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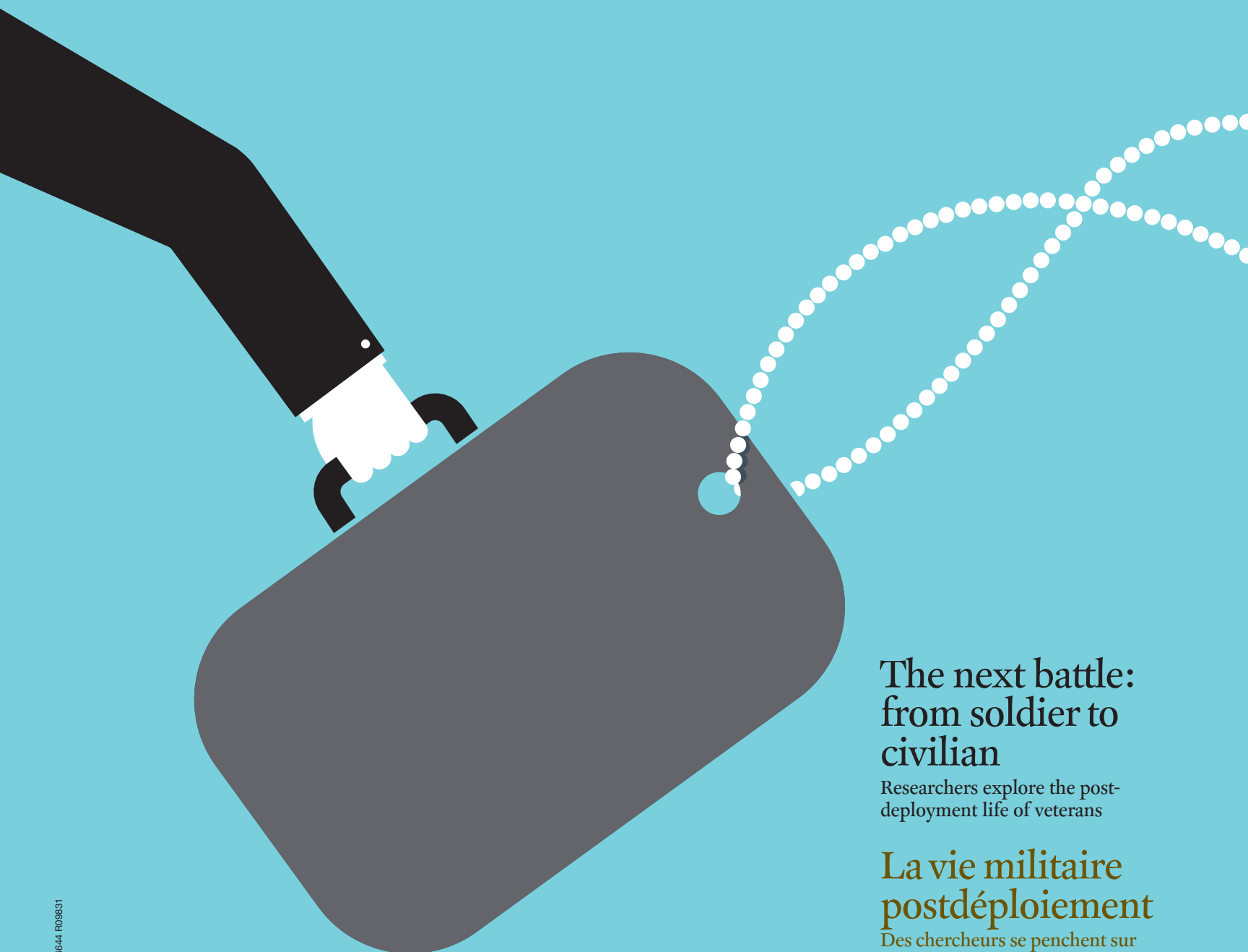
Taking the doctorate in new directions
Le doctorat prend un nouveau virage

An alternative 'Great Books' syllabus
Plan de cours « Les grands oubliés »

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The next battle: from soldier to civilian

Researchers explore the post-deployment life of veterans

La vie militaire postdéploiement

Des chercheurs se penchent sur
le sort des anciens combattants
de retour à la vie civile

Our commitment to research that has impact



At the University of Regina researchers like **Dr. Mehran Mehrandezh** are using their expertise to make the world a safer place.

One of the ways Mehrandezh and his team are doing this is through the development of robots that can assess the structural integrity of underwater guy-wires or large ropes for offshore oil rigs. The robots are able to travel hundreds of metres of rope to give workers a safer way to view potential defects. Each one is equipped with cameras and lasers which give operators the ability to measure the diameter of the rope they are inspecting and in turn show them inconsistencies such as permanent deformation in the rope, loose or broken strands, and kinks due to periodic bending-load shocks.

This method is safer for workers — it reduces human error — and significantly lowers the risk of catastrophic environmental disasters. These versatile robots can also be used to test the safety of bridges, pipeline and underwater infrastructure. While the robots are currently in the prototype stage of development Mehrandezh expects they will be ready for use in the field within the next two years.

Dr. Mehran Mehrandezh shown holding a prototype of the device.



12/ When soldiers return home

Researchers explore the post-deployment life of Canada's recent veterans

by Anita Lahey

12/ Quand les soldats rentrent au pays

Des chercheurs se penchent sur le sort des anciens combattants de retour à la vie civile

par Anita Lahey

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A number of programs are exploring options for applied scholarship within the PhD

by Suzanne Bowness

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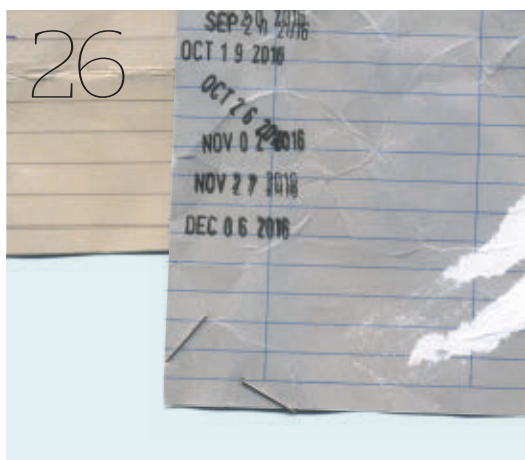
Professors pick underrated titles that students should be reading

by Asbleigh VanHouten and Natalie Samson

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par Asbleigh VanHouten et Natalie Samson



COVER:
The tricky transition from military to civilian life

COUVERTURE :
Le délicat passage de la vie militaire à la vie civile

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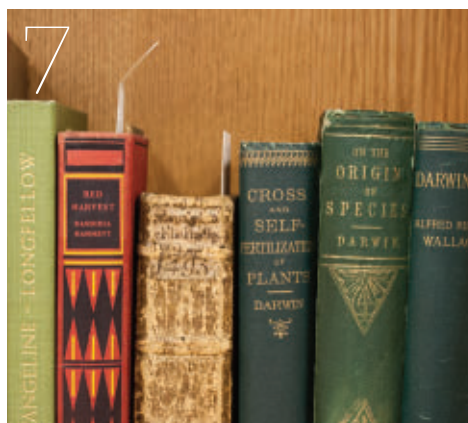


“

When I'm talking to media now, they want the short quote. That's been a huge learning curve for me going from an academic to becoming a politician. I guess I'm a politician now. Wow, I can't believe that.

”

Robert-Falcon Ouellette, previously director of the Aboriginal Focus Programs at the University of Manitoba and now the new Member of Parliament for Winnipeg Centre, p.36



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A change in tone In support of science

AS I WRITE THIS, the 42nd Parliament has not yet begun sitting and yet the impacts of the new government continue to reverberate. The steady string of announcements since the election appears almost designed specifically to please the university community. Academics – and researchers more generally – seem particularly heartened by the change in tone from the, let's just say, *churlishness* of the previous regime.

The new cabinet, sworn in on Nov. 4, includes not just a Minister of Innovation, Science and Economic Development, but also a Minister of Science, full stop. The day after the swearing in, the new Minister of Science, Kirsty Duncan, tweeted: “Looking forward to restoring science to its rightful place in government!”

That same day, the government's first policy announcement was the reinstatement of the mandatory long-form census, the elimination of which by the previous government was so criticized by academics. Soon after, the new Minister of Innovation, Science and Economic Development, Navdeep Bains, signaled that government scientists were henceforth free again to speak to the media without prior authorization.

The mandate letters for new ministers released by the Prime Minister on Nov. 13 also contained good news. The new Science Minister has been mandated, among other things, to “examine options to strengthen the recognition of and support for fundamental research to support new discoveries” – music to the ears of many a researcher. Even before Mr. Trudeau was officially installed as Prime Minister, he dropped in for a surprise visit to a reception of university presidents being held by Universities Canada. “I think it sets a wonderful tone moving forward,” said Elizabeth Cannon, president of the University of Calgary and board chair of Universities Canada. We have two news stories in this issue covering some of these events.

The cover story of this issue, by our freelance writer Anita Lahey, also deals with a topic very much in the news: the mental health of Canada's veterans. Our story doesn't focus on PTSD, per se, nor on the tragic suicides that have recently made headlines, but rather on the difficult transition more generally from military to civilian life, as researched by a handful of Canadian academics from a variety of disciplines. One point made clear in the article is researchers' desire for more funding for this type of work – perhaps something else to add to the government's research agenda.

Un changement de ton À la défense de la science

A LORS QUE J'ÉCRIS ces lignes, la 42^e législature ne siège pas encore, mais l'effet du nouveau gouvernement se fait déjà sentir. On dirait même presque que les annonces faites depuis les élections sont précisément conçues pour plaire au milieu universitaire. Les professeurs (et les chercheurs en général) sont particulièrement encouragés par ce changement de ton, qui diffère passablement de celui *peu courtois* (pour rester poli) du gouvernement précédent.

Assermenté le 4 novembre dernier, le nouveau cabinet compte non seulement un ministre de l'Innovation, des Sciences et du Développement économique, mais aussi une ministre des Sciences, Kirsty Duncan, qui a d'ailleurs publié sur Twitter dès le lendemain de son assermentation qu'elle avait hâte de redonner à la science la place qui lui revient au gouvernement.

Le même jour, une première annonce politique visait le rétablissement du questionnaire long et obligatoire du recensement, dont l'élimination par l'ancienne administration avait été déplorée, pour ne pas dire critiquée, par les universitaires et tant d'autres. Peu après, le nouveau ministre de l'Innovation, des Sciences et du Développement économique, Navdeep Bains, a déclaré que les scientifiques fédéraux n'avaient plus besoin d'obtenir une autorisation pour parler aux médias.

Les lettres de mandat des nouveaux ministres, rendues publiques par le premier ministre le 13 novembre, contenaient également de bonnes nouvelles. La ministre des Sciences a été chargée, entre autres, d'« étudier des options pour renforcer la reconnaissance et le soutien de la recherche fondamentale en appui des découvertes », de la musique aux oreilles de nombreux chercheurs. Avant même qu'il soit officiellement nommé premier ministre, Justin Trudeau a fait une visite surprise lors d'une réception d'Universités Canada réunissant des recteurs.

Notre article-vedette, signé par la rédactrice-pigiste Anita Lahey, examine un autre sujet très en vogue dans les médias : la santé mentale des anciens combattants du Canada. Cet article ne met pas l'accent sur l'état de stress post-traumatique (ESPT) ni sur les suicides qui ont récemment fait les manchettes, mais plutôt sur des recherches, effectuées par quelques universitaires canadiens travaillant dans un éventail de disciplines, sur la transition difficile de la vie militaire à la vie civile. L'article met clairement en lumière le désir des chercheurs d'obtenir du financement supplémentaire pour ce type de travaux. Un nouvel élément à ajouter au programme de recherche du nouveau gouvernement.



An idea worthy of Leacock

I read with delight Jessica Riddell's inaugural column (November 2015), which stresses the importance of creative spaces for academic and intellectual engagement. It immediately summoned the ghost of an earlier Canadian English professor, Stephen Leacock, who wrote in his book *My Discovery of England*: "If I were founding a university – and I say it with all the seriousness of which I am capable – I would found first a smoking room; then when I had a little more money in hand I would found a dormitory; then after that, or more probably with it, a decent reading room and a library. After that, if I still had money over that I couldn't use, I would hire a professor and get some text books." Dr. Riddell wrote: "I believe that a key ingredient [to generate collective moments of delight] is a certain kind of togetherness that comes from interactions in the same physical space." While we may no longer want to see "smoking rooms" on our campuses, I'm sure that Professor Leacock would strongly agree.

Richard Kool

Dr. Kool is an associate professor in the environmental education and communication program at the school of environment and sustainability, Royal Roads University.



Sometimes new is better

REFURBISHING OLD STRUCTURES sometimes, but not always, saves money ("The case for rehabilitation," December 2015). A 50-year-old building designed with the poured-concrete brutalism of the 1960s is often found to have many steps into classrooms, narrow doors through structural poured concrete, etc. With the proviso that in 10 years, by 2025, we must meet the new Ontario Building Code requirements for accessibility, I can think of many university buildings around the province that cannot under any circumstance come close to meeting the new code requirements, let alone the current OBC requirements. I would suggest that in as much as 50 percent of cases, the cost of new space would be cheaper than the renovation costs for buildings made of

structural concrete when such factors as accessibility, inadequate ventilation and asbestos remediation are taken into account.

Jack M. Miller

Dr. Miller is a professor emeritus, department of chemistry, at Brock University. Since his retirement 10 years ago, he has been the special advisor on buildings and space at Brock.

Tribulations of large classes

THANK YOU, David Smith, for this very honest account of teaching a large-lecture course ("Trial and error [and cursing]: How to teach large classes," December 2015). The most students I ever taught was 200, but I can remember many of the feelings you had. I was never completely comfortable teaching in that fashion – I often

thought it was more performance than teaching. There are certainly things you can do with large classes like this, such as peer instruction and small-group discussions, but it is certainly not an ideal way to teach.

Terry Bridges

Dr. Bridges previously taught undergraduate physics and astronomy courses at Queen's University and is now teaching high school physics at Robert College, Istanbul.

A disservice to psychology

I WAS DISMAYED to read the "Mad Studies" article (December 2015) for numerous reasons, but primarily as a psychologist familiar with the many academics who have sought to alleviate the suffering of people with serious psychologi-



cal conditions, to understand scientifically the underlying processes, to apply that understanding to prevention and treatment, to study and correct the stigma that prevents so many people from seeking help, and to engage in numerous other scholarly and science-based activities in this area with laudable goals and substantive achievements.

It was particularly depressing to read such ideological and unsubstantiated statements as “People with PhDs had oppressed mad people throughout history.” Even the claim from one proponent that “Mad Studies doesn’t reject medical models of madness” rings hollow in the face of such assertions as “I wanted to help liberate this history from the shackles of the medical model.” Hardly seems like a rapprochement!

Nor did it provide much comfort that there was no mention of the discipline of psychology throughout the entire piece given most university students would primarily be exposed to mental health issues in fact through their psychology

courses. I certainly recognized nothing in the diatribes of Mad Studies advocates even closely related to the psychological perspective summarized briefly above.

A fundamental problem is that too many people in the humanities and some non-empirical social sciences think wrongly that anecdotal reports, ideologically-driven critical studies, and like approaches provide a substantive way to examine important social and psychological issues. Such a misguided postmodern approach that “deconstructs medical models” harkens back to pre-scientific days and certainly does not merit the title interdisciplinary or multidisciplinary. Rather it represents a narrow and deeply misguided ideological approach that Sokal and Bricmont accurately labeled “fashionable nonsense,” although a truer conception is captured by the original French title, *Impostures intellectuelles*.

Jim Clark

Dr. Clark is a professor and chair of psychology, University of Winnipeg.

Correction

The Alphonse Raymond Building at Laurentian University is named for Jesuit Father Alphonse Raymond of Verner, Ontario, a champion of Roman Catholic and French-Canadian rights, president of Collège du Sacré-Coeur from 1952-1959, and first president of the University of Sudbury. Incorrect information appeared in the article, “The case for rehabilitation,” December 2015. We regret the error.

Le pavillon Alphonse Raymond de l’Université Laurentienne doit son nom à un père jésuite de Verner, Ontario. Ardent défenseur des droits de l’Église catholique romaine et des Canadiens français, le père Raymond a été recteur du Collège du Sacré-Coeur de 1952 à 1959 et le premier recteur de l’Université de Sudbury. De l’information erronée est parue dans l’article « À la défense de la restauration » publié en décembre 2015. Nous nous en excusons.

What’s new
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Nouveautés
en ligne!

NEWS

Mass resignation at *Lingua* journal

An associate editor at the journal, from U of Alberta, describes the behind-the-scenes manoeuvrings.

ACTUALITÉS

La Fédération des sciences humaines a 75 ans

Pour marquer son anniversaire, l’organisation publie une chronologie consacrée aux moments importants de son histoire.

CAREERS

Engaging audiences: Structure your content

In the fourth and final video for this series, learn how to structure a presentation for maximum engagement.

STUDENT VOICES


Dealing with mental health

A student offers some advice to professors on how they can help in times of distress.

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Congratulations

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- Sudbury Neutrino Observatory (Canada)
 - Daya Bay (China)
 - KamLAND (Japan)
 - K2K / T2K (Japan)
 - Super-Kamiokande (Japan)

Carleton University Congratulates Worldwide Winners of the 2016 Breakthrough Prize in Fundamental Physics

For nearly 20 years, Carleton has been proud to be a leading member of the Sudbury Neutrino Observatory's team. Carleton scientists are leading and collaborating on this international-scale project, and are pushing the frontiers of particle physics at a global level. This is fundamental to our understanding of the universe and, ultimately, life itself.

We applaud the founders of the Breakthrough Prize for recognizing the importance of discoveries around neutrino oscillations that contribute so much to this knowledge.

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Ici et là
Here and there

Campus



On the Origin of Species is back in its rightful place at Mount Saint Vincent University.

Book theft

Darwin's classic treatise returned six years after being stolen

The first-edition book was the last of several stolen artifacts to come home to MSVU's library

WHO BETTER THAN a librarian to imagine a plot for a book that would feature a stolen first edition of Darwin's *On the Origin of Species* as its protagonist? The thought crossed Tanja Harrison's mind after she witnessed the return in October of the prized 1859 book to the Mount Saint Vincent University library where she works. "Just imagine what it has seen," says Ms. Harrison, who found herself caught up in the book's adventures since it was swiped from the shelves by a former stu-

dent and serial antique thief who reportedly flew under the radar for more than 20 years.

Librarians at MSVU first noticed the book was missing from a locked glass cabinet when taking inventory in 2009. They contacted the police but it wasn't until 2013 that they learned of the arrest of John Tillmann, one of the most daring antique thieves in Canada's history, now serving a nine-year prison sentence.

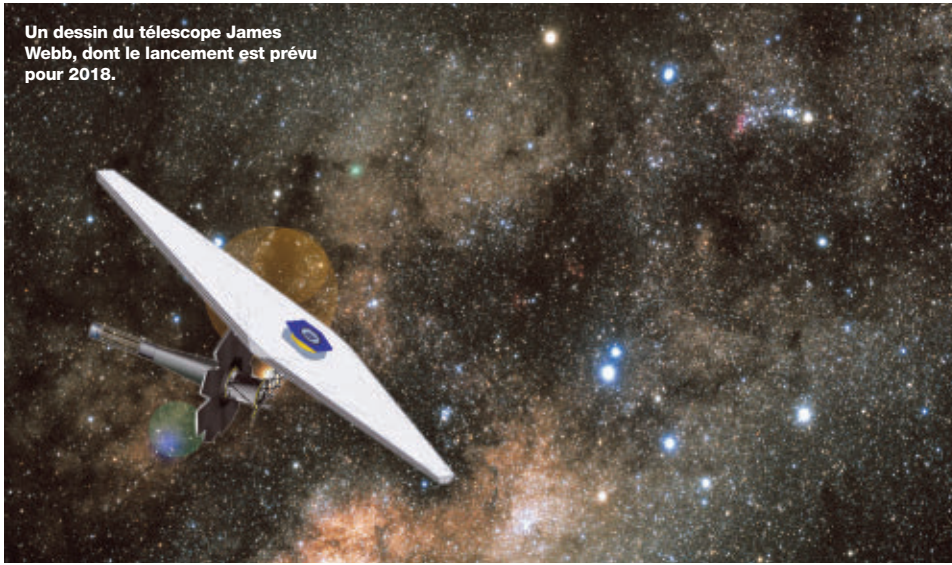
Mr. Tillman had thousands of artifacts hid-

den in his home from across the Maritimes, including other books from MSVU that had gone missing at the same time as the Darwin book. A search through Mr. Tillman's records led police to discover that the book had been sold in the U.S. The department of Homeland Security tracked down the book after its sale at auction. The transfer process between the U.S. and Canada took another two years and concluded with an RCMP officer travelling to the Canadian Embassy in New York to pick up the book in 2015.

The treasured Darwin, valued at between \$30,000 and \$50,000, was the last of the stolen books to be returned to the library, says Ms. Harrison. "We're really happy to have it back."

— ZACK BRADLEY

Un dessin du télescope James Webb, dont le lancement est prévu pour 2018.



Astrophysique

L'U de M dans la course pour découvrir la vie extraterrestre

LA DÉCOUVERTE DE la vie extraterrestre est l'objectif du tout nouvel Institut de recherche sur les exoplanètes (iREx) à l'Université de Montréal (U de M), dirigé par René Doyon. « Pour la première fois, la création de nouveaux outils comme le télescope James Webb, dont le lancement est prévu pour octobre 2018, permet d'espérer la découverte de la vie ailleurs que sur Terre d'ici une ou deux décennies », soutient le professeur d'astrophysique.

