UNIVERSITY OF MANITOBA
ResearchLIFE
SUMMER 2016 | VOLUME 2

THE FINE ART OF RESEARCH
CERAMIC ARTIST EXPLORES LIFE OF TREES

BACTERIA
Nature's biopesticide

LA VIA ACADÉMICA
Agrarian social movements

GETTING FROM POINT A TO POINT B
Moving MS research forward

MESSAGE

FROM THE VICE-PRESIDENT (RESEARCH AND INTERNATIONAL)

"In art, there's rarely a clear split between research and the work necessary to realize the concrete result, and for Nickel, the evolution happens through the doing."

The quote refers to one of the feature stories in this issue highlighting the work of ceramic artist Grace Nickel. Her work graces the cover of this issue. I wanted to throw a spotlight for this issue on the rich diversity of research, scholarly works and creative activities undertaken at the University of Manitoba. In every issue, I seek to strike a balance in the stories we share about the inspiring and cutting edge research our students and faculty are immersed in.

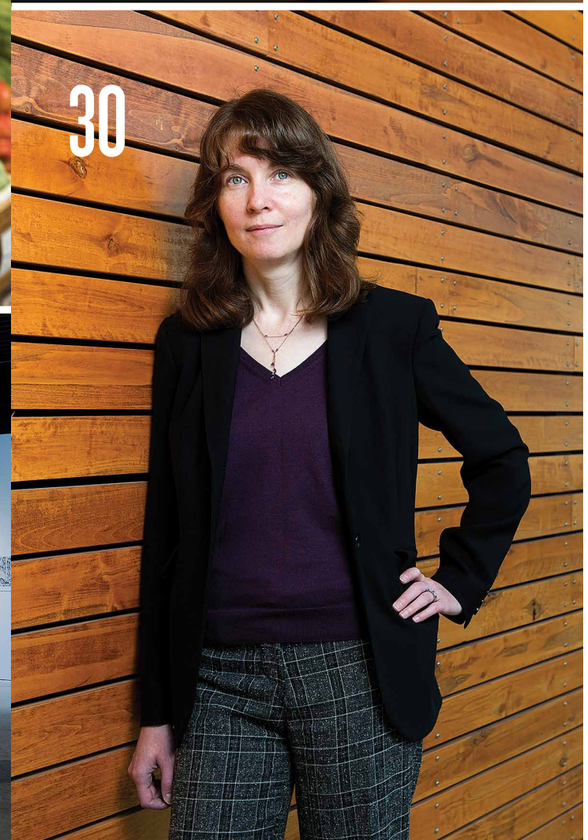
I'm excited to share some insights into our new federal Minister of Science Kirsty Duncan's thoughts on science, innovation and the need to increase the engagement of young women in the pursuit of science, technology, engineering and mathematics fields.

Other stories in this issue explore social justice and food sovereignty, using microorganisms to increase crop yields, and the research of the inaugural Waugh Family Chair in Multiple Sclerosis. Female scholars and rising stars, and their significant accomplishments exemplify our institution's commitment to enhancement of the academy and STEM fields.

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

On the cover:
Grace Nickel, tree-columns from the installation Arbor Vitae, 2015, porcelain, up to 240 cm in height.
Photo by Michael Zajac. *See feature story on page 18.*

Acknowledgements for support go to the Canada Council for the Arts, the Winnipeg Arts Council, the University of Manitoba, the Faculty of Architecture's C.A.S.T. facility at the University of Manitoba, the Pottery Workshop and the Sculpture Factory in Jingdezhen, China.



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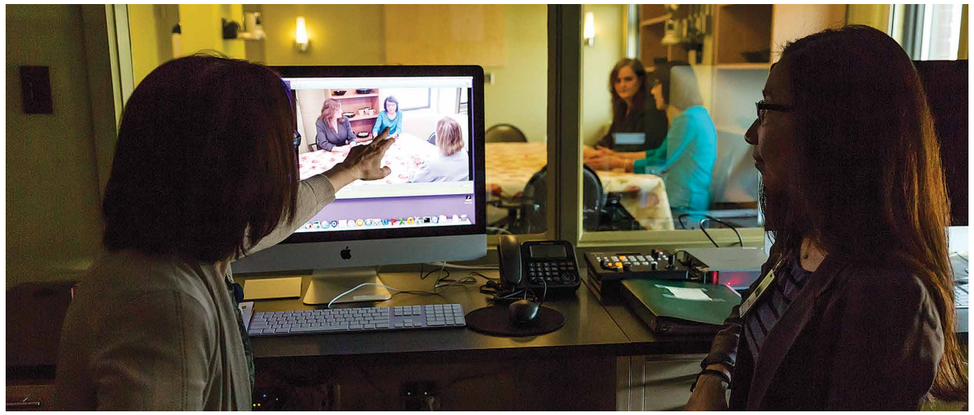
CARING FOR THE CAREGIVER



A new kind of research lab opened this spring at the Grace General Hospital, one focused on enhancing students' and clinicians' empathic communication skills with patients, families and caregivers.

The CAregiver Communication Research Environment (CAre) Lab was established thanks to $200,000 in funding each from the Canada Foundation for Innovation (CFI) and Research Manitoba. Other supporters include the Grace Foundation, Winnipeg Foundation, Thomas Sill Foundation, College of Nursing and Rh Institute Foundation.

"When you ask what they remember most about the care they receive, patients and families don't talk about a clinician's technique or what type of medication they were given," says College of Nursing researcher and associate professor Michelle Lobchuk. "What actually stays with them the most is how they were treated."

Lobchuk is co-principal of the CAre Lab with Alan Katz, director of the Manitoba Centre for Health Policy at U of M and a family physician and health services researcher.

Through innovative technology, the CAre Lab will allow clinicians, residents, undergraduate and graduate students, to review footage of themselves interacting with patients and their families.

ABOVE (L-R): Nursing student **Amy Wu** and researcher **Michelle Lobchuk**.

TOP: Lobchuk in the CAre Lab observation room at Grace Hospital, with Wu.

photo: Adam Dolman

This outside perspective will allow them to hone their interpersonal abilities and to pick up on subtle cues they might not have noticed during the conversation itself.

Healthcare professionals are typically taught how to give a needle and many other physical procedures. "But when in your training do you learn about how to interact with other people?" said Lobchuk, who holds the Research Manitoba Chair in Caregiver Communication. "It's just as important."

The CAre Lab is a unique home-like environment in a renovated 943 square foot space that features a simulated kitchen and living room. Equipped with one-way mirrors, video-cameras and editing software, the facility offers the unique opportunity to practice vital communication skills, to gauge the response of the participants and to provide empathy coaching.

Through this lab, tools and resources will be developed that will ultimately become part of clinical practice. Dedicated live interactive video-conferencing technology is also available, providing access to those in remote or northern communities and extending the reach of this innovative research facility.

Currently, pilot studies involve patients and their caregivers; however, future work may include interprofessional training for students from colleges across the Rady Faculty of Health Sciences. "I foresee future studies in CAre between students from different disciplines around negotiation and decision-making for their clients," said Lobchuk.

In cases where more than one type of health-care provider is working with a patient at the same time—such as a physician, occupational therapist and nurse—greater collaboration has the potential to provide better outcomes and improved service.

HONOURING THE VOICES

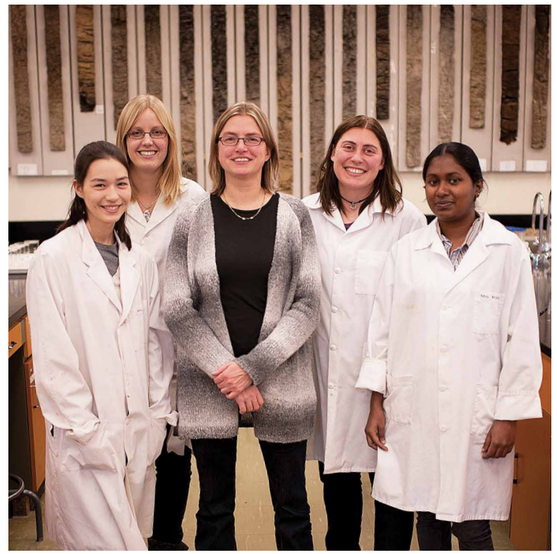
Oral history plays a vital role in understanding the past and sharing it with those who come after. The use of this form of storytelling is a way to pass information from generation to generation.

Honouring the Voices: 40 Years of First Nations, Métis, Inuit and Indigenous Health Research in Manitoba is an exhibit resulting from more than 50 interviews with people working in this important field over the past four decades.

Collected by the Manitoba First Nations Centre for Aboriginal Health Research (MFN CAHR), in partnership with the Assembly of Manitoba Chiefs, Manitoba Métis Federation and Manitoba Inuit Association, these oral histories were used to spark an intriguing collection of interactive displays that resulted in the exhibit being launched in March 2016.

