inside:

CIHR PRESIDENT ALAIN BEAUDET

FROM MICRO TO MACRO

RENEWING HOPE WITH REGENERATIVE MEDICINE
Welcome to our fifth issue of ResearchLIFE. It’s an ongoing challenge to communicate what we do as researchers at the University of Manitoba with those who are directly affected by our innovations and discoveries. While it may be a challenge, it is one that I happily embrace as we have many interesting stories yet to share. This magazine provides us with a good vehicle to do so. After all, what happens in the laboratories or out in the field ultimately has an impact on the greater society.

In addition to my administrative duties at the university, I have the privilege of working in the field of grain storage research and collaborating with many faculty members, along with young and talented graduate students. I have seen firsthand in my colleagues a real passion for knowledge, and have witnessed the true impact of their work here in Canada and overseas.

As you read this issue, I believe you too will feel the investigative drive of our featured researchers, who are exploring new terrain in the driving abilities of seniors; regenerative medicine (using stem cells to replace, repair or regenerate diseased tissue or organs); and microwave spectroscopy (the science of studying the movement of molecules at a microscopic level). Enjoy.

—Digvir S. Jayas, PhD, PEng, PAg
The subject of age and driving is increasingly controversial. Younger and older drivers have higher motor vehicular accident rates but for very different reasons. Researcher Michelle Porter is working to reduce those odds as part of a national team of researchers looking at older drivers.

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BY KATIE CHALMERS-BROOKS
HAPPENINGS

LEGACY LIVES ON

MORE THAN THREE DECADES HAVE PASSED SINCE TERRY FOX WAS SET TO RUN ACROSS CANADA, but his mom Betty still remembers the enthusiasm felt on the prairies in preparation for her son’s arrival.

“We recall the anticipation and excitement as Manitoba and Saskatchewan readied to welcome Terry to their provinces just over 30 years ago,” said Betty, who was in Winnipeg Dec. 2 with Terry’s father Rolly for the launch of The Terry Fox Research Institute’s (TFRI) Prairie Node. “Since 1980 the residents of Manitoba and Saskatchewan have welcomed Terry and embraced his vision by supporting cancer research in his name. [The] launch of The Terry Fox Research Institute Prairie Node is an extension of this tremendous support.”

The institute is partnering with the University of Manitoba, CancerCare Manitoba and the Saskatchewan Cancer Agency, completing their goal of being fully pan-Canadian. The Prairie Node is the sixth that TFRI has established since its creation in October 2007. The final node launch coincides with events across the country, marking the 30th anniversary of Terry Fox’s historic Marathon of Hope.

TFRI will invest approximately $1.1 million over the next four years to support the node and the training of researchers at CancerCare and other research organizations in Manitoba and Saskatchewan.

PUTTING THE ACTIVE IN LEARNING

RISING OBESITY LEVELS IN CANADA AFFECT EVERY-ONE: citizens, healthcare professionals, educators, and policy-makers alike. The Province of Manitoba’s Ministry of Education has put a plan into place that makes physical and health education mandatory in secondary schools. Manitoba is now the only province in Canada in which students from Grade 9 to 12 require physical education credits to graduate.

The trio of Catherine Casey (education), Jane Griffith (community health sciences) and Jonathan McGavock (medicine and the Manitoba Institute of Child Health) are teaming up with collaborators across the country to investigate this new policy. The Canadian Institutes of Health Research and the Heart and Stroke Foundation of Canada are providing $300,000 in funding for this research over the next three years. Collaborators at the Universities of Waterloo, Prince Edward Island, and Alberta will also be involved as control groups.

“All eyes are watching what is happening here in Manitoba,” said Casey. “We will be looking at how effective the policy is by reviewing various factors such as the influence of the school environment, whether over time students’ physical activity levels are affected and, if so, can these environmental influences be identified?”
FLURRY OF FUNDING

TWENTY FIVE RESEARCH TEAMS WORKING ON DIVERSE PROJECTS—ranging from a brain function laboratory to a longitudinal study on aging and health—will receive more than $9.5 million in provincial support.

The Manitoba Research and Innovation Fund (MRIF) will help researchers set up labs and purchase equipment needed for their investigations in various fields, from scientific imaging to neurobiology. Innovation, Energy and Mines Minister Dave Chomiak announced the new funding in October.

These MRIF projects have also been approved for funding through the Canada Foundation for Innovation, an independent corporation created by the government of Canada to fund research infrastructure.

AGRICULTURAL AND FOOD SCIENCES professor David Lobb will be the province’s first-ever research chair in watershed systems.

This new position is a result of a partnership between the Manitoba government and the University of Manitoba to develop new, innovative ways to clean up Lake Winnipeg. The Clean Environment Commission and the Lake Winnipeg Stewardship Board recommended the chair be created at the University of Manitoba. The Province will provide $1.25 million over five years.

The initial focus of Lobb’s program will be to better understand how nutrients that cause algal blooms such as those on Lake Winnipeg move so readily off Manitoba’s relatively flat prairie landscape and into streams, rivers and lakes, and to assist in identifying measures to prevent this from happening.

“Support for cutting-edge research is one of the cornerstones of our plan to clean up Lake Winnipeg,” said Water Stewardship Minister Christine Melnick, who announced the new chair with vice-president (research) Digvir Jayas in December. “The appointment of Dr. Lobb will set the stage for ensuring that our province’s water research is co-ordinated so we can develop innovative solutions that will help fix a problem that is generations in the making.”
Ronald has spent the better part of the last three decades studying infectious diseases in hard-hit Africa. His early work to control an outbreak of the sexually transmitted disease chancroid in Winnipeg in the mid-1970s provided a strategy that proved important later in the prevention and control of HIV infection.

In 1980, he established one of the first clinical investigation units exploring sexually transmitted infections in Africa. The program started small but eventually put the University of Manitoba on the map as a leader in the field of HIV epidemiology and immunology, as well as improved disease prevention and care. Lessons learned have been used widely throughout Kenya and around the world. The Manitoba/University of Nairobi group has made major discoveries, including recognizing the importance of breast milk in the transmission of HIV from mothers to infants, the role of male circumcision in reducing the risk of HIV infection among men, and the role of the immune system in protecting some individuals from acquiring HIV infection.

Ronald officially retired in 2000 after a 32-year career as a professor and researcher with the University of Manitoba but since then has kept busy fostering the comprehensive HIV/AIDS Care and Prevention Program in Uganda. His expertise is still sought-after by governments and international agencies. The University of Manitoba now has three Canadian Medical Hall of Fame laureates: Ronald, Bruce Chown and Henry Friesen.

Allan Ronald, new inductee to the Canadian Medical Hall of Fame
ROYAL SCHOLARS

THE UNIVERSITY OF MANITOBA is home to three newly-elected fellows to the Royal Society of Canada (RSC), the country’s most esteemed association of scholars and scientists: Terry Cook, Leslie Roos and George Toles. World-renowned mineralogist and RSC Fellow Frank Hawthorne is the recipient of the Bancroft Award.

Cook, a history professor, is a distinct voice for Canadian archival scholarship who has transformed our understanding of archives from being storehouses of old records to becoming themselves the focus for close scholarly attention.

Roos, a community health sciences Distinguished Professor, is a pioneer of health data linkage. He cofounded the Manitoba Centre for Health Policy in the early 1990s and helped develop the Population Health Data Repository. This population-based system allows researchers to examine the social determinants of health and the efficacy of the healthcare system.

Toles, an English, film and theatre Distinguished Professor, is an internationally-recognized screenwriter and film critic. For more than 25 years he has been the scriptwriter, story consultant and script editor for director Guy Maddin and in the process helped shape one of the most innovative and highly-praised bodies of work in recent Canadian film history.