Découvrir la vie extraterrestre est le Graal de l'exploration spatiale. Mais de quelle vie parle-t-on? Oubliez E.T. et pensez plutôt... bactéries et microbes. « La vie microbienne est la plus répandue sur Terre et c'est ce que nous cherchons aussi sur d'autres planètes », précise M. Doyon.

Il ne s'agit donc pas d'observer directement la vie, mais plutôt d'en détecter les effets atmosphériques (biosignature) sur une planète observée. M. Doyon donne l'exemple de l'oxygène sur Terre, qui est produit par les plantes et le phytoplancton. Pas de vie, pas d'oxygène.

Le Canada fournit l'un des quatre instruments embarqués sur le télescope James Webb, dont l'une des utilités sera justement de détecter et de mesurer la composition chimique de l'atmosphère des exoplanètes. M. Doyon est le directeur scientifique de cet instrument, et a contribué à son élaboration. Cet apport

vaudra à son équipe un accès privilégié à 450 heures d'observation au tout début de la vie utile de l'instrument.

M. Doyon vise à obtenir 15 millions de dollars en financement sur 10 ans pour l'iREx. « Nous possédons déjà les infrastructures, le financement ira aux cerveaux, notamment par l'entremise de chaires de recherche », explique-t-il. À terme, l'iREx pourrait ajouter 30 chercheurs aux 20 qui en font déjà partie.

Le directeur de l'iREx croit que le temps est venu de s'unir pour les chercheurs d'exoplanètes œuvrant à Montréal. Il rappelle que l'Université McGill, qui ne donnait pas dans l'astrophysique il y a à peine 15 ans, a maintenant un groupe de la même taille que celui de l'Université de Montréal auquel elle greffe présentement des spécialistes de la recherche d'exoplanètes.

« La proposition de l'iREx est de rassembler ces forces pour créer un pôle d'excellence de calibre mondial, dit-il. En 2008, nous avons été les premiers à photographier un système de planètes hors de notre système solaire, et nous pourrions être aux premières loges pour une découverte encore plus fondamentale : celle de la vie extraterrestre. » – JEAN-FRANÇOIS VENNE


« La création de nouveaux outils permet d'espérer la découverte de la vie ailleurs que sur Terre d'ici une décennie. »



Person / Place / Thing

Chasing pieces of the Berlin Wall

Two Ryerson profs are documenting the afterlife of the iconic ruin

 AFTER THE BERLIN WALL fell in 1989, a new, lesser-known chapter in its history began. Many large slabs and smaller pieces began to circulate around the world, landing in various places from presidential libraries to museums, hotel lobbies, eBay and even a vacant lot in downtown Truro, N.S.

More than 25 years on, two Ryerson University professors in the School of Image Arts, Blake Fitzpatrick and Vid Ingelevics, are trying to track down and document the movement of the wall, in photographs and video, from Berlin to North America. “We refer to it as tracing a mobile ruin,” says Dr. Fitzpatrick, “We are interested in the backstory of how these objects get to where they are, and why.”

The researchers are especially keen on documenting intact slabs, like the set purchased by a Maritime entrepreneur and brought to Truro. “Some of the local merchants complained that they were really an eyesore,” says Dr. Fitzpatrick. “There was an instant movement to get rid of them.”

The pieces were eventually moved from their downtown site to a butterfly meadow tucked behind Dalhousie University's agricultural college about 4 km away in Bible Hill. “In a strange way it's a more appropriate site, though it's still wildly out of context,” says Mr. Ingelevics. “But that's true of every piece of the wall in North America. They are all decontextualized to some degree.”

What they found most interesting about the new Dalhousie site is that the panels are not placed in a straight line, but rather are staggered, creating a sculptural feel, almost like Stonehenge. “It points to the multiple levels, or registers, at which the wall exists,” says Mr. Ingelevics.

The two professors note that many of the graffiti-covered pieces have taken on new esthetic meaning as art objects. “The fact that the Truro pieces were not particularly well-covered with paintings is perhaps what allowed the new custodians a little bit more freedom,” says Dr. Fitzpatrick. “They've been a little bit more interpretive with the objects than most places.” – SHAWNA WAGMAN

Six 12' x 4' panels of the Berlin Wall
now reside on the Dalhousie Agricultural
Campus in Bible Hill, N.S.



Ellen Hibbard



Deaf culture

Deaf grad defends thesis with ASL

EVEN THOUGH Ellen Hibbard's thesis defence did not include much sound, her message is being heard. Dr. Hibbard, who recently graduated from Ryerson University's communication and culture program, completed her PhD on the impact of online videos (or vlogs) on deaf culture, communication and identity. Her thesis could open doors for the use of technology for deaf academics and the deaf community.

Dr. Hibbard's defence, last October, was the first mixed media thesis of its kind for Ryerson. She used a format that combined content presented in online videos in her native language of American Sign Language (ASL), interspersed with written English sections. The dissertation has been made available on TerpTube, an emerging social media platform designed to meet the needs of deaf people.

Dr. Hibbard says she chose to use ASL in her defence because most deaf people cannot read beyond a fourth grade level and therefore require ASL to understand her work. "I created access and transparency for deaf people to be able to actually see the research I did on them in their own language," she says.

— ZACK BRADLEY

Overheard

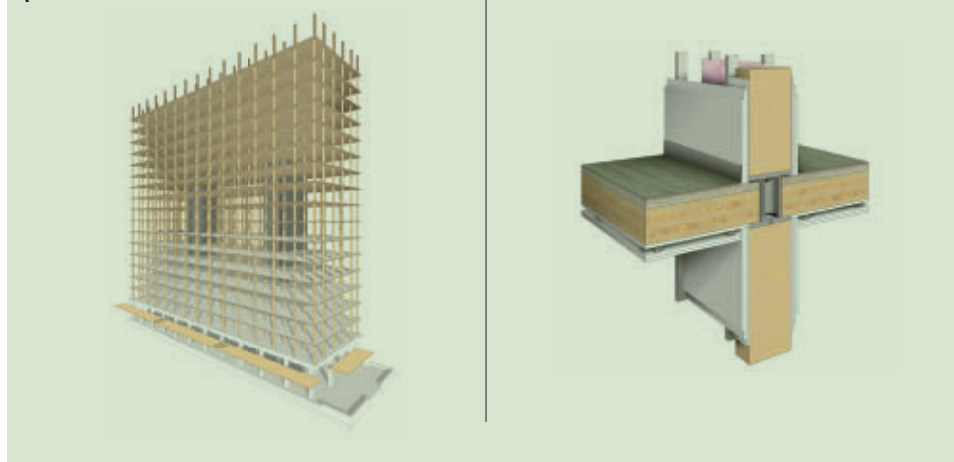


The online celebrity juxtaposed with everyday family and academic life, I find amusing. You're changing a diaper and meanwhile on Twitter, people are calling you brilliant.



Nathan Hall, associate professor in the department of education and counselling psychology at McGill University and creator of the Shit Academics Say Twitter account. His full interview can be viewed online at universityaffairs.ca.

Architectural drawings (l to r) show the mass timber structure and a detail of floor panels with steel connectors.



Natural resources

UBC residence will be one of world's tallest wood buildings

A STUDENT RESIDENCE under construction on the University of British Columbia campus will be one of the tallest wood buildings in the world once completed. UBC says the 18-storey structure builds on the university's commitment to sustainability and innovation. The eco-friendly structure will stand 53 metres tall and house more than 400 students after its completion, planned for 2017.

Building code regulations in B.C. cap the height of wood buildings at six storeys, but exceptions are made for structures created

"Mass timber does not easily ignite and if it does ignite, it typically extinguishes quite quickly."

with innovative materials. In this case, the material being used is called mass timber, defined as large-dimension engineered wood products, including glue-laminated columns and cross-laminated timber floor panels. Proponents of mass timber construction say it is more eco-friendly than using steel or concrete, which emit large amounts of carbon dioxide in their manufacture. Wood, on the other hand, stores carbon dioxide.

The new building is part of an overall plan to add more student residences on campus while supporting local industries, says John Metras, managing director of manufacture and development at UBC. The \$51.5-million tower will be funded mainly from student

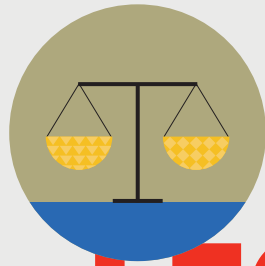
residence fees with some external funding coming from government and private agencies to cover the extra costs associated with using a material for the first time, says Mr. Metras.

Some within the construction industry are critical of tall wood buildings because of concerns they may be a fire hazard. To ease these concerns, UBC has taken extra precautions to prevent the spread of fire, including wrapping the walls with three to four layers of protective drywall and capping floors with a concrete topping.

A large wood building under construction in Kingston, Ont., made news when it burned to the ground in a spectacular ball of flames two years ago. But, Mr. Metras says the UBC building does not face the same fire risks as the one in Kingston.

"It's important to understand this is a mass timber structure. In Kingston, it was 2x4 construction, which has much greater risk for fire," he says. "Mass timber does not easily ignite and if it does ignite, it typically extinguishes quite quickly. The wood maintains its structural integrity and just chars on the outside."

This is not the first wood building the university has built and, says Mr. Metras, it won't be the last. "This is really the next step for us in the evolution of mass timber structures." — ZACK BRADLEY



LEGALLY SPEAKING



The university is opening a new mixed-use building and the tenants all need leases; the student union wants to hold an end-of-term block party; a spin-off company is using the university's logo on its marketing material; and the co-op program has questions about unpaid internships.

Call the university lawyer! Brent Davis, corporate counsel at McMaster University, explores these and other legal issues in our new column, "Legally Speaking."

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WHEN SOLDIERS



RETURN HOME

Researchers explore the post-deployment life
of Canada's recent veterans

by/par Anita Lahey Illustration by/par Noma Bar

QUAND LES SOLDATS



RENTRENT AU PAYS

Des chercheurs se penchent sur la vie des anciens
combattants de retour à la vie civile

“THE

WAY SOME VETERANS have spoken about it reminds me of when I first came to Canada,” says Maya Eichler, who holds the Canada Research Chair in Social Innovation and Community Engagement at Mount Saint Vincent University in Halifax. “I spoke the language – people could speak to me, I could speak to them – but we didn’t quite understand each other.”

Dr. Eichler is alluding to the “cross-cultural experience” faced by former soldiers embarking on civilian life. An assistant professor in the departments of political and Canadian studies as well as women’s studies at MSVU, Dr. Eichler has recently trained her eye on the new generation of Canadian veterans. For her study, “Veterans Policy and the Transition from Military to Civilian Life,” Dr. Eichler will conduct in-depth interviews with up to 100 veterans who’ve served in Canada’s most recent military engagements, including Bosnia-Herzegovina and Afghanistan.

Dr. Eichler will compare male and female soldiers’ transition experiences, and will also interview family members, veterans’ service providers and veteran activists. Her lens on gender, and her inclusion of broader familial and community perspectives, make Dr. Eichler’s study notable. “As a political scientist I’m very interested in the struggle over veterans’ policy,” she says. “I’m thinking about transition in terms of these interlocking social, economic, psychological and gender issues and how they interact with policy.”

Dr. Eichler is 25 interviews in and encounters “new insights” with each one. One veteran described requesting leave from work – “leave” to a soldier means simply “vacation” – only to be asked by an alarmed boss why she had to go on leave: had there been a crisis? Others talk of steep learning curves, especially those who’ve never lived off base or in their own homes. “They don’t know how to go shopping. They don’t know how to rent an apartment.” Dr. Eichler says she’ll conduct a deeper analysis once patterns emerge. Meanwhile, two key lessons are already apparent. One: there is no typical veteran’s story. And two: the term “transition” is inadequate. “‘Transition’ implies going from one to the other,” says Dr. Eichler. “But people never ‘transition’ fully. They leave things behind, they take things with them. It’s about legacies – some positive, some negative.”

At the other end of the country at the University of Victoria, Tim Black,

associate professor and department chair in education psychology and leadership studies, puts it another way. “The military way of life changes you fundamentally,” says Dr. Black, who has devoted much of his clinical work and scholarship over two decades to veterans, including co-developing the Veterans Transition Network with colleagues at the University of British Columbia in 1998. “You come back to the civilian world as a veteran, which could be viewed as a nebulous, politically charged label. Negotiating that identity is tricky for many people.”

Dr. Black says veterans’ common struggles are not necessarily what the wider public would expect. For example, instead of “what happened to them” while on deployment, many say their main problem is friendship, a different ball game outside the military’s group-based social environment. “I’ve been one of the more vocal voices in the research community to switch the focus from post-traumatic stress disorder to transition,” says Dr. Black. “Transition encompasses PTSD, not the other way around. PTSD doesn’t necessarily take away your whole identity. But some people literally don’t know who they are now that they’re out of the military.”

In 2010, Dr. Black published the results of an online survey of 216 veterans. One striking fact reported by some of the veterans was that they typically withheld their military experience in the civilian world because they felt it would be perceived negatively. That finding led to a current study by one of Dr. Black’s master’s students, supported by a Social Sciences and Humanities Research Council grant, on public perceptions of the military. “As a society we don’t pay much attention to what the military does,” says Dr. Black. “People tend to be critical of the military, be down on the military. That cultural piece is for me why transition issues matter.”

A decade ago, the kinds of inquiries Drs. Eichler and Black are conducting would have popped up as their own isolated islands in a sea of academic study. Now, the plight and well-being of veterans, and simply their growing presence in society since the war in Afghanistan, is attracting critical study across a broad spectrum of disciplines nationwide, from health and sciences to arts and humanities.

“It’s been a real growth area of research,” says Alice Aiken, associate director of the School of Rehabilitation Therapy at Queen’s University and scientific director of the Canadian Institute for Military and Veterans’ Health Research, or CIMVHR. “We have 36 Canadian universities in our network and we have researchers at them all doing work on veterans and veterans’ health. This is not only professors in the health sciences; we have professors from literature, drama, history and even music doing re-



QUE RACONTENT CERTAINS anciens combattants me fait penser à moi à mon arrivée au Canada, confie Maya Eichler, titulaire de la Chaire de recherche du Canada sur l'innovation sociale et l'enseignement communautaire à l'Université Mount Saint Vincent. Je parlais la langue, on pouvait s'adresser à moi et je pouvais répondre, mais on n'arrivait pas vraiment à se comprendre.»

M^{me} Eichler fait allusion au « choc culturel » auquel sont confrontés les soldats qui réintègrent la vie civile.

Professeure adjointe au département d'études politiques et canadiennes et au département d'études des femmes de l'Université Mount Saint Vincent, elle s'intéresse depuis peu à la nouvelle génération d'anciens combattants canadiens. Pour son étude, intitulée *Veterans Policy and the Transition from Military to Civilian Life* (Politique relative aux anciens combattants et passage de la vie militaire à la vie civile), elle entend mener des entrevues approfondies avec une centaine d'anciens combattants ayant participé aux derniers engagements militaires du Canada, y compris en Bosnie-Herzégovine et en Afghanistan.

M^{me} Eichler prévoit comparer les expériences de transition des soldats, hommes et femmes, et interviewer des membres de leur famille, des prestataires de services aux anciens combattants et des militants. La comparaison entre les deux sexes et la prise en compte des points de vue des membres de la famille et de la collectivité confèrent un caractère particulier à son étude. « En tant que chercheuse, je m'intéresse beaucoup à la lutte liée aux politiques concernant les anciens combattants, dit-elle. Je m'intéresse aux aspects sociaux, économiques et sexospécifiques de la transition, qui sont interconnectés, et à leur incidence sur les politiques. »

M^{me} Eichler a déjà mené 25 entrevues. Elle découvre chaque fois de « nouveaux points de vue ». Une ancienne combattante lui a confié qu'après avoir demandé un congé – c'est-à-dire des vacances –, son supérieur, alarmé, lui a demandé si elle vivait une crise. D'autres se heurtent à de grosses difficultés d'adaptation, surtout s'ils n'ont jamais vécu hors d'une base militaire ou seuls. « Ils ignorent comment faire leurs courses ou louer un appartement », explique M^{me} Eichler, qui entend procéder à une analyse approfondie une fois que des profils types se dégageront. Deux grandes constatations émergent déjà : l'expérience de chaque ancien combattant est unique, et le terme « transition » est inadéquat. « La transition, c'est passer d'une chose à une autre, mais les gens ne passent jamais totalement à autre chose, explique-t-elle, ils ne laissent que certaines choses derrière eux. La vie est faite d'héritages, positifs et négatifs. »

À l'autre bout du pays, Tim Black, professeur agrégé et chef du département de psychologie de l'enseignement et d'études du leadership à

l'Université de Victoria, présente les choses autrement. « La vie militaire transforme les gens en profondeur », dit celui qui a consacré plus de 20 ans de travaux cliniques et d'études aux anciens combattants, contribuant entre autres à la mise sur pied du Veterans Transition Network avec ses collègues de l'Université de la Colombie-Britannique en 2008. « On réintègre la vie civile en tant qu'ancien combattant, une identité qui est parfois perçue comme floue et à connotation politique. Beaucoup ont du mal à l'assumer. »

Selon M. Black, les difficultés des anciens combattants ne sont pas forcément celles qu'imagine le grand public. Par exemple, beaucoup affirment avoir surtout du mal non pas avec ce qu'ils ont vécu pendant leur déploiement, mais plutôt à se faire des amis hors de l'armée et de son esprit de corps. « J'ai été parmi les chercheurs qui ont le plus insisté sur la nécessité de se concentrer sur la transition plutôt que sur l'état de stress post-traumatique, ou ESPT, souligne M. Black. Si la transition comprend l'ESPT, l'inverse n'est pas vrai. L'ESPT ne prive pas forcément de son identité, mais certains ne savent plus qui ils sont une fois qu'ils ont quitté la vie militaire. »

M. Black a publié en 2010 les résultats d'une enquête en ligne auprès de 216 anciens combattants. Ils révèlent entre autres que les anciens combattants évitent généralement d'évoquer leur expérience militaire dans la vie civile, craignant que ce soit mal perçu. Ce constat a conduit à une nouvelle étude sur la perception des militaires par le public, actuellement menée par un étudiant à la maîtrise de M. Black grâce à une subvention du Conseil de recherches en sciences humaines (CRSH). « Notre société se soucie peu des militaires, affirme M. Black. Les gens les regardent d'un œil critique. C'est pour ça qu'il est si important d'aborder les problèmes de transition. »

Il y a 10 ans, les enquêtes comme celles de M^{me} Eichler et de M. Black étaient rares. Aujourd'hui, les préoccupations liées à la détresse et au bien-être des anciens combattants ainsi que leur nombre grandissant depuis la guerre en Afghanistan poussent des chercheurs de partout au pays et d'un large éventail de disciplines – santé, sciences, arts, sciences humaines, etc. – à effectuer d'importantes études sur le sujet.

« C'est une thématique de recherche en plein essor », affirme Alice Aiken, présidente du département de physiothérapie de l'Université Queen's et directrice scientifique de l'Institut canadien de recherche sur la santé des militaires et des vétérans. « Notre réseau compte 36 universités dont les chercheurs s'intéressent aux anciens combattants et à leur santé. Parmi eux figurent des professeurs de sciences de la santé, mais également de littérature, d'art dramatique, d'histoire et même de musique. Nous envisageons la santé au sens large, selon la définition de l'OMS : un état de complet bien-être physique, mental et social. »



« On réintègre la vie civile en tant qu'ancien combattant, une identité qui est parfois perçue comme floue et à connotation politique. Beaucoup ont du mal à l'assumer. »



“You come back to the civilian world as a veteran, which could be viewed as a nebulous, politically charged label. Negotiating that identity is tricky for many people.”

lated research. We take ‘health’ in the broadest sense of the World Health Organization definition: a complete state of mental, physical and social well-being.”

Founded in 2010, CIMVHR has played no small part in putting veterans-related research on the academic radar. Canada is home to between 600,000 and 700,000 veterans, nearly 40,000 of whom served in Afghanistan, and Dr. Aiken says Canadian academia is late to the game in seeking to understand their issues and needs. “Before we started,” she says, “things were done ad hoc, this here and that there, and the results weren’t going anywhere. We’ve captured the Canadian landscape; we’ve become the essential knowledge broker.”

Formed in collaboration with, but at arms’ length from, the Department of National Defence and Veterans Affairs Canada, CIMVHR distributes a handful of graduate scholarships and runs a graduate webinar course with, this year, 36 participants nationwide. CIMVHR’s annual conference on military and veterans’ health, now in its fifth year, has become a focal point. “It’s the one place every year where government, the military, clinicians, social workers and veterans all come together,” says Dr. Black. “The information that gets shared and the connections made are huge. ... David Pedlar [director of research for VAC] is there. I see him once a year. We compare notes, we talk about collaboration.”

Kip Pegley, an associate professor of musicology at Queen’s University, is likewise enthusiastic about CIMVHR. “You have a network of researchers really committed to improving the lives of military personnel. That’s powerful. I’ve heard vets speak to those conferences and say ‘This is unbelievable. We feel like we’re on the radar.’”

Dr. Pegley, a Halifax native whose father was a veteran of the Korean War, is part of that network. Co-editor of the 2012 essay collection, *Music, Violence and Politics*, she’s in the midst of a multi-year research program funded by SSHRC on the relationship between music, war and Canadian identity. In addition to studying the use of music in Canadian War Museum exhibits, Dr. Pegley has conducted qualitative interviews – “We often meet in a Tim Horton’s” – with 20 Canadian army veterans who served in Bosnia, Cyprus and Afghanistan. Dr. Pegley doesn’t ask these men and women about PTSD or transition issues per se. She asks them about their use of music, both during and after deployment, which has often led to them talking about PTSD and how music has helped them cope. “I have found the vets incredibly generous in telling me about their struggles and difficulties, especially if it might help future soldiers,” says Dr. Pegley.