"The University of Manitoba has a long and successful history of engaging in health research with First Nations, Inuit, Métis and other Indigenous peoples around the world," says Josée Lavoie, director of MFN CAHR. "It is because of this leadership that many amazing changes to the way research is performed have taken place, within Manitoba and nationally. We are thrilled to be able to honour and recognize those people who have helped shape the research process and look forward to seeing where the future of health research takes us."

The stories, told from a wide variety of perspectives, reveal the ways in which the research community has connected with, listened to and learned from First Nations, Métis, Inuit and Indigenous communities and organizations. While initial relationships varied in their degree of collaboration, today's partnerships reflect a respect for self-determination and Indigenous knowledges.



DAY OF THE GIRL

Young women interested in science and engineering descended on campus this past fall as part of International Day of the Girl activities. The day was first declared by the United Nations in 2012.

Celebrations around the globe highlight the rights of girls and advocate for greater action and investment to enable girls to reach their full potential. The event in Manitoba was intended to encourage girls to discover the fields of science, technology, engineering and mathematics and raised the profile of women working in these fields.

"This event allows established female scientists to showcase their research to the next generation," said Annemieke Farenhorst, the U of M/NSERC Prairies Chair for Women in Science and Engineering. "There are already many of us in STEM fields, but we are working hard to increase our numbers. Greater participation of women in STEM will lead to better products and services for society. Maximizing diversity in the workplace is an important goal and leads to enhanced results."

The day began at the Manitoba Legislative Building, where top women scientists shared their passion for their fields of research. Featured U of M researchers were: Annemieke Farenhorst (soil science), Nicola Koper (Natural Resources Institute), Kim Ominski (animal science), Felicia Magpantay (mathematics), Zahra Moussavi (electrical and computer engineering), Samar Safi-Harb (physics and astronomy) and Qiuyan Yuan (civil engineering).

The 30 students were nominated by superintendents, school administrators and teachers from across Manitoba, and selected for the promise and interest they show in STEM fields.

POPULATION HEALTH PIONEER RECOGNIZED

PARTNERS IN RESEARCH (PIR) awarded the 2016 Biomedical Science Ambassador Award to professor Noralou Roos (community health sciences) in recognition of her outstanding work in her field and leadership in communicating across academic and policy sectors.

"Noralou's leadership as the founding director of the Manitoba Centre for Health Policy (MCHP)—the first such 'big data' centre for health policy research in Canada—has had a profound impact on the delivery of evidence-based healthcare and has been modelled by many countries around the world," said Digvir Jayas, vice-president (research and international).

The award recognizes a Canadian researcher whose outstanding body of work over a period of time has contributed to the fields of biomedical science and/or clinical medicine and their promotion of this research to the Canadian public.

Roos developed MCHP into a world leader by using administrative data for bridging the gap between research and government policy development. She held a National Health Research Scientist award for 25 years, a tier 1 Canada Research Chair in Population Health and received a Canada Foundation for Innovation grant to expand MCHP's data infrastructure further. Roos was a member of the Prime Minister's National Health Forum, the Medical Research Council and the Interim Governing Council that established today's Canadian Institutes of Health Research.

In 2011, Roos founded evidencenetwork.ca, a non-partisan Canadian healthcare resource for journalists. The project informs health policy topics for publication in the mainstream media and links journalists with health policy experts to provide access to credible, evidence-based information.

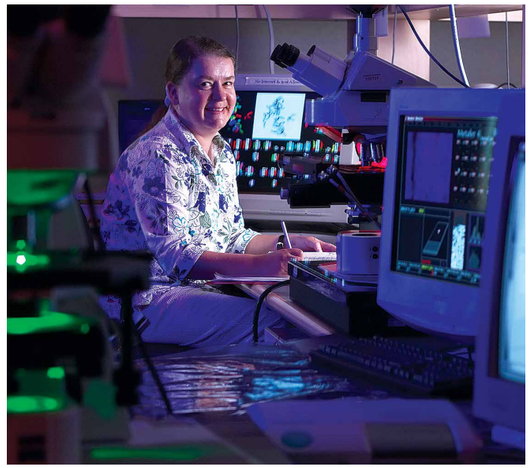
SCIENTIFIC LEADER

SABINE MAI'S RESEARCH focuses on how instability of DNA occurs in cancer cells and has the potential to lead to new tools to diagnose cancer. She uses 3D imaging technologies to identify signs of gene instability. She was the first to introduce the use of super resolution microscopy to Canada and her facility purchased the first commercially available super resolution system in North America.

Her excellence and leadership was recognized by the Women's Executive Network (WXN): she was named one of Canada's Most Powerful Women Top 100 for 2015.

Mai is both a Max Rady College of Medicine professor and scientist with CancerCare Manitoba, working in the jointly operated Research Institute of Oncology and Hematology.

The Top 100 Awards recognize Canada's strong, fearless female leaders who have become agents of change in reshaping Canadian organizations at the highest levels. Mai established and directs the Genomic Centre for Cancer Research and Diagnosis, a cutting edge and unique molecular imaging facility.



GLOBAL REACH

LINNAEUS UNIVERSITY IN SWEDEN recognized Distinguished Professor Diana Brydon with an honorary doctorate for her work on colonial and postcolonial studies and commitment to international and interdisciplinary development of the arts and humanities. Brydon holds a Canada Research Chair in Globalization and Cultural Studies.

During the spring of 2013, she was a visiting professor at Linnaeus University.

"I am so deeply honoured to accept this award, not least because I hold such admiration for the fine scholarship being done at Linnaeus University and for the openness colleagues here have shown to me, a visiting scholar and collaborator from another society," said Brydon.

Brydon teaches in the department of English, film and theatre at the U of M and has published extensively on Canadian and postcolonial literary studies and how communities are adapting to globalizing processes.

SEEKING ANSWERS TO ALZHEIMER'S

ZAHRA MOUSSAVI'S COMMITMENT TO RESEARCH in the field of dementia and Alzheimer's disease is being recognized by the Riverview Health Centre Foundation with their 2016 'Friends of Riverview Award.'

Professor of electrical and computer engineering, and a Canada Research Chair in Biomedical Engineering, Moussavi grew up in Iran in the 1960s and at that time girls did not receive the same quality of education as boys. She did not let that halt her progress. She challenged the odds and herself and eventually earned a PhD. Today, her research is providing crucial insights into disease.

"When Riverview Health Centre talks about research, they talk about Zahra Moussavi," says Sheldon Mindell, executive director of Riverview Health Centre Foundation. "She has placed the facility on the research map."

In addition to detection of early signs of Alzheimer's, Moussavi is also developing innovative approaches for Alzheimer's treatment to either improve patient symptoms or to slow its progression. She uses naturalistic virtual reality navigational assessment for Alzheimer's onset detection and a combination of her own designed mental exercises along with application of repetitive transcranial stimulation (rTMS) to the brain.

Moussavi will be honoured at a gala in fall 2016.

BUGGEY PROFESSORSHIP IN PHARMACY

HOPE ANDERSON'S RESEARCH gives new hope (pun intended) to those suffering from cardiovascular disease. She is the 2016 recipient of the Leslie F. Buggey Professorship in the College of Pharmacy. An associate professor in the college and principal investigator at the Canadian Centre for Agri-Food Research in Health and Medicine, Anderson's research program seeks to understand how risk factors for cardiovascular disease, especially hypertension (high blood pressure), cardiac hypertrophy (abnormal growth of the heart), and diabetes promote the development of heart failure.

"My ultimate goal is to identify new therapies, perhaps from a nutritional perspective, that prevent or slow the onset of heart failure," said Anderson.

To achieve this aim, Anderson's lab at the St. Boniface Hospital Albrechtsen Research Centre uses several models of cardiovascular disease of escalating complexity ranging from cultured heart muscle cells, to isolated hearts and arteries, to hearts and arteries *in vivo*.

The Leslie F. Buggey Professorship in Pharmacy is the first research professorship in the college's history, and is supported by an endowment fund set up by the Buggey family, to honour and recognize the distinction of a superior academic while providing financial support for use in research, teaching or service activities.

INTIMATE PARTNER VIOLENCE: ENGAGING THE COMMUNITY

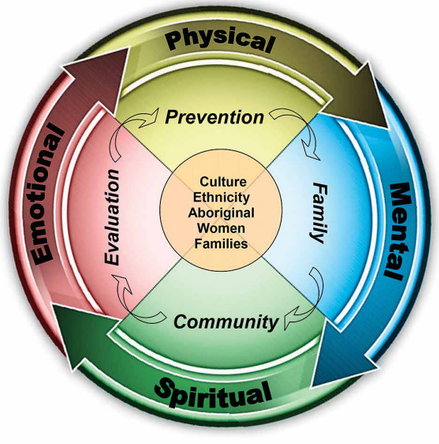
BY JANINE HARASYMCHUK

FAMILY VIOLENCE creates widespread social, legal, psychological, health and financial problems for tens of thousands of Canadians every year. RESOLVE—a U of M based tri-provincial (Alberta, Saskatchewan, Manitoba) research network—is seeking to reduce the incidence and impact of violence and abuse.