Hawthorne, a geological sciences Distinguished Professor, has addressed some of the most fundamental problems in mineralogy, and has made major contributions to our understanding of energetic and mechanistic factors affecting the stability of crystalline materials. His experimental work has involved a wide range of rock-forming and accessory minerals.

FOLLOW THE LEADERS

THREE FACULTY OF MEDICINE PROFESSORS—Allan Becker, Hani El-Gabalawy, and Leslie Roos—were recently inducted as fellows into the Canadian Academy of Health Sciences (CAHS), one of the highest honours for individuals in the Canadian health sciences community. Fellows are elected by their peers in recognition of outstanding career accomplishments and exceptional leadership, creativity and commitment to advancing academic health sciences.

Becker (pediatrics/immunology) is among Canada’s premier academic pediatric allergists and is widely recognized for pioneering studies in, and active practice of, pediatric medicine, with a focus in early childhood asthma and allergies.

El-Gabalawy (internal medicine) is an internationally-recognized leader in rheumatoid arthritis research. His research has been dedicated to understanding the mechanisms involved in initiating and sustaining rheumatoid arthritis and helping patients with this disorder.

Roos (community health sciences) cofounded the Manitoba Centre for Health Policy in the early 1990s and helped develop the Population Health Data Repository. A revolutionary concept that helped transform research using data routinely collected by multiple ministries, the repository continues to lead to important findings in health policy and prevention.
SAVING LIVES

STEPHEN MOSES, A FRONTLINE FIGHTER in the global battle against HIV/AIDS, is the 2010 recipient of the Dr. John M. Bowman Memorial Winnipeg Rh Institute Foundation Award for outstanding research by senior university faculty.

A medical microbiology and community health sciences professor as well as associate director of the Centre for Global Public Health within the Faculty of Medicine, Moses plays a key role in a collaborative team developing groundbreaking research and prevention programs to fight the spread of the disease in Africa and India.

He was the principal investigator in research that revealed a significant hole in the deadly virus’ armour. He and his colleagues showed that male circumcision significantly reduces the risk of acquiring HIV for heterosexual men, by as much as 60 per cent. Estimates show that scaling up male circumcision services in hard-hit sub-Saharan Africa could avert more than 7.7 million HIV infections and 3 million AIDS deaths during the next two decades.

These findings have prompted the Government of Kenya to establish a task force and adopt national policy guidelines for voluntary male circumcision. In 2007, Time magazine identified male circumcision for HIV prevention as one of the year’s top medical breakthroughs. Two years later, the Canadian Institutes of Health Research and the Canadian Medical Association Journal declared these findings one of the Top Canadian Achievements in Health Research. More recently, the British newspaper The Independent identified male circumcision for HIV prevention as one of the top 10 medical breakthroughs of the past decade.

Not only has Moses’ research and programmatic work on the prevention and control of HIV infection and other sexually transmitted infections directly contributed to saving lives and reducing suffering, it has made a considerable impact economically by reducing the tremendous costs associated with HIV/AIDS care worldwide.

Moses received his medical degree from the University of Toronto and a Master of Public Health degree from John Hopkins University. From 2001-2006, he held a prestigious Investigator Award from the Canadian Institutes of Health Research. He has authored more than 150 peer-reviewed publications, and over 20 review articles, book chapters and working papers.
IN 1989 THE L.H. ASPER SCHOOL OF BUSINESS OPENED THE CENTRE FOR ENTREPRENEURSHIP with the goals of increasing awareness about entrepreneurship and its importance to the Canadian economy. The centre took on a new name in 2008—the Stu Clark Centre for Entrepreneurship—in recognition of the generous contribution made by Clark but the Centre’s mission remained unchanged. The Stu Clark Centre for Entrepreneurship is a non-traditional centre in that its primary focus is community outreach rather than academic research but the impact of its activities are felt around the world.

The Stu Clark Centre focusses on three main areas: youth programs, university programs and community development. In the area of youth programs, the centre has developed a very successful program called the Curry BizCamp in Entrepreneurship. This program uses the principles of entrepreneurship to build the self-esteem levels of participants and provide them with options for dealing with life’s issues. Typical BizCamp participants come from lower socioeconomic areas of Winnipeg or exhibit some form of at-risk behavior. Examples of at-risk behavior include: involvement in gang activity, truancy, actual or potential involvement in automotive theft and suicide. Over 1,300 Winnipeg youth have participated in this program since its launch in 1998.

To successfully deliver BizCamp the Stu Clark Centre has worked with a variety of groups including the Winnipeg Aboriginal Sport Achievement Centre, Winnipeg Police Service and school divisions throughout Winnipeg. Both the Canadian Council for Small Business and Entrepreneurship and the International Council for Small Business have recognized the Stu Clark Centre for BizCamp’s innovative teaching methods and its successes in encouraging youth to adopt healthier lifestyle choices. The BizCamp program has been used as a model to launch similar programs in Calgary, Ottawa and Toronto. The Stu Clark Centre has also helped launch programs in Israel, the West Bank and in the Philippines.

The centre also runs two very successful programs for university students: business planning and the Stu Clark Investment Competition. Since launching its business planning program in 1997, the centre has produced a world record 47 first place finishes at competitions in Europe, Asia and across North America. In compiling this record the participating students have won in excess of $1 million in cash and in-kind prizes. More importantly, over two dozen businesses have been launched based on this experience, including one TSX listed company. The centre’s experience attending competitions allowed it to launch the Stu Clark Investment Competition in 2004. This competition attracts graduate teams from such top universities as Carnegie Mellon, Thammasat (Thailand) and Fundacao Getulio Vargas (Brazil).

In the area of community outreach, the centre is actively involved in building the capacity of Manitoba’s entrepreneurs and early stage investors. It accomplishes this through its involvement in such programs as the Winnipeg Angel Organization, Manitoba Mentoring Service, Manitoba Venture Challenge and by putting on seminars covering such topics as valuation and exit strategies. To support these efforts the centre has added Entrepreneur-in-Residence Rob Adams, who focusses on supporting the development of the angel and early stage investment community.  ■
Dr. Alain Beaudet has served as President of the Canadian Institutes of Health Research (CIHR) since July 2008. Before joining CIHR he was the President and Chief Executive Officer of the Fonds de la recherche en santé du Québec. He earned a medical degree and a PhD in neuroscience from the Université de Montréal and completed his post-doctoral training at the Centre d’études nucléaires in Saclay, France and the University of Zurich’s Brain Research Institute in Switzerland. He taught in McGill University’s Neurology-Neurosurgery and Anatomy-Cell Biology departments.
For me, research defines a quintessential human quality: curiosity. There are so many questions that we want answers to, starting with who we are and where we’ve come from. We can only get these answers through research.

Research is about making a difference, not accepting limits, focusing on the unknown; for the good of society as well as for our individual fulfillment.

Everything about research excites me, particularly the rare but thrilling “eureka” or ‘ah ha!’ moment. Admittedly, there are only a few of these moments in a researcher’s life, but they are worth the trip. It’s probably the endorphins and adrenalin that are released during these episodes that keep us going! Indeed, the exhilaration of discovery, of being the first to see or learn something, works a bit like a drug and may be part of what keeps researchers moving forward.

Research and the knowledge that stems from it are also, in a way, source of immortality; immortality of the species, that is. Indeed, it is the knowledge that we have gained through research and that we have transferred to the next generation that forms the essential heritage of humankind. This is why research, in my mind, cannot be dissociated from teaching.

I value our North American system of integrating research and teaching. Teaching the scientific method and teaching through research are two essential roles of our universities. For research is more than a trade (even if research training is sometimes viewed as an apprenticeship), it is a way of thinking. Research training is not about cloning academics, it’s about instilling a culture of enquiry, whatever the wake of life the student later chooses.

Not to mention the tremendous personal reward attached to the transmission of knowledge to young, bright, creative and insightful individuals. It makes you feel that you are handing the world to the next generation, a world that’s going to be even better than your generation was.