In a paper slated for the second edition of CIMVHR’s new publication, the *Journal of Military, Veteran and Family Health*, Dr. Pegley argues that in the face of growing neurological science proving music’s measurable effect on the body and the brain – from heart rate and blood pressure to muscle tension and hormone levels – music’s potential to aid in PTSD prevention and management should be studied more deeply. She writes, “If soldiers wearing headsets appeared as though they were simply ‘tuning out,’ they were in fact, consciously or not, gaining more control of their environment and their responses to it – from the inside out.”

Dr. Pegley describes how veterans she spoke with had used music to “focus, go inside, as an incredibly important mode of preparation” before going out on patrols or into potential combat situations, or conversely “to come back down” after returning to camp. Singing along with crewmates in the back of a light armoured vehicle was, for some, grounding and bonding. Others related sharing iPods while on duty. One female driver of a LAV sang hymns she’d learned from her grandmother while driving her crew across the Afghan desert. In effect, Dr. Pegley explains, they were using music “to protect and maintain their mental health.”

Back home, soldiers use music to help themselves “manage, and remember, the experience of war.” Some veterans only listen to music they knew before they were deployed – a lost time of stability. For others, particular songs trigger excruciating memories. Bagpipes, associated for many with ramp ceremonies for fallen soldiers, can be potent. “Hearing them ... can unleash feelings of loneliness or rage, often when they least expect it.” Dr. Pegley wants to investigate how personalized playlists could be used in neurofeedback treatments to help sufferers of PTSD “reset” their brains.

Before the launch in early 2015 of CIMVHR’s new journal, Dr. Pegley may have sent her paper to a musicology journal, far from the eyes of those with a stake in veterans’ well-being. “We still encourage researchers to publish diversely,” says Dr. Aiken, who serves as co-editor-in-chief of JMVFH. “But we really needed a go-to spot for military, veterans and family health research. My own PhD is in health services and health policy. If I wanted to influence government policy makers, I’d publish in our journal. We know they’re paying attention.”

Ibolja Cernak, professor and chair of Canadian Military and Veterans’ Rehabilitation Research at the University of Alberta, certainly hopes so. A physician with a PhD in neuroscience and master’s degrees in biomedical engineering and homeland security and public health preparedness,

Créé en 2010, l'Institut a beaucoup contribué à l'intérêt des chercheurs universitaires pour les anciens combattants. Le Canada compte entre 600 000 et 700 000 anciens combattants, dont près de 40 000 ont servi en Afghanistan. Selon M^{me} Aiken, les universitaires canadiens ont tardé à se pencher sur leurs problèmes et leurs besoins. « Avant la création de l'Institut, dit-elle, la recherche se faisait au cas par cas et ne menait nulle part. Maintenant, nous sommes devenus la plateforme d'échanges entre chercheurs canadiens. »

Mis sur pied en collaboration avec les ministères de la Défense nationale et des Anciens combattants Canada (ACC), mais indépendant de ceux-ci, l'Institut attribue quelques bourses d'études supérieures et propose, sous forme de webinaire, un cours destiné aux étudiants aux cycles supérieurs. Trente-six étudiants de partout au pays le suivent cette année. La conférence annuelle de l'Institut sur la santé des militaires et des anciens combattants, qui en est à sa cinquième édition, est devenue un événement phare. « Elle attire chaque année des représentants des gouvernements, des militaires, des cliniciens, des travailleurs sociaux et des anciens combattants, souligne M. Black. La somme d'information mise en commun et de liens tissés est énorme. [...] J'y retrouve chaque année le directeur général de la recherche d'ACC, David Pedlar. Nous échangeons et discutons de collaboration. »

Professeure agrégée de musicologie à l'Université Queen's, Kip Pegley est tout aussi emballée par l'Institut. « C'est un réseau de chercheurs déterminés à améliorer la vie du personnel militaire. Un réseau puissant. Lors des conférences annuelles, j'ai entendu d'anciens combattants raconter être agréablement surpris de constater qu'on se soucie d'eux. »

Native d'Halifax, M^{me} Pegley, dont le père a servi en Corée, fait partie de l'Institut. Corédactrice en chef de la collection d'essais *Music, Violence and Politics* parue en 2012, elle dirige un programme de recherche pluri-annuel financé par le CRSH, axé sur la relation entre musique, guerre et identité canadienne. En plus d'étudier l'usage de la musique dans les expositions du Musée canadien de la guerre, M^{me} Pegley a effectué (souvent dans des Tim Horton's) des entretiens qualitatifs auprès de 20 anciens combattants canadiens ayant servi en Bosnie, à Chypre et en Afghanistan. Elle n'interroge pas directement ces hommes et femmes sur l'ESPT ou sur leurs problèmes de transition, mais plutôt sur leur usage de la musique pendant et après leur déploiement, ce qui les conduit souvent à parler de l'ESPT et de la manière dont la musique les a aidés à tenir le coup. « Ils confient leurs luttes et leurs difficultés avec une générosité incroyable, surtout si ça peut être utile aux futurs soldats », souligne M^{me} Pegley.

Dans un article du deuxième numéro de la nouvelle publication de l'Institut, le *Journal of Military, Veteran and Family Health* (JMVFH), M^{me} Pegley soutient que la contribution potentielle de la musique à la prévention et à la gestion de l'ESPT doit être étudiée plus à fond maintenant que les progrès en neurologie montrent ses effets mesurables sur le corps humain (cerveau, rythme cardiaque, pression sanguine, tension

musculaire, taux d'hormones, etc.). Elle écrit : « Les soldats utilisent des écouteurs pas seulement pour "déconnecter", comme on pourrait le croire, mais dans le but conscient ou non de mieux maîtriser leur environnement et leurs réactions à celui-ci. »

M^{me} Pegley précise que les anciens combattants interrogés lui ont confié avoir recours à la musique pour se retrancher en eux-mêmes et faire le point (un mode de préparation extrêmement important avant de partir en patrouille ou de s'exposer au combat) ou encore pour « se déconnecter » une fois de retour au camp. Pour certains, chanter avec leurs coéquipiers à l'arrière d'un véhicule d'assaut léger était un moyen de s'ancrer dans la réalité et de créer des liens. D'autres ont partagé leur iPod pendant qu'ils étaient en devoir. La conductrice d'un véhicule d'assaut léger a précisé qu'elle chantait des hymnes appris de sa grand-mère en conduisant son équipe dans le désert afghan. Pour M^{me} Pegley, « tous ces gens ont utilisé la musique pour se protéger et préserver leur santé mentale ».

De retour au pays, les anciens combattants utilisent la musique pour « mieux gérer et se remémorer leur expérience de la guerre ». Certains n'écoutent que de la musique qu'ils connaissaient avant leur déploiement, à savoir avant la déstabilisation qu'il a provoquée. Pour d'autres, certaines chansons ravivent des souvenirs insupportables. Le son de la cornemuse, souvent associée aux cérémonies d'adieu aux soldats tombés au combat, peut déclencher de tels souvenirs. « Le son de la cornemuse peut faire ressurgir des sentiments de solitude ou de colère aux moments les plus inattendus. » M^{me} Pegley souhaite étudier la possibilité d'utiliser des listes d'écoute personnalisées dans le cadre de traitements de rétroaction neurologique pour aider les personnes présentant un ESPT à « réinitialiser » leur cerveau.

Avant le lancement de la nouvelle publication de l'Institut au début de 2015, M^{me} Pegley aurait soumis son article à une revue de musicologie, inconnue des gens qui s'intéressent au bien-être des anciens combattants. « Nous continuons à encourager les chercheurs à écrire sur divers sujets, précise M^{me} Aiken, corédactrice en chef de la publication JMVFH, mais souhaitons être une publication de référence en matière de recherche axée sur la santé des militaires, des anciens combattants et de leurs familles. Une telle publication est essentielle. Je possède un doctorat en services et en politiques de santé. Si je souhaitais influencer les décideurs politiques, je publierais dans le JMVFH. Nous savons qu'ils le lisent. »

Professeure et titulaire de la chaire en rétablissement clinique des militaires et des anciens combattants canadiens à l'Université de l'Alberta, Ibolja Cernak espère que c'est le cas. Médecin titulaire d'un doctorat en neurosciences et d'une maîtrise en génie biomédical, sécurité intérieure et préparation aux crises de santé publique, la D^{re} Cernak se penche depuis plus de 25 ans sur les problèmes des militaires et des anciens combattants. Elle est l'auteure principale d'un article paru dans le premier numéro du JMVFH portant sur les résultats d'une étude totalement novatrice, pour laquelle elle est devenue la première universitaire nord-américaine em-

Dr. Cernak has devoted her more than 25-year career to military and veterans' issues. She is senior author of a paper published in JMVFH's first issue, which discusses results from her current, groundbreaking research, for which she became the first North American scholar to embed with soldiers during deployment in combat zones. (The first phase of Dr. Cernak's research was reported in the March 2014 issue of *University Affairs*.) The findings outlined in that paper, how soldiers' cognition improves during deployment, form one piece of what Dr. Cernak says will ultimately be a more accurate and complete understanding of soldiers' and veterans' resilience against, and susceptibility to, mental health problems in different operational-stress environments.

Her plan was to track 200 soldiers at five time points: during training, during service and deployment, during early readjustment (six to nine months post-deployment), and then two and five years later. The study combines questionnaires with objective data: computerized cognitive testing (measuring memory function, spatial memory, focus, attention switching, emotion and impulse control, among others) and stress-hormone measurement through saliva and urine samples. "As we repeat these baselines at multiple time points, in different stress situations," says Dr. Cernak, "we can sense pre-emptively when a person moves from a functional stage to a dysfunctional stage. We can identify people at risk and intervene on time."

However, with the first three stages of testing complete (training, deployment and readjustment), Dr. Cernak's funding from the Royal Canadian Legion has run its course, so the study has closed early. She's not alone in pointing out that funding in this area can be challenging to come by through the traditional "tri-council" of scholarly research funding bodies: SSHRC, the Canadian Institutes for Health Research and the Natural Sciences and Engineering Research Council. "Currently, when you send a funding proposal that includes 'military,' it is seen as too specific. You are advised to apply for support from DND," says Dr. Cernak. "Health problems military personnel acquire due to their service are complex and long term, and as such they represent a health care challenge for the entire country. This should be recognized by every research funding agency."

Veterans Affairs does conduct its own research on veterans, chiefly via the Life After Service Survey administered by Statistics Canada. The survey consists of telephone interviews of veterans: in 2010, StatsCan interviewed 3,154 regular force veterans released from duty between 1998 and 2007; and in 2013, it interviewed about 3,450 regular and reserve

force veterans released between 1998 and 2012. (VAC researchers could not be interviewed for this article, which was being compiled during the recent federal election campaign: *University Affairs* was told no VAC staff could be interviewed while the campaign was ongoing.)

"Their job is to research veterans, and they do," says UVic's Dr. Black, referring to Veterans Affairs Canada. "But why shouldn't we also have independent academic research, to have something to compare to the government statistics? Since not all veterans are clients of Veterans Affairs, independent researchers could potentially capture experiences not covered by government sources. I can pursue whatever line of questioning I choose through academic freedom."

Dr Cernak's research, though incomplete, offers evidence supporting Dr. Black's argument. "Our study covers three essential operational environments in a military career, which provides unique insight into the effects of operational stressors," says Dr. Cernak. "We're performing quite a complex statistical analysis, looking at the patterns that would identify those at risk of developing mental health problems, compared to the patterns of those with high resilience."

So far, her study reveals a higher incidence of depressive behaviour, anxiety and pre-PTSD behaviour among those serving in the military than the official statistics show: 15 percent pre-deployment, 28 to 30 percent during deployment and about 25 percent post-deployment. (The most recent official statistic of "cumulative incidence of PTSD" in the military population, from government data collected between 2001 and 2011, is 8 per cent, with other Afghanistan-related mental disorders affecting 5.2 percent of personnel.) Dr. Cernak's team will also break down data in ways the government studies don't.

"What is the percentage [of mental health problems] among artillery versus support staff? What about operational experience, number of deployments, combat versus peacekeeping deployment? We're building these databases. In our data analysis, the stress-coping of every individual is compared to his or her own previous baselines. This allows us to identify subtle changes in an individual's health."

Despite having to close her study early, Dr. Cernak is hopeful for veterans' research – and, by extension, veterans' improved well-being – down the road. "CIMVHR is still in a very first phase, trying to raise awareness and co-ordinate potential collaboration. But it will not solely depend on academic researchers," she says. "It will depend on recognition of its importance through financial support." UA

“Health problems military personnel acquire due to their service represent a challenge for the entire country. This should be recognized by every research funding agency.”



barquée avec des soldats déployés en zones de combat. (La première phase de cette étude fait l'objet d'un article dans le numéro de mars 2014 d'*Affaires universitaires*.) Selon la D^{re} Cernak, les résultats publiés dans le *JMVFH*, relatifs à la manière dont la cognition des soldats est accentuée pendant leur déploiement, devraient, avec ceux qui suivront, permettre de mieux comprendre la résilience des soldats et des anciens combattants face aux problèmes de santé mentale dans divers contextes de stress opérationnel, et les risques qu'ils soient victimes de tels problèmes.

L'étude prévoyait au départ faire le suivi de 200 soldats à cinq stades : formation, déploiement, réadaptation (six à neuf mois après la fin de leur déploiement), puis deux ans et enfin cinq ans après la fin de leur déploiement. L'étude vise à recueillir des renseignements au moyen de questionnaires ainsi que des données objectives au moyen de tests cognitifs informatisés (évaluation de la mémoire et de la mémoire spatiale, de l'attention, de la distraction, du contrôle des émotions et des impulsions, etc.) et de mesures du taux d'hormones de stress à partir d'échantillons de salive et d'urine. « La collecte de ces données à chaque stade, dans différentes situations de stress, permet de prévoir le moment où un individu passera d'un état fonctionnel à un état dysfonctionnel, explique la D^{re} Cernak, et donc de cibler les personnes à risque pour intervenir à temps. »

Malheureusement, l'étude de la D^{re} Cernak a pris fin après les trois premiers stades prévus en raison de l'épuisement de la subvention de la Légion royale canadienne dont elle bénéficiait. La D^{re} Cernak n'est pas seule à souligner la difficulté d'obtenir, pour ce type d'études, du financement des organismes subventionnaires traditionnels – le CRSH, les Instituts de recherche en santé du Canada (IRSC) et le Conseil de recherches en sciences naturelles et en génie (CRSNG). « Ils jugent trop ciblées les demandes de financement où figure le mot "militaire". Mieux vaut demander du financement au ministère de la Défense nationale, affirme-t-elle. Les problèmes de santé qu'éprouve le personnel militaire pendant son déploiement sont complexes et s'étalent dans le temps. Ils représentent un défi pour le pays. Les organismes subventionnaires devraient en être conscients. »

ACC mène également ses propres recherches sur les anciens combattants. Signalons entre autres l'Enquête sur la vie après le service militaire, administrée par Statistique Canada. L'enquête est basée sur des entrevues téléphoniques d'anciens combattants menées respectivement en 2010 auprès de 3 154 anciens combattants de la force régulière démobilisés entre 1998 et 2007, et en 2013 auprès de 3 450 anciens combattants des forces régulières et de réserve démobilisés entre 1998 et 2012. (Les chercheurs d'ACC n'ont pu être interviewés pour cet article, ACC ayant informé *Affaires universitaires* qu'aucun membre de son personnel ne pouvait être interviewé

pendant la campagne électorale fédérale, période au cours de laquelle cet article a été préparé.)

« Le ministère des Anciens Combattants a entre autres pour mission de mener des études sur les anciens combattants, ce qu'il fait, souligne M. Black. Mais pourquoi ne mènerait-on pas également des études universitaires indépendantes dont les résultats pourraient être comparés aux statistiques gouvernementales? ACC n'interroge pas tous les anciens combattants; des chercheurs indépendants pourraient se pencher sur les expériences non visées par le ministère. Personnellement, la liberté universitaire m'autorise à poser toutes les questions que je veux. »

Bien qu'incomplète, l'étude de la D^{re} Cernak apporte de l'eau au moulin de M. Black. « Notre étude couvre trois contextes opérationnels inévitables pendant une carrière militaire. Elle apporte un éclairage unique sur les facteurs de stress opérationnel, dit-elle. Par des analyses relativement complexes, nous comparons les profils des personnes qui risquent de développer des problèmes de santé mentale à ceux des personnes très résilientes. »

Jusqu'à présent, cette étude a révélé une incidence supérieure des comportements dépressifs, anxieux et pré-ESPT chez les militaires que dans les statistiques officielles. Elle serait de 15 pour cent avant le déploiement, de 28 à 30 pour cent pendant celui-ci, et d'environ 25 pour cent après celui-ci. (Selon les dernières statistiques officielles sur « l'incidence cumulée de l'ESPT » chez les militaires, issues des données gouvernementales recueillies entre 2001 et 2011, cette incidence serait de huit pour cent, et celle des autres troubles mentaux liés aux séjours en Afghanistan, de 5,2 pour cent.) L'équipe de la D^{re} Cernak entend également fractionner les données recueillies autrement que le fait le gouvernement.

« Quelle est l'incidence des problèmes de santé mentale au sein du personnel de l'Artillerie, comparativement au personnel de soutien? Quelle est l'incidence si on compare l'expérience opérationnelle, le nombre de déploiements, la participation à des missions de combat comparativement à des missions de maintien de la paix? Nous analysons ces données, comparons la résistance au stress d'un individu par rapport à sa propre résistance antérieure. Ça nous permet de déceler de subtiles modifications sur le plan de sa santé. »

Même si elle a dû interrompre son étude avant terme, la D^{re} Cernak croit en l'avenir de la recherche sur les anciens combattants et, par conséquent, à sa contribution potentielle à leur bien-être. « L'Institut entreprend à peine son action de sensibilisation et de coordination des collaborations potentielles, mais son avenir ne dépend pas uniquement des chercheurs universitaires, conclut-elle. Il dépend de la reconnaissance de son importance, et cela se traduit par son financement. » **AU**

Taking the doctorate in **new** **directions**

by Suzanne Bowness





A number of programs are exploring options
for applied scholarship within the PhD

Art by Stephen Doyle



WHEN SHE BEGAN her doctorate in social psychology at the University of British Columbia, Ashley Whillans knew that she wanted to study workplace happiness – or, more specifically, the benefits of time

off versus more money in relation to job satisfaction. She also wanted her work to have a real-world impact. To that end she began to wonder: what if, rather than seeking out the usual crowd of undergraduates as research subjects, she could collect data from actual workplaces and in exchange she'd offer them her findings?

Ms. Whillans, who's in the second year of her PhD program, reached out to potential partners, including YouEarnedIt, a Texas-based company that designs employee-rewards programs. In exchange for real-world customer data, Ms. Whillans would provide these companies with results they could use to tweak their businesses or organizational approaches.

"Since starting graduate school, I have always been very interested in putting science to work to solve real-world problems," she says. In the case of YouEarnedIt, Ms. Whillans set up a survey to measure whether employees were happier to receive time-saving rewards like getting their lawns mowed and having groceries delivered, or more typical and tangible rewards like iPads and coffee gift cards. The company will in turn be able to share those insights with its customers. For Ms. Whillans, this means her results won't just sit in a journal somewhere, but be put to use immediately.

Administrators at the companies she reached out to seem just as enthusiastic about the project. Tim Ryan, vice-president of marketing for YouEarnedIt, says he appreciates both the opportunity to help a young researcher as well as the potential improvements the company can make based on Ms. Whillans' findings. "I love that it's two-way, that we're all benefiting from this," he says.

It's not just companies catching on to the merit of this kind of field-work; Ms. Whillans was assisted in her project through a grant from UBC's recently launched Public Scholars Initiative, a pilot project that, ac-

cording to the university, is targeted at PhD students "who are interested in explicitly linking their doctoral work to an arena of public benefit and integrating broader and more career-relevant forms of scholarship into their doctoral education process." The program's first call for proposals attracted 98 applications (mostly from students mid-PhD) and provided up to \$10,000 of funding to each of the 39 selected projects. Besides Ms. Whillans, successful applicants include a political science candidate who is developing a humanitarian training program for those helping former child soldiers, and an applied science student (and former Boeing employee) who is creating a framework to link academic knowledge and industry practice.

"The idea is to integrate scholarship that is preferably collaborative with an entity or individuals outside of academia or in different levels of academia, and to do the diverse types of scholarship that lead to an impact on the public good," says Susan Porter, dean and vice-provost of graduate and postdoctoral studies at UBC.

Public humanities is just one approach that university leaders are exploring to address the concern that the PhD is in need of attention both in terms of structure and relevance. The often quoted statistic that only 20 percent of doctoral graduates attain tenure-track positions, and the growing awareness that a good number of PhDs leave academia altogether, is finally prompting discussions like the ones held at the Future Humanities conference last May at McGill University. The conference attracted scholars, doctoral candidates and academic "refugees" to brainstorm and address issues like lagging completion times and the perceived irrelevance of the PhD outside the academy.

Despite these discussions, there have been few examples of actual change. One promising effort is the Public Humanities @ Western program, launched in May 2011 by Joshua Lambier, a PhD candidate in English at Western University. Back then, Mr. Lambier, a Trudeau Scholar, wrote what he calls a "Jerry Maguire-style" vision statement for his doctoral research and presented it to Western's dean of arts and science. In response, the dean provided a small amount of seed funding that Mr.