The researchers work collaboratively to create and evaluate new strategies, promoting education, awareness and social change on issues and programs addressing violence and abuse.

"By working with community agencies to identify where the research needs to be done," said Jane Ursel, director of RESOLVE, "Our research is action-oriented, done in partnership with community groups."

Every year, the RESOLVE Centres host the RESOLVE Research Day on a rotating basis. This is an opportunity to provide results and feedback to the community on research and program innovations responding to violence and abuse. The 2015 Research Day, hosted by RESOLVE Saskatchewan on the theme of "Intimate Partner Violence: Engaging Beyond the Survivor" was a great success. Inspired by the healing wheel, sessions covered physical, mental, spiritual and/or emotional healing as well as a range of prevention and intervention programs.



Inspired by the healing wheel, sessions covered physical, mental, spiritual and/or emotional healing as well as a range of prevention and intervention programs.

LEFT: Healing from Violence & Abuse, image courtesy of RESOLVE Saskatchewan.

ABOVE: Manitoba 2015 RESOLVE Award recipient **Suhad Bisharat** of The Laurel Centre with RESOLVE director **Jane Ursel**.

On October 4 and 5, 2016 RESOLVE Alberta, in partnership with the Awo Taan Healing Lodge, will sponsor the Research Day in Calgary. The theme of the Calgary event is "Indigenous Healing and Trauma: Intergenerational Solutions." For more information visit ucalgary.ca/resolve

The inaugural RESOLVE Awards were presented at the 2015 Saskatchewan conference and will occur annually at RESOLVE Research Days. The awards go to members of the RESOLVE community, in each province, in recognition of their distinguished contribution to creating homes and communities safe from interpersonal violence and abuse.

"The inspiration for this award came from our close working relationship with service providers working in the field of violence and abuse prevention and intervention," said Ursel. "In each of our prairie provinces we have a wide range of community agencies—from shelters and second stage programs to counselling services and advocacy. Work in this field is difficult, typically involving long hours and a very unique skill set; compassion for clients, persistence in the pursuit of funding, and a willingness to speak out and be counted when circumstances put individuals and families at risk."

"Often program directors and service workers in the field of interpersonal violence are the unsung heroes in our community," said Ursel. "We felt it was time to sing their praises and create an award that would acknowledge their outstanding contributions to our communities."

The 2015 award recipients were: Andrea Silverstone (AB) executive director of Peer Support Services for Abused Women in Calgary, Diane Delaney (SK) former coordinator of the Provincial Association of Transition and Houses and Services, Suhad Bisharat (MB) executive director of The Laurel Centre in Winnipeg. In addition to their remarkable work in their communities, all are active members of their respective provincial RESOLVE Steering Committees.

INSIGHTS: KIRSTY DUNCAN

The Honourable Kirsty Duncan, Minister of Science and Member of Parliament for Etobicoke-North, was first elected in 2008 and re-elected in 2011 and 2015. She is a medical geographer by trade and is internationally recognized as a leading expert in pandemic influenza, environmental change, and its impact on human health. Kirsty is a fierce defender of the environment, having served on the Intergovernmental Panel on Climate Change, an organization which won the Nobel Prize in 2007. Prior to entering politics, she was an associate professor at the University of Toronto, University of Windsor and Royal Roads University, where she taught global environmental processes and medical geography.

RESEARCH LIFE RECENTLY sat down to chat with Minister Duncan and what follows is an excerpt from that conversation:

"Research, as we all know, is about gathering evidence, gathering facts, and as Minister of Science, it's my job to ensure that evidence reaches the cabinet table. I love research! I think we should all be excited about research! It's about finding out about our world, ourselves, and to improve quality of life, improve our environment. Scientists work for a better tomorrow; they make exciting discoveries whether it's in aerospace, biotech or clean tech and I think it's important for building a healthier and stronger Canada. I am thrilled to have this mandate to be able to support the excellent research I've seen from coast to coast. It's a privilege to go from university to university and see what's being done. It has both wowed and humbled me.

"I LOVE RESEARCH! I THINK WE SHOULD ALL BE EXCITED ABOUT RESEARCH! IT'S ABOUT FINDING OUT ABOUT OUR WORLD, OURSELVES, AND TO IMPROVE QUALITY OF LIFE, IMPROVE OUR ENVIRONMENT."

When I received my mandate letter, I said that I would make increasing the role of women in STEM (science, technology, engineering, mathematics) an absolute priority. Thirty years ago, 20% of those in the STEM workforce were women, today it's 22%. That is simply unacceptable in 2016. In my role, I meet with many young women. I was recently in Cape Breton meeting with a group of young women interested in STEM. One approached me to talk about her aspiration to be a coast guard engineer. I was enthusiastic and she said that I was the first person in her life that told her she can achieve that goal: everyone has told her it's impossible. I said, "impossible is an opinion, and it's a dare!"

All children want to discover, they want to explore, and it is our job to foster that from early years through high school, to say that these [STEM] are possible careers. I think there are many pieces to addressing engagement but I really think it's fostering that natural born curiosity from an early age.

Research is important to Canadians. Science is key to creating a better society: both fundamental and applied, increase economic, environmental, health, and societal benefits. It creates jobs and opportunities and is at the heart of an innovation economy. To be successful in a highly competitive global economy, Canada is going to have to strengthen its approach for developing highly qualified, talented people.

The comprehensive review for federal support announced in Budget 2016 will ensure we continue to have research excellence and to make sure our research programs keep pace in a changing world. We want to ensure they are strategic and effective and they meet the needs of our researchers. I want to be clear, when I was here under the previous administration [this is the third time I've been elected], I dreaded when I saw the words "streamline inefficiencies" because they were code words for cuts. This [the review] is not what this is about; it's actually about getting it right.

Everything comes back to 'science matters'—because we face big challenges such as climate change and an aging population.
We also must work diligently to support science promotion and activities to inspire the next generation. I want to ensure that young Canadians have the STEM skills they need for rewarding careers in a modern Canadian economy. Providing the appropriate support to young women who want to pursue a career in science is so important to me, so that they can succeed in an innovation driven future."

LA VIA ACADÉMICA:

FORMER FARMER STUDIES AGRARIAN SOCIAL MOVEMENTS

BY HELEN FALLDING

David Lipnowski

Activist scholar Annette Desmarais's road from tractor seat to research chair wound through Latin America and Europe before bringing her home to the Prairies. As a young Saskatchewan farmer volunteering in Nicaragua with the Oxfam Farmers' Brigade, Desmarais learned one of the key lessons that would guide her future career.

"**THE BEST WAY YOU CAN HELP US** is to go back to your country and convince your government to change its unfair policies and practices and then come back and we can exchange information and experiences," a Nicaraguan farm leader told the Women in Agriculture Study Tour participants.

Desmarais joined the National Farmers Union (NFU) as soon as she got home. She and her sister were already making headlines as young organic farmers but after her first taste of international agrarian solidarity, Desmarais "wanted to do more than drive around the field on a tractor."

For the next decade, she co-ordinated the Oxfam Global Agriculture Project, facilitating links between the NFU and its counterparts in other countries, especially Latin America. It helped that Desmarais spoke three languages—French learned at home and Spanish studied during bitter Saskatchewan winters when she headed south.

La Vía Campesina: Globalization and the Power of Peasants has been published in six languages.

Desmarais (far left) helped monitor 2013 national elections in Honduras.

When an international movement of peasants and farm organizations—*La Vía Campesina*—was formed in 1993 in Belgium, Desmarais attended the founding meeting on behalf of Canada's NFU. By then, she was living in nearby England writing a master's thesis on the response of Bolivian and Honduran peasant women to the globalization of agriculture.

Based on her PhD research, Desmarais literally wrote the book on what is now one of the world's largest transnational social movements. *La Vía Campesina: Globalization and the Power of Peasants* has been published in six languages. World-renowned Cornell sociologist Philip McMichael calls it a "landmark study" that required Desmarais's rare combination of language, diplomatic and farming skills. He said she represents "voices often unheard or ignored," including the peasants presumed to be redundant in an age of agro-industry.

"ANNETTE IS A HIGHLY REGARDED LEADER IN THE FIELD OF COMMUNITY-ENGAGED SOCIAL RESEARCH."