I feel very privileged to play a part in supporting researchers and helping talent flourish through my work at the Canadian Institutes of Health Research. CIHR plays an important role not only in supporting the creation of knowledge, but also the translation of this knowledge into social benefits. This is why it is critical that we engage young people in scientific careers. We have a number of programs at CIHR geared to doing just that. Researchers have a role to play in such programs by giving their time and energy to act as mentors and role models.

Canada performs extremely well in health research, according to all (including bibliometric) indicators. This is due in part to the significant increase in research investments by federal and several provincial governments over the past 10 years. I like to think that the Canadian Institutes of Health Research (CIHR) also have a role in it.

CIHR’s strength lies in its structure of 13 virtual institutes, each directed by a top researcher in their field. These scientific directors are the ones who steer the ship: their knowledge of the channels ensures that we don’t run aground. They know what the destination is and are familiar with the prevailing winds. Thanks to its unique model, CIHR has been able to respond to emerging threats and societal issues (e.g. SARS, H1N1, shortage of medical isotopes). It has never waivered from focusing on excellence and addressing the relevant questions. Its challenge in the years to come will be to maintain a broad base of curiosity driven research to fuel the pipeline, while ensuring that downstream, the results of this research translate into better health outcomes and a stronger economy; and demonstrating to the public and the legislator that it does. It is particularly important that our organization better succeeds at integrating innovation and care. Indeed, research and innovation are key to the quality of care, the quality training of health-care practitioners and the efficiency and cost-effectiveness of our health-care system.
The 1989 movie *Driving Miss Daisy*, set in 1942, begins with the 72-year-old title character having had a driving mishap that leaves her car unsalvageable. Her son tells her she will have to get a chauffeur because no insurance company will cover her. She refuses and becomes stuck at home unable to run errands or visit friends. Her son eventually finds her an experienced 60-year-old driver, played by actor Morgan Freeman. Miss Daisy at first refuses to be driven, insisting she prefers to walk. But we soon learn that her reluctance to be driven around stems from her embarrassment that people might think she is either too old to drive or so wealthy that she can afford a driver.
Katie Chalmers-Brooks

Was Miss Daisy too old to drive? Is there an age at which we should stop driving? Who makes that decision? And how do we assess the impact of age-related conditions on our ability to drive?

The subject of age and driving is increasingly controversial. Younger and older drivers have higher motor vehicular accident rates but for very different reasons. Younger drivers’ crash rates are attributed to risk-taking behaviours, while older drivers experience more collisions due to the number of medical and functional conditions that occur as they age.

Finding answers to these questions is what drives (pun intended) researcher Michelle Porter, a professor at the Health, Leisure and Human Performance Research Institute in the Faculty of Kinesiology and Recreation Management at the University of Manitoba.

Where did her research journey begin? In a car, of course!

“I was in a vehicle with an older driver on a long road trip and began contemplating why they were doing some of the things they were doing and thought it might be related to their neuromuscular system,” recalls Porter.

“When I first started working in the area I wanted to look at the people driving in a quantitative way, which really hadn’t been done. I wanted to look at the vehicle velocity profile, acceleration and deceleration, and different ways of obtaining that data like using a Global Positioning System (GPS). I added a video component and it just snowballed from one study to another.”

Porter’s research on driving and aging really started to roll when she joined a Canadian Institutes of Health Research (CIHR) New Emerging Team of the Institute of Aging in 2002. She is now involved in a CIHR Team called the Canadian Driving Research Initiative for Vehicular Safety in the Elderly—or Candrive for short. The program’s aim is to improve the safety and quality of life of older drivers in Canada.

Candrive involves researchers interested in older driver issues and is multi-
disciplinary in its approach, including occupational therapists, physiotherapists, psychologists, kinesiologists, epidemiologists, geriatric medicine specialists, and experts in physical medicine, rehabilitation, rheumatology and geriatric psychiatry. The project is led by co-principal investigators Shawn Marshall and Malcolm Man-Son-Hing of the Ottawa Health Research Institute.

The group was recently awarded a $5.5 million CIHR Team Grant to continue their work for the next five years. Porter is involved in the five-year multi-centre cohort study of older drivers, looking to find the key factors that impact their driving safety. The results will be used to develop and implement a validated, easy-to-use clinical screening tool that will allow family physicians to assess older adults’ medical fitness to drive.

Porter and her colleagues’ initial goal was to recruit and enroll 1,000 mature drivers, aged 70 and older, from seven Canadian cities (Victoria, Winnipeg, Thunder Bay, Toronto, Hamilton, Ottawa, and Montreal). This has now been expanded to include Australia and New Zealand. As of Nov. 30, 2010 enrolment in Canada reached 937 participants; recruitment in Winnipeg is now closed.

“We enrolled subjects between August 2009 and September 2010, when we reached our 125th person enrolment target,” says Porter. “Getting 125 participants wasn’t as easy as you’d think. For example, the study’s duration of five years might deter some people. As well, study results wouldn’t be shared with participants until completion of the study and analysis of results took place. They also needed to be in Canada throughout most of the year, so no ‘snowbirds,’ and drive with a frequency of three to four times a week.”

Of the 125 participants, 69.7 per cent were male. “There were more older men in this cohort [in Winnipeg] and this could be reflective of not as many women being licensed to drive or having a husband who is driving,” says Porter.

Participants will come in for a three to four-hour assessment once each year during the study period. Information on current and past medical history, medications, and driving records will be obtained. Different assessments will be conducted on anything that would have an impact on somebody’s ability to drive; for example, vision, hearing, movement, flexibility, strength, reaction time and cognitive function.

“The goal is to develop a tool that can be easily used in the doctor’s office. The study is designed around the premise that we would have very few false positives,” says Porter. “We don’t want people sent for additional screening that are actually okay to drive. We know that when older drivers lose their ability to drive this negatively affects their quality of life and independence.”

In addition to the larger five-year study, CIHR provided funding for six sub-projects. Porter is heading up one which explores the driving patterns of older Canadians. This involves putting a GPS device in the participants’ vehicles as mentioned above and monitoring all trips they take over the time period of the study. The GPS plugs into the vehicles’ power system and each subject is identifiable by a key fob when they drive the car. The GPS will assist researchers in plotting their position.

“The amount of data we anticipate we will have at the end of the study—50,000,000 kilometres—is equivalent to driving to Mars. We will be tracking the drivers to determine their driving patterns and habits in different locations across Canada and looking at things like vehicle speed and the effect of climate conditions on driving,” says Porter.

“We are doing a study that I wouldn’t be able to do on my own. Comparing Manitoba drivers and how they differ from older drivers elsewhere in Canada, and with the addition of our Australian and New Zealand participants, even outside Canada.”

One such driver is 78-year-old retired social worker Sophie Kolt, a participant in one of the early pilot studies who is also involved in the Transportation Working Group.

“I became involved because I was interested in continuing to drive as I became older,” she says. “I met Michelle Porter at a consultation group and was very impressed by her attitude and her research excellence.”

Research tells us that the rate of serious injury and death due to car crashes rises dramatically in adults over the age of 70.

The pilot for the current study, conducted by the co-investigators in Ottawa, involved assessing how many at fault crashes older drivers have in a year and testing to predict for at fault crashes. Porter says, “If we were doing a driving test, who would pass or fail that driving test? This may or may not indicate or predict who would have an at fault crash.”

A major predictor is cognitive function. “For example, when an older driver is aware they are making errors when driving versus having no awareness of those errors. Usually, the cognitive measures are a stronger indicator in our research than physical impairments. For example, the difference between not being able to visually process what you see versus not being able to make a decision on how to react to the driving situation you are presented with.”

Kolt speaks to the challenges facing us as we age, though indicates she is by no means a spokesperson for her generation.

