous artificial sweeteners on the market in both food and drink products.

Around 40 per cent of adults and 25 per cent of children have reported consuming artificial sweeteners on any given day.

While these intensely sweet compounds are generally considered safe, we still know very little about their impact on pregnant women and their babies. With the prevalence of artificial sweetener consumption during pregnancy nearing one in four women, we need to better understand the impact of these compounds on infants. Research has indicated the consumption of artificial sweeteners during pregnancy can increase the body weight of offspring, putting them at risk of obesity related complications later in life. Another report has suggested the consumption of artificially sweetened food during pregnancy could increase a child's risk for developing asthma, but it is unclear how or why this may occur.

To better understand the cause-effect relationship between artificial sweetener exposure during pregnancy and lung health in children, we turned to a novel animal model developed in the lab of Andrew Halayko (Canada Research Chair in Chronic Lung Disease Pathobiology and Treatment Physiology) at the Max Rady College of Medicine, with funding from the Banting Postdoctoral Fellowship and Developmental Origins of Chronic Disease in Children Network (DEVOTION).

It is my desire to continue researching treatment options for lung disease that are based on the natural history of the disease and to eventually prevent lung disease in people by understanding its origins.

With this model, we can assess how consuming artificial sweeteners, like aspartame or sucralose, during pregnancy changes the sensitivity of the offspring to common allergens in asthma. We can also determine if exposure during pregnancy or breastfeeding is more important for asthma risk and therefore, allow us to develop preventative strategies to limit new cases of asthma. This model can be applied to other environmental exposures (marijuana, air pollution, dust) thought to increase a child's risk for asthma in order to gain a better understanding of the origins of asthma and allow us to develop strategies aimed at decreasing the incidence of asthma in Canada.

I chose to come to the U of M and the Children's Hospital Research Institute of Manitoba (an affiliated research partner of the university) for my post-doctoral training because the institute has a strong group of lung researchers that are renowned for their training and mentoring skills. Securing the prestigious Banting Postdoctoral Fellowship is a testament to the impactful mentorship and guidance I have received in my time at the university. It is my desire to continue researching treatment options for lung disease that are based on the natural history of the disease and to eventually prevent lung disease in people by understanding its origins. This way, we may one day see a world in which young children are not hindered in their daily activities by a difficulty to breath. **■**