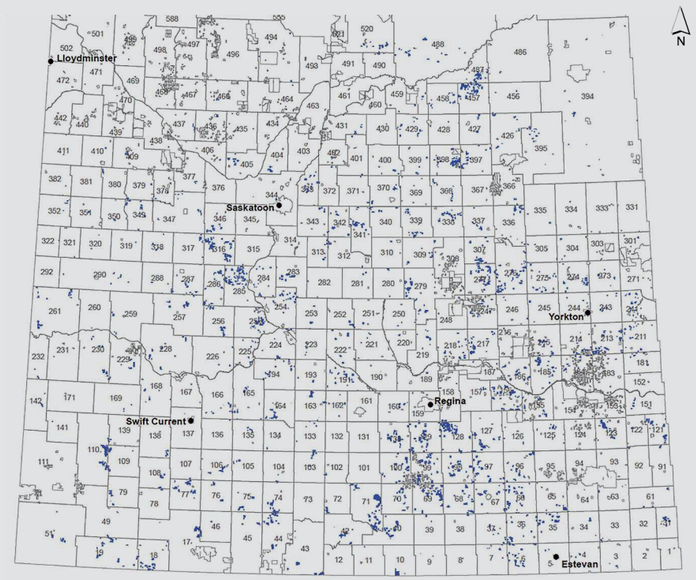
Members of La Via Campesina coined the term food sovereignty, defining it as "the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems."

In 2013, Desmarais moved to the U of M from the University of Regina to become Canada Research Chair in Human Rights, Social Justice and Food Sovereignty.

Hannah Wittman, director of the Centre for Sustainable Food Systems at the University of British Columbia, said Desmarais was one of the first academics to document the "radical project" of food sovereignty. "Annette is a highly regarded leader in the field of community-engaged social research," Wittman said. "Her insightful perspective on food sovereignty has provided the basis for many fruitful collaborations across social science disciplines, including sociology, anthropology, geography and agri-food studies."

GEOGRAPHICAL INFORMATION SYSTEMS ANALYSIS OF FARMLAND OWNERSHIP IN SASKATCHEWAN

Desmarais is currently studying land grabs on the Prairies, where she found a 16-fold increase in ownership by investors from other parts of Canada after provincial government ownership rules were relaxed.



- Cities
- Rural municipalities
- Investors, investment companies, pension plans and similar entities

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Committed to grounding her research where she lives, Desmarais is currently studying land grabs on the Prairies.

"The land grabbing issue is mostly considered as a problem of developing countries. Other scholars don't realize that it's also happening in the more developed world," said her postdoctoral fellow Mengistu Assefa, who recently completed a PhD in Copenhagen on land grabs in his Ethiopian homeland.

Using geographical information systems to analyze farmland ownership in Saskatchewan, Desmarais and her colleagues found a 16-fold increase in ownership by investors from other parts of Canada after provincial government ownership rules were relaxed. These investors, including the Canada Pension Plan Investment Board and businessmen from other provinces, help drive up the price of land, making it difficult for young family farmers to get into the market. The long-term commitment of such investors to maintaining rural communities is also unclear.

Dr. Desmarais interviews farmers in Spain.

Desmarais said huge farms rely on industrial farming methods that depend heavily on fossil fuels. "In the context of climate change, we really need to understand the environmental impact of industrial agriculture and think hard about what some of the alternatives might be."

The farmland ownership research contributed to a public debate that led to changes in Saskatchewan legislation, including limiting ownership by institutional investors. Desmarais and Assefa plan to do similar research in Manitoba.

They are also working on a new research project on milk prices and their impact on families on and off reserve in Northern Manitoba. And Desmarais's master's student Jeanette Sivilay—a community-supported farmer—is researching the food sovereignty movement in Manitoba.

"IT WAS PROBABLY THE MOST INSPIRED AND ALIVE AND MOTIVATED I HAVE FELT IN ALL MY YEARS AT UNIVERSITY."

Meanwhile, undergraduate nutrition student and budding food activist Michaela Bohunicky is working with Desmarais to compare how well the universities of Winnipeg and Manitoba implement the principles of food sovereignty. The results aren't yet fully analyzed but it's clear the U of M could do more to source food locally and engage students—perhaps even devoting some university land to growing food for students.

Bohunicky raves about a sociology course Desmarais taught on feeding the world and sustaining livelihoods that the undergrad believes every nutrition student should take. "It was probably the most inspired and alive and motivated I have felt in all my years at university."

That bodes well for the U of M's proposed master of human rights program, for which Desmarais is likely to teach a core course and may eventually offer a field course in Latin America.

David Lipnowski

Desmarais with master's student **Jeanette Sivilay**, a community-supported farmer, at Vic's Market in Winnipeg.

AFTER ARRIVING AT THE U OF M, one of her first questions was whether it would be possible to offer a master of human rights here. "It's the perfect place for this," she said, noting the proximity of the National Centre for Truth and Reconciliation and the Canadian Museum for Human Rights, as well as efforts by Winnipeggers to brand the city as a human rights education centre. Many U of M faculty members already have human rights expertise. "We have the opportunity to put the University of Manitoba on the map of where good, strong research is being done in this area," Desmarais said.

A graduate human rights program had been floated before but Desmarais's question sparked a new round of discussions that culminated in the proposal now heading to the university senate for review before a proposed start date of September 2018. Desmarais and U of M genocide scholar Adam Muller are spearheading the proposal, which has support from the faculties of Arts, Law, Education and Social Work.

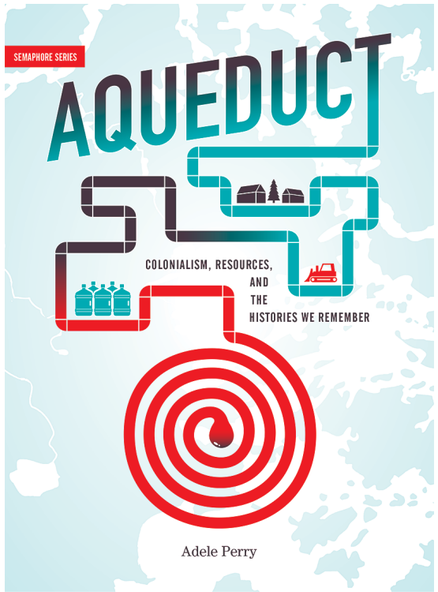
Desmarais's local research does not stop her from continuing to make international links, because she recognizes that capital-intensive, export-oriented agriculture is affecting families in similar ways around the globe. She's currently conducting research with farm organizations in Canada and the Basque Country in Spain that are working to transform the food system based on food sovereignty. Desmarais said farmers in many countries are caught in a price-cost squeeze that pushes them to intensify production while making them more dependent on expensive chemical inputs. They face high debt loads, land is concentrated in the hands of fewer people, services in rural communities are collapsing and farmers are losing power in the marketplace and in policy development.

The struggle to reverse some of these trends can be deadly. In 2013, Desmarais was part of an international human rights delegation that monitored the national elections in Honduras, during which a peasant leader was killed. Violence continues to rise in that country against those working toward a socially-just, sustainable and rights-based food system.

"WE HAVE THE OPPORTUNITY TO PUT THE UNIVERSITY OF MANITOBA ON THE MAP OF WHERE GOOD, STRONG RESEARCH IS BEING DONE IN THIS AREA."

Desmarais's career is proof that becoming an academic doesn't have to mean abandoning a passion for social change. "Social movements need really strong academic work to be able to make cases for the kinds of policies that they want," she said.

AQUEDUCT: COLONIALISM, RESOURCES, AND THE HISTORIES WE REMEMBER



AUTHORS: ADELE PERRY (ARP BOOKS, 2016); RICK HARP (FOREWORD)

1919 IS OFTEN RECALLED as the year of the Winnipeg General Strike, but it was also the year that water from Shoal Lake first flowed in Winnipeg taps. For the Anishinaabe community of Shoal Lake 40 First Nation, construction of the Winnipeg Aqueduct led to a chain of difficult circumstances that culminated in their isolation on an artificial island where, for almost two decades, they have lacked access to clean drinking water.

In *Aqueduct: Colonialism, Resources, and the Histories We Remember,* Adele Perry analyses the development of Winnipeg's municipal water supply as an example of the history of settler colonialism. Drawing from a rich archive of historical sources, this timely book exposes the cultural, social, political and legal mechanisms that allowed the rapidly growing city of Winnipeg to obtain its water supply by dispossessing an Indigenous people of their land, and ultimately depriving them of the very commodity—clean drinking water—that the city secured for itself.

Royalties from the sale of this book will be donated to Shoal Lake 40 First Nation's Museum of Canadian Human Rights Violations.

This book is part of ARP Books Semaphore Series. Launched in 2002, the series consists of short, accessible books on timely issues. Semaphore books are not intended to be basic "introductions" to an issue or "beginner's guides." Rather, they fall somewhere between a pamphlet and a book, consisting of a long essay, polemic, or commentary.