“Older people think that once it’s defined, in terms of the assessment tool, it’s game over, you won’t be able to drive anymore. I look at it as an opportunity for us older drivers to take responsibility for ourselves, to get the information to make the decisions we need to make. I’m more than delighted to engage in any discussion or learning process so that I can learn and take responsibility to drive safely. I want to see what we can do to ameliorate those issues. If that’s not possible, then a decision has to be made. I like that this new study is national in scope and involves the subjects that are part of the research in the process, which makes it more meaningful.”

In the end, Miss Daisy was a victim of her era and the screenwriter’s imagination. We can’t say definitively if she should have stopped driving because of one crash without a scientifically validated assessment. Porter and her colleagues in Canada, Australia and New Zealand will ultimately be in a position to put that tool in the hands of physicians and by doing so give us the answers we seek so we can all drive safely in our golden years.
“We don’t want people sent for additional screening that are actually okay to drive. We know that when older drivers lose their ability to drive, this negatively affects their quality of life and independence.”
Recent books by UofM faculty members

HOT OFF THE PRESSES

CANADA AND BALLISTIC MISSILE DEFENCE 1954-2009: DÉJÀ VU ALL OVER AGAIN
(UBC Press in association with the Canadian War Museum, 2010)
James G. Fergusson • political studies

SINCE THE MID-1950s, successive Canadian governments have grappled with the issue of Canada’s participation in US ballistic missile defence programs. Until Paul Martin’s Liberal government finally said no, policy-makers responded to US initiatives with fear and uncertainty as they endlessly debated the implications—at home and abroad—of participation. However, whether this is the end of the story remains to be seen.

Drawing on previously classified government documents and interviews with senior officials, James Fergusson assesses Canada’s policy deliberations and rationales for avoiding a definitive commitment in response to five major US initiatives. He reveals that a combination of factors resulted in indecision: weak leadership, wrangling between the Departments of External Affairs and National Defence, a belief that the United States would defend Canada without much Canadian participation, and a tendency to place uncertain and ill-defined notions of international security before national defence. Successive Canadian governments have failed to transform the debate over ballistic missile defence into an opportunity to define Canada’s strategic interests at home and on the world stage.

Balanced and engaging, Canada and Ballistic Missile Defense offers the first full account of Canada’s uncertain response to US ballistic missile defence initiatives and an exploration of the implications of this indecision. It is essential reading for policy-makers, students, and scholars of Canadian foreign and defence policy as well as anyone who wants a fuller understanding of Canadian-American relations.

WHAT’S WRONG WITH OUR SCHOOLS: AND HOW WE CAN FIX THEM
(Rowman & Littlefield, 2010)
Michael C. Zwaagstra (Frontier Centre for Public Policy & Green Valley School), Rodney A. Clifton and John C. Long (retired) • education

“THIS FINE AND BRAVE BOOK more than delivers on its claim of common sense—an uncommon virtue in the world of school reform. It will empower parents and liberate teachers. I hope it will be widely read, for its message desperately needs to be heeded.”—E. D. Hirsch, Jr., founder, Core Knowledge Foundation; author of The Schools We Need and Why We Don’t Have Them.

What’s Wrong with Our Schools: and How We Can Fix Them examines the status of public education in North America and exposes many of the absurd instructional practices found in all-too-many schools.

Written by three experienced educators, this book provides readers with a direct window into public education. The language is straightforward, the case studies based on real events, and the research evidence clearly presented. With chapter titles like, “Subject Matter Matters,” “A Pass Should be Earned,” and “There is Too Much Edu-Babble,” the authors systematically demolish the ridiculous fads that have taken hold of public education. As unashamed apologists for the importance of knowledge and content in school curricula, the authors clearly show why the views of romantic progressives, like those of popular author Alfie Kohn, fail to stand up to rigorous scrutiny.

A consistent focus on common sense permeates this book and provides parents, teachers, and administrators with practical ways in which they can help improve public education. Anyone interested in the future of public education will benefit from reading this book.

ENERGY MYTHS AND REALITIES: BRINGING SCIENCE TO THE ENERGY POLICY DEBATE
(Rowman & Littlefield, 2010)
Vaclav Smil • environment and geography

“I RECOMMEND THIS BOOK to everyone who spends time working on energy issues—not to cheer them up but to help them have a stronger framework...”
for evaluating energy promises.”—Bill Gates, thegatesnotes.com

There are many misconceptions about the future of global energy often presented as fact by the media, politicians, business leaders, activists, and even scientists—wasting time and money and hampering the development of progressive energy policies. Energy Myths and Realities: Bringing Science to the Energy Policy Debate debunks the most common fallacies to make way for a constructive, scientific approach to the global energy challenge.

When will the world run out of oil? Should nuclear energy be adopted on a larger scale? Are ethanol and wind power viable sources of energy for the future? Vaclav Smil advises the public to be wary of exaggerated claims and impossible promises. The global energy transition will be prolonged and expensive—and hinges on the development of an extensive new infrastructure. Established technologies and traditional energy sources are persistent and adaptable enough to see the world through that transition.

Energy Myths and Realities brings a scientific perspective to an issue often dominated by groundless assertions, unfounded claims, and uncritical thinking. Before we can create sound energy policies for the future, we must renounce the popular myths that cloud our judgment and impede true progress.

SADE ET L’ITALIE
(Desjonquères, 2010)
Valerio Cantafio Casamaggi (Société d’Études Florentines) et Armelle St-Martin • French, Spanish & Italian

SADE ET L’ITALIE, co-authored with Valerio Cantafio Casamaggi, is the result of 3 years research conducted in the archives and national libraries of Florence, Rome, Venice and Naples. The book sheds a critical light on Sade’s sojourn in Italy. It is the first study that is devoted entirely to Sade’s trip to Italy and to its influence on his fictional work. It has succeeded in establishing with empirical evidences that Sade’s most important novel, the infamous Histoire de Juliette, is not built solely of Sade’s phantasms, but is a realistic representation of the life of the Italian aristocracy and foreign travelers during the 18th Century. It demonstrated that in Italy Sade was socially very well integrated and that he managed to establish successful relationships in every class of the society. In this respect, the book has modified the traditional picture that was associated with Sade among scholars, who portrayed Sade mainly as a solitary libertine. Not only does the book bring new materials to Sade’s biography, it also helps to better understand how Sade drew from every aspect of his Italian experience to build his fictional pornographic universe.

POLITICS: AN INTRODUCTION
(Oxford University Press, 2010)
George A. MacLean • political studies and Duncan R. Wood (Instituto Tecnológico Autónomo de México)

A NEW ENTRY on the Canadian market, Politics: An Introduction guides students through the basics of political ideologies and institutions before moving on to more complex concepts such as the importance of government, the organization of political systems, and the role of individuals and groups in society. With an emphasis on Canadian content throughout, the text also maintains an international scope by using case studies to examine and compare political issues in ‘developed’ and ‘developing’ countries around the world. Featuring extensive pedagogy and a beautiful full-colour design, this new text offers students an accessible, comprehensive entry into the field of political studies.

MANITOBA PREMIERS OF THE 19TH AND 20TH CENTURIES
(Canadian Plains Research Centre, 2010)
Edited by Barry Ferguson • history and Robert Wardhaugh (University of Western Ontario)

THROUGHOUT ITS HISTORY, Manitoba has been a province struggling with religious, linguistic, ethnic and class conflict. Manitoba’s premiers have led—and often barely controlled—political movements and parties that have been consistently unstable. Their governments have been characterized by policies that have divided the province.

The premiers of Manitoba have ranged from clever legislative managers, like Davis and Norquay, through tough party bosses like Greenway, Roblin and Norris managing a rudimentary two-party system, to uneasy coalitions controlled by the iron-willed Bracken and his successors Garson and Campbell. The modern period has seen shifting partisan alliances under the successive premierships of Roblin, Wein, Schreyer, Lyon, Pawley, Filmon and Doer. These are their stories.