“The majority were either suspicious or lukewarm. They’d ask: ‘Why would you want to do this? Where does this fit into your PhD?’”

Lambier used to start approaching arts groups in London as partners.

Today, Mr. Lambier is program director for the initiative, which counts about a dozen program coordinators from disciplines as diverse as sociology, anthropology, music and medicine. The program’s flagship projects include a speaker series, a literary and creativity festival called Words, a campus-community partnership called Engage Western, and Stories of Illness and Health, an initiative involving Western, the London Public Library and the London Health Sciences Centre to collect and share personal stories of living with illness. Since its inception, Public Humanities @ Western has engaged with 90 local groups and boosted the university’s profile in the community, even though students receive no official credit for their involvement to apply against degree requirements.

This lack of recognition is a far cry from the situation in the U.S., where students can earn master’s degrees in public humanities at Brown University and Yale University, or a PhD in public humanities at the University of Washington. Imagining America, an umbrella organization dedicated to “advancing the public and civic purposes of humanities,” is supported by more than 90 institutions.

Roberta Cauchi-Santoro followed up a traditional PhD in comparative literature with a two-year Mitacs-funded postdoc that fits the public humanities profile. She echoes both Ms. Whillans and Mr. Lambier in their desire for more official support of the field. “I think this kind of project should not be undertaken by a postdoc totally independently on their own initiative, but should be arranged by core faculty members who actually come up with projects and then give the PhD students, even in their first and second year, the opportunity to carry out some parts of the research,” says Dr. Cauchi-Santoro. For her own project, she looked at 35 buildings in downtown London, Ontario (many slated for demolition), and interviewed locals about them. The project allowed her to make valuable community connections, she says.

For Mr. Lambier, the enthusiasm his work received from the local community was not always matched by faculty at Western. “I got a much more mixed reaction,” he says. “There were some immediate champions,

but I think the majority were either suspicious or lukewarm. They’d ask: ‘Why would you want to do this? Where does this fit into your PhD?’”

Controversies about changing the PhD go beyond the field of public humanities. How about making the degree more interdisciplinary? Many critics see this as a threat to traditional departmental silos. Or more coursework-based degrees? Some consider them a useful grounding in a discipline’s language and methodologies, while others argue the option repeats much of what’s covered in the master’s degree and lacks consistency. And what of comprehensive exams and the PhD’s crowning glory, the dissertation? While their purpose and relevance have been questioned (particularly in light of lengthy completion times), most are wary of any change for fear of diminishing their rigour.

For dissertation defenders, Félix Grenier might be considered a blaspheemer. A doctoral candidate in political studies at the University of Ottawa, he points to the gradual disappearance of the purely research-focused social sciences master’s degree in favour of the coursework-stream master’s as a marker of things to come. “I see it coming at the PhD level. You will see it in maybe 10, 15, 20 years,” he says.

Mr. Grenier’s dissertation explores the sociology of knowledge in international relations through graduate education programs. At a recent roundtable discussion with representatives from international studies programs, he learned that these programs, which currently offer mostly master’s degrees, are looking to develop doctoral streams. In a field that already values applied work, the challenge is to create a program that would prepare students equally for positions in non-governmental organizations and government as for pure research. Mr. Grenier’s most controversial idea for making a hands-on PhD a reality is to have students select either a research track or an applied track for their doctoral degree, much like they already do at the master’s level.

“A program should help them decide very quickly, in the first six months, what they want to do,” Mr. Grenier says. Researchers who aspire to the tenure track would pursue a traditional dissertation whereas those inclined towards non-academic jobs could select applied components like intern-

“It’s important for the students to have a more concrete idea of what is possible and what their peers are doing with their degrees.”

ships, publishable articles, policy papers or patents. He realizes the potential for debate this option stirs up: “Are they the same kind of program? I’m not sure. It’s a hanging question that remains to be solved,” he says.

Even for those who support switching up the dissertation for other forms, the idea of a two-track PhD may take it too far. “I’m wary of suggesting we should have academic PhDs versus alt-ac PhDs because I don’t think it’s fair to ask students to self-select before they’ve become PhDs,” says Frédéric Bouchard, a professor of philosophy and director of the Centre interuniversitaire de recherche sur la science et la technologie at Université de Montréal. Western’s Mr. Lambier agrees: “I would be very suspicious of creating a PhD A and a PhD B. If somebody had to identify right from the get-go that to do PhD B means you’re off the tenure track, I think it’d be very discouraging and I don’t think it would take,” he says.

One problem with these theoretical discussions is that they’re just that – theoretical. Meanwhile, after a strategic review in 2005, the University of Saskatchewan’s history department eliminated its traditional first year of coursework in favour of directing doctoral students straight into comprehensive exams (in a major and two minor fields) on set dates early on in year two. The program also instituted mandatory biweekly meetings with supervisors, guaranteed five-year funding, and teaching fellowships to give students experience as course directors. Martha Smith-Norris, director of graduate studies in the department, says the change was generally well received. “I think overall people prefer the more efficient process, and the fact that now statistically we can show that our students are finishing on average around six years,” she says.

Dr. Smith-Norris also began to track her history PhDs post-graduation, yet another task that many vow to implement but have yet to start (among the exceptions are UBC and Concordia University, and at a national level there is a new project that emerged from the McGill conference called TRaCE, which will track PhDs outside academia and organize them into a network). Tracking students all the way back from 1990, Dr. Smith-Norris found that of 29 PhD students who graduated, nine had academic jobs, three had senior administrative jobs at the university, and four are postdocs. Others went on to get jobs at NGOs, to do other professional degrees, or into a combination of sessional and writing work.

In total, there were 72 students who entered the program since 1990 (which historically admitted one to two per year and after its redesign admitted around five per year), of which 32 are currently still completing

their degrees. Dr. Smith-Norris says tracking the graduates is fairly labour-intensive, using digital “trails” such as online searches and LinkedIn profiles in addition to direct contact. However, she believes the results have the potential to inspire her students to persevere with the program. “It’s important for the students to have a more concrete idea of what is possible and what their peers are doing with their degrees,” she says.

To increase the professional development aspect of the PhD, some departments are starting to invite consultants like Anne Krook to help doctoral candidates to prepare for non-academic job searches. (Dr. Krook wrote an essay on the subject, “Mobilizing the humanities for diverse careers,” for *University Affairs* published last June). Dr. Krook shared her own experience as a case study: denied tenure, she reinvented herself as a business communications professional and consultant, starting with a position at Amazon.

Her experience suggests that perhaps one of the most helpful changes to the PhD is one that costs very little: encouraging students to see the world outside the academy as intellectually stimulating. “Frankly, Amazon was the most intellectually demanding place I ever worked. I didn’t find it less demanding than academics. I did not turn off my brain when I stopped being a faculty member,” she says.

Dr. Bouchard at U de Montréal agrees: “We easily fall into this mythology of universities that they are the only place where breakthroughs happen. But everyone outside of universities knows there are lots of people doing highly innovative things.”

As for Ms. Whillans at UBC, she says that opening up her PhD has “definitely broadened my horizons and it’s made me feel a little bit better about my prospects when I graduate. Actually working with these industry and government contacts has made me realize that the skills that we’re gaining in a graduate program are broader than we often think.” ^{1A}

This is the second of a two-part series by Suzanne Bowness examining PhD programs. The first instalment, “Awakening to alt-ac careers,” appeared in the October 2015 issue.

Le doctorat prend un nouveau virage

par Suzanne Bowness

LORSQUE ASHLEY WHILLANS a entrepris son doctorat en psychologie sociale à l'Université de la Colombie-Britannique (UCB), elle voulait étudier le bien-être en milieu de travail. Elle voulait surtout connaître les avantages du temps libre par rapport aux récompenses en argent dans la satisfaction professionnelle. Elle souhaitait également que son travail ait des répercussions tangibles. Au lieu de mener ses recherches auprès de la population universitaire, elle a donc décidé de recueillir ses données dans de véritables milieux de travail et de leur offrir en échange les résultats de ses recherches.

Étudiante au doctorat en deuxième année, M^{me} Whillans a abordé des partenaires potentiels, dont YouEarnedIt, une entreprise d'Austin, au Texas, spécialisée dans les programmes de reconnaissance pour les employés. En échange de données réelles au sujet de leurs employés, M^{me} Whillans a décidé de faire cadeau à ces entreprises des résultats de ses recherches afin qu'elles puissent s'en inspirer pour améliorer leurs stratégies de gestion ou leurs démarches organisationnelles.

Dans le cas de YouEarnedIt, M^{me} Whillans a élaboré un sondage visant à savoir si les employés préféreraient les récompenses qui leur donneraient plus de temps libre (soit des services comme tondre leur pelouse ou livrer leur épicerie) ou des récompenses tangibles telles que des iPad et des cartes-cadeaux pour du café. L'entreprise pourra ensuite s'inspirer des résultats pour mieux répondre aux besoins de ses employés. Pour M^{me} Whillans, cela signifie que ses recherches ne se contenteront pas d'être dans une revue : elles pourront être mises à profit immédiatement.

M^{me} Whillans a reçu l'aide financière du Public Scholars Initiative, un projet pilote récemment mis sur pied par l'UCB, et qui, selon l'Université, est conçu pour venir en aide aux doctorants qui « désirent intégrer des projets de recherche axés sur le monde professionnel de vaste portée à leur parcours d'études doctorales ». Trente-neuf projets ont été sélectionnés et financés jusqu'à concurrence de 10 000 dollars chacun.

Ces bourses d'études pour la recherche appliquée constituent une des manières envisagées par les universités pour répondre aux besoins des doctorants, tant sur le plan de la structure que de la pertinence. Félix Grenier, étudiant au doctorat en science politique à l'Université d'Ottawa, propose une autre méthode pour favoriser le cheminement pratique des doctorants : offrir aux doctorants le choix entre un volet d'étude pratique ou un volet théorique. Ainsi, les chercheurs qui visent à obtenir un poste universitaire menant à la permanence pourraient opter pour le cheminement traditionnel avec thèse, tandis que ceux qui souhaitent poursuivre

leur carrière hors de l'université pourraient opter pour un volet pratique comportant par exemple des stages, la rédaction d'articles, la préparation de documents d'orientation ou le dépôt de brevets. Il est conscient que ce type de cheminement peut éveiller des doutes : « s'agit-il du même type de programme? Je n'en suis pas certain. Cette question reste pour l'instant sans réponse », dit-il.

Même ceux qui sont en faveur de laisser tomber la thèse demeurent sceptiques face aux programmes de doctorat à deux volets. « Je suis réticent au concept des programmes de doctorat parallèles. Je ne crois pas qu'il soit judicieux de demander aux étudiants de choisir un cheminement de carrière avant même qu'ils n'aient obtenu leur diplôme », s'inquiète Frédéric Bouchard, professeur de philosophie et directeur du Centre inter-universitaire de recherche sur la science et la technologie de l'Université de Montréal.

Dans le but de favoriser le développement professionnel des doctorants, certains départements ont invité des conseillers, comme Anne Krook, originaire de Seattle, pour préparer les candidats au doctorat à une carrière hors de l'université. Lors de ses séminaires, M^{me} Krook s'inspire de sa propre expérience : après avoir essuyé un refus pour un poste permanent à l'université, elle s'est réorientée comme conseillère et spécialiste des communications en entreprise et a démarré sa carrière à Amazon.

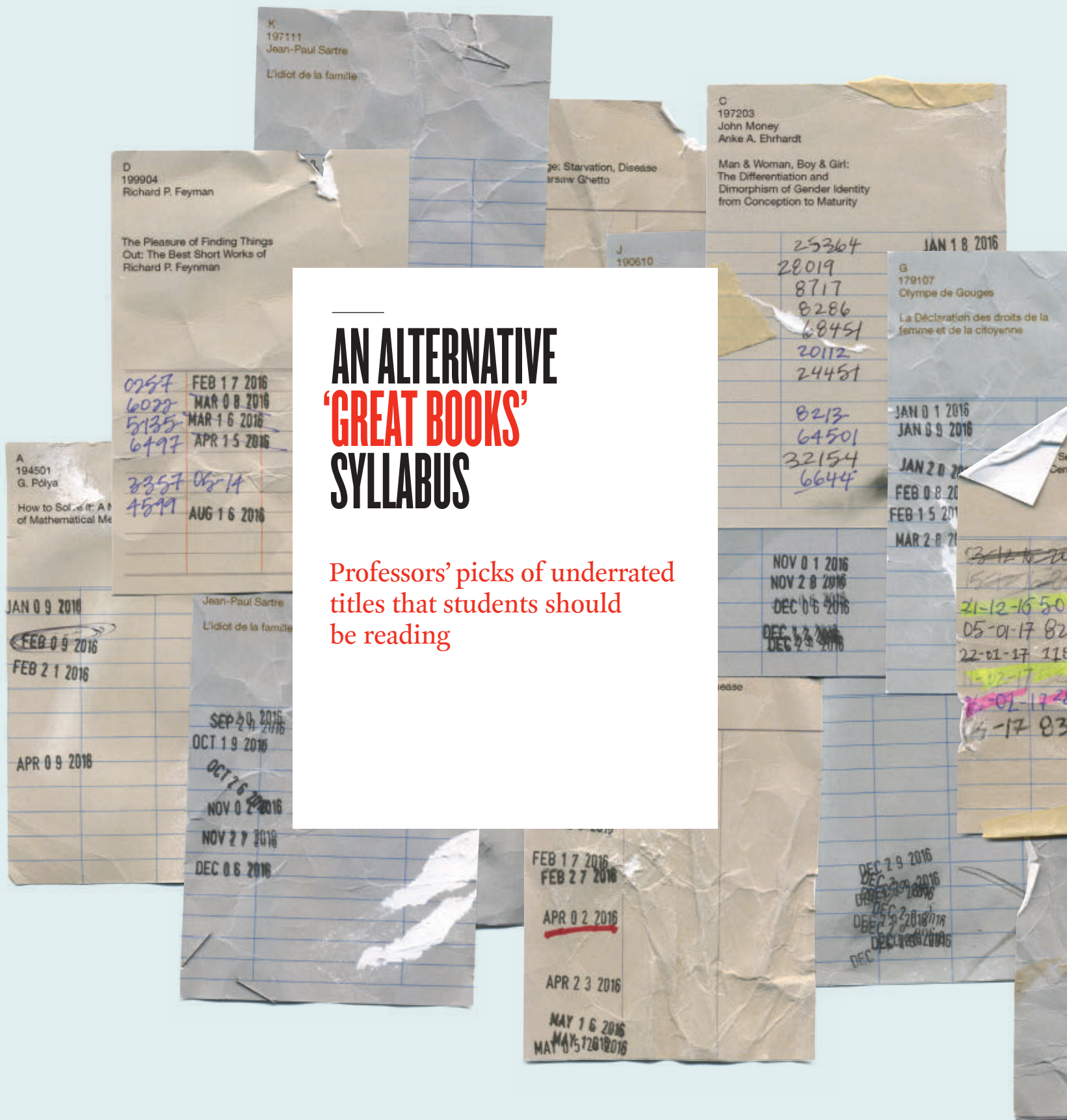
Son expérience suggère qu'un des changements les plus utiles et les moins coûteux qu'on puisse apporter au programme de doctorat est peut-être d'encourager les étudiants à considérer les carrières hors de l'université comme étant stimulantes sur le plan intellectuel. « Honnêtement, Amazon n'a rien à envier au milieu universitaire, c'est l'endroit le plus intellectuellement exigeant où j'ai travaillé. Mon cerveau n'a pas cessé de fonctionner lorsque j'ai quitté l'université! » dit-elle.

M. Bouchard, de l'Université de Montréal, est du même avis : « Nous croyons trop souvent que les universités sont les seuls endroits où il est possible d'innover. Mais il est bien connu que beaucoup de gens réalisent des choses exceptionnellement novatrices en dehors du cadre universitaire. »

Quant à M^{me} Whillans de l'UCB, elle affirme qu'avoir opté pour un doctorat à portée plus vaste a beaucoup élargi ses horizons et qu'elle se sent plus confiante face à ses perspectives d'emploi après ses études. « J'ai constaté, au fil de mes collaborations avec les domaines privé et public, que les études supérieures nous permettent d'acquérir des compétences beaucoup plus diversifiées qu'on ne le pense. » ■

AN ALTERNATIVE 'GREAT BOOKS' SYLLABUS

Professors' picks of underrated
titles that students should
be reading



PLAN DE COURS «LES GRANDS OUBLIÉS»

Des professeurs proposent
aux étudiants d'autres choix
de lecture

Generations of undergraduate students have taken “Great Books” courses to introduce them to some of the authors and ideas that are said to have contributed to shaping Western thought and traditions. There are, however, many more notable authors and ideas that these courses leave out. *University Affairs* enlisted the help of a few professors in drafting the reading list for an alternative to the Great Books course, one designed around titles of enduring import that have been culturally, if not critically, underappreciated.

How to Solve It: A New Aspect of Mathematical Method

by G. Pólya (Princeton University Press, 1945)

AS SOMEONE WHO values poetry and science equally, I often regret not having a liberal arts education. I think I made up for it somewhat by reading widely on my own. Therefore, I would encourage students to read outside of course curricula as much as possible. However, if I have to recommend a book, it would be mathematician G. Pólya’s *How to Solve It*. The title alone is appealing, right? Who doesn’t have a problem to solve? I received it as a gift from the person who would go on to become my PhD supervisor.

First and foremost, it is an example of excellent writing, but it promises so much more. (Blurbs claim “it will show anyone in any field how to think straight.”) It’s basically a book that attempts to teach reasoning, but in doing so emphasizes the role of creative thinking – though solving a difficult problem might seem straightforward in retrospect, it never is from the outset. Pólya lays out his approach and provides examples, all the while reminding us that there are many ways to solve a problem. I use many of his strategies in my work as an environmental scientist and in my work as a poet.

– Madhur Anand, professor in the School of Environmental Sciences, University of Guelph

Courage Under Siege: Starvation, Disease and Death in the Warsaw Ghetto

by Charles G. Roland (Oxford University Press, 1992)

WITHOUT EXAGGERATION, this is the single most compelling, indeed chilling, work of history I have ever encountered. Roland’s medical history of the Warsaw Ghetto, the largest of the Jewish ghettos in Nazi-occupied Europe, presents in haunting detail the physical impacts of one of the worst atrocities of the 20th century.

Courage Under Siege describes the horrific effects of the implementation of Nazi ideology, including imposed hunger (the official ration in the ghetto was 200 calories a day) and squalor that fuelled diseases like typhus, tuberculosis and other diseases of extreme poverty. As many as 100,000 people died of starvation from 1940 until the community was destroyed in 1943, and almost 400,000 others were murdered in the nearby

Des générations d’étudiants ont suivi des cours d’introduction à la lecture de grands auteurs afin de connaître les idéologies ayant contribué à façonner la pensée et la tradition occidentales. Il existe toutefois un grand nombre d’éminents auteurs et d’idées que ces cours ont omis. *Affaires universitaires* a fait appel à quelques professeurs pour la rédaction d’une liste de lecture pouvant servir à un cours hypothétique intitulé « Les grands oubliés », portant sur des ouvrages impérissables, mais sous-estimés d’un point de vue critique ou culturel.

death camp at Treblinka. Despite the almost unimaginable horror of the scene, the narrative is at times unexpectedly uplifting as Roland shows that even the doomed were not without choices; while they perished from hunger, several victims kept detailed medical records so that one day some good might come from their anguish. As the walls literally closed in on the ghetto, those inside organized a clandestine medical school that brought sanity and hope to an impossible situation. They even organized a summer camp to provide children with a fleeting glimpse of normalcy.

As I write this, millions are displaced by conflicts with no reasonable solutions in sight. In Europe, more refugees are on the move than at any time since the Second World War. In Syria, hundreds of thousands of people have been systematically starved and are no doubt experiencing a decline in health reminiscent of what was experienced in the Warsaw Ghetto. This book matters because it presents in dispassionate terms one of the darkest chapters in human history as well as the responses of those who endured it. It reminds us that we are all connected and that the lives of others, even in distant lands, still matter.

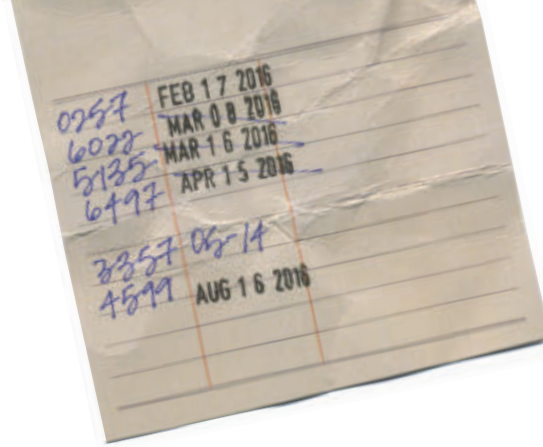
– James Daschuk, associate professor in the faculty of kinesiology and health studies, University of Regina

La Déclaration des droits de la femme et de la citoyenne

par Olympe de Gouges (1791)

OLYMPE DE GOUGES, femme exceptionnelle de l’époque des Lumières en France, est moins connue aujourd’hui que ses collègues masculins philosophes et activistes politiques, comme Voltaire, Rousseau, Condorcet et autres. Anti-esclavagiste et de tous les combats pour plus de justice sociale, cette auteure dramatique et pamphlétaire, née en 1748 dans le sud de la France, a pourtant écrit en 1791 le texte fondateur du féminisme moderne : *La Déclaration des droits de la femme et de la citoyenne*, une réponse ironique et incontournable à la *Déclaration des droits de l’homme et du citoyen* de 1789.