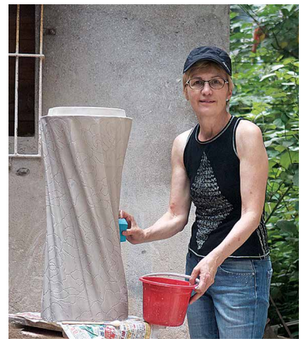
ABOUT THE AUTHORS:

Adele Perry is professor of history in the Faculty of Arts. She was born and raised in a non-Indigenous family in British Columbia, did hard time in Toronto, and has lived in Winnipeg since 2000. She writes about the nineteenth century, gender, Canada and colonialism, and is the author of *On the Edge of Empire: Gender, Race, and the Making of British Columbia, 1849-1871* (University of Toronto Press, 2001), *Colonial Relations: The Douglas-Connolly Family and the Nineteenth-Century Imperial World* (Cambridge, 2015), and the co-editor of four editions of *Rethinking Canada: The Promise of Women's History.*

With Esyllt Jones, she coordinated 2011's *People's Citizenship Guide to Canada,* published by ARP Books. You can find her on twitter at @AdelePerry.

A broadcast journalist for over two decades, **Rick Harp's** media resumé includes on-air roles with the Aboriginal Peoples Television Network and CBC Radio. He has also served as Artistic Director for the Winnipeg Aboriginal Film Festival. A co-founder and president of the INDIGENA Creative Group, Rick is a member of the Peter Ballantyne Cree Nation in northern Saskatchewan.

Michael Zajac



BY MARIIANNE MAYS WIEBE

Ceramic artist Grace Nickel's latest large-scale work elaborates rich tensions between fabricated and natural worlds, the monumental and the fallen, contemporary experience and ancient metaphors and traditions.

IMAGINE WALKING THROUGH a lush forest with trees all around, enveloped by their green scent, a carpet of moss and mulch underfoot. Look up: many of those tall trees have been alive for much longer than you. "Life-sized" for a tree is definitively unlike human scale, and as you walk, that difference in scale may also impart a fractional understanding of our human place in relation to the earth and nature's timeworn rhythms, along with our connection to all living—and dying and decaying—things.

The felt experience of trees is something that award-winning ceramic artist and School of Art professor Grace Nickel challenged herself to bring to her latest art installation. Entitled *Arbor Vitae* (Latin for "tree of life") the installation comprises six large porcelain "tree-columns," as she calls them, surrounding a "floor piece" of a fallen tree.

Master Tang making a multi-piece plaster mould from the Host prototype. Sculpture Factory quarter, Jindezhen, China.

A laser marking test on porcelain tile, for Grace Nickel's *Espalier* tile series. Instead of firing in a kiln, ceramic material is sintered onto porcelain by a laser cutter.

Arbor Vitae is also the title of her recent show at Winnipeg's Actual Contemporary Gallery, which ran from January 22 to March 19, 2016, and included the eponymous installation, along with several other pieces such as a large spiral tree-column entitled *Host*, and *Espalier*, a series of five porcelain tiles marked by laser imagery. The exhibition originally showed at the Canadian Clay and Glass Gallery, from January 18 to March 25, 2015.

NICKEL'S *ARBOR VITAE* encompasses a rich religious and mythological tradition drawn from many cultures. The tree represents the sacredness of life and the connectedness of all things, as well as access to realms both earthly and divine, to mortal experience as well as enlightenment or transcendence; the upward movement of life can't be represented without its inverse, death, decline and decay, suggests Nickel. The tree of life, with its trunk mirroring both directions, symbolizes this understanding.

Fabric model for *Host*, made by Grace Nickel in Jingdezhen.

PREVIOUS PAGES (LEFT): Grace Nickel, *Host*, 2015. Installed in the Canadian Clay and Glass Gallery, Waterloo, ON. Jingdezhen porcelain with metal base, 270 × 50 × 50 cm.

(RIGHT): **Grace Nickel** working in Jingdezhen, China.

photos: Michael Zajac

NICKEL CALLS THE WORK HER MOST AMBITIOUS TO DATE, NOTING THAT IT WAS CREATED "THROUGH RESOURCES OF ALL KINDS, INCLUDING ONES AT THE UNIVERSITY, ALLOWING ME TO MAKE THIS … [AND TO] PUSH THE LIMITS FURTHER."

The grand scale of Nickel's sculptural pieces—constructed of individual ceramic modules, which when fitted together, reach up to nine feet high—is also highly unusual for ceramics. The hollow forms are difficult to align precisely, due to the considerable shrinkage that occurs during the drying and firing processes, especially with such large works. Each individual module began with careful planning through experimentation in an intricate fabric modelling process and making complex plaster moulds, done in advance of the casting and firing of individual pieces. The fabric-formed modelling process also accounts for the deceptively soft look of the porcelain tree-column's draping effects.

Nickel calls the work her most ambitious to date, noting that it was created "through resources of all kinds, including ones at the university, allowing me to make this … [and to] push the limits further, in terms of scale and the use of new technologies. With ceramics, it's simply a fact that the bigger the scale, the more challenging [it becomes]."

The hollowed-out, decorated ceramic forms of *Arbor Vitae* reference the antiquity of pottery-vessels as that most ancient and emblematic of arts. Preserving with the lightest touch that traditional embellishment aspect of vessels, through individualized decorative application to each piece, while transforming the vessel into figurative form, feels very contemporary for both the intricate technologies employed and for the way Nickel's tree-shapes echo and intimate the body.

The plaster prototype for *Host* being extracted from its fabric form.

TOP: Grace Nickel, *Arbor Vitae*, 2015. Installed at Actual Contemporary Gallery, Winnipeg, MB. Porcelain, 240 × 360 × 525 cm overall.

photo: Michael Zajac

The fallen tree on the ground is particularly haunting. Divided into five equal, hollow segments, *Prone* recalls Nickel's earlier work commemorating the devastation of Halifax's Point Pleasant Park after Hurricane Juan in 2003, which took down 75 per cent of its 80,000 trees. Strikingly, each of the individual two-foot segments evokes a coffin. *Prone* is perhaps the most tender of the components in *Arbor Vitae*, with each section covered by subtle, intricate decoration like a kind of shroud, typically cloth in which a body is enveloped for burial. Each segment's interior is further ornamented by bronzed fungal-like growths, in delicate homage to the inner growth that may accompany physical deterioration.

"*ARBOR VITAE* NEGOTIATES THE RELATIONSHIP BETWEEN THE NATURAL AND THE FABRICATED, THE AUSTERE AND THE EMBELLISHED, GROWTH AND DECAY, LOSS AND RECOVERY,"

With all of the metaphorical, historical and methodological complexity inherent to *Arbor Vitae*, perhaps what's most remarkable is its elegance and compression. The tree-columns are reminiscent of ancient Greek and Roman architecture and structures, such as a temple—or temple ruins. That figural solemnity and deceptive simplicity of the tree-columns, both the upright and the prone, convey a powerful, austere presence that elicits wonder and awe, an effect only enhanced by the paradoxical fragility of the porcelain.

RESEARCH IN THE MAKING

Arbor Vitae is the result of over two years of intensive research by the artist, and draws on techniques and themes Nickel developed over the past decade. Through those past two years of working on the pieces, she spent time in different artists' residencies, including two periods in the southeastern Jiangxi province, China, in the city of Jingdezhen, also known as the "Porcelain Capital" for its pottery production that stretches back almost 2,000 years. There she worked with an Undergraduate Research Awards student (who accompanied her on one of the trips) and a Master mould maker on the process of building special plaster moulds that would allow her to cast the hollow pieces.

She also explored fabric formwork at the U of M's Centre for Architectural Structures and Technology (CAST), and experimented with fabrication technologies at AssentWorks makerspace in Winnipeg.

According to Nickel, the new work advances her investigations of natural forms pitted against artificial construction and surfaces separated from and reintegrated with forms. "The large-scale porcelain sculptures and installations in Arbor Vitae negotiate the relationship between the natural and the fabricated, the austere and the embellished, growth and decay, loss and recovery," she says in her artist statement.

Along with more traditional processes such as slip-casting, press moulding and hand-building, new and experimental technologies (fabric-formed model making, vacuum forming, and laser-marking) are integral to creating the three major components that make up the exhibition, she explains.

In art, there's rarely a clear split between research and the work necessary to realize the concrete result, and for Nickel, the evolution happens through doing.

It starts with a vision or intention. That vision may be vague at first, says Nickel. "But then there's a germination period. The making becomes the research. There's always this searching, the evolution, and then it changes and grows as you move to completion."

For Nickel, the "growing" metaphors are both happenstance and deliberate. She's been working with trees as a symbolic subject for years. And the tension between process and the finished work presented to an audience, she adds, is never resolved. The burden is on the finished work to convey all that's gone into it, however; it must "speak" for itself and move beyond the technical.

Nickel's work speaks powerfully and profoundly—drawing on the depth of her research, experimentation and technical expertise.

"You don't want to lose sight of the audience when you are so involved in the technology and challenges of material and process," she says.

"Everything else, all of the research, experimentation and labour, has to stand in service to the intention of the work and what it conveys and communicates."