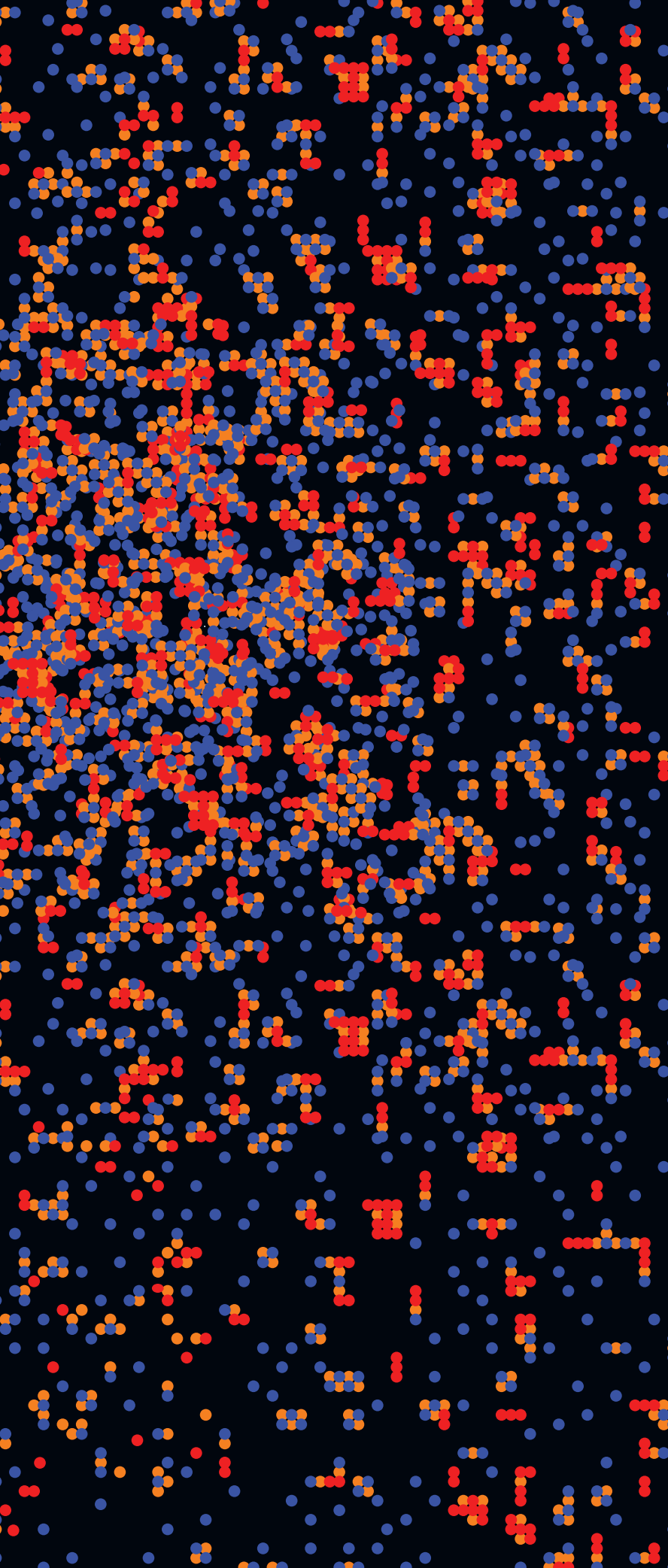


ABOVE: Banting post-doctoral fellow, Christopher Pascoe.

FEATURE

THE SPEED OF A RUMOUR





HOW INFORMATION TRAVELS THROUGH A NETWORK

BY SUSAN
PETERS

Pure mathematics is all about the long game, according to mathematician Karen Gunderson [BSc(Hons)/2004, MSc/2007].

YOU HOPE THAT SOME OF THE IDEAS THAT you have now, someday, will help people to answer a real-world problem in the future,” says Gunderson, still in the early years of her career as an assistant professor in the mathematics department in the Faculty of Science. “You hope that when you’re not so focussed on a particular real world problem, your mind is a little freer to be imaginative and creative. You might come up with ideas that people wouldn’t see if they were too focused on a particular application. Maybe you can see a more general structure of what’s going on.”

Gunderson works within the fields of graph theory and combinatorics. Graph theory is the study of networks—systems of nodes with links between nodes. Combinatorics encompasses both the mathematics of counting (not necessarily just large sets) and the study of finite structures such as systems of sets.

“I’VE WORKED ON MAKING MY EXPLANATIONS OF WHAT I DO UNDERSTANDABLE,” GUNDERSON SAYS, BECAUSE WHEN SHE TRAVELS TO THE U.S. FOR MATHEMATICS CONFERENCES, BORDER SECURITY GUARDS ALWAYS ASK WHAT SHE DOES, AND THEN ASK, FASCINATED, “WHAT KIND OF MATHEMATICS?”

An example of how these two fields are applied to the every day, is trying to understand how information—or rumours, or an infection—can travel through a large network. Another real-world application of similar research could be applied to how rumours—such as political mudslinging—would travel between people through phone calls, face-to-face conversations or social media, but there’s also potential to apply her research to computer science, linguistics, physics or animal conservations.

One of Gunderson’s projects, a collaboration with Ryerson’s Anthony Bonato and post-doc researcher Amy Shaw, could be described as an attempt to come up with a model for viral marketing. For example, assume a company is trying to spread a rumour (or promote a product) in a network, using their resources to spread the message every day, with the goal to spread it everywhere.

“But of course the network is also growing and changing over the time. So the question is, can you keep up?” explains Gunderson.