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while canadian comedian-turned-actor mike myers was doing damage control for the decline in toronto tourism due to a sars outbreak, manitoba physicists had advanced a tool many biological researchers relied upon to study such communicable diseases. myers may have armed himself with a leafs jersey but these researchers were packing a qstar mass spectrometer.

physics professors kenneth standing and werner ens are pioneers for advancing the field of time-of-flight (tof) mass spectrometry. the pair was first on the scene to describe the sars virus proteins, thus providing key evidence about how the virus infected cells.

mass spectrometry is a tool used to identify compounds and their chemical composition. to do this the molecules of the substance must be vaporized and ionized (charged) and then manipulated in electromagnetic fields to reveal their mass and the masses of their fragments. standing and ens introduced significant improvements in the way the ions are cooled and injected into a tof mass spectrometer after their rather violent production, allowing for a clearer picture of a compound’s composition. this enables analysis of more complex mixtures with better sensitivity to trace amounts of the molecules of interest.

tof mass spectrometry has existed since the 1940s but it was in the 1970s—through the availability of enhanced technology and a new type of ion source—that it became practical for biological applications. this sophisticated advancement gives scientists much more precise and accurate data. the increased power offers greatly improved windows into protein function. this provides researchers with the means to acquire knowledge that helps explain how living cells function, ultimately advancing our knowledge of life which translates into better treatment of diseases.

“what standing and ens have done with the instruments that they’ve developed is to make it really practical for biologists such as myself to be able to probe biological systems in a way that i never thought would be feasible within the lifetime of my scientific career,” says john wilkins, professor of internal medicine and director of the manitoba centre for proteomics and systems biology, a centre that conducts a wide range of studies in biology, including biomedical research.

in 2003 members of the standing and ens research team played an integral role in identifying and characterizing the key proteins of the sars virus weeks before its genome was fully sequenced. instruments using the team’s innovations have also been employed in a wide range of proteomics research, including drug development and disease studies, as well as agricultural applications. the research group has participated in projects that evaluate cancer treatments, study tissue transplant rejection, seek understanding about disease resistance in wheat, and look for improved methods of biofuel production.

with the help of the university’s technology transfer office, standing and ens have developed numerous successful collaborations, most notably with ab sciex, which led to the development of the highly successful qstar mass spectrometers, incorporating the manitoba innovations. between 2000 and 2009 over 500 of these instruments were sold, generating over $300 million in total sales revenue. the standing and ens research team continues to provide mass spectrometry technologies that are being developed and licensed even today.

the research ideas that led to the tof mass spectrometry innovation used today has been recognized with many awards including the 2006 brockhouse canada prize for interdisciplinary research in science and engineering and, more recently, the 2010 encana principal award. this award is the highest honour bestowed by the ernest c. manning awards foundation. this is the first university of manitoba research team to receive the award and only the second manitoba recipients.
Researcher’s molecular-level investigations could unlock much larger secrets, including how the universe evolves.
The poster on the wall in Jennifer van Wijngaarden’s lab shows a cartoon woman from the 1940s peeling back the sleeve of her blue-collared work uniform to reveal a flexed bicep. She looks determined. The caption above her declares: We Can Do It!

The war-time replica provides meaningful support to the physical chemist, who is perched on a stool, sandwiched by two pieces of hulking equipment used to study minute molecules—one of which is the only of its kind in the country.

“I like the poster because it gives encouragement. In research, you have an idea but don’t know the outcome. You put in a lot of effort but just don’t know if your work will pay off,” says the 36-year-old assistant professor. “It’s also encouragement when I look around this lab and think about how I inherited this as an empty room filled with tossed away junk and how we’ve turned it into a research lab with instruments that we built with raw materials, stainless steel, wiring. It’s sort of a reminder of what we’re capable of.”

“It’s also nice that it’s a woman on the poster,” she adds with a smile, noting how few female physical scientists there are.

Van Wijngaarden is an expert in microwave spectroscopy. That’s the science of studying the movement of molecules at a microscopic level. Her goal? To
uncover all she can about the properties of these structures, including how they interact with each other. These tiny components that twist and bend are a big deal since they’re in everything around us. “Everything in the universe, all our actions, all behaviour of matter,” she says. Van Wijngaarden’s work isn’t industry-driven—she doesn’t have patents on the horizon—but rather focuses on the fundamental side of science. “Which fortunately is still supported in Canada in the funding environment,” she notes, having secured more than $1 million in grants since arriving at the University of Manitoba four years ago.

But since van Wijngaarden and her team are among the first to study unstable reactive molecules in such great detail, one never knows what offshoot discoveries could result. After all, it was scientists studying the basics of ammonia molecules who stumbled upon a unique property that ultimately led to the development of the laser, a major scientific breakthrough now used around the planet.

The molecules van Wijngaarden investigates are highly unstable so they require special equipment to isolate them long enough for actual study to occur. Van Wijngaarden uses a custom-made 600-pound machine called a chirped pulse microwave spectrometer. There are only a handful of these devices in the world; the technology has only been around for a few years. She and her team built the $276,000 spectrometer with funding from the Canada Foundation for Innovation.

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The molecules are put into a vacuum chamber at speeds greater than sound, which makes them extremely cold. The chilly temperature, which drops to roughly -27ºC, keeps them from reacting or interacting with neighbouring molecules, allowing scientists to take a closer look.

Light plays a big role. Every molecule has a set of distinguishing energy levels, similar to how humans have signature fingerprints. The spacing between these levels corresponds to certain wavelengths of light. By figuring out what wavelength the molecule absorbs, scientists can uncover the spacing of its energy levels, which in turn reveals the molecule’s structure, bond lengths and angles.

The range of light they are interested in, the one that applies to their targeted type of molecules, is the microwave region.

When people hear microwave, they might think the kitchen variety that warms food. That everyday appliance is similar in that it involves microwave wavelengths but it’s designed to interact only with water molecules in food (which does the heating). Van Wijngaarden’s equipment allows her to look at any molecule she wants.

She admits the structure of molecules “might not sound super exciting or sexy” but the new technology her team is using has only recently become available thanks to advancements in digital electronics. At one time such parts were reserved for the defense industry, specifically those involved in radar and sensors. Some government control still exists; when buying parts for the spectrometer, van Wijngaarden had to sign a declaration that ensured the components wouldn’t be mounted on aircraft or missiles.

This science will help researchers better predict how new molecules will behave if they were to design them from scratch. But the greatest contribution of this heightened molecular knowledge could be its ability to help astrophysicists—those who model the chemistry of the universe and study clouds, stars, meteorites and the atmosphere of planets and moons. Molecules in space are most often identified by the microwave emission signal they give off, just as they are in van Wijngaarden’s lab. Since she can uncover the unique energy spacing of molecules using the microwave spectrometer, she can tell the astrophysics community what molecules they are looking at. This can help them make sense of how our universe is evolving.

Van Wijngaarden has undergone her own personal evolution, from a little girl growing up in Essex, Ont. (population
6,000) with a passion for science but who didn’t think a research career was possible to an award-winning professor who loves teaching and runs her own groundbreaking lab.

Van Wijngaarden’s mother was a school teacher; her dad worked in the auto industry. “I always had this idea that to have a PhD and to do science required genius, that it was not something that was accessible. I always had good grades and scholarships and was highly successful but still it seemed to me really out of reach,” she says. “There are great things about small towns, but you’re not exposed to people who do these types of other jobs. You know teachers. You know a doctor, a dentist, sales people, so I didn’t know any scientists.”

That all changed when she arrived at the University of Western Ontario to do her chemistry degree and spent a summer working in a research lab with graduate students. “I started to think, Hey wait a minute, these are regular people.”