See more of Grace Nickel's work at gracenickel.ca

A DIFFERENT KIND OF ARCHIVE

BY RUTH SHEAD

WHEN SHAWNA FERRIS started doing research on missing and murdered Indigenous women, she would bookmark websites made by families and friends of the missing women. "I'd think, that representation of that person is really important," says Ferris, an assistant professor of women's and gender studies. "Community has done a lot of work to speak back to the very negative representations of loved ones in media."

But often, when she would return to the sites weeks or months later, they would no longer be there. "It would be sort of this double whammy of this person who has been murdered or disappeared and then this much more loving and appropriate portrayal of them would disappear."

Ferris and her co-investigator Kiera Ladner are behind the Digital Archives and Marginalized Communities Project. Supported by the Social Sciences and Humanities Research Council and Canada Foundation for Innovation, they are developing three separate but related digital archives: the Missing and Murdered Indigenous Women Database, the Sex Work Database, and the Post-Apology Residential School Database. They are exploring how they can use technology and U of M's Space (funded by the Canada Foundation for Innovation and Province of Manitoba) to support decolonization, anti-violence and feminist agendas.

The use of technology is because that is where news lives and that's

"I don't think that the university should create research to sit in a library. It should be usable,"

where activist and marginalized communities are trying to engage. "The other part of that is, I don't think that the university should create research to sit in a library. It should be usable," says Ladner who holds the Canada Research Chair in Indigenous Politics and Governance until July 1, 2016 and is an associate professor of political studies. "If we can create tools out of this that can in fact be used then why not?"

That said, Ladner stresses that community consultation still needs to take place. "We are trying to ensure that it is really known that this project is in its infancy," she says.

Shawna Ferris

Kiera Ladner

TOP: Mural artist **Tom Andrich's** public art in honour of MMIW, located on the Portage Ave. and Empress St. overpass in Winnipeg.

Because the digital archives reflect community-derived knowledge, consultation with community will determine how the collections will ultimately be used.

"It's about respecting community ownership and recognizing ourselves as partners," says Ferris. An example she describes is with sex worker activist groups. "Community has said to us, 'the media archive is interesting, and we hope it continues, but we want to be involved in the organizational process and the ways you use it as a teaching tool.'"

Working so closely with community also means working at community's pace. At the same time technology is constantly changing. "It's hard to work on the cutting edge," says Ladner. "But it's also hard to work when every few months there is another missing and murdered Indigenous woman, or sex work changes. Everything changes."

Both Ladner and Ferris see the Digital Archives and Marginalized Communities Project as career-long research, but if they had their choice it would end.

"We can't have one more Aboriginal woman go missing before we start really paying attention. I wish it would end so that we could see an end to the project," says Ladner.

"Yeah, for it to be an historical archive," says Ferris.

FETAL ALCOHOL SPECTRUM DISORDER: REDUCING RISK THROUGH NUTRITION

BY KARLEE DYCK

EACH OF US BEGAN as a tiny group of cells in our mother's womb. The way we grew and developed was impacted by what our mothers' ate and drank—their nutrition. This concept inspired me to study prenatal nutrition at a graduate level, and particularly to look at the interplay between nutrition and alcohol during pregnancy.

It is known that alcohol during pregnancy puts the fetus at risk for Fetal Alcohol Spectrum Disorder (FASD). The fetal brain is highly vulnerable to alcohol and exposure can lead to lifelong disabilities in learning and behaviour. This is a significant problem as it is estimated that 9 in every 1,000 babies are born with FASD in Canada.

To prevent FASD, the Public Health Agency of Canada recommends that no alcohol be consumed during pregnancy. The advice is simple, but implementing it may not be. Many women who drink do not realize they are pregnant, while others may struggle with addictions.

The answer may be a harm reduction approach using nutrition to decrease the risk of FASD. Studies in animal models have found that certain nutrients may help mitigate the effects of alcohol. These nutrients include folate, found in green leafy vegetables, and an omega-3 fat called docosahexaenoic acid (DHA) found in fish. However, before providing pregnant women with these nutrients, it's important to know how much they are already consuming, especially those at risk for drinking alcohol.

Karlee Dyck is a registered dietitian and master's student in the Faculty of Graduate Studies under the supervision of associate professor Miyoung Suh (human nutritional sciences). Dyck was the 2016 first place winner in the University of Manitoba Three Minute Thesis (3MT) competition, which challenges graduate students to present their research in accessible language in three minutes or less.

To determine this, pregnant women were interviewed in the downtown and Point Douglas areas of Winnipeg. These areas have lower incomes and education levels, and a higher percentage that identify as Aboriginal. To connect with women, this project worked closely with prenatal programs such as The Mothering Project at Mount Carmel Clinic, Healthy Start for Mom and Me, and Pregnancy and Family Support Services.

This information is vital for moving forward with improved food and nutrition security and potentially reducing the risk of FASD. This will ultimately lead to healthier mothers and babies.

Results thus far indicate that many women are not consuming enough folate and DHA to meet recommendations. This is critical, as almost half of mothers had alcohol exposure during their pregnancy. A third of mothers also reported that they didn't have enough money to provide for themselves and their families. This can have implications of what foods, and therefore, nutrients, they consume.

Providing these nutrients to pregnant women is not an easy task, and requires a holistic view of their lives and the systematic barriers they face. However, this information is vital for moving forward with improved food and nutrition security and potentially reducing the risk of FASD. This will ultimately lead to healthier mothers and babies.

This project would not have been possible without support from the Canada-Israel International Fetal Alcohol Consortium, as well as funding from the Manitoba Liquor and Lotteries Corporation.

BACTERIA

NATURE'S BIOPESTICIDE

BY SHARON CHISVIN

Back in 1985, Teresa de Kievit's decision to enroll in the biology program at the University of Waterloo, in her hometown, made perfect sense. She had thoroughly enjoyed her biology classes at high school. The subject had come easily to her, and she had consistently done well. Plus, enrolling at the University of Waterloo meant she wouldn't have to move or commute. But biology, de Kievit quickly realized, was just a means for her to discover her real scientific passion. That passion, it turned out, was microbiology.

(L-R) Student **Kelly Duke** with **de Kievit** examining canola in the growth chamber.

photos: David Lipnowski

Canola sprouts

"AFTER MY FIRST two microbiology courses, I knew that was the area in which I wanted to focus," she says, "I was completely enthralled by the topic."

That enthrallment prompted de Kievit to transfer to the University of Guelph in order to pursue a microbiology degree, an option not available in Waterloo. That same enthrallment then saw her through the PhD program at Guelph and a post-doctoral fellowship at the University of Rochester, and has continued for 15 years to inform her work and research at the University of Manitoba.

De Kievit joined the Department of Microbiology at the U of M in 2001, a year after taking an industry-based job in Winnipeg. Unsatisfied with that work, she approached department head Peter Loewen about a possible adjunct position, and was encouraged instead to apply for a faculty vacancy. De Kievit did so and was offered a job as assistant professor, an opportunity that let her get back to the classroom, back to the lab and back to her microbiology research.

That research is primarily focused on investigating bacteria as a possible safe alternative to conventional agrochemical pesticides traditionally used to control plant disease. The use of bacteria instead of chemicals, de Kievit explains, will eliminate the risk that pesticides pose to the environment, humans and animals, and provide a much safer and sustainable option for plant disease control.

De Kievit and her research group, consisting of five graduate students, are mainly paying attention to two bacterial strains that have been isolated from Manitoba soils. These strains, *Pseudomonas chlororaphis* strain PA23 and *Pseudomonas brassicacearum* strain DF41, were originally isolated by de Kievit's colleague, Dilantha Fernando, from the Department of Plant Science.

"Interest in these bacteria stems from the fact that they can suppress growth of fungal pathogens causing disease in important crops, including canola," de Kievit says. Manitoba is one of the largest canola producers in the world.

THE USE OF BACTERIA INSTEAD OF CHEMICALS WILL ELIMINATE THE RISK THAT PESTICIDES POSE TO THE ENVIRONMENT, HUMANS AND ANIMALS, AND PROVIDE A MUCH SAFER AND SUSTAINABLE OPTION FOR PLANT DISEASE CONTROL.

This process of suppressing growth is known as biological control or biocontrol.

"My group is interested in the bacterial genes and products that are responsible for biocontrol," de Kievit continues. "We've discovered that the bacteria produce an arsenal of antibiotics and degradative enzymes, which inhibit the growth of the fungus."

This is true for plants grown in the greenhouse as well as in the field.

Having identified the bacteria's weaponry, de Kievit's next step was to figure out why the bacteria produce those compounds in the first place.

"Since it costs the bacteria considerable energy to make antibiotics and enzymes," she says, "there must be a benefit to the producer."

That benefit, it turns out, is a life-saving one.

As de Kievit and her team discovered, the compounds that the bacteria produce to inhibit the growth of fungus in plants also happen to protect the bacteria themselves from being consumed by organisms that normally feed on them. Bacteria grown in the presence of their predators automatically increased their production of the toxic compounds.