If the world’s growing population keeps growing, can a company ever find enough of the right influencers so that



ABOVE: Karen Gunderson

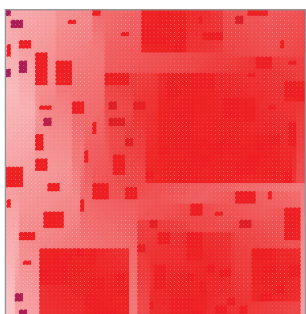
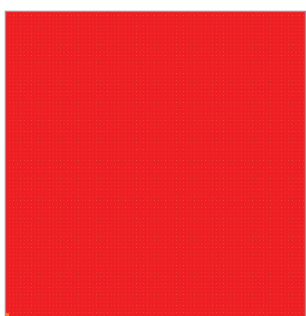
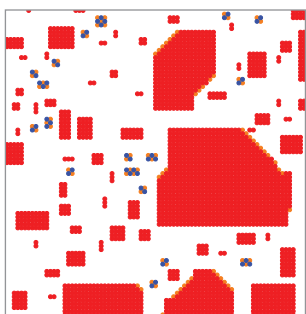
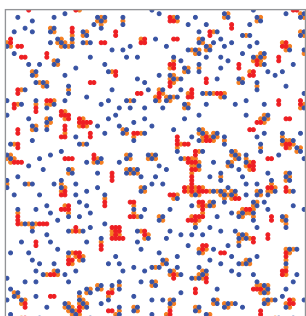
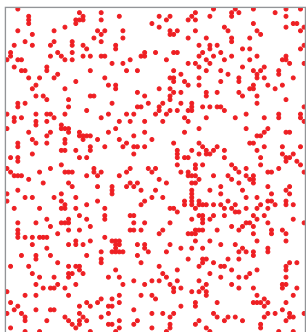
(RIGHT, TOP TO BOTTOM: Graphs representing a run of a bootstrap percolation process, showing infection and recovery spreading through neighbours across the plane. The darkest red are the patches that were infected the longest and the bits of blue/purple represent patches that recovered from infection at least once before finally succumbing. The last graph is an amalgam of all steps.

even as the network keeps growing, the rumour (or sales pitch) covers more and more of the network?

“We were able to come up with an exact speed. If the network is growing this fast, you can make sure that almost everybody in the network knows over time,” says Gunderson, with some satisfaction. “If it’s growing this fast, you can make sure that a reasonable proportion of people know. And if it’s growing faster than a certain speed, there’s no hope. Over time, almost nobody knows, no matter how well-chosen your influencers are.”

Mathematics was a gradual career choice for Gunderson. While she thought algebra was “the most fun and amazing thing in the world” in junior high school, she hadn’t realized mathematics could be an occupation until her undergraduate years at the U of M. She became progressively interested in graph theory and combinatorics, with her imagination fired by the six degrees of separation theory (pop-culture fans might recall a game called Six Degrees of Kevin Bacon, trying to figure out how Hollywood actors are connected to Kevin Bacon). Gunderson was intrigued by the techniques used by mathematicians to figure out how many degrees of separation there were in an acquaintance network.

She came back to U of M after completing her PhD at the University of Memphis. On what drew her back (her husband is also a faculty member),



“We were keen to end up working in the same city after seven years apart (four while dating and three after we got married). I was very happy to get the job here, not only to solve our “two-body problem”, but also because I think this is a great university and one where I thought I could contribute something positive and that would also have good opportunities for my research.”

Her current research interests are random graphs, percolation, hypergraphs and extremal combinatorics.

“BUT OF COURSE THE NETWORK IS ALSO GROWING AND CHANGING OVER THE TIME. SO THE QUESTION IS, CAN YOU KEEP UP?”

“I’ve worked on making my explanations of what I do understandable,” Gunderson says, because when she travels to the U.S. for mathematics conferences, border security guards always ask what she does, and then ask, fascinated, “What kind of mathematics?”

Her work is sometimes inspired by real life problems, seeking a more abstract version, such as when she sees a rumour spreading on a social network such as Facebook and thinks, oh, there are some interesting math problems there.

“You’re always going around inventing problems. You see something from real life, or a physical application, and say, okay, well I don’t actually want to answer that question, but what would be an interesting thought experiment, an abstract problem that gets to the heart of what’s going on there,” explains Gunderson. “And then you have to dream up how to answer these questions.”

It’s a thought process that involves a large dose of creativity: to see the problem and abstract it. To come up with examples typical of the problem being considered. If you decrease the size of the network, or loosen the restriction—will the thing that you’re trying to prove still be true?

To start off by trying to use one technique to solve the problem, only to realize after days of writing on whiteboards that approach will never work, and something completely new will have to be attempted. “It’s always that thing of trying to dream up something that’s completely unique and brand new to address these problems people come up with,” says Gunderson. “It’s really creative in mathematics.”