Estimant que « l’ignorance, l’oubli ou le mépris des droits de la femme sont les seules causes des malheurs publics et de la corruption des gouvernements », la *Déclaration* affirme dans son premier article que « la femme naît libre et demeure égale à l’homme en droits ». L’auteure a féminisé les articles qui suivent d’une manière simple et directe qui peine encore à trouver sa voie aujourd’hui : « Article 2 : Le but de toute association politique



est la conservation des droits naturels et imprescriptibles de la femme et de l'homme. » La *Déclaration* propose des formules saisissantes pour inciter les femmes à prendre leur place dans la Révolution qui se déroulait sous leurs yeux : « Femme, réveille-toi; le tocsin de la raison se fait entendre dans tout l'univers; reconnais tes droits », écrit Olympe dans le postambule; « quelles que soient les barrières que l'on vous oppose, il est en votre pouvoir de les affranchir; vous n'avez qu'à le vouloir. »

Olympe de Gouges est morte le 3 novembre 1793, guillotinée pour avoir posé des affiches politiques contre Robespierre. La totale cohérence entre la pensée libre et novatrice d'Olympe, sa vie personnelle hors normes et son engagement passionné dans la vie politique de son temps est une inspiration pour toutes les femmes.

- Florence Piron, professeure titulaire au Département d'information et de communication, Université Laval

Man & Woman, Boy & Girl: The Differentiation and Dimorphism of Gender Identity from Conception to Maturity

by John Money and Anke A. Ehrhardt (John Hopkins University Press, 1972)

MAN & WOMAN, BOY & GIRL might seem like an obvious choice for someone who just wrote a book entitled *The Man Who Invented Gender: Engaging the Ideas of John Money* (UBC Press). Nevertheless, I truly believe in the historical importance of Money's work. When the book was published in 1972, it was reviewed everywhere (even *Time* magazine) and became a *cause célèbre* for its controversial views on the fluidity of gender and sexuality. It was a compulsory text on courses from women's studies to psychiatry. And yet now, as far as I know, it is out of print.

Part of the reason for this is the David Reimer case – the story of a child who, after a botched circumcision, underwent sex-reassignment surgery and radical gender identity therapy under Money's care (the tragic story is recounted in John Colapinto's *As Nature Made Him: The Boy Who Was Raised as a Girl*). Suffice to say Money's influence in raising the child as female and the later choice by that child to live as a male, destroyed the psychologist's reputation. He was an easy target as his radical views of sex and gender that seemed so fresh in the '70s looked dangerous by the late '90s. However, *Man & Woman, Boy & Girl* laid the groundwork for much that we think today about sexual orientation and gender. The

current cultural role of transgender is a product of the attitudes displayed in this book. No matter what you think of transgender reality TV star Caitlyn Jenner, her story would be very different without *Man & Woman, Boy & Girl*. Everyone should read this book to find out the ghost behind our zeitgeist of sex and gender.

– Terry Goldie, professor in the department of English, York University

La paix de la foi

par Nicolas de Cues, traduction de Hervé Pasqua (Pierre Téqui éditeur, 2008)

POURQUOI ÉVOQUER UN petit livre de 1453, le pétillant *De pace fidei* du cardinal Nicolas de Cues (1401-1464) parmi les livres qui auraient pu changer le cours des choses? C'est parce que c'est un dialogue qui aurait pu nous aider à surmonter celles d'aujourd'hui, plus particulièrement le « conflit des civilisations » qui voudrait opposer le monde occidental, imprégné de valeurs chrétiennes, mais complexé par son passé colonial, au monde oriental et musulman.

À une époque elle-même déchirée par des guerres (Constantinople venait de tomber aux mains des musulmans), Nicolas imagine un homme rempli de zèle divin transporté au milieu d'un dialogue céleste auquel participent Dieu, son fils et les grands saints qui s'affligent des sempiternels conflits de religion entre les hommes. Ils somment les représentants les plus intelligents de pas moins de 17 religions et nations pour discuter avec eux de la manière dont on pourrait mettre fin aux guerres prétendument menées au nom de Dieu. En discutant franchement de leurs différends, les sages s'entendent pour reconnaître que les conflits viennent de ce que les hommes pensent que les rites établis par leurs dirigeants furent institués par Dieu lui-même. Dieu, rappelle Nicolas, est inconnu, mais tous croient qu'il n'y a qu'une seule sagesse qui préside à l'ordre des choses. En cultivant cette foi commune, les sages pourraient aider les hommes à relativiser la diversité des rites. C'est de cette paix commune de la foi (d'où le titre) que dépend la paix perpétuelle entre les hommes. En 1453 comme en 2015, le *De pace fidei*, rédigé par un cardinal qui était un diplomate avisé et un fin lecteur du Coran, indique la voie à suivre pour le dialogue entre les religions et les cultures.

– Jean Grondin, professeur titulaire au Département de philosophie, Université de Montréal

“Our understanding of humanity past and present is dependent not just on what we discover or what we know but on how we know what we know.”

d'elles

par Suzanne Lamy (l'Hexagone, 1979)

ELLES M'ONT PARLÉ, *j'ai aimé leurs intonations, leurs pointillés...* Paru en pleine période d'exubérance féministe au Québec, *d'elles* a donné naissance à ce qui deviendra la critique au féminin. Savant dosage d'acuité critique et de lyrisme, alliant Nicole Brossard à Roland Barthes, Marguerite Duras et Hubert Aquin, France Théorêt et Maurice Blanchot, ce court volume lance un nouveau vocabulaire et une nouvelle manière de lire.

Si on ne reconnaît plus le nom de Suzanne Lamy aujourd'hui, c'est qu'elle a disparu trop tôt, à l'âge de 59 ans en 1987. Pourtant, durant son vivant, elle a exercé une réelle influence sur la scène littéraire québécoise. Directrice de la revue *Spirale*, conférencière, essayiste, romancière, elle a voulu que la critique féministe soit exigeante. Elle demandera à l'écriture féministe qu'elle soit justement cela, une *écriture* – bien qu'empruntant des voies propres : « l'écriture des femmes semble garder trace de ce qui se passe dans la voix, comme si du corps à la lettre, un ton ou une fluidité palpable demeurerait. » Si les propos de Suzanne Lamy sont largement acceptés aujourd'hui, que plusieurs générations de critiques ont profité de ses propos et de ses actions, relire ce livre est encore profitable et agréable, pour ses propos sur la bavardage, par exemple : « Un jeu où le je se déploie, prend plaisir à être ballotté par la marée montante. Les vagues s'entrelacent, naissent l'une de l'autre, chaque fois analogues, différentes. Terre et mer mêlées : une érotique, » ou sur le dialogue : « Une forme nouvelle est née là, du rythme de leurs respirations, de la contiguïté faite de distance et d'harmonie, de la gravité légère de ces femmes pour qui écorce et épaisseur des êtres sont indissociables. »

- Sherry Simon, professeure titulaire au Département d'études françaises, Université Concordia

The Pleasure of Finding Things Out: The Best Short Works of Richard P. Feynman

by Richard P. Feynman, edited by Jeffrey Robbins (Perseus Books, 1999)

WHY RECOMMEND A book by a Nobel Prize-winning physicist renowned for his work in quantum electrodynamics to undergraduate students in various fields? The reason is this: our understanding of humanity past and present is dependent not just on what we discover or what we know

but on how we know what we know about _____. That is exactly what is at the core of Richard Feynman's collection of short works on the excitement, challenges and beauty of finding things out.

Feynman was one of the most formidable scientists of the 20th century but also one of the most human, as reflected in his often irreverent attitude towards the trappings of scientific awards and honours (this much is apparent in his very popular essay collection, *Surely You're Joking, Mr. Feynman! Adventures of a Curious Character*). But he also had little patience for those who failed to recognize what was empirically evident, as reflected in his famous minority report on the *Challenger* space shuttle explosion.

The essays in *The Pleasure of Finding Things Out* convey the excitement and epistemological challenges of gleaning new understanding of seen and unseen worlds. But Feynman was also a pragmatist; he required that his science recognize doubt and uncertainty as vital to finding things out and he believed that scientists and academics have responsibilities to society. The volume offers both a scientific view of human endeavours and a very human look at science.

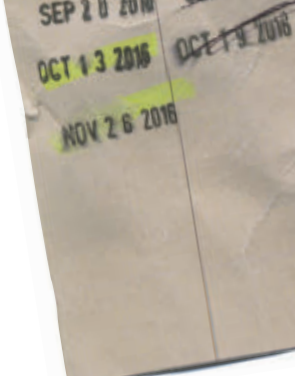
- George P. Nicholas, professor in the department of archaeology, Simon Fraser University

Initiation mathématique

par Charles-Ange Laisant (Georg & cie, 1906)

ON NE SE SOUVIENT plus guère aujourd'hui de Charles-Ange Laisant (1841-1920). C'est bien à tort. Mathématicien de valeur, professeur à la polytechnique, il jouera un rôle de tout premier plan dans l'internationalisation et dans l'enseignement au plus haut niveau de sa discipline. À titre de militant anarchiste, ce qu'il était aussi, c'est surtout l'éducation qui suscitera son intérêt. Il écrira donc des ouvrages qu'on rangerait aujourd'hui sous la catégorie de philosophie de l'éducation, mais aussi d'autres qui appartiennent à la vulgarisation scientifique et à la didactique des mathématiques. Avec la publication d'*Initiation mathématique*, Laisant ambitionne d'y donner à chacun ce qui lui permettra d'acquérir sans souffrir ce bagage mathématique indispensable au citoyen.

Il travaille à partir d'une conception originale des mathématiques, abstractionniste et anti-platoniste, dont il s'explique ainsi dans un autre ouvrage antérieur (*La Mathématique. Philosophie. Enseignement*, 1898), lui aussi oublié. « Rien ne pénètre dans notre esprit qu'après avoir d'abord passé sous le témoignage de nos sens. La Mathématique, pas plus qu'au-



« Inlassablement, il préconise de miser sur la curiosité de l'enfant, sur le jeu, sur le plaisir entretenu de la découverte. »

cune autre science, n'échappe à cette loi. J'estime que sans la présence du monde extérieur aucune connaissance mathématique n'aurait jamais pu pénétrer dans le cerveau de l'homme et que, seul dans l'univers et réduit à l'état de pure intelligence, le plus incomparable génie n'arriverait jamais à la notion du nombre 2, ce génie fut-il celui d'un Archimède, d'un Gauss ou d'un Lagrange. » Partant de là, en 65 chapitres, Laisant introduit de manière originale, ludique et qui reste fort inspirante, à la numération, au calcul, à la géométrie, à l'algèbre et donne en prime aux parents des conseils pour l'éducation mathématique de leurs enfants en plus de proposer des énigmes et de stimulants paradoxes.

Inlassablement, il préconise de miser sur la curiosité de l'enfant, sur le jeu, sur le plaisir entretenu de la découverte faite parce qu'habilement préparée, sur la manipulation d'objets concrets et sur le dessin.

- Normand Baillargeon, professeur au Département d'éducation et pédagogie, Université du Québec à Montréal

L'Idiot de la famille

par Jean-Paul Sartre (trois volumes, 1971-1972)

DES 15 000 PAGES QUI CONSTITUENT l'œuvre sartrienne, peu sont aussi ignorées, voire dédaignées que les quelques 3 000 sur lesquelles s'étend *L'Idiot de la famille*. Aboutissement de 30 années fébriles de recherche et de rédaction, cette somme inouïe cherche à déterminer dans quelles conditions familiales, psychologiques, historiques et politiques un génie comme Gustave Flaubert a pu décider de se faire écrivain, optant, contre sa société, pour l'irréalisation de l'imaginaire. On compte sur les doigts de la main ceux qui peuvent aujourd'hui écrire une bonne étude à propos de ce texte monstrueux, que l'on ne saurait réduire à une simple biographie.

L'Idiot fait la synthèse de toutes les théories et savoirs mobilisés par Sartre au cours de sa carrière d'écrivain, de philosophe et d'intellectuel; il est un traité novateur de « psychanalyse existentielle », un méticuleux ouvrage de critique littéraire, un ambitieux panorama socio-historique et, surtout, comme l'auteur l'a lui-même dit, un « roman vrai ». Dans sa démesure, il décortique, en les totalisant, les masses considérables de renseignements divers qui étaient nécessaires à sa propre réalisation : correspondance et œuvres de jeunesse de Flaubert, témoignages, ouvrages d'analyse littéraire, monographies sur le XIX^e siècle, travaux sur la névrose,

théories sur le comique, fondements de linguistique, de psychanalyse, de marxisme... Tout est intégré par Sartre à l'approche méthodologique dite « progressive-régressive » qu'il a inventée, qui est reproductible en théorie, mais dont il a été le seul praticien véritable (des ambitions de cette sorte, demandant une telle force de travail et une aussi grande envergure intellectuelle, ne suscitent pas de disciples). C'est plutôt sur le plan créatif que cet essai hors-normes, se jouant allègrement de la fiction pour atteindre à la connaissance véritable, ouvre les voies les plus fécondes. Au Québec, pour ne donner qu'un exemple, il a inspiré Victor-Lévy Beaulieu dans l'élaboration des chefs-d'œuvre que sont *Monsieur Melville* et *James Joyce, l'Irlande, le Québec, les mots*.

- Yan Hamel, professeur de littérature à l'Unité d'enseignement et de recherche (UER) Sciences humaines, Lettres et Communications, TÉLUQ

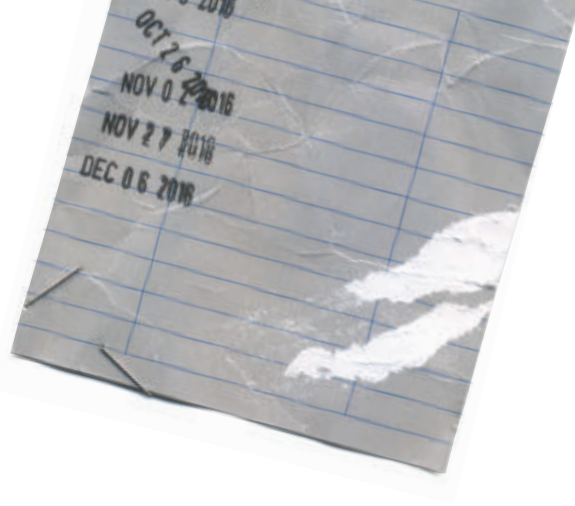
Lipstick Traces: A Secret History of the Twentieth Century

by Greil Marcus (Harvard University Press, 1989)

LIPSTICK TRACES STANDS as an almost perfect example of how academic scholarship and cultural criticism might cross over. It looks like a book about punk music, and in large measure it is, but the beauty of *Lipstick Traces* lies in the ways music critic Greil Marcus continually explores beyond the music before eventually returning to it. Marcus lifts the punk music of the late 1970s out of the rock music histories to which it has so often been confined, and sets it within the much longer histories of popular revolt and artistic rebellion. In particular, Marcus shows how punk could be part of the broader history of avant-gardes and their invention of new art forms – that punk culture is also a visual culture, a movement deeply engaged in changing visual landscapes.

The subtitle's "secret history" refers to the history of those 20th century avant-gardes which, in 1989, were still understudied. The connections Marcus draws between music, the visual arts and politics now seem familiar but were then obscure. No one has gone further than Marcus in showing the links between 1970s punk and the post-war European artistic movement known as Situationism and in doing so, *Lipstick Traces* signalled (and helped kick off) the incredible renewal of scholarly interest in the Situationists which has unfolded since the book's publication.

- Will Straw, professor in the department of art history and communication studies, McGill University



The Artist and the Moose: A Fable of Forget

by Roy Kiyooka, edited by Roy Miki (LINEBooks, 2009)

I WOULDN'T WANT to teach a course called "Alternative Great Books" – not at this point in time. Such a pedagogical rubric wouldn't do much to shake up the notion of "Great Books" representing the Western tradition and so-called universal values, written by (predominantly) white male authors. "Alternative" in this case would immediately define these books as not good enough to be counted among the great ones or as books whose values and meanings are inassimilable. Furthermore, it would require teaching these titles in the context already established by Great Books, yet another way of signaling that "alternative" in this instance remains determined by the very ideologies that have produced what we call "Great Books" in the first place. The myth of the Great Books may have long been dispelled but, like most myths, it's proven to be tenacious.

The course I would teach would question the cultural paradigms that have established the notion of Great Books, the very paradigms that the anonymous narrator in Roy Kiyooka's *The Artist and the Moose: A Fable of Forget* sets out to probe. The narrator is a Prairie man from Forget, Saskatchewan. Commissioned by the federal government to identify "a Genuine Multi-Cultural Aesthetic for Canadians in the 21st Century," he travels in the company of a bedraggled moose that has contracted, among other things, smallpox and AIDS. An eccentric whose exploits are parodic and hilarious, he often stumbles on nationalist paradigms such as "the unmitigated Garrison Mentality." Not surprisingly, he gives up on his quest but not before he tries to solve the mystery of Tom Thomson's death. It is a great book not only because it deconstructs familiar paradigms but also because it performs the very epistemic shifts necessary for doing away with such categories as those of "great" and "alternative." ^{UA}

- Smaro Kamboureli, Avie Bennett Chair in Canadian Literature, University of Toronto

Croisières et caravanes

par Ella Maillart (Petite Bibliothèque Payot, 2001)

EN 1951, ELLA MAILLART décide de se pencher sur sa vie. Il faut dire que son existence n'est pas banale. Elle a traversé la première moitié du XX^e siècle comme peu de femmes ont pu le faire. Née à Genève en 1903, elle ne se bornera pas à incarner la jeune femme sage que l'époque affectionne. Elle sera hockeyeuse, matelot, aviatrice, actrice, voyageuse de commerce, dactylo, professeure de français, modèle d'art, photographe, journaliste, écrivaine. Elle barrera pour la Suisse aux régates olympiques de 1924 et puis sera membre de l'équipe de ski helvétique pendant quatre ans. On la retrouve en Grèce, en Corse, au Pays de Galles, en Allemagne, à Moscou, en Crimée, au Tukestan, dans les Monts célestes Tian, dans un désert en Chine interdite, à Pékin, en Inde, au Nord du Tibet, au Tsaidam, en Iran, en Turquie et en Afghanistan. « La vagabonde des mers », comme elle aimait s'appeler, la voyageuse infatigable parcourt les contrées souvent sans permis, dans la ferveur et l'émerveillement, devenant l'amie de la veuve de Jack London, de la comtesse Tolstoi, du cinéaste Poudovkine, de Teilhard de Chardin, de l'explorateur Sven Hedin, de l'aventurier Peter Flemin, de l'écrivaine Anne-Marie Schwarzenbach (avec laquelle elle ira en Ford en Afghanistan en 1939) ou encore des voyageurs rencontrés en chemin.

Si Ella Maillart aimait lire un livre par jour, elle n'écrivait que pour payer ses voyages. C'est cette vie pleine et étourdissante que Maillart raconte dans *Croisières et caravanes*, mais le livre ne nous plonge pas dans un tourbillon de lieux. C'est une réflexion étonnante sur la vie. Ella Maillart se libère de ce qu'elle appelle l'égoïsme et s'abandonne à ce qui est plus grand qu'elle-même. ^{AU}

- Catherine Mavrikakis, professeure titulaire au Département des littératures de langue française, Université de Montréal

Ce mois-ci
This month

Nota bene

Navdeep Bains and Jean-Yves Duclos
(to his right) announce the news on
Parliament Hill on Nov. 5.



Science policy

Liberals move quickly by reinstating the long-form census

Still some researchers call for changes to StatsCan's independence and data-gathering methods

JUST ONE DAY AFTER taking office, the Liberal government moved to fulfill one of its election promises and reinstated the mandatory long-form census in time for the 2016 head count, a move that was cheered by university researchers and others who depend on the data for their work. The announcement reversed a controversial decision by the previous Conservative government to abolish the 2011 mandatory long-

form census in favour of the voluntary National Household Survey (NHS).

"We are committed to making evidence-based decisions on programs and policies and to providing better and more timely services to Canadians," said Navdeep Bains, the newly-appointed Minister of Innovation, Science and Economic Development, in announcing the change. "Today Canadians are reclaiming their

right to accurate and reliable information." Mr. Bains made the announcement in Ottawa on Nov. 5 alongside Jean-Yves Duclos, Minister of Families, Children and Social Development and an economics professor at Université Laval.

"It has been 10 years since we last had a good hard look at ourselves as Canadians," said Stephen Toope, president of the Federation for the Humanities and Social Sciences and former president of the University of British Columbia. "We are now back on track to knowing who we are, in all our diversity. This is essential to building a more prosperous, inclusive future for Canada."

The census, administered every five years, gathers information on a wide range of factors including education, labour and income that, because of the large sample size, can be used →

to analyze data for small geographic areas and population subgroups. It is widely used by researchers, business groups and other levels of government to conduct research and make policy decisions. The voluntary survey used in 2011 included the same questionnaire as previous censuses but without the threat of penalties for those who failed to complete it. Previously, those who didn't complete a mandatory census could face fines of up to \$500 and a jail term of up to three months, although the penalties were rarely enforced.

Still, the change resulted in a steep drop in the response rate to 69 percent for the 2011 NHS from 94 percent for the 2006 census. The voluntary survey also cost \$22 million more to administer because Statistics Canada sent out more questionnaires (4.5 million in 2011 versus 3 million in 2006) in an effort to offset the anticipated drop in responses.