"These findings indicate that the bacteria are able to sense the presence of the predators, probably through chemical communication," surmises de Kievit.

"Such traits," she adds, "bode well for the ability of these bacteria to survive in the environment, which is essential for the success of any biocontrol agent. You can introduce organisms into a particular environment, but if they don't survive, they won't be able to elicit their desired effects."

This interaction between the bacteria and their predators is currently the main area of research for PhD student Munmun Nandi, who has been working with de Kievit for four and a half years. Toiling away in the lab alongside Nandi, Master's student Nidhi Shah is examining the expression of biocontrol genes that are regulated by PtrA and what factors influence that expression. In a related project, Kelly Duke is looking at changes that occur in the physiology of the canola plant when it is treated with *Pseudomonas chlororaphis* PA23, one of the lab's main bacteria of interest.

Canola flowers

"We are interested in PA23 because it protects canola from *Sclerotinia* fungus infection when it's sprayed onto the plant," explains Duke. "We know that PA23 can attack the fungus directly, but we were curious to know if PA23 somehow helps the plant to become more resistant to infection by boosting its immune system."

Duke was introduced to de Kievit's research when she joined the lab part-time as a first year student. She also took a microbiology course with de Kievit that year, and found her to be an interesting and inspiring teacher.

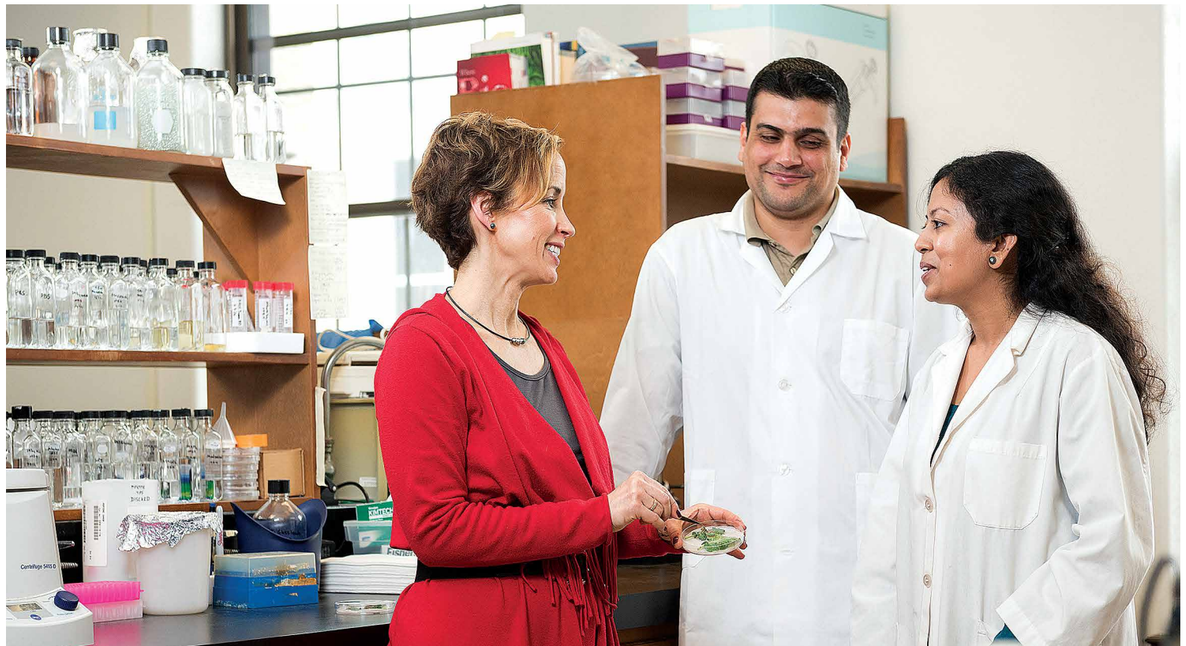
"IT'S IMPOSSIBLE NOT TO BE CAPTIVATED BY THIS SUBJECT, I KNOW HOW IMPACTFUL THESE INTRODUCTORY COURSES CAN BE FOR STUDENTS IN HELPING THEM CHOOSE A CAREER PATH."

For her part, de Kievit, who was recently named a full professor and also promoted to Associate Head of Graduate Affairs for the department, admits that while she loves and is excited by her research, she also loves teaching, especially the first year Intro to Microbiology course.

"It's impossible not to be captivated by this subject," she says, adding, "I know how impactful these introductory courses can be for students in helping them choose a career path."

After all, de Kievit's own career path was determined the moment she sat down in her first microbiology course as an undergrad, and the interest and excitement she experienced then has never abated.

That interest and excitement have followed de Kievit for three decades now, from one classroom to another and from the lab to the greenhouse and out to the field. They have made her into a great teacher, a great mentor and a great researcher, and have been instrumental in her determined search for a non-toxic and organic alternative to agrochemical pesticides.



RIGHT: (L-R) **de Kievit** with graduate students **Akrm Ghergab** and **Munmun Nandi** in the lab

THINKING ABOUT THE FUTURE

BY HAYLEY SMITH

SCIENCE, ENGINEERING AND TECHNOLOGY (SET) DAY IS HELD ANNUALLY FOR GRADE 11 AND 12 HIGH SCHOOL STUDENTS AND TEACHERS IN MANITOBA. JUST UNDER 200 PARTICIPANTS VISIT THE CAMPUS TO LEARN ABOUT RESEARCH THROUGH A SERIES OF HANDS-ON ACTIVITIES AND PRESENTATIONS. HERE'S A LOOK AT WHAT THEY DID THAT DAY.

Hayley Smith is the winner of the 2016 SET Day Essay Competition. She is a student at Balmoral Hall School.

Mike Latschislaw

Build-A-Bridge session in the Engineering Mechanics Lab.

ALMOST EVERYONE AT SOME early point in their life has been asked,"What do you want to be when you grow up?" Answers start simple enough: a princess, an astronaut, a cowboy. However, as young adults, those childlike answers do not suffice. Many of us feel as if we are being rushed towards a major decision that will most likely affect us for years to come. The future may seem scary but SET Day reassured me that I will not be bored following science as a career path.

The sciences are an intimidating field to pursue. There are so many different subdivisions, it is hard to keep track. It startled me when I told people I wanted to study biology at university, and they asked me, "What kind?" Having to pinpoint one area to go into out of hundreds of options is a frightening thought. I find all of the subjects interesting and intriguing, and I know that if I go into this field I will never be short of new knowledge.

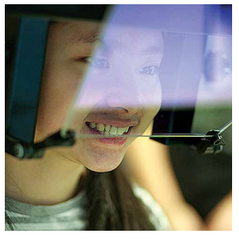
One of the things that I loved about SET Day was the speakers, and how they interacted with the students in the lecture room. They have a way of making these subjects even more interesting than they already are. It's one thing to learn about global warming in class, but to hear about it from someone such as Dr. C.J. Mundy, who is actually out in the world researching this topic, is something completely different. I was on the edge of my seat throughout the presentations. I had many questions, not just about the subjects themselves, but about the speakers' opinions and thoughts on their research. The passion that these people have for their jobs showed through, and that is one thing that made my day at the University of Manitoba great.

"SET Day has inspired and motivated me to learn more about all aspects of the sciences but most importantly, it showed me that any job in this field will become an amazing career".

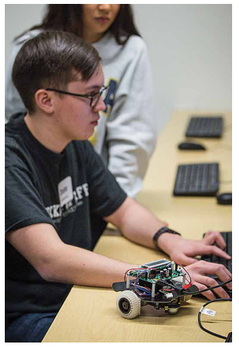
Two of three speakers were women, which was not something I expected. The world of science has been dominated mostly by men until very recently. Doctors and engineers have had very few women in their respective fields. This has been an intimidating fact for me, seeing as I am a girl who wants to pursue a career in these areas. SET Day introduced me to women who are not only studying the sciences, but are leaders in their respective fields. Both Dr. Zahra Moussavi and Jennifer West are making discoveries about our world that are positively impacting multitudes of people. It was inspiring to listen to them talk about how science has changed their lives, and how, one day, I could be doing something like that as well.

My eight hour day at the University of Manitoba was an incredible experience. From analyzing my movements in the morning, to extracting DNA in the afternoon, I wouldn't want to change a thing. SET Day has inspired and motivated me to learn more about all aspects of the sciences but most importantly, it showed me that any job in this field will become an amazing career.

Let's Talk Science activity: Analyzing your DNA



RIGHT: Analyzing your moves in Kinesiology & Recreation Management: using eye-tracking technology to measure interactions with environment.



RIGHT: Learning the language of Intelligent Robotics in the Autonomous Agents Lab.

FAR RIGHT: Pizza 101 in Human Nutritional Sciences and Food Science, exploring the chemical composition of ingredients.