FROM PHYSICS TO INFECTIONS

ON KAREN GUNDERSON’S WEBSITE, an image illustrates a project she worked on with Tom Coker (International Mathematical Olympiad), then a grad student at Cambridge. A panel of eight boxes shows a succession: the first box is white, and contains a few red and blue dots like the spatter from an artist’s paint brush. The boxes progressively fill with more and more red dots until the final panel is entirely red.

As an example of graph theory, the boxes filling with red represent several things. It depicts how infections can travel through a large group of people, but also how information or rumours can travel through a network, such as news travelling through a social network like Facebook—the red dots represent infected people, or those who know the rumour, while the blue dots represent healthy people, those who don’t know the rumour or stopped believing.

But the problem was originally proposed by physicists who wanted to understand the behaviour of particles laid out in a configuration, where a negatively charged particle surrounded by lots of positively charged particles will tend to change its charge to match its neighbour, and vice versa.

“The question that I was working on was, if you scatter the sick people initially randomly on the grid, what’s the cut-off density for where everybody eventually will recover or everybody eventually will get sick,” says Gunderson. They were able to find the turning point, where if enough people are initially sick, everyone is eventually infected.

SPOTLIGHT ON STUDENTS

READY—SET—GO!

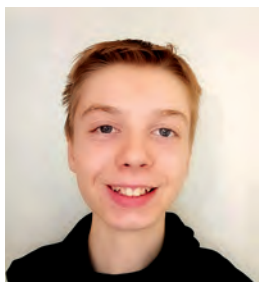
BY BRYCE CADIEUX

Clink, clunk, clink, clunk. That was the sound of the marble dropping down, inch-by-inch, in the world's slowest marble roller coaster competition. My partner, Jo, and I had spent the entire 45 minutes of our allotted time racing against the clock to come up with the most boring design possible for our marble roller coaster.

OUR THOUGHT PROCESS INVOLVED realizing that having the marble sway back and forth, from side to side, as many times as it can on the way down, would bring the marble down in the slowest fashion possible. And how right we were! Coming in at 38 seconds, we took first place with 46 per cent more time than the second place runner-up, winning a few whistles and tape-measure-pens as prizes. However, as much fun as the marble competition was, SET Day 2019 involved many more fun activities. Have you ever seen real robots playing soccer before? We sure have! We were able to view autonomous robots find a ball in their vicinity, walk up to it, and then kick it! We were also very intrigued by the new AI paradox: robots can easily perform very complicated activities, such as playing soccer, yet it is very difficult for them to perform simple tasks, such as identifying objects in an image. But there weren't only robots on the ground – there were robots in the sky as well!



LEFT: Beluga whale blowing mucous through its blow hole. Vanier scholar Justine Hudson with her 'snot' collection tool in Hudson's Bay.



ABOVE: Bryce Cadieux


Dr. Philip Ferguson led an extremely fascinating discussion where he mentioned how with the help of supposedly useless space debris, satellites can determine their physical location. As satellites pass by random junk orbiting in various layers of earth's atmosphere, they can calculate their angles relative to the space junk over time to pinpoint their location. This proved to be a very interesting discovery and even though I wasn't planning on going into satellite engineering anytime soon, Dr. Ferguson much evoked my inner spaceman and I am now much more interested in that field. Not only were machines included in SET Day, but an assortment of biology was included as well. Dr. Meghan

All in all, the UofM occupies superb facilities with the latest tech gadgets and research equipment, allowing for some of the most fascinating research projects to take place.

Azad taught us how natural breastfeeding provides the baby all the essential nutrients a baby requires. From personalized medicine, to lowering a child's risk for obesity, breast milk is the ultimate "superfood" for brand-new babies. It even goes so far as lowering stress levels, which was not only helpful for the baby and the mother but was a

perfect segue to the final presentation: a study into the stress levels of beluga whales.

Master's student, Justine Hudson, demonstrated her effective technique of capturing beluga snot out of their blow hole to study their stress levels without straining their mental health too significantly. By capturing the sample through this simple method, scientists will not be required to capture belugas before extracting a sample, resulting in a much more accurate collection of health data.