"The change meant we had worse data and more expensive data," said Alain Bélanger, president of the Canadian Population Society and a

researcher at the Institut national de la recherche scientifique, part of the Université du Québec network. It also made the data not directly comparable to that of previous census years. And for about 25 percent of municipalities and small geographic areas, the response rate was so low that the agency didn't release the results at all because of quality concerns, said Dr. Bélanger, who worked at Statistics Canada for 17 years, including two in the census division.

Despite the drawbacks, the overall quality of 2011 NHS federal and provincial-level data was good. But, at the neighbourhood level, it "was clearly problematic," said Don Kerr, a demographer at King's University College at Western University. "There's a black hole there for many municipalities, particularly in rural Canada," said Dr. Kerr, who conducts research for the London Poverty Research Centre at King's and relies heavily on neighbourhood data for his work.

Dr. Kerr, who has also spent time at Statistics Canada, urged the federal government to go further and restore the autonomy that Statistics

Canada and the chief statistician had traditionally enjoyed. Many researchers saw the shift to a voluntary NHS as a politically motivated move. "We can't have this political interference continuing," said Dr. Kerr.

In an op-ed article in the *Globe and Mail*, Munir Sheikh, former chief statistician of Canada and now an executive fellow at the University of Calgary's School of Public Policy, called on the federal government to change the Statistics Act to make the agency truly independent. The act gives the responsible minister the final authority in deciding technical statistical matters and gives cabinet the authority to determine questions that go into a census, he noted. "This is simply not right," wrote Dr. Sheikh, who resigned his post at Statistics Canada to protest the cancellation of the mandatory long-form census. "I believe the contents of a census should be a decision purely based on a country's data needs and not on the politics of the day."

Despite the widespread criticism of the voluntary NHS, the change had spurred "a lot of

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creative thinking” at Statistics Canada about how to conduct a census, said Miles Corak, economics professor at the University of Ottawa’s graduate school of public and international affairs, something he hopes will continue. Among other things, the agency had started to explore alternate methods of tallying population counts through the large troves of information contained in government databases known as “administrative data,” such as income tax rolls and voter’s lists. “This is extremely innovative and cost-effective,” he said.

A number of other jurisdictions are also moving in this direction. Earlier this year, the British government officially adopted the Census Transformation Programme, a plan to consider using less-costly methods of running a census, including the use of administrative data, by 2021.

Dr. Corak also cautioned the government against reverting to the use of “a big stick type of attitude,” towards those who don’t complete the questionnaire. For some groups, the census is seen as an intrusion of privacy and they resented the notion that it was mandatory, Dr. Corak said. Legal threats are not going to win them back, he added. In the future, he’d like to see the government promote the completion of the census as a duty that is part of good, responsible citizenship.

Although buoyed by the return of the long-form census, Statistics Canada still faces significant funding challenges. The agency receives base funding from the federal government to gather certain data such as the census, as well as inflation, GDP and labour force figures that are crucial to setting macroeconomic policy. It also gathers data for other federal departments and levels of government on a cost-recovery basis. In recent years, Statistics Canada, along with other ministries, had its base funding reduced. At the same time, other departments and levels of government, faced with budget restrictions of their own and shifting priorities, reduced the amount they spent on data collection. As a result, Statistics Canada took “a double hit,” resulting in the termination of several surveys, said Dr. Corak. Still, the agency remains “a fundamentally well-managed place,” said Dr. Corak, who spent a number of years working in its research division.

The federal government followed up its announcement on the return of the long-form census with another days later lifting restrictions on federal government scientists that had prohibited them from speaking publicly about their research.

The policy changes are “highly encouraging,” said Scott Findlay, an associate professor of biology at the University of Ottawa and a co-founder of Evidence for Democracy, an advocacy group that had protested the muzzling of federal scientists and the elimination of the long-form census under the previous Conservative government.

Dr. Findlay said the Liberal’s election pledge to create a federal Chief Science Officer will be more difficult to implement quickly because of the financial resources required. He said it isn’t clear if the government intends to reinstate the post of a National Science Adviser – a position held from 2004 to 2008 by Arthur Carty, former president of the National Research Council, until it was eliminated by the Conservative government – or have it take another form.

– ROSANNA TAMBURRI

Politique scientifique

Les Libéraux agissent rapidement et rétablissent le questionnaire long du recensement

Les chercheurs réclament tout de même des changements pour améliorer l’indépendance et les méthodes de collecte de données de StatCan

DÈS LE LENDEMAIN de son entrée en fonction, le gouvernement libéral a rempli une de ses promesses électorales et rétabli le questionnaire long obligatoire juste à temps pour le recensement de 2016, un geste accueilli avec joie par les chercheurs universitaires et les personnes dont le travail dépend des données du recensement. L’annonce vient infirmer la décision controversée du gouvernement conservateur d’abolir le questionnaire long obligatoire au profit de l’*Enquête nationale sur les ménages* (ENM) à participation volontaire.

« Tout au long de la campagne électorale, nous avons réitéré notre engagement à prendre des décisions fondées sur des données probantes en ce qui a trait aux programmes et aux politiques, et à fournir aux Canadiens des services de meilleure qualité et en temps opportun, a déclaré Navdeep Bains, le nouveau ministre de l’Innovation, des Sciences et du Développement économique lors de l’annonce. Aujourd’hui, les Canadiens retrouvent leur droit d’accéder à de l’information précise et fiable. » M. Bains a fait

cette annonce à Ottawa le 5 novembre aux côtés de Jean-Yves Duclos, ministre de la Famille, des Enfants et du Développement social et professeur d’économie à l’Université Laval.

« Le dernier portrait complet et objectif des Canadiens remonte à 10 ans, constate Stephen Toope, président de la Fédération des sciences humaines et ancien recteur de l’Université de la Colombie-Britannique. Nous disposons de nouveau des outils pour savoir qui nous sommes, dans toute notre diversité. C’est une démarche essentielle pour bâtir un avenir prospère et inclusif. »

Le Canada procède au recensement tous les cinq ans pour recueillir de l’information sur un éventail de sujets, dont l’éducation, la main-d’œuvre et le revenu. Étant donné la taille importante de l’échantillon, il est possible d’analyser les données de petites aires géographiques ou des sous-groupes démographiques. Les données du recensement sont largement utilisées par les chercheurs, les organisations du milieu des affaires et d’autres ordres de gouvernement pour effectuer de la recherche ou prendre des décisions stratégiques. L’enquête volontaire menée en 2011 reposait sur le même questionnaire que les recensements précédents, mais ceux qui refusaient d’y répondre ne s’exposaient à aucune pénalité. Auparavant, ceux qui ne remplissaient pas le questionnaire obligatoire risquaient une amende pouvant atteindre 500 \$ et jusqu’à trois mois d’emprisonnement, bien que ces pénalités étaient rarement appliquées.

Le changement a néanmoins entraîné une chute du taux de réponse, qui est passé de 94 pour cent au recensement de 2006 à 69 pour cent à l’ENM de 2011. L’enquête volontaire entraîne également un coût supplémentaire de 22 millions de dollars, car Statistique Canada doit envoyer un plus grand nombre de questionnaires (4,5 millions en 2011 contre trois millions en 2006) pour compenser la baisse anticipée du taux de participation.

« Ainsi, nous avons des données plus coûteuses et de moins bonne qualité », résume Alain Bélanger, président de la Canadian Population Society et chercheur à l’Institut national de la recherche scientifique, membre du Réseau de l’Université du Québec. Il n’était pas non plus possible de comparer les données à celles des recensements précédents. De plus, le taux de réponse était si bas dans environ 25 pour cent des municipalités et petites aires géographiques que l’organisme n’a même pas publié les résultats

en raison de préoccupations liées à la qualité, explique M. Bélanger, qui a travaillé à Statistique Canada pendant 17 ans, dont deux à la direction responsable du recensement.

Malgré ces lacunes, la qualité générale des données de l'ENM de 2011 aux niveaux provincial et fédéral était bonne. Au niveau des quartiers, « la situation était clairement problématique, affirme Don Kerr, démographe au Collège universitaire King's de l'Université Western. C'est le néant pour de nombreuses municipalités, surtout en région rurale », explique celui qui effectue de la recherche pour le London Poverty Research Centre du Collège King's et dont les travaux dépendent largement des données sur les quartiers.

Lui aussi un ancien de Statistique Canada, M. Kerr a exhorté le gouvernement fédéral d'aller plus loin et de redonner à l'organisme fédéral et au statisticien en chef l'autonomie dont ils disposaient auparavant. Beaucoup de chercheurs ont perçu le passage à l'ENM volontaire comme un geste à motivation politique. « Cette ingérence doit cesser », croit-il.

Dans une lettre ouverte publiée dans le *Globe and Mail*, Munir Sheikh, ancien statisticien en chef du Canada et cadre chercheur à l'École de politique publique de l'Université de Calgary, demande au gouvernement fédéral de changer la Loi sur la statistique pour faire de Statistique Canada un organisme véritablement indépendant. En vertu de cette loi, le ministre responsable a l'autorité de trancher les questions techniques, et le cabinet peut déterminer les éléments à inclure dans le questionnaire du recensement. « C'est une situation inacceptable, écrit celui qui a démissionné de son poste à Statistique Canada pour protester contre l'annulation du questionnaire long obligatoire. Je crois que le contenu d'un recensement doit dépendre uniquement des besoins en données du pays, et non des enjeux politiques du jour. »

Malgré les critiques qui ont fusé de toutes parts au sujet de l'ENM à participation volontaire, le changement a poussé Statistique Canada à faire preuve « d'une grande créativité » quant à la façon de mener un recensement, explique Miles Corak, professeur d'économie à l'École supérieure d'affaires publiques et internationales de l'Université d'Ottawa, une tendance qu'il espère voir perdurer. L'organisme a entre autres commencé à explorer d'autres méthodes de dénombrement des populations au moyen des trésors d'information contenus dans les bases de

« données administratives » du gouvernement, comme le rôle des contribuables et les listes électorales. « Ces méthodes sont très novatrices et rentables », fait-il remarquer.

D'autres pays prennent également ce virage. Plus tôt cette année, le gouvernement britannique a adopté officiellement son programme de transformation du recensement, un plan qui vise à étudier l'utilisation de méthodes de recensement moins coûteuses, y compris le recours aux données administratives, d'ici 2021.

M. Corak a également mis le gouvernement en garde contre l'adoption d'une politique du bâton contre ceux qui ne remplissent pas le questionnaire. Certains groupes considèrent le recensement comme une intrusion dans leur vie privée et n'aiment pas le fait qu'il soit obligatoire, explique M. Corak. Des menaces de poursuites ne les gagneront pas à la cause, ajoute-t-il. Il aimerait voir le gouvernement faire la promotion de la participation au recensement en tant que devoir relevant d'un comportement civique responsable.

Fort du retour du questionnaire long, Statistique Canada se heurte tout de même à d'importantes difficultés de financement. L'organisme reçoit un financement de base du gouvernement fédéral pour recueillir certaines données, comme celles du recensement, de même que des chiffres sur l'inflation, le PIB et la main-d'œuvre qui sont essentiels à l'établissement des politiques macro-économiques. Il recueille également des données pour d'autres ministères fédéraux et ordres de gouvernement selon un modèle de recouvrement des coûts.

Au cours des dernières années, Statistique Canada et d'autres ministères ont vu leur financement de base diminuer. Parallèlement, d'autres ministères et ordres de gouvernement, eux-mêmes aux prises avec des restrictions budgétaires et des priorités changeantes, ont réduit le montant consacré à la collecte de données. Par conséquent, Statistique Canada a accusé un « double coup » qui a entraîné la fin de plusieurs enquêtes. L'organisme demeure malgré tout « fondamentalement bien géré », indique M. Corak, qui a travaillé au sein de la direction responsable de la recherche pendant un certain nombre d'années.

Quelques jours après avoir annoncé le retour du questionnaire long, le gouvernement fédéral a fait savoir qu'il levait les restrictions empêchant les scientifiques fédéraux de parler publiquement de leurs travaux de recherche.

Ces changements de politiques sont « des plus encourageants », estime Scott Findlay, profes-

seur agrégé de biologie à l'Université d'Ottawa et cofondateur d'Evidence for Democracy, un groupe de défense d'intérêts qui a protesté contre le musellement des scientifiques fédéraux et l'élimination du questionnaire long par le gouvernement conservateur.

Selon M. Findlay, l'engagement pris par les Libéraux pendant la campagne électorale de créer un poste de directeur scientifique sera plus difficile à mettre en œuvre rapidement en raison des ressources financières nécessaires. Il est difficile de savoir si le gouvernement entend rétablir le poste de conseiller national des sciences – occupé de 2004 à 2008 par Arthur Carty, ancien président du Conseil national de recherches du Canada, jusqu'à ce qu'il soit éliminé par le gouvernement conservateur – ou lui donner une autre forme. – ROSANNA TAMBURRI

Transitions

Academics elected to the new Parliament adjust to life as MPs

They and their colleagues are a well-educated bunch: 14 MPs hold PhDs while more than two-thirds have at least a bachelor's degree

THE MOVE FROM academic to politician can be a difficult transition – it's a bit like being in a Three-Minute Thesis Competition over and over again, said Robert-Falcon Ouellette, the new Liberal Member of Parliament for Winnipeg Centre. Prior to his win, Dr. Ouellette, who holds a PhD in anthropology and Master of Music degree, both from Université Laval, had been program director for the Aboriginal Focus Programs at the University of Manitoba. Now he's adjusting to life talking in sound bites.

“[In academia] I go and give a speech and there's time for ideas to develop. When I'm talking to media now, they want the short quote,” he said. “That's been a huge learning curve going from an academic to becoming a politician. I guess I'm a politician now. Wow, I can't believe that.”

Jean-Yves Duclos is making a similar career change. The former director of the department of economics at Université Laval and president-elect of the Canadian Economics Association was not only elected MP for Quebec, he was also appointed Minister of Families, Children and Social Development. The day after he was named

to the cabinet position, Dr. Duclos was before the media announcing the reinstatement of the mandatory long-form census, a move widely cheered by academics.

Data compiled by Universities Canada show that Drs. Duclos and Ouellette are in good academic company in the 42nd Parliament. Some 227 of 338 MPs in the House of Commons have a bachelor's degree (compared to 184 in the last Parliament of 304 MPs); about 97 of these MPs went on to complete a master's degree and 14 hold PhDs (compared to 62 and 13 respectively in the previous Parliament). The new cabinet includes 14 MPs holding master's degrees and five with PhDs like Dr. Duclos.

While Drs. Ouellette and Duclos are new on the scene, several returning MPs have already made the jump from higher education to federal politics:

- **Kirsty Duncan**, the new Minister of Science and Liberal MP for the Toronto riding of Etobicoke North, is a medical geographer who taught meteorology, climatology and climate change at the University of Windsor from 1993 to 2000. She was also an adjunct professor teaching medical geography at the University of Toronto and global environmental processes at Royal Roads University. She served on the Intergovernmental Panel on Climate Change, an organization that won the 2007 Nobel Prize with Al Gore. She has been an MP since 2008.

- **Stéphane Dion**, Minister of Foreign Affairs and Liberal MP for the Montreal riding of Saint-Laurent–Cartier since 1996, was a professor of political science at Université de Moncton and Université de Montréal. He has been Leader of the Liberal Party of Canada and Leader of the Official Opposition in the House of Commons, and has held several cabinet positions.

- **John McCallum**, Minister of Immigration, Refugees and Citizenship and Liberal MP for the Ontario riding of Thornhill–Markham, was dean of arts at McGill University and in 1993 fund-raised \$10 million to found the McGill Institute for the Study of Canada. He was later chief economist for RBC before entering politics in 2000. He has led several ministries including National Defence, Veterans Affairs, Natural Resources and National Revenue since joining federal politics in 2000.

- **Michelle Rempel**, a Conservative MP for Calgary Nose Hill, was director of the University of Calgary's institutional programs division and worked in the technology commercialization

A highly-credentialed cabinet

Advanced education figures prominently in Prime Minister Justin Trudeau's cabinet. Of the 31 members of Parliament he appointed, several hold graduate or professional degrees and nearly all have completed a bachelor's degree.



MEMBERS OF CABINET

Medical degree (MD)	2	7%
Bachelor's of laws	7	23%
PhD	5	16%
Master's degree	14	45%
Bachelor's degree	27	87%

division of the University of Manitoba before entering politics in 2011. She served as Minister of State for Western Economic Diversification in the previous government.

- **Alice Wong** has been the Conservative MP for Richmond in B.C. since 2008. She holds a PhD in instruction and curriculum from the University of British Columbia and worked as the manager of international programs at Kwantlen Polytechnic University. In the previous government she was Minister of State for Seniors.

- **Kennedy Stewart**, NDP MP for the Vancouver-area riding of Burnaby–Douglas since 2011, is an associate professor on leave from the School of Public Policy at Simon Fraser University.

David Lametti, a law professor at McGill University who earned a doctorate in law at Oxford University, is another academic-turned-rookie politician. A former associate dean, academic, of McGill's faculty of law, he decided to run as the Liberal candidate for Montreal's LaSalle–Émard–Verdun riding in part to advocate for evidence-based policy-making – an approach he says he has come to value through his academic training.

“You learn to do that at a university, you learn to look at the evidence,” he said.

While the Liberal platform on higher education has yet to be elaborated, Dr. Lametti said he anticipates a reversal of the previous government's “demeaning of what scientists do, of what universities do, of what social science scholars do.”

In the short time since the election, many stakeholders in the postsecondary education sector have praised the new government for its seemingly open approach to research and to higher education more generally. On Oct. 27, then-Prime Minister designate Justin Trudeau made a surprise appearance at Universities Canada's annual membership meeting in Ottawa. Elizabeth Cannon, chair of the board at Universities Canada and President of the University of Calgary, told the Canadian Press that the appearance was “a huge signal for us” and marked a change in tone from the previous government. “He talked passionately about the impact his own university education had on him, his life, his thinking. That was a very positive message,” she said. – NATALIE SAMSON

Transitions

Des universitaires élus au sein du nouveau Parlement s'adaptent à la vie de député

Avec leurs collègues, ils forment un groupe d'érudits : 14 d'entre eux sont titulaires d'un doctorat et plus des deux tiers ont au moins un baccalauréat

LE PASSAGE DU MILIEU universitaire à la vie politique peut s'avérer ardu. Selon Robert-Falcon Ouellette, député libéral de Winnipeg-Centre, c'est un peu l'équivalent de devoir sans cesse participer au concours *Ma thèse en 180 secondes*. Avant son élection, M. Ouellette, titulaire d'un doctorat en anthropologie et d'une maîtrise en musique de l'Université Laval, était directeur des programmes axés sur les questions autochtones à l'Université du Manitoba. À présent, il doit s'habituer à parler par petites phrases.

« [Dans le milieu universitaire], lorsque je prenais la parole, j'avais le temps d'approfondir mes idées. Aujourd'hui, lorsque je parle aux médias, je dois être concis, affirme M. Ouellette. La courbe d'apprentissage d'un universitaire qui entre en politique est immense. Je suppose que je suis un politicien maintenant. Mais j'ai du mal à y croire. »

Jean-Yves Duclos vit un changement de carrière semblable. En plus d'avoir été élu député de Québec, l'ancien directeur du département d'économie de l'Université Laval et président désigné de l'Association canadienne d'économie a été nommé ministre de la Famille, des Enfants et du Développement social. Le lendemain de sa nomination au conseil des ministres, M. Duclos s'est présenté devant les médias pour annoncer le rétablissement du formulaire long de recensement obligatoire, une décision vivement applaudie par le milieu universitaire.

Les données recueillies par Universités Canada indiquent que MM. Duclos et Ouellette sont loin d'être les seuls universitaires au sein du 42^e Parlement. Quelque 227 des 338 députés à la Chambre des communes ont un baccalauréat (contre 184 dans l'ancien gouvernement, qui comptait 304 députés); environ 97 de ces députés ont également une maîtrise, et 14, un doctorat (contre 62 titulaires d'une maîtrise et 13 titulaires d'un doctorat à la dernière législature). Le nouveau conseil des ministres compte 14 titu-

lares d'une maîtrise et cinq titulaires d'un doctorat, dont M. Duclos.

Même si MM. Ouellette et Duclos sont de nouveaux venus, plusieurs députés réélus issus du milieu de l'enseignement supérieur ont déjà fait le saut en politique :

• **Kirsty Duncan**, nouvelle ministre des Sciences et députée libérale de la circonscription torontoise d'Etoobicoke-Nord, est géographe médicale et a enseigné dans les domaines de la météorologie, de la climatologie et des changements climatiques à l'Université de Windsor de 1993 à 2000. Elle a aussi été professeure adjointe de géographie médicale à l'Université de Toronto et de processus environnementaux mondiaux à l'Université Royal Roads. Elle a siégé dans le Groupe d'experts intergouvernemental sur l'évolution du climat, une organisation qui a reçu le prix Nobel en 2007 conjointement avec Al Gore. M^{me} Duncan est députée depuis 2008.

• **Stéphane Dion**, ministre des Affaires étrangères et député libéral de la circonscription montréalaise de Saint-Laurent-Cartierville depuis 1996, a été professeur de sciences politiques à l'Université de Moncton et à l'Université de Montréal. Il a été chef du Parti libéral du Canada et chef de l'opposition officielle à la Chambre des communes, en plus d'avoir occupé plusieurs postes au sein du cabinet.

• **John McCallum**, ministre de l'Immigration, des Réfugiés et de la Citoyenneté et député libéral de la circonscription ontarienne de Markham-Thornhill, a été doyen de la Faculté des arts de l'Université McGill et, en 1993, a recueilli 10 millions de dollars lors d'une campagne de financement de l'Institut d'études canadiennes de l'Université McGill. Il a ensuite été économiste en chef de RBC avant de se lancer en politique en 2000. Il a depuis occupé plusieurs ministères, dont ceux de la Défense nationale, des Anciens combattants, des Ressources naturelles et du Revenu national.