She set out to do her PhD at the University of Alberta before heading to the University of Basel in Switzerland for a Natural Sciences and Engineering Research Council-funded postdoctoral position. Now she’s the one playing host to PhD students—and colleagues—from around the world who are eager to use the spectrometer.

In 2007 she won a University of Manitoba Teaching Excellence Award. The recognition was particularly special since it’s the students who nominate the contenders. Van Wijngaarden makes a point of learning her students’ names, getting to know them and being a mentor. It’s a style she adopted while teaching for two years at the prestigious Mount Holyoke College (MHC), a liberal arts institution for women in South Hadley, Mass., founded by a female chemist in the early 19th century. “I taught the core physical chemistry courses at MHC and had the pleasure of watching several female students from my class continue in physical chemistry at top graduate schools—Caltech, Rice, Northwestern, Cornell,” she says. “I can’t describe how excited and emotional I get when I think about the futures that lie ahead of these talented young women.”

She tries to reach out to her female students here as well, encouraging them to continue with their studies in a field where women are still the minority. “At the undergraduate level, the number of men and women in chemistry is maybe 50-50. It’s when you go up to the higher levels that women don’t stay in it. It’s the same for engineering. I don’t want to dwell on it, but when I see the chance to do something one-on-one I try to do that. I try to encourage students to apply for internships in the lab and that kind of thing,” she says.

Van Wijngaarden enjoys being in the classroom as much as being in the lab. Sometimes her investigations take her west to the Canadian Light Source facility in Saskatoon, home to a $173 million synchrotron project, one of the largest science projects in the country to date. She is one of few researchers with frequent access to this technology, which complements her research at the University of Manitoba. Instead of exploring the structures of molecules, the device examines their vibrations. And the wavelengths of light involved are in the infrared rather than microwave regions. Van Wijngaarden is a member of their Infrared Beam Team. Findings from that project could lead to a number of advancements—from the development of new ways to reduce greenhouse gases to the design of new drugs and the construction of more powerful computer chips.

Whether van Wijngaarden is working with the synchrotron, or in her own lab planning ways to enhance the capabilities of her spectrometer, or busy teaching the next generation of researchers, her attitude remains the same: to continuously grow. She prefers to keep moving like the molecules she probes. “I like to evolve,” she says. “That’s the important thing.”
HAVE YOU EVER WONDERED WHAT ROLE SOCIAL WORK PLAYS IN REDUCING OVER-REPRESENTATION RATES OF ABORIGINAL PEOPLES IN THE CHILD WELFARE AND CRIMINAL JUSTICE SYSTEMS? As a social worker and doctoral candidate in the University of Manitoba Faculty of Social Work, I am alarmed that Canada has chosen to respond to the social conditions facing many Aboriginal peoples by increasing child welfare apprehensions and incarceration rates. As a member of a profession that has a unique mandate for social justice and to work with the most marginalized, I am baffled by legislated policies that continue to unravel the fabric of social welfare only to reweave those threads into an increasingly dense net of punitive social control responses.

As social programs continue to be cut, the most marginalized face ever increasing risk for exclusion, poverty and involvement in government systems. Yet, throughout these journeys of marginalization, Aboriginal peoples continue to encounter social workers along the way. I wondered, what role do social workers play along these journeys? What do we, as a profession, do well? What do we need to be doing differently? To answer these questions, I interviewed a select and unique group of professionals: 15 Aboriginal social workers, who had in addition, been clients of social workers as a result of their involvement in the child welfare and criminal justice systems. Cumulatively, these 15 participants represented over 135 years of professional practice experience with almost 95 years of systemic involvement with 60 social workers.

My intention as a researcher is to engage in inquiry that joins in the struggle for social justice, specifically to reduce the alarming trends of systemic control of Aboriginal peoples. My motivation has been informed initially by the numerous conversations I have had with Aboriginal women and men during my practice career as a clinical therapist and as a director of a non-profit organization. As a result of these conversations and during my doctoral work, I developed a focus specifically on the role of social work in the processes and effects of contemporary colonization for Aboriginal peoples.

As I write up the findings from my research, I am hopeful that the ‘insider’ expertise of these social workers will offer not only recommendations for social work practice, professional education and research but also legitimize a much needed perspective informing the social work literature: the expertise of insider knowledge in reducing marginalization. I am inspired by the work of bell hooks and Gayatri Spivak and I hope that the realities of Aboriginal peoples on the margins will form the centre of social work discourse. By listening and learning from Aboriginal social workers who were formerly involved with social workers, the centre of our social work profession will shift and become richer and deeper.
Dozens of budding researchers showed off their work at the 2010 Undergraduate Student Research Poster Competition. Fifty-two students went head-to-head in a handful of categories at the fifth annual competition Nov. 5 at University Centre. The categories included: applied sciences, health sciences, natural sciences, social sciences/humanities, and—new this year—creative works.

Research topics ran the gamut from the benefits of yoga on cancer patients to the antioxidant properties of hempseed. The aim of the poster competition is not just to reward students based on the scholarly, scientific or creative success of their content, but more so on the visual display, the clarity of their conclusions and objectives, and how well they can provide jargon-free explanations to their audience.

The posters were judged by university faculty members, staff, and individuals from topic-related government departments. First and second-place cash prizes ($500 and $250) were awarded to the top two entrants in each category.

Darren Neufeld, who won second place in the social sciences/humanities category for his poster ‘Grandiose and Vulnerable Narcissism and their
Relations to Envy’ said he viewed the contest as a great way to see how people react to his ideas. Discussing his findings at length has motivated him to delve even deeper into his research topic. “You get into some interesting conversations,” the 23-year-old noted.

Participant Ana Klahr’s exploration of autism symptoms in rats zeroed in on a specific protein involved. She competed in the natural sciences category and found that rats with autism that were provided with “environmental enrichment”—basically, housed with toys—have more expression of the protein MeCP2. This is important because a lack of this protein has been identified as the main cause of Rett syndrome, which falls within the autism spectrum. “I got very good feedback from the judges and some tips too,” she said.

Third-year geology student Brandi Shabaga based her poster on a summer project that had her searching for a way to determine the authenticity of gems—specifically multi-coloured Paraiba tourmalines from Brazil—by measuring their boron and lithium isotopes. The value of these tourmalines, which are also mined in Morocco, Mozambique and Nigeria, are determined by the location in which they’re found, Paraiba being the most expensive (they command up to $20,000 per carat). Since no standard gemological testing existed to tell them apart, Shabaga spent the summer with supervisor and Canada Research Chair Mostafa Fayek running samples on a secondary-ion mass spectrometer and figured out a method for sourcing. “I think it’s a great opportunity to get the chance to present. It’s nice that we can show people what we’ve accomplished,” said Shabaga, 21. “It’s also interesting to see what other people are doing.”

Wilder Robles, a family social sciences professor who judged three posters, said the competition helped participants “develop critical research skills.” Robles said he drew inspiration from the enthusiastic young researchers, specifically “their desire to become scientists.” “They’re showing that they have the skills for grad school,” he said.

The university’s vice-president (research) Digvir Jayas agreed. He said the competition highlights not only rising stars but the “tremendous opportunity that exists for undergraduate students at the University of Manitoba to get their feet wet in the research world.”

“These students not only embark on exciting research projects,” he said, “but do so with guidance from faculty members who also happen to be leaders in their research field. This hands-on experience early on in their student careers is extremely valuable, as is learning how to effectively share their findings with the public, as they do in this competition.”
RENEWING HOPE
THE COMMON THREAD THAT BINDS CELLS TOGETHER

BY KATIE CHALMERS-BROOKS
Faculty of Medicine scientist Geoff Hicks studies the genes at the root of this heartache. He meets with doctors, surgeons, other researchers and the hard-hit family who come together in their shared quest for answers.

“[This is] a really horrific cancer of stem cells in the bone,” Hicks explains. “To those families it’s devastating. My hope is that our research may impact those patients and their families—that’s the motivation.”