All in all, the U of M occupies superb facilities with the latest tech gadgets and research equipment, allowing for some of the most fascinating research projects to take place. I would rate this SET Day a five out of five and would absolutely recommend this event to all future students interested in science, engineering and technology. Not only were you able to learn about many new interesting topics, but everyone was able to experience a full, action-filled day of the extraordinary life on the U of M campus. 

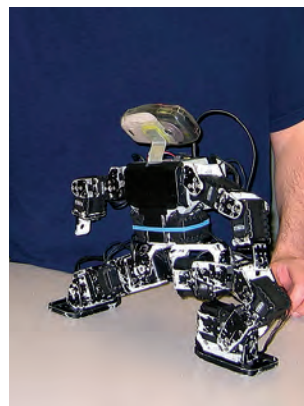
Students at the Manitoba Institute for Materials.



Students in the "analyzing your moves" activity, evaluating their next steps in the research process.



LEFT: Soccer playing robot in Computer Science. RIGHT: Students doing a geotechnical learning activity in civil engineering.



Viewing the detailed samples at the Manitoba Institute for Materials.



Projection





IS PASSION THE KEY TO A HAPPY AND SUCCESSFUL LIFE?

BY SHARON
CHISVIN

Ben Schellenberg asks a lot of questions. He asks people about their lives, their hobbies, their daily activities, their academics, their obsessions and their passions.

His research focuses on the construct of passion and the way in which an individual's degree of passion toward an athletic pursuit, or any favourite activity, affects their experiences in that activity and overall sense of well-being.



SCHELLENBERG IS AN ASSISTANT professor in the Faculty of Kinesiology and Recreation Management. He teaches the psychology of sport and physical activity, and physical activity, health and wellness, and he researches sport and exercise psychology and social and personality psychology. Schellenberg grew up in Portage la Prairie and Winnipeg, graduating from Westgate Mennonite Collegiate. He completed a BA (hons) in psychology at the University of Winnipeg and a MA in kinesiology at the University of British Columbia, and then returned to Winnipeg to do his PhD in psychology at the University of Manitoba. Following that, Schellenberg did a two-year postdoctoral fellowship in the School of Psychology at the University of Ottawa, before returning to the U of M in the summer of 2018 to teach and do research. On why he chose the U of M as an early career researcher, “Because I can’t imagine a better place to continue this research. Being in Manitoba is great because I do a lot of research with athletes and sports fans, and Manitoba certainly has a lot of both. The faculty specifically is also perfect because the topics I study intersect many domains studied by other researchers, including sport psychology, social psychology, recreation, and leisure. Being at U of M is also a rare opportunity to be able to conduct research in your home community.”

During his undergraduate years, Schellenberg was an elite volleyball player, an Athlete of the Year, a Canadian Interuniversity Sport (CIS) First Team All-Star, and a five-time Academic All Canadian. His athletic prowess and passion for the game of volleyball was a major influence on his academic and career paths and on his research.

“Using mostly surveys, I ask people about their feelings



ABOVE: Ben Schellenberg

TOP: U of M Bisons volleyball players in action.

toward their favourite activities and how they feel about these activities and their lives,” Schellenberg explains.

“Sometimes I administer surveys all at the same time, sometimes I follow people at several time points to see how motivation and experiences change over time, and sometimes I adopt experimental designs by including manipulations of some sort,” he adds.

“MOST OF THE RESEARCH I’VE DONE, IN COLLABORATION WITH COLLEAGUES, HAS USED THIS DUALISTIC MODEL OF PASSION FRAMEWORK TO STUDY HOW PASSIONATE PEOPLE RESPOND TO THREATS, OBSTACLES AND SET-BACKS WHILE ENGAGING IN THEIR PASSION.”

Schellenberg studies all types of people, including athletes, sports fans, exercise enthusiasts, gamblers and university students. He analyzes the results of his studies by testing hypotheses and examining statistical relationships.

The role that passion plays in people’s lives, Schellenberg has discovered, depends a great deal on the extent to which the passion is in balance with their other life activities, as well as the extent to which they are consumed and preoccupied with their passion.