• **Michelle Rempel**, députée conservatrice de Calgary Nose Hill, a été directrice de la Division des programmes institutionnels de l'Université de Calgary et a travaillé au service de la commercialisation des technologies de l'Université du Manitoba avant d'entrer en politique en 2011. Elle a agi à titre de ministre d'État de la Diversification de l'économie de l'Ouest du Canada dans l'ancien gouvernement.

• **Alice Wong** est députée conservatrice de Richmond, en Colombie-Britannique, depuis 2008. Titulaire d'un doctorat en enseignement

et en gestion de programmes de l'Université de la Colombie-Britannique, elle a été gestionnaire des programmes internationaux de l'Université polytechnique Kwantlen. Elle a été ministre d'État des Aînés au sein du gouvernement précédent.

• **Kennedy Stewart**, député néo-démocrate de la circonscription de Burnaby-Douglas dans la région de Vancouver depuis 2011, est professeur agrégé en congé autorisé à l'École de politique publique de l'Université Simon Fraser.

David Lametti, professeur de droit à l'Université McGill et titulaire d'un doctorat en droit de l'Université d'Oxford, compte aussi parmi les universitaires devenus politiciens. Ancien vice-doyen à l'enseignement de la Faculté de droit de l'Université McGill, il a décidé de se présenter en tant que candidat du parti libéral dans la circonscription montréalaise LaSalle-Émard-Verdun, en partie pour faire la promotion de l'élaboration de politiques fondées sur des données probantes – une démarche qu'il a appris à valoriser pendant sa formation universitaire. « C'est ce qu'on apprend à l'université : on apprend à s'attarder aux données probantes », explique-t-il.

Bien que la plateforme libérale en matière d'enseignement supérieur n'ait pas encore été élaborée, M. Lametti prévoit un changement radical par rapport à la façon dont l'ancien gouvernement « dévalorisait le travail des scientifiques, des universités et des chercheurs en sciences humaines ».

Même s'il s'est écoulé peu de temps depuis les élections, nombreux sont les intervenants du secteur de l'éducation postsecondaire qui se sont réjouis de la démarche, à première vue ouverte, du nouveau gouvernement à l'égard de la recherche et de l'enseignement supérieur en général. Le 27 octobre, Justin Trudeau, alors premier ministre désigné, a fait une apparition-surprise aux réunions des membres d'Universités Canada à Ottawa.

Elizabeth Cannon, présidente du conseil d'administration d'Universités Canada et rectrice de l'Université de Calgary, a indiqué à la Presse canadienne que cette visite avait envoyé un signal fort et qu'elle démontrait un changement de ton par rapport au gouvernement précédent. « Il nous a parlé avec passion de l'incidence que sa propre formation universitaire avait eue sur lui, sur sa vie, sur sa façon de penser. Son message était très positif », a-t-elle raconté. – NATALIE SAMSON



Classroom distractions

The laptop is not your enemy

by Paul Axelrod



**“There are proven ways
to have technology serve
the teacher’s goals. The
challenge is to channel
the tools to that purpose.”**

AFTER MORE THAN four decades as a university student, professor and administrator, I retired recently and moved into the sage age where I can now offer unsolicited (and undoubtedly unappreciated) advice to ex-colleagues on how to be better at what they do. Today’s lesson is the use of technology in the lecture hall. Should laptops be banned, as some exasperated academics are now proposing? Uh, no.

This misguided idea comes from a noble, if self-centred place. We professors have important things to tell students and we want their attention. Trolling Facebook and its multiple online cousins is an obvious distraction from the class at hand. Notwithstanding students’ well-known ability to multi-task, they are bound to miss something critical when they allow their minds to wander – away from us.

Or are they? Our fear of being ignored is less a comment on the disruptive effect of electronic gadgetry than on our failure to rethink the use of the large lecture. For reasons of efficiency and cost, academics are slaves to this mostly anachronistic teaching model. We have huge classrooms that must be filled by hundreds of students with nowhere else to go if they hope to encounter a live professor. And a single instructor is obviously the budget-friendly way to deliver a course.

We rationalize this approach intellectually by treating students as adults and giving them the right not to attend. We may even post our lectures online, making it unnecessary for them to do so. We encourage those in the lecture hall

to ask questions, but only a handful generally do. And many universities no longer provide smaller tutorial or seminar discussion groups to accompany the large lecture, which reinforces this one-dimensional teaching model.

Please don’t misunderstand. I think excellent lecturing is valuable and admirable. Deeply learned and charismatic presenters who can creatively engage students week in and week out are heroic. But let’s be candid. They are a distinct minority. Some lecturers are masters of content and dreadful communicators. Others are better at entertaining than enlightening students. In all likelihood, most are middling orators and decent, if ordinary, assimilators of knowledge in their teaching fields. Effective classroom instruction requires some degree of acting and when do aspiring professors ever get that training? They learn how to teach through trial and (probably too much) error.

This was all known and tolerated in the pre-Internet age. There was one main way to teach and learn. Professors defined and delivered both essential and required knowledge. Students soaked it up, raised the occasional question and reiterated what they had learned on final exams. At its best, this system provided strong grounding in a particular discipline. At its worst, it was a dull, pedestrian endurance test for both professor and student.

But this single-minded teaching strategy, which is still employed, surely won’t do any longer – and students know it. They will go through the motions of meeting the instructor’s require-

ments, but learning opportunities are being missed if available teaching tools are not used more creatively.

Students require laptops to take notes, which they can organize in ways that best suit them, so banning them in the lecture hall is foolish and unfair. Computers can be used to view original texts or images, to which professors are alluding, during the lecture itself. Tweeted questions can be taken up immediately, or be the source of in-class discussions during periodic – and necessary – breaks in the lecture. The class may evolve into a less linear but more dynamic and interesting forum. Sheer gimmickry and noisy free-for-alls should be avoided, so the professor needs to manage as well as instruct, but there are proven ways of having the technology serve the teacher’s intellectual goals rather than detract from them. The challenge is to channel the tools to that purpose. Treat the laptop as your friend not your enemy.

But doing so requires deeper learning about the potential of these high-tech instruments than most faculty, particularly veterans, have been prepared to undertake. Too few take advantage of teaching-support services that most institutions now offer. The lecture hall is not going anywhere in the near future. Nor are laptops, smartphones and their yet-to-be conceived offspring. Those of you not yet retired should immerse yourself in this new world of teaching and learning. If you do so successfully, your students will be genuinely engaged and you will find those great big classes more rewarding than burdensome.

Lecture concluded. Class dismissed. **UA**



Advocate for fisheries and marine education named VP at UArctic



Memorial University's **Gerald Anderson** was appointed vice-president, indigenous, at the University of the Arctic, a co-operative network of about 150 universities, colleges and other organizations committed to higher education and research in the North. He will provide strategic oversight of UArctic's contributions to the well-being of northern indigenous communities while continuing as director, development and engagement, at Memorial's Fisheries and Marine Institute. Mr. Anderson will also sit as a member of the board of UArctic's executive committee and ex-officio member of the board of governors. Mr. Anderson joined Memorial's Fisheries and Marine Institute in 1987. In that time he has taken on various roles with indigenous groups in Newfoundland and Labrador, Nunavut and Nunavik, primarily focusing on establishing fisheries and marine education and training programs. He has also advocated for growth in youth employment in the fisheries sector and marine transport industry by bringing training to those who would otherwise be unable to access the necessary education.

Nasser-Eddine spent three years as a research scientist at Labo-Pharm in Montréal.



Murray Kyte has been appointed vice-president, advancement, at St. Francis Xavier University. Prior to his appointment, Mr. Kyte, a lawyer and business instructor, was academic chair and dean at Algonquin College in Ottawa. He starts at StFX on Jan. 4, 2016.



Larry P. Alford, chief librarian at the University of Toronto, was elected president of the Association of Research Libraries. He began his one-year term on Oct. 7. Mr. Alford has been chief librarian at U of T since August 2011. Prior to U of T he was dean of University Libraries at Temple University in Philadelphia.



The University of Guelph has named **Al Lauzon** interim director of the School of Environmental Design and Rural Development, effective Nov. 1. Dr. Lauzon has been with the school since 1989. He teaches in, and acts as the coordinator of, the Capacity Development and Extension MSc and rural studies PhD programs.



At Trent University, **Julie Davis** has been reappointed vice-president, external relations and advancement, for a second five-year term. In her first term, Ms. Davis oversaw a successful legacy gift campaign, doubling the number of legacy donors, and spearheaded community relations improvements and Trent's 50th anniversary celebrations. Before joining Trent she was president and CEO of the Peterborough Regional Health Centre Foundation.



At Concordia University, **Bram Freedman** transitioned to the full-time role of vice-president, advancement and external relations, as of Dec. 1. For more than two years, Mr. Freedman had been vice-president of development and external relations and secretary-general. With the transition, Mr. Freedman continues to oversee the offices of urban and cultural affairs and community engagement. Before taking on these roles in 2008, he was chief

operating officer and director of external relations at Federation CJA, the central fundraising and community service organization for Quebec's Jewish community.



Mohamad Nasser-Eddine joined the Canada Foundation for Innovation as director of programs on Oct. 13. He was previously director of the office of strategic development initiatives at the University of Ottawa, a position he held for four years. Before joining U of O, Dr.



Patricia Corcoran was appointed director of the Centre for Environment and Sustainability at Western University. An earth sciences professor, Dr. Corcoran will lead the centre through a period of review and long-term planning. The two-year appointment lasts until June 2017.



Chantal Beauvais has been reappointed rector of Saint Paul University. First

appointed in 2009, Dr. Beauvais has steered the university through a period of academic and institutional expansion. Under her direction, the university has seen steady growth in student enrolment and in international visibility. Dr. Beauvais is the first woman and first layperson to helm the institution.



Mohamed Lachemi is now serving as interim president and vice-chancellor of

Ryerson University, effective Dec. 1. Dr. Lachemi transitioned to the role from that of provost and vice-president, academic. As provost since 2013, he has served as chief academic officer and chief operating officer. A civil engineer by training, Dr. Lachemi has also served as dean, associate dean, assistant chair, and founding graduate program director.



Education scholar and registered psychologist **Vicki Schwan** has been reappointed

dean of the faculty of education at Western University. First appointed in 2011, Dr. Schwan was previously vice-dean, finance and academic administration, in the faculty of education at the University of Calgary. She was also associate dean, division of applied psychology at U of C; head of educational psychology and special education at the University of Saskatchewan; and founder of U of C's applied psychological and educational services. Her second term at Western begins Sept. 1, 2016 through Aug. 31, 2022.



La TÉLUQ annonce la nomination de son nouveau directeur général par intérim,

Martin Noël, confirmé dans ses fonctions le 12 novembre dernier par l'Assemblée des gouverneurs de l'Université du Québec. Titulaire d'un doctorat en recherche opérationnelle, M. Noël a fait carrière à la TÉLUQ où il a d'abord été professeur en gestion des opérations à l'École des sciences de l'administration. Avant sa nomination, il occupait le poste de directeur des affaires académiques.



The Fisheries and Marine Institute of Memorial University has named **Gary**

Bradshaw to the new role of associate vice-president, administration and finance. Mr. Bradshaw previously served as associate vice-president of administration and finance at Memorial's Grenfell Campus, a post he'd held since 2011. He came to Memorial from the University of Prince Edward Island, where he was vice-president, finance and facilities, for nine years. Mr. Bradshaw is the past-president of the Canadian Association of University Business Officers.



Air Canada president and chief executive officer **Calin Rovinescu** has been

named chancellor at the University of Ottawa. Mr. Rovinescu, who holds a degree in common law from U of O, has been a member of the university's campaign cabinet since 2014. Mr. Rovinescu has served in several senior positions with Air Canada since 2000. In 2004, he became a co-founder and principal of Genuity

Capital Markets, an independent investment bank. In June 2014, he was elected to chair the board of governors of the International Air Transport Association.



Dan Ryan has been named acting vice-president, academic, and provost at the

University of Northern British Columbia. Dr. Ryan previously served as dean of UNBC's college of science and management. He specializes in environmetrics, the application and development of statistical techniques in the environmental sciences.



Concordia University has appointed **Frederica Jacobs** secretary-general and

general counsel for a five-year term, beginning Dec. 1. Ms. Jacobs joined Concordia seven years ago after a 20-year career in private practice specializing in commercial real estate. In her new role she will oversee the offices of board and senate administration, translation services, records management and archives, the ombuds office, and the office of rights and responsibilities.



Political scientist **David Cameron** has been reappointed dean of the faculty of

arts and science at the University of Toronto. His three-year term begins July 1, 2016. Dr. Cameron was first appointed dean in 2014, following an eight-month term as interim dean. He previously served as vice-president, institutional relations, chair of the department of political science and acting vice-dean of undergraduate education and teaching in the

faculty of arts and science. A Fellow of the Royal Society of Canada, Dr. Cameron has been a faculty member at U of T since 1985.



Geoffrey Payne was named interim vice-president, research, at the

University of Northern British Columbia. Dr. Payne came to UNBC in 2004 as a founding faculty member in the northern medical program. He joined UNBC following a postdoctoral fellowship at Yale University in the department of cellular and molecular physiology. Dr. Payne, a professor of vascular physiology, served as the assistant dean for both education and research with the northern medical program.



The University of Saskatchewan has hired **Johannes**

Dyring as managing director of the industrial liaison office. The appointment took effect Oct. 27. Dr. Dyring joins the university from SLU Holding AB, a subsidiary of the Swedish University of Agricultural Sciences, where he was CEO. He has a PhD in sub-atomic physics, co-founded a European subsidiary of an aerospace materials company, served as CEO of CONNECT Eastern Sweden, a non-profit business network, and co-founded Dedicera AB, a business consulting firm.



The University of Lethbridge has appointed **Ken McInnes** executive director

of sport and recreation services for a three-year term. Mr. McInnes has served in the role on an interim basis since early 2015.



Over the course of 25 years at the university, he has held several senior roles, including executive director of human resources. Mr. McInnes is a former U of Lethbridge track and field athlete who competed nationally.



Le doyen de la Faculté de médecine de l'Université Laval, **Régnald Bergeron**, a été nommé médecin de famille par excellence au Québec par le

Collège des médecins de famille du Canada. La remise du prix Reg L. Perkin consacre la contribution exceptionnelle du Dr Bergeron envers ses patients et sa communauté, et pour l'avancement de la médecine familiale. Le Dr Bergeron a multiplié au fil des décennies les rôles de premier plan au sein de la Faculté de médecine de l'Université Laval. En plus d'exercer activement la médecine familiale depuis 1980, il a été professeur au Département de médecine de

famille et de médecine d'urgence, où il a occupé le poste de directeur de 1999 à 2007. Il est doyen de la Faculté de médecine depuis 2010.



At the University of Toronto, **Don McLean** has been reappointed dean of the faculty of music until June 30, 2021. He will resume his duties after a one-year administrative leave from July 1, 2016, to June 30, 2017. During his first term,

Dr. McLean helped develop cross-disciplinary initiatives, including the Music and Health Research Collaboratory, and new programs in music and health, music technology and digital media, and early music/historical performance. He serves on the EU Council of the Association of European Conservatories and is a member of the Canadian University Music Society, the American Musicological Society, and the Society for Music Theory.

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Pregnant pauses

Contesting gendered bodies in academia

by Jessica Riddell

“Once pregnant, an individual becomes defined first by her biological state and second by her professional status.”



THE FOLLOWING is an email exchange I had with one of my students who was profiling community members for a weekly column in the local newspaper. At the time, I was seven months pregnant with my first child.

Good day Professor,

First, I want to thank you for taking the time to do this, it's much appreciated!

- 1. How far along are you with the pregnancy?*
- 2. How many years have you been teaching at Bishop's?*
- 3. Where did you pursue your doctorate education?*
- 4. Has being pregnant affected your school implications? (I understand you're still involved with extracurricular activities like the Ted talks, debate weekend, the undergraduate conference, etc. Has it slowed you down at all?!)*
- 5. Are you teaching classes this semester, if so how many?*
- 6. Are you one of those women who knew how many kids she wanted, and already named them before she even met their father?!*
- 7. Boy or girl, or is it going to be a surprise?*
- I think that should be enough. I know that the questions are seemingly all over the place, but trust me I have a plan! If there are any that you prefer to omit, feel free to do so, and if there is anything else that you want to add, please do so!*

Again, thanks a bunch!
John Doe

Dear JD,

Your email presents an important teaching and learning opportunity. A profile of a university professor in a local newspaper might focus on teaching interests, research projects, extracurricular activities, awards and a general sense of how the individual contributes to diverse communities.

However, you have chosen – I am sure unintentionally – a very different kind of profile. Indeed, your first question, “How far along are you with the pregnancy?” precedes the more relevant, “How many years have you been teaching at Bishop's?” The order of questions implies a hierarchy; once pregnant, an individual becomes defined first by her biological state and second by her professional status. Identity becomes *relational* (identity is established *vis-à-vis* a child or spouse) rather than *individual* (self-definition based on goals, values, and beliefs) or *collective* (identification with groups and social categories to which the individual belongs). The problem here is that relational identity doesn't allow for an individual to establish his or her own identity.

I do not mean to suggest that academia and motherhood isn't a topic that warrants attention. Female academics are much less likely to have children, much older when they do choose to have children, and in some cases (in the sciences in particular) women leave academia altogether. There is a lot of scholarship on this, and I encourage you to do some reading on this subject (e.g. *Academic Motherhood*, 2012).

What concerns me is that your questions do not probe the implicit gender bias around aca-

demia and motherhood as much as they manifest implicit gender bias. If we were to pose the same questions to my colleague Dr. X, who – along with his wife – is expecting a baby in a few weeks, the results would be much more incongruous (e.g. “Are you one of those [men] who knew how many kids [he] wanted, and already named them before [he] even met their [mother]?!”). This differential should give us pause for serious reflection.

There are a few relatively benign questions in your interview, while other questions are loaded with underlying assumptions that warrant attention. The question that concerns me is question 4: “Has being pregnant affected your school implications? ... Has it slowed you down at all?!”

What this suggests is that pregnancy, like a debilitating disease, interferes with a woman's ability to fulfill her professional obligations. This statement is not only untrue, but it is also one of the central arguments put forward to justify male privilege and female subordination.

I do not mean to suggest that you are trying to be sexist. However, your questions are informed by an underlying cultural bias that is often invisible. One of the most important functions of higher education is to make visible these dominant ideological structures to question, challenge and deconstruct implicit gender bias. I hope I have helped you think more critically about these issues and I thank you for the opportunity to think critically about this topic myself.

If you would like to pursue a professional profile, I would be happy to answer your questions relating to my academic career. **UA**

Listes d'emplois Job listings

Careers Carrières



Civil Engineering

University of Victoria - The Faculty of Engineering, at the University of Victoria, invites applications for a tenure-track or tenured faculty position to support the development of a green Civil Engineering program. The Faculty seeks one appointment at the Assistant or Associate Professor level in Green Buildings and Structures. Candidates should be motivated to conduct research towards reducing environmental impacts in areas such as structural design (e.g., lightweight structures, wood frame structures), net-zero building design, building science, building systems, or sustainable materials. An advanced degree in Civil Engineering with focus on structural engineering or significant professional structural design office experience is required. Experience teaching structural design would be an asset. Candidates for the position must have a PhD in Civil Engineering, or a related field, together with demonstrated excellence in teaching, research, graduate student supervision, verbal and written communication, and collaboration with colleagues with engineering and non-engineering backgrounds. Candidates must be registered as a professional engineer or be eligible for and committed to registration. The successful applicant will be expected to teach at the undergraduate and graduate levels, supervise graduate students, establish an active research program, and participate in the academic affairs of the university. The Civil Engineering Program was established in 2013 and currently has 140 undergraduate students in the first three years. The establishment of the Civil Engineering department and the development of a graduate program are under way. The program presently has five faculty members with three additional members to arrive in January 2016, including the Chair of the Department. The successful applicant will have the opportunity to contribute further to the new Civil Engineering Program at UVic. The University of Victoria (www.uvic.ca/) is situated in the City of Victoria, the capital of British Columbia, at the southeast tip of Vancouver Island. Founded in 1963, the University is ranked as one of the leading universities in Canada with a reputation for excellence in research and teaching. Applications should include curriculum vitae, a statement of teaching and

research objectives and interests, and the names, addresses, telephone numbers, and email addresses of at least four referees. Applications can be sent electronically by 19 February 2016 in PDF format to CIVEROle1@uvic.ca addressed to: Dr. Sadik Dost - Professor and Acting Director of Civil Program, Faculty of Engineering, University of Victoria, PO Box 1700, Victoria, BC, Canada V8W 2Y2. Faculty and Librarians at the University of Victoria are governed by the provisions of the Collective Agreement. Members are represented by the University of Victoria Faculty Association (www.uvicfa.ca). The University of Victoria is an equity employer and encourages applications from women, persons with disabilities, visible minorities, Aboriginal Peoples, people of all sexual orientations and genders, and others who may contribute to the further diversification of the university. All qualified candidates are encouraged to apply; however, in accordance with Canadian Immigration requirements, Canadians and permanent residents will be given priority. [34538]

University of Victoria - The Faculty of Engineering, at the University of Victoria, invites applications for a tenure-track or tenured faculty position to support the development of a green Civil Engineering program. To address sustainability challenges of rapid global urbanization the Faculty is seeking an Assistant or Associate Professor in Sustainable Cities and Infrastructure Systems. Candidates with a diversity of research backgrounds will be considered including: urban water systems and sanitation (including treatment processes and hydraulics), urban transportation (e.g., land-use transportation planning, public transit), resilient cities, smart cities, low carbon cities, cities as complex systems, climate change adaptation, and urban infrastructure planning in a development context. Candidates for the position must have a PhD in Civil and/or Environmental Engineering, or a related field, together with demonstrated excellence in teaching, research, graduate student supervision, verbal and written communication, and collaboration with colleagues with engineering and non-engineering backgrounds. Candidates must be registered as a professional engineer or be eligible for and committed to registration. The successful applicant will be expected to teach at the undergraduate

and graduate levels, supervise graduate students, establish an active research program, and participate in the academic affairs of the university. The Civil Engineering Program was established in 2013 and currently has 140 undergraduate students in the first three years. The establishment of the Civil Engineering department and the development of a graduate program are under way. The program presently has five faculty members with three additional members to arrive in January 2016, including the Chair of the Department. The successful applicant will have the opportunity to contribute further to the new Civil Engineering Program at UVic. The University of Victoria (www.uvic.ca/) is situated in the City of Victoria, the capital of British Columbia, at the southeast tip of Vancouver Island. Founded in 1963, the University is ranked as one of the leading universities in Canada with a reputation for excellence in research and teaching. Applications should include curriculum vitae, a statement of teaching and research objectives and interests, and the names, addresses, telephone numbers, and email addresses of at least four referees. Applications can be sent electronically by 19 February 2016 in PDF format to CIVEROle2@uvic.ca addressed to: Dr. Sadik Dost - Professor and Acting Director of Civil Program, Faculty of Engineering, University of Victoria, PO Box 1700, Victoria, BC, Canada V8W 2Y2. Faculty and Librarians at the University of Victoria are governed by the provisions of the Collective Agreement. Members are represented by the University of Victoria Faculty Association (www.uvicfa.ca). The University of Victoria is an equity employer and encourages applications from women, persons with disabilities, visible minorities, Aboriginal Peoples, people of all sexual orientations and genders, and others who may contribute to the further diversification of the university. All qualified candidates are encouraged to apply; however, in accordance with Canadian Immigration requirements, Canadians and permanent residents will be given priority. [34537]

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- » **COMPUTER SOFTWARE** The department is particularly interested in candidates with a demonstrated research record in big data, data analytics, deep learning, artificial intelligence or machine learning. Consideration will also be given to exceptional candidates in computer software.
- » **SOFTWARE SYSTEMS** The department is particularly interested in candidates with a demonstrated research record in systems software, operating systems, dependable systems, embedded systems or real-time software systems. Consideration will also be given to exceptional candidates in computer software.