And that’s why he feels a sense of urgency. Scientists have made major strides in stem cell research in recent years and are relatively close to offering patients a major treatment tool that could give them back their lives. “The potential is so huge in this field. It’s unlike anything I’ve encountered before,” Hicks says.

The University of Manitoba launched the Regenerative Medicine Program two years ago with Hicks at the helm. So far the team has six principal investigators, each of them tackling different but equally debilitating diseases.

“This is an exciting new area of medicine because the diseases for which this regenerative medicine holds promise are the late onset degenerative diseases that affect the majority of Canadians and for which new approaches for treatment will have a significant impact,” says Hicks.

The team plans on moving into their 24,000-square-foot $5 million lab on the sixth floor of the Basic Medical Sciences Building this spring. The space will also be home to an intense training program with up to 40 graduate students and post-doctoral fellows.

From different angles the researchers will try to better understand how stem cell biology works and use that knowledge to replace, repair or regenerate diseased tissue or organs (what Hicks calls the 3Rs.)

Stem cells aren’t just any ordinary cells; they’re special. While other cells eventually stop dividing or die, stem cells can renew themselves indefinitely. They also have the magical ability to morph into any cell type of the body. For example, stem cells can potentially be used to repair heart muscle killed off during a heart attack; replace neuron cells to a brain that’s under assault by Alzheimer’s disease; and regenerate cells destroyed by spinal cord injuries or cancer.

There are two types of stem cells: adult and embryonic. The latter are derived from human embryos and are the most versatile but also the most controversial. The former are found in the adult body and tend to be tissue-specific.

Common practice for the last two decades has been using adult stem cells found in the blood—within the bone marrow—for transplants; this means a patient’s entire blood system is replaced to combat disorders like leukemia, some metabolic syndromes and immune deficiencies.

Members of the regenerative medicine group will try to apply what is already known about bone marrow transplant technology to cardiac disease, paralysis, neurodegenerative disorders, and cancer. The common thread in all of these ailments? They either involve a loss of cells or malfunctioning cells.

Cancer itself is considered a stem cell disease. It develops when a stem cell process fails to complete itself and becomes blocked. To treat cancer, a surgeon often operates to remove the tumor but the cells that initiated its growth typically aren’t targeted and relapse often occurs. Stem cell advancements could change that, Hicks says. “If we really want to take a long-term disease-free approach we need to not only take care of the tumors by surgery or chemotherapy or radiation, we need to consider targeting the so-called cancer stem cells to completely eradicate the disease. So this doesn’t replace the current treatment, it doesn’t say current treatments aren’t effective but it’s a major new arm that is expected to have significant impact on the long-term survival rates because...
the reoccurrence of cancer is what’s being targeted.”

Donna Wall, director of the Manitoba Blood and Marrow Transplant Program and a key member of the regenerative medicine team, knows firsthand the excitement of witnessing new technologies become reality. She was on the ground level when umbilical cord blood became a feasible donor source.

“About 20 years ago, we would quite frequently have to tell parents and children that we did not have a transplant option because the patient’s immune type was rare and we would not be able to find a donor for transplant. We are now able to find a donor for a vast majority of children and most adults,” she says.

Wall hopes to see similar, sizeable advances for a whole host of diseases now under investigation by stem cell scientists. She provides the regenerative medicine group with a unique perspective, given she manages the province’s team of doctors who perform transplants on a daily basis. Wall provides a solid link to patient care and hopes to see those in need benefit from the latest discoveries in the lab.

“Getting the therapies to patients is our priority. It wouldn’t make sense to have the regenerative program if we couldn’t take the discoveries in the laboratory to the bedside. And then, importantly, as we treat the first patients, to take our clinical observations back into the laboratory so that we can refine and improve these new treatment approaches,” she says.

Hicks believes having experts from various disciplines in one shared space will foster more brainstorming. The program is one of only three of its kind in Canada that doesn’t exist merely on a virtual level. “We are putting everyone together so you’re bumping into people. Your graduate students are working with each other and each of our own expertise related around stem cells can be shared, intensified and collaborated,” he says. “We’re recruiting the brightest post-doctoral fellows out of the biggest labs in Canada.”

The team’s principal stem cell researchers so far include: Soheila Karimi, who explores stem cell based therapies for spinal cord injuries and disease; Tamra Ogilvie, who studies the earliest changes in brain tumour progression and the invasion of brain tumor stem cells; Afshin Raouf, who studies the unique properties of breast cancer stem cells for early detection of premalignant disease; Mojgan Rastegar, who studies the unique properties of breast cancer stem cells for early detection of premalignant disease; and John, who probes the aging process of stem cells for more effective bone marrow and cord blood transplant therapies.

A Canada Research Chair in Functional Genomics, Hicks spent 15 years working with mouse embryonic stem cells and successfully developed several technologies that genetically modify the mice to mimic
the role of diseased genes or disease in patients. His work has provided researchers worldwide with an effective way to test their applications before going to human clinical trials. These days, his research zeroes in on sarcoma and leukemia.

Hicks is looking to fill two more positions with cardiovascular experts, creating the ingredients for what he calls “The Perfect Storm.” It’s no coincidence the research expertise of Hicks’ team builds on long-established research strengths in Manitoba.

“We want to have a seamless continuum between what is really basic research to clinical applications,” says Hicks, who as a kid growing up on the prairies would play in the creeks and ravines by his home, fascinated by the biology of summer. “We’re not just in an ivory tower thinking of really cool biology that doesn’t have much meaning beyond our walls. The reason we’re setting up this way is that we’re focusing more on the real challenges for getting these kinds of approaches into clinical trials.

This is one of the reasons we are so excited about regenerative medicine, not just that it’s offering new treatments for diseases that might not have very good or great current ones but the things that we discover are so close to the application, it’s tangible.”

Clinical trials in Canada are beginning right now for a number of cell-based therapies. Typically, it takes 20 to 30 years from discovery to actual treatment in a hospital but these trials are happening more quickly.

Yet there are still hurdles to overcome. Hicks cautions that not enough time has passed to know the long-term effects of stem cell procedures. When modifying cells, there’s also a risk of “undesired outcomes” like cancer growth.

“I think the biggest challenge will be knowing the excitement of what is possible and to be experimentally proven, to the point where it can actually be delivered in the clinic safely. Humans are humans and if you know something is working you want to run out and get it done. But for many of these we just don’t know the efficacy or the safety. There is no proof yet.”

The most frustrating part is finding a way to move to clinical trials quickly to meet the expectations of suffering Canadians and at the same time making sure the procedures are safe, says Hicks.

“There is a very understandable urgency and there is a very understandable human element,” he says. “It’s hard to meet the urgency felt in the hearts and minds of those people waiting for the treatments and their families.”

The government of Canada Federal Knowledge Infrastructure Program and the University of Manitoba provided $5 million for the construction of the new lab; and the federal government, through Western Economic Diversification Canada, provided $1.7 million to purchase its state-of-the-art equipment.
WHAT WOULD THE FORT GARRY CAMPUS LOOK LIKE IF SIMA CHAVOOSHI GOT HER HANDS ON IT?

The environmental design student pressed the fast forward button and offered up her version of a futuristic sustainable campus. “It is an attempt to create a compelling model of future civilization,” says Chavooshi, who spent several months dreaming up the details. “The project involves putting together a number of already available, tested technologies to achieve a highly efficient, eco-friendly, healthy and—most importantly—a desirable urban environment.”

Her plan takes into account the aesthetics of the campus, the mental and physical well-being of the students, along with energy issues.

She proposes the university have its own energy source and not rely on Manitoba Hydro. On grade level, the campus would be covered with glass, allowing almost full exposure to sunlight. Heat would build up under this protective shield and eventually be exhausted by a solar tower system to produce electricity. This glass-enclosed area would also provide a warm space for pedestrian activities—like playing sports, walking, or having lunch. “It will be a more dynamic space in terms of human interaction,” she says.