At the Bruce D. Campbell Farm & Food Discovery Centre: students reached down into the rumen of a fistulated cow to grab a handful of partially digested feed to take a closer look at the billions of microbes hard at work.

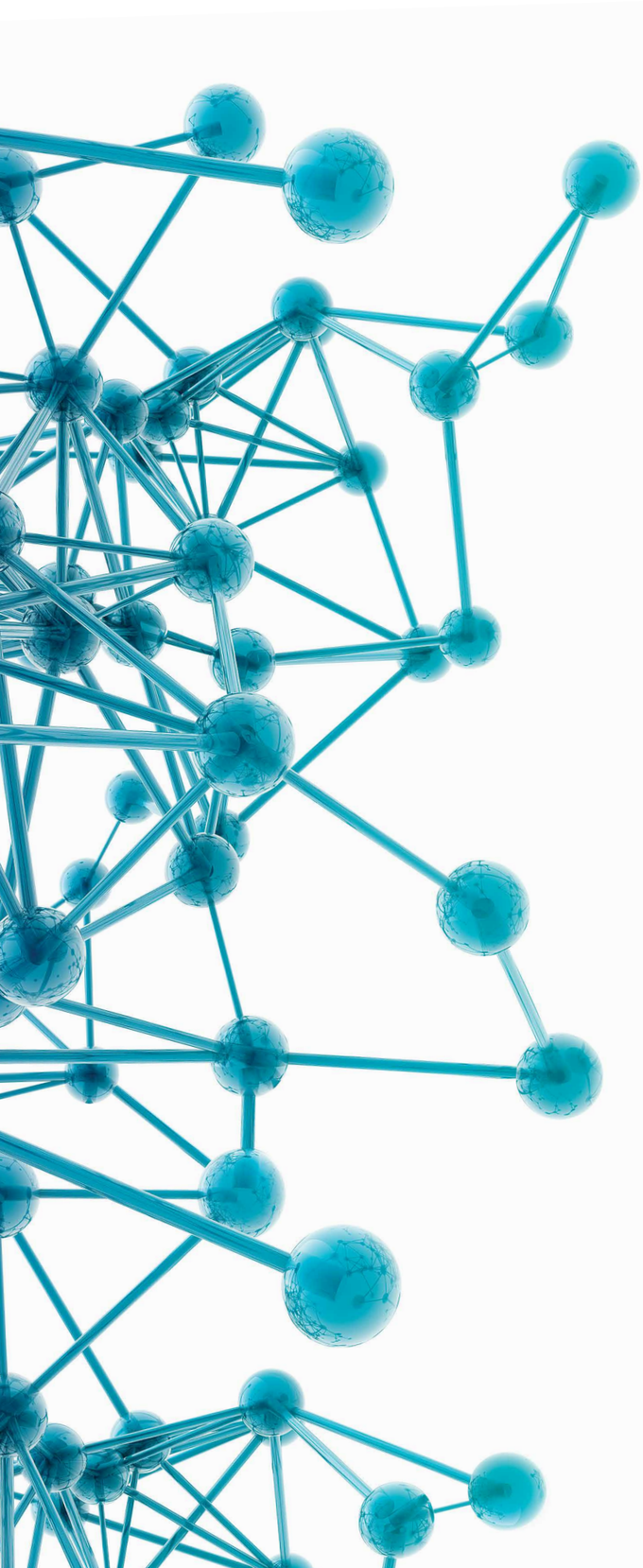
David Lipnowski

GETTING FROM POINT A TO POINT B

MOVING MS RESEARCH FORWARD

BY ANNETTE ELVERS

Multiple Sclerosis (MS) is a complex disease, but Ruth Ann Marrie has a simple way of summing it up. “It’s like the game of telephone,” she says. If you’ve ever played the game, you know how easy it is for a message to get scrambled by the time it goes from the first player to the last, breaking down and changing as the words are whispered down the line. When the last person reveals the final mixed-up sentence, it’s usually pretty funny. That’s where the similarities between MS and the kids’ game stop.



MS AFFECTS THE central nervous system, which includes the brain, spinal cord and optic nerves. Inflammation affects the lining of the nerves—myelin—causing the signal to slow or degrade as it passes from point A to point B. Just like 'telephone', the results can be different from one patient to the next and from one occasion to another. The end result may range from numbness in the extremities to difficulty walking, loss of vision that ranges from partial to complete, or cognitive impairment. It's no laughing matter.

Marrie, a professor of internal medicine (neurology) and community health sciences in the Rady Faculty of Health Sciences, directs the MS Clinic at Winnipeg's Health Sciences Centre, and says MS can be a confusing

"IT'S A CHALLENGING DISEASE." SHE'S BEEN STUDYING IT FOR OVER A DECADE, WORKING ON A VARIETY OF ONGOING AND OVERLAPPING STUDIES TO HELP UNDERSTAND THE FULL SCOPE AND NATURE OF MS."

disease, both for patients and for medical professionals. While some individuals will initially develop progressively worsening symptoms—others will present with the relapsing/remitting type. For those patients, the symptoms will appear then disappear, often to be followed by a period of wellness until the next relapse. That makes it harder for clinicians to make a diagnosis, and if symptoms are very mild, may make it hard for the individual affected to realize that there is a problem that needs attention.

"It's a challenging disease," Marrie admits. She's been studying it for over a decade, working on a variety of ongoing and overlapping studies to help understand the full scope and nature of MS. As each piece of the puzzle drops into place, Marrie says more questions are raised. But the picture also becomes a bit clearer.

One area that's come into focus is the fact that MS patients are often affected by comorbidities—additional diseases and health problems on top of their MS.

RIGHT: **Marrie,** conducting a neurological assessment, is also director of the MS Clinic at Winnipeg's Health Sciences Centre.

PREVIOUS PAGE: **Ruth Ann Marrie,** Rady Faculty of Health Sciences, was recently named The Waugh Family Chair in Multiple Sclerosis.

"There's a broad range, but we often see diabetes, high blood pressure, high cholesterol or heart disease," says Marrie. And the difference between the general population and MS patients can be staggering.

"Up to 50 per cent of people with MS will develop depression at some point—that's far higher than the general population." How much higher? Two to three times, Marrie says. "That's fairly substantial."

"WE REALLY HOPE THIS WILL ALLOW US TO UNDERSTAND WHAT WE SHOULD BE DOING TO MOVE FORWARD TO IMPROVE OUTCOMES."

She and her team are exploring how these additional problems affect the progression of the disease, how patients use the healthcare system, whether they're hospitalized more often, and if their stays are longer. But the mental health factor—a current priority in Marrie's research, funded by the Canadian Institutes of Health Research—is trying to uncover how psychiatric illness impacts the disease.

"We already know that people with other conditions in addition to MS are more likely to have fatigue and to have greater pain." Then those problems create new ones, says Marrie. "If you have MS and these other health conditions, it actually increases your depression and anxiety. And that has a big impact on your quality of life."

Work on a cure is still ongoing. But for Marrie, there are still huge wins to be made if we can do a better job of managing a patient's mental health until the disease can be limited altogether. Her five-year study, now just about at the two-year mark, will follow 1,000 people to get a better understanding of the relationship between MS and depression and anxiety, as compared to the relationship between depression and anxiety in inflammatory bowel disease and rheumatoid arthritis. "We really hope this will allow us to understand what we should be doing to move forward to improve outcomes."

Marrie's research recently received a significant injection of funding, with her being awarded the Waugh Family Chair in MS Research, funded by the Waugh Family Foundation. She will lead a team of internationally recognized MS specialists and help advance our understanding and treatment of the disease.

It's research that's important for all Canadians—there are roughly 100,000 with the disease—but it's a particular concern for Manitobans. "As of 2013, Canada has the highest number of people with MS per capita," says Marrie. "If you ask someone if they have a family member or a co-worker that's been affected by MS, you find out that it has a very broad-reaching effect."

Through both her research and her clinical work, Marrie has met countless MS patients and their families. "It's amazing to me what they manage to do despite the challenges they face," she says. "I want to keep focussing on what we can do to continue to reduce those challenges so that people can really meet their potential."

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OUR FEMALE SCHOLARS, BY THE NUMBERS

19	Endowed and sponsored research chairs
24	Rh Award winners – established by the Winnipeg Rh Institute Foundation to honour academic staff members in the early stages of their careers who display exceptional innovation, leadership and promise in their fields.
44	YMCA-YWCA Women of Distinction Awards
10	Canada's Most Powerful Women – Top 100
16	New Fellows in national academies – Royal Society of Canada (RSC), Canadian Academy of Engineering, Canadian Academy of Health Sciences
3	RSC's College of New Scholars, Artists and Scientists

Ian McCausland

The RSC's College of New Scholars, Artists and Scientists elected professors Esyllt Jones (history), Kiera Ladner (political studies), Laura Loewen (music).

David Lipnowski

La Via Académica: Former farmer studies argrarian social movements *(see page 12 inside).*