The extent to which the passion is in balance with other life activities is referred to as harmo-

nious passion. The extent to which people are consumed and preoccupied with their passion is known as obsessive passion.

"Most of the research I've done, in collaboration with colleagues, has used this dualistic model of passion framework to study how passionate people respond to threats, obstacles and set-backs while engaging in their passion," Schellenberg explains.

"THIS MEANS THAT, WHEN THINGS AREN'T GOING WELL IN A PASSION, COPING RESPONSES CAN BE PREDICTED BY THE TYPE OF PASSION ONE HAS FOR AN ACTIVITY."

That research clearly indicates that individuals who have a harmonious passion tend to respond to adversity with problem-focused coping, self-compassion, and a belief that the situation is controllable and a challenge that could be overcome. Those with an obsessive passion, on the other hand, are more likely to respond to adversity, such as stress and performance anxiety, with avoidance, self-criticism, and a belief that their situation is threatening and uncontrollable.

"This means that, when things aren't going well in a passion, coping responses can be predicted by the type of passion one has for an activity," Schellenberg sums up.

Moving forward, Schellenberg is focusing less on how passionate people respond during difficult times to exploring and better understanding how they respond during positive times, such as when they experience unexpected victories and surpass certain milestones.

"I'm currently working on a project (funded by the Social Sciences and Humanities Research Council) that will test if one's ability to maintain and augment positive emotions in sport – a process known as savouring – is differentially predicted by different forms of passion, and if differences in savouring can explain why harmonious and obsessive passion predict adaptive and maladaptive outcomes in sport, respectively," he explains.

Preliminary results from that research project, being conducted in collaboration with colleagues from McGill and the University of Ottawa, indicate that individuals with high levels of harmonious passion engage in more savouring behaviour than do people with high levels of obsessive passion. Not only do those plagued with obsessive passion not savour as much, but they also tend to restrain their positive feelings.

Concurrently, Schellenberg is researching several other passion projects – all of which, by their very nature, require him to ask a lot more questions.

Do harmonious and obsessive passions combine to predict experiences in sport? How do passion types affect the experience of sports fans? Are individuals with multiple passions happier than those with only a single passion?

And, what may be the most important question of them all-Is passion the key to a happy and successful life? ■

HARMONIOUS VS OBSESSIVE PASSION



MUCH OF BEN SCHELLENBERG'S RESEARCH TO DATE has focused on Robert Vallerand's dualistic model of passion, first proposed in 2003 when Schellenberg was still in high school.

That model defines what passion means and distinguishes between harmonious and obsessive forms of passion. It also articulates the first broad theory about the development and consequences of passion for certain activities, including academics and sports.

"A goal of my research has been to understand why harmonious passion tends to predict good outcomes and why obsessive passion tends to predict more maladaptive outcomes," Schellenberg explains.

"So far," he adds, "it seems that harmonious passion predicts responding to stress in a way that facilitates positive outcomes, whereas obsessive passion predicts stress responses that are less conducive to good outcomes."

More specifically, harmonious passion tends to predict adaptive outcomes such as psychological well-being and positive interpersonal relationships, but obsessive passion tends to predict more maladaptive outcomes such as burnout, aggression and difficulty concentrating.

In a 2016 study, for example, Schellenberg and colleagues found that during university exam time, students with strong levels of obsessive passion for academics tended to see their exams as a threat and coped with them by using avoidance strategies.

Students with strong levels of harmonious passion, on the contrary, were more likely to see their exams as a challenge that was under their control, and tended to cope by using positive approach-oriented strategies. These types of coping responses, in turn, contributed to better academic performance.

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Ley Fraser, Allison Balasko, Kyle Monkman, Elena Bilevicius, Aleah Fontaine, Andrew Hogan

Record year for **VANIER SCHOLARS**

The University of Manitoba congratulates these six exceptional PhD students, who are all recipients of Vanier Canada Graduate Scholarships.

These innovative, emerging researchers will become the future leaders of our communities, our businesses and our government. Their research will shape our world in the years to come.

We are proud to be a part of their stories, and proud that the University of Manitoba is where they call home.

umtoday.ca/vanier2019



**University
of Manitoba**



Close-up of mural
located at 116 Sherbrook
Street, Winnipeg, Man.
(see story on page 12)

Research**LIFE**