And it would provide vast areas that could be used by Faculty of Agricultural and Food Sciences researchers to grow greens during Winnipeg’s harsh winters.

Naturally, the air flow would circulate upwards and in the process reduce the spread of colds and the flu. Parking would also be
underground, making costly car plug-in spots obsolete.

Above ground, the four-to-six-storey buildings would have a narrow design with all-glass exterior walls, allowing occupants to have direct access and control of fresh air and daylight.

The campus would be home to an ecologically-friendly water and sewage recycling method made up of a handful of multi-layer pools spread across the grounds. The top layer is constructed wetlands. Below is a giant reservoir divided into two: one to collect purified water from the wetlands and the other for gathering waste and storm water.

Chavosshi insists her overall vision for a sustainable campus is feasible. She says we should “undo a lot of our urban-living cultural learning”—the way we commute, use energy, think of comfort, get food, and view social interaction.

“I am trying to raise the point that we already have what we need to attain all of the above. We just need to see things from a new perspective.”

POST-KELLY RE: CONSTRUCTED REALITY
BY KATIE CHALMERS-BROOKS

DETERMINING WHETHER a piece of art has hit the mark is difficult. But fine arts student Kelly-Jo Dorvault has her own way to gauge the success of her first major video project, a highly personal photo-still animation called Post-Kelly Re: Constructed Reality.

“As long as somebody gets something out of the animation, then I feel it’s successful,” she says. “I want to use my experiences to help others. Maybe if I can be more open about it, then people can learn from it.”

Dorvault’s seven-minute video—which was her thesis—gives viewers a glimpse into her life and how she believes the world sees her. The 31-year-old full-time student opens up about being a lesbian and a nomadic single mom to a 12-year-old boy whom she has chosen to homeschool. She also reveals what it’s like to suffer from irritable bowel syndrome (IBS), anxiety and depression. In the video, she refers to these characteristics as her “seven deadly sins.”
“I called them that because it seems like these are seven topics that don’t fit in with society or are looked down upon or are not generally accepted. This is how I feel that I’m being criticized,” she says.

A photography major, Dorvault set still images to motion to explore these themes. In one scene, a gaggle of girls tries to make over Dorvault but she soon resists and the group abandons her. “It shows how I’ve always feared that by being who I really am I would lose everybody and end up alone,” says Dorvault, who for most of her life denied her homosexuality.

Her health has also been a challenge. Some days her IBS is so debilitating she can’t leave the house. In the video, a fork stabs her in the stomach. “That’s the visual I have when I am in pain. I wish I could just cut it out.”

An atlas that descends and becomes the landscape for another scene illustrates her belief in homeschooling and her perspective that learning doesn’t necessarily only happen in the classroom. There are also references to her childhood: for example a water tower similar to the one in her hometown of Steinbach makes an appearance; a Connect 4 game symbolizing her need to remain playful as an adult shows itself; and Montreal Canadiens hockey jerseys pop up frequently, a reference to her unfulfilled desire to play on a hockey team as a little girl.

The process of making the animation has been cathartic for Dorvault. “It’s a way of expressing myself but it’s also a learning process,” she says. “I’m just trying to make sense of everything, how everything connects to each other.”

SERVICE LEARNING IN THE GLOBAL COMMUNITY: GHANA 2010 DESIREE MCKAY AND KAYLA SCHLOSSER

By Katie Chalmers-Brooks

INTERIOR ENVIRONMENT STUDENTS Kayla Schlosser and Desiree McKay didn’t have to look far for motivation while helping design and build a girls’ boarding school in a rural West African village.

On a daily basis Schlosser and McKay drew inspiration from the 40-some girls ages 11 to 17 in the small community of Damongo, Ghana, who now call the new 2,500-square-foot building home. The teens are on scholarships since their families, who live in remote communities, can’t afford to send them to school. The passion of the local trades people helping out with the build was also contagious.

“They were always excited to see us and happy to be doing whatever it took. It didn’t matter if it was plus 40 out, they worked as hard as they could,” recalls Schlosser. “Just to see that, it made us push ourselves further.”

The pair, who were joined on the five-week trip last May by seven fellow Faculty of Architecture students and three instructors, had to take into account major differences between the African and Canadian climates when planning materials for the structure’s dining room, kitchen, and study hall.

The design called for creative ways to keep disease-carrying mosquitoes at bay, provide shade when the mercury climbs to 45ºC, and incorporate outdoor spaces where tenants can dry leaves and herbs for their meals, or launder their clothes. “It was helpful because we got to interview them on...
what they would like to see on the site and what would make their living conditions better,” says McKay.

They learned what termite-deterring woods and coatings to use to make furniture, door and window frames, and roof trusses. They also had to consider what products were readily available in Damongo as the nearest town is two hours away. Practicality was paramount in every decision. For example, they chose a specific paint colour that was accessible to locals for future touchups.

It was McKay and Schlosser’s first time working on an integrated design team made up of undergraduate and graduate students studying landscape and urbanism, architecture and interior environments, in addition to members of non-profit organizations, and Ghanaian trades people. The experience provided them with an education in design, materials and construction—but also culture. According to their recent entry in the University of Manitoba Undergraduate Student Research Poster Competition, “The workmen shared their skills as experienced builders while we contributed our knowledge of design. Both groups taught one another about our respective cultures and social realities.”

The team at the construction site

Schlosser and a local worker team up to mortar

The 2,500-square-foot boarding school

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ON THE HORIZON

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Interested in talking and learning more about different health topics and related research? Café Scientifiques bring together experts with non-researchers (you, me, neighbours, friends, etc.) in a relaxed atmosphere to talk about their work and the questions it raises. Come and join the discussion!

MEN’S HEALTH: SEPARATING FACT FROM FICTION
With Robert Tate, Donna Turner, Curt Sparks, and Janice Dodd
January 24, 2011 • 7:00 p.m. – McNally Robinson Booksellers

SCHIZOPHRENIA: BEYOND THE SOCIAL STIGMA
With Diana Clarke, Xin-Min Li, Chris Summerville, and Michael Eleff
February 28, 2011 – 7:00 p.m. – McNally Robinson Booksellers

USE IT OR LOSE IT: MOBILITY IN OLDER ADULTS
With Tony Szturm, Phillip Gardiner, and Michelle Porter
March 21, 2011– 7:00 p.m. – McNally Robinson Booksellers

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umanitoba.ca/research
BY THE NUMBERS:

- 71 endowed & sponsored research chairs – including 48 Canada Research Chairs and 1 Canada Excellence Research Chair
- 40 research centres, institutes & shared research facilities
- 8 National Synergy Awards for Innovation
- 30 tenant companies in Smartpark, the university’s research and technology park
- 8,454 staff (2009/10) – 3,831 academic staff; 4,623 support staff
- $514.3 million annual operating budget (2010/11)
- $1.3 billion in building assets

RESEARCH FUNDS BY SOURCE 2009-10

- Federal Government 48%
- Provincial Government 15%
- Other 37%

TOTAL: $164.4 MILLION

TRI-COUNCIL FUNDING 2009-10 ($ MILLION)

- CIHR (Canadian Institutes of Health Research) $23
- SSHRC (Social Sciences and Humanities Research Council) $7
- NSERC (Natural Sciences and Engineering Research Council) $20

TOTAL: $51 MILLION

SPONSORED RESEARCH INCOME, 2005 TO 2010 ($ MILLION)

- 2004/05: 146.7
- 2005/06: 139.6
- 2006/07: 154.9
- 2007/08: 161.7
- 2008/09: 172.1
- 2009/10: 164.4
Service Learning in Ghana: Students who benefitted from the construction of a new school were frequently on site observing the progress (see inside on page 31ges).