All qualified candidates are encouraged to apply; however Canadians and permanent residents will be given priority. The University of Waterloo encourages applications from all qualified individuals, members of visible minorities, native peoples, and persons with disabilities.

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For complete job descriptions and application details visit uwaterloo.ca/engineering
Three reasons to apply: uwaterloo.ca/watport/why-waterloo



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ulty is seeking an appointment at the Full or Associate Professor level in Sustainable Cities and Infrastructure Systems. Candidates with a diversity of research backgrounds will be considered including: urban water systems and sanitation (including treatment processes and hydraulics), urban transportation (e.g., land-use transportation planning, public transit), resilient cities, smart cities, low carbon cities, cities as complex systems, climate change adaptation, and urban infrastructure planning in a development context. Candidates for the position must have a PhD in Civil Engineering, or a related field, together with demonstrated excellence and proven record in teaching, research, graduate student supervision, verbal and written communication, and collaboration with colleagues with engineering and non-engineering backgrounds. Candidates must be registered as a professional engineer or be eligible for and committed to registration. The successful applicant will be expected to teach at the undergraduate and graduate levels, supervise graduate students, establish an active research program, obtain significant research funding, and participate in the academic affairs of the university. The Civil Engineering Program was established in 2013 and currently has about 140 undergraduate students in the first three years. The Program presently has five faculty members with additional three members to arrive as of Jan 1, 2016, including the Chair of the Department. The establishment of the Civil Engineering depart-

ment and the development of its graduate programs are under way. The successful applicants will have the opportunity to contribute further to the growing Civil Engineering Program at UVic. The University of Victoria (www.uvic.ca/) is situated in the City of Victoria, the capital of British Columbia, at the southeast tip of Vancouver Island. Founded in 1963, the University is ranked as one of the leading universities in Canada with a reputation for excellence in research and teaching. Applications should include curriculum vitae, a statement of teaching and research objectives and interests, and the names, addresses, telephone numbers, and email addresses of at least four referees. Applications can be sent electronically by 19 February 2016 in PDF format to MENGrole2@uvic.ca addressed to: Dr. Sadik Dost - Professor and Acting Director of Civil Program, Faculty of Engineering, University of Victoria, PO Box 1700, Victoria, BC, Canada V8W 2Y2. Faculty and Librarians at the University of Victoria are governed by the provisions of the Collective Agreement. Members are represented by the University of Victoria Faculty Association ((a href="http://www.uvicfa.ca/") http://www.uvicfa.ca/(a)). The University of Victoria is an equity employer and encourages applications from women, persons with disabilities, visible minorities, Aboriginal Peoples, people of all sexual orientations and genders, and others who may contribute to the further diversification of the university. In accordance with Canadian

Immigration requirements, Canadians and permanent residents will be given priority. [34536]

Computer Science

University of New Brunswick - The Faculty of Computer Science at the University of New Brunswick invites applications for a three-year term position at the rank of Instructor. Applicants are expected to have a minimum of a Master's degree in Computer Science with at least two years relevant industry experience. A PhD degree in Computer Science and/or additional industry experience would be a plus. Applicants for this term position should have evidence of or demonstrated potential for excellence in teaching, and be able to teach Computer Science, broadly defined, courses at the undergraduate level. Subject to budgetary approval, this position will start as early as July 1, 2016. Salary level will be commensurate with qualifications and experience. Applicants should send a cover letter, a detailed CV, one-page teaching interests and philosophy, and the names and addresses of three academic references, to: Dr. Ali A. Ghorbani - Dean, Faculty of Computer Science, University of New Brunswick, Fredericton, New Brunswick; Fax: 506-453-3566; Email: fcs@unb.ca. The search committee will begin to review applications in mid-January, 2016 and will continue to do so until the position is filled. For more information on the Faculty of Computer Science,

visit www.cs.unb.ca. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. Applicants should indicate current citizenship status. The University of New Brunswick is committed to the principle of Employment Equity. [34471]

University of New Brunswick - The Faculty of Computer Science at the University of New Brunswick invites applications for a tenure-track position at the rank of Assistant Professor. Priority areas are Cybersecurity, Mobile Computing, and Graphics. Strong preference will be given to candidates in these areas, although exceptional applicants in other areas of Computer Science will be considered. The successful candidate will have a PhD in Computer Science and a research record commensurate with rank. The successful candidate is expected to develop a strong, externally funded research program and supervise graduate students. Additionally, applicants should have evidence of or demonstrated potential for excellence in teaching and be able to teach courses at the undergraduate and graduate levels in Computer Science. A demonstrated willingness to work with industry is considered an asset. Subject to budgetary approval, this position will start as early as July 1, 2016. Salary level will be commensurate with qualifications and experience. Applicants should send a cover letter, a detailed CV, a statement of contributions to research,



FACULTY OF EDUCATION Educational Psychology (Inclusive Education) Tenure-Track Position

The Faculty of Education at the University of Lethbridge seeks to fill a tenure-track position in Educational Psychology (Inclusive Education) at the rank of Assistant or Associate Professor to commence July 1, 2016.

The appointment carries the following key expectations:

- Fluency with current theories and practices in areas of expertise
- Engagement in scholarly or creative work
- Contribution to the undergraduate and graduate programs, including teaching, supervision of student research, and student supervision in practice

Qualifications include a completed or nearly completed PhD in Educational Psychology (Inclusive Education). Preference will be given to individuals with two or more years successful K-12 classroom experience (working within inclusive settings as a teacher, learning coach/consultant, or administrator), and to individuals who are eligible for teacher certification in Alberta (B.Ed. or equivalent). Interest and expertise in universal design, differentiation strategies, assessment, coaching principles, behavioural supports, and individual learning profiles will strengthen applications for this position.

Applicants are asked to indicate other areas of expertise relevant to teaching and research in education including, but not limited to Counselling Psychology and Learning. The successful candidate will demonstrate exemplary teaching skills, a commitment to special needs learners and a willingness to teach in blended or off-campus programs. Experience in Alberta schools demonstrating knowledge of and experience with Action on Inclusion and work with First Nations students will enhance applications.

The Faculty of Education at the University of Lethbridge is one of the finest teacher training programs in Canada. You will experience a collegial environment and the opportunity to make a difference. Applications from persons of First Nations, Métis, or Inuit descent are encouraged. Information about Lethbridge can be found at <http://www.lethbridge.ca/living-here/Pages/default.aspx>

Applications, which must be accompanied by a curriculum vitae and the names of three references, should be sent to Dr. Craig Loewen, Dean, Faculty of Education, University of Lethbridge, 4401 University Drive, Lethbridge, AB, T1K 3M4. Electronic applications are welcomed and may be sent to darcy.mckenna@uleth.ca. Applicants are encouraged to apply early as the first review of applications will begin after February 2016. Applications will be accepted until the position is filled. For further information about the Faculty of Education visit our website at <http://www.uleth.ca/education>.

This position is open to all qualified applicants although preference will be given to Canadian citizens and permanent residents of Canada. The University is an inclusive and equitable campus encouraging applications from qualified women and men, including persons with disabilities, members of visible minorities, and Aboriginal persons.

or continue a career. The Department offers undergraduate, masters and doctoral programs and candidates should be prepared to teach at both the undergraduate and graduate level. Information about the Department is available at web.uvic.ca/econ. Applicants should have a Ph.D. in hand or be close to completion and possess a strong commitment to quality teaching as well as exhibiting excellent research potential and the ability to introduce recent research themes to students at the senior level. The University of Victoria is an equity employer and encourages applications from women, persons with disabilities, visible minorities, Aboriginal peoples, people of all sexual orientations and genders, and others who may contribute to the further diversification of the University. Faculty and Librarians at the University of Victoria are governed by the provisions of the Collective Agreement. Members are represented by the University of Victoria Faculty Association (www.uvicfa.ca). All qualified candidates are encouraged to apply; however, in accordance with Canadian immigration requirements, Canadians and permanent residents will be given priority. Applications will include: a cover letter with a clear statement of current eligibility to work in Canada; a current C.V.; a short form teaching portfolio, with a statement of teaching philosophy and interests, teaching evaluations or other evidence of teaching effectiveness; a sample of scholarly research; and three current letters of reference forwarded directly by the referees to econfacultysearch@uvic.ca. Applications will be considered until the position is filled. Applications must be submitted electronically in pdf format to econfacultysearch@uvic.ca. [34581]

English

Glendon College/York University

The Department of English at York University, Glendon College, invites applications in Canadian literature for a 12-month alternate-stream contractually-limited appointment at the rank of Sessional Assistant Lecturer to commence July 1, 2016, subject to budgetary approval. For a complete job description and application details, visit www.yorku.ca/acadjobs. York University is an Affirmative Action (AA) employer and strongly values diversity, including gender and sexual diversity, within its community. The AA Program, which applies to Aboriginal people, visible minorities, people with disabilities, and women, can be found at www.yorku.ca/acadjobs or by calling the AA office at 416-736-5713. Temporary entry for citizens of the U.S.A. and Mexico may apply per the provisions of the North American Free Trade Agreement (NAFTA) or citizens of Chile may apply per the provisions of the Canada Chile Free Trade Agreement (CCFTA). All qualified candidates are encouraged to apply; however, Canadian citizens and permanent residents will be given priority. [34518]

Études internationales

Collège universitaire Glendon/Université York - Le nouveau programme en Administration des affaires du Département d'études internationales à l'Université York, Collège universitaire Glendon, sollicite des candidatures pour deux postes au rang de professeur adjoint ou professeure adjointe menant à la permanence, débutant le 1er juillet 2016. Ces postes sont sujets à l'approbation budgétaire de l'Université. Nous recherchons des titulaires d'un doctorat en Administration des affaires ou en gestion pouvant enseigner : (1) des cours en gestion, théorie des organisations et autres sujets introductifs en administration des affaires; (2) des cours en entrepreneuriat ou en gestion de projets/opérations. Pour lire la description complète de ces postes et faire une demande, veuillez consulter le site www.yorku.ca/acadjobs. York est un employeur qui a adopté un programme d'action positive et préconise la diversité dans sa communauté, notamment celle de genre et de sexe. Le programme d'action positive s'applique aux autochtones, aux minorités visibles, aux personnes ayant un handicap et aux femmes. Pour plus de renseignements sur ce programme, veuillez consulter le site www.yorku.ca/acadjobs, ou vous adresser au Bureau d'action positive au (416) 736-5713. Toutes les personnes qualifiées sont encouragées à poser leur candidature; toutefois, la priorité sera accordée aux personnes de citoyenneté canadienne ou détenant le statut de résident permanent au Canada. [34516]

Études religieuses

Université McGill - La Faculté des études religieuses de l'Université McGill, située à Montréal (Canada), lance un appel à candidatures pour un poste permanent de professeur adjoint ou de professeur agrégé, dans le domaine des religions japonaises. Nous cherchons un universitaire dynamique capable d'élargir et d'enrichir le programme des religions asiatiques à McGill. Le candidat doit posséder une expertise de premier ordre en recherche dans une ou plusieurs disciplines - le bouddhisme zen, le bouddhisme de la Terre Pure et l'école de philosophie de Kyoto - situées dans le contexte des débats approfondis sur les traditions religieuses et culturelles asiatiques ainsi que leurs recoupements mutuels. Une formation disciplinaire en anthropologie, en histoire, en études culturelles, en philosophie et en sociologie des religions japonaises peut être complémentaire de l'expertise en approches théoriques et méthodologiques des études religieuses. Le candidat idéal doit posséder une compétence étendue en supervision dans le domaine des traditions religieuses japonaises, une connaissance de la langue japonaise (classique et contemporaine) et idéalement, une compétence supplémentaire en recherche dans une deuxième langue de l'Asie orientale. Il est essentiel que le candidat puisse donner des cours d'introduction qui couvrent les traditions bouddhistes et

teaching, and curriculum development, three sample research publications, and three reference letters to: Dr. Ali A. Ghorbani - Dean, Faculty of Computer Science, University of New Brunswick, Fredericton, New Brunswick; Fax: 506-453-3566; Email: fcs@unb.ca. The search committee will begin to review applications in mid-January, 2016 and will continue to do so until the position is filled. For more information on the Faculty of Computer Science, visit www.cs.unb.ca. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. Applicants should indicate current citizenship status. The University of New Brunswick is committed to the principle of Employment Equity. [34472]

Economics

University of Victoria - The Department of Economics at the University of Victoria invites applications for two limited-term Assistant Teaching Professor positions, with course load of six or eight classes per year. The start date is negotiable, but may be as soon as May 1, 2016. These positions are for two years, with the second year renewal subject to excellent performance and available funding. The Department has priority interest in the areas of Finance and Macroeconomics. Excellent teaching candidates in all fields will be considered. The Department of Economics at the University of Victoria offers an ideal environment in which to gain teaching experience and commence

YORK UNIVERSITY is helping shape the global thinkers who will define tomorrow. Our unwavering commitment to excellence reflects a rich diversity of perspectives and a strong sense of social responsibility that set us apart. As an internationally recognized research university, York's 11 Faculties and 27 research centres have well-established partnerships with 280+ leading universities worldwide. Located in Toronto, York is the third largest university in Canada, with a strong community of 53,000 students, 7,000 faculty and administrative staff, and more than 275,000 alumni.

For more information, please visit our website at yorku.ca/acadjobs

The **Faculty of Liberal Arts & Professional Studies (LA&PS)** brings together internationally recognized research, a devotion to effective teaching, and a commitment to diversity, equity and social justice. The range, global sensitivity and intensity of disciplinary and interdisciplinary degree programs are mirrored by the diversity and engagement of its professors and students. Within its 21 academic units, LA&PS provides a compelling learning experience for more than 23,000 undergraduate and 1,800 graduate students. Become part of LA&PS - Canada's most comprehensive group of academic programs and researchers in social sciences, humanities and related professional fields.

Faculty of Liberal Arts & Professional Studies

Canada Research Chair (Tier 2) in Social Epistemology and Cognitive Science

The Department of Philosophy at York University invites applications from scholars who specialize in the field of Social Epistemology and Cognitive Science to be nominated for a Tier 2 Canada Research Chair (CRC). The successful CRC is expected to have the necessary qualifications to be appointed as a tenured or tenure-track professor at the Assistant or Associate level. We are interested in applicants who demonstrate the potential for major and transformative scholarship in the field of social epistemology, drawing connections with cognitive science and/or other empirically informed approaches to philosophy.

Following York's strategic research prioritization of Advancing Fundamental Discovery and Critical Knowledge, we seek scholars who are undertaking research on new modes of acquiring, justifying, and disseminating knowledge in the social world. Also, in accordance with York's strategic research prioritization of Exploring the Frontiers of Science and Technology, we are interested in hiring a scholar who is engaged in understanding how technological advances affect the acquisition, justification, and

dissemination of knowledge. Some of the research foci that would fall within the scope of this appointment would include: distributed cognition, collective epistemic agents, feminist epistemology, group polarization, peer disagreement, implicit bias, debiasing strategies, division of epistemic labour, epistemic injustice, and the influence of ideology and social power, among others. Interdisciplinary and cross-disciplinary approaches are welcome.

For a complete job description and application details, visit www.yorku.ca/acadjobs.

York University is an Affirmative Action (AA) employer and strongly values diversity, including gender and sexual diversity, within its community. The AA Program, which applies to Aboriginal people, visible minorities, people with disabilities, and women, can be found at www.yorku.ca/acadjobs or by calling the AA office at 416.736.5713. All qualified candidates are encouraged to apply; however, Canadian citizens and Permanent Residents will be given priority.

liberal arts & professional studies



leur interface avec d'autres traditions religieuses, et superviser des thèses de premier cycle dans les domaines élargis des études de l'Asie de l'Est et du bouddhisme. La nomination au poste prend effet le 1^{er} août 2016. Le candidat doit déjà être titulaire de son doctorat avant la nomination. Le comité de recherche a commencé à étudier les demandes le 15 novembre 2015, et continuera de le faire jusqu'à ce qu'il trouve un candidat répondant aux exigences. Nous recherchons un universitaire dynamique capable d'offrir et d'enrichir le programme déjà solide des religions asiatiques à McGill. Le salaire est négociable et sera établi d'après les qualifications et l'expérience. Pour en savoir plus sur la Faculté des études

religieuses, visiter www.mcgill.ca/religiousstudies/. Les postulants doivent envoyer une lettre de candidature (énonçant leurs qualifications, leurs intérêts en matière de recherche et d'enseignement) avec leur curriculum vitae, des évaluations pertinentes comme enseignant, trois lettres de recommandation ainsi qu'un exemple de présentation écrite ou de publication universitaire à : Prof. Lara Braitstein; Présidente - Comité de recherche, religions japonaises; Faculté des études religieuses; Université McGill; 3520, rue University; Montréal (Québec) H3A 2A7 Canada. Les documents électroniques doivent être envoyés par courriel à Luvana Di Francesco, agente administrative, Faculté des études religieuses, à luvana.di francesco@mcgill.ca.

L'Université McGill souscrit à la diversité et à l'équité en matière d'emploi. Elle accueille favorablement les demandes d'emploi des femmes, des peuples autochtones, des personnes handicapées, des minorités ethniques, des personnes de toutes orientations et identités sexuelles, des minorités visibles et d'autres personnes qui pourraient contribuer à une plus grande diversité. Tous les candidats qualifiés sont invités à poser leur candidature; toutefois, conformément aux exigences canadiennes en matière d'immigration, les résidents canadiens et permanents du Canada auront la priorité. La langue d'enseignement à McGill est l'anglais, mais une connaissance pratique du français est un atout. [34505]

Health Sciences

Brock University - The Department of Health Sciences at Brock University invites applications for a tenure-track position at the rank of Assistant Professor in Human Pathology. The successful applicant will build and maintain an internationally recognized, externally funded research program in the field of human pathology. Undergraduate teaching expectations include introductory general pathology and functional gross and histologic anatomy. In addition, the Assistant Professor will supervise M.Sc. and Ph.D. students, while integrating senior undergraduates into their research. The Department of Health Sci-

St. Paul's Hospital Endowed Chair in Addictions Research

The Faculty of Health Sciences at Simon Fraser University invites applications from early to established career scientists with an outstanding research record to be appointed as a tenure-track Endowed Chair in Addictions Research. The focus of the Chair will be to develop a program of research in addiction prevention, treatment and policy. Areas of interest are: 1) the critical examination of health policies and interventions related to addiction prevention, treatment and control at the population level 2) addiction epidemiology, randomized trials and database development pertaining to research capacity in British Columbia and beyond, and 3) addiction intervention studies with vulnerable populations. The successful applicant will join a dynamic group of interdisciplinary scholars in the Addiction Medicine program at St. Paul's Hospital (affiliated with the BC Centre of Excellence in HIV/AIDS) and the Centre for Applied Research in Mental Health and Addictions (CARMHA) in the Faculty of Health Sciences at SFU. The combined resources of these two research centres include well-developed datasets based on administrative and survey data, statistical and other research service support, and active collaborations with government, community and clinical units.

The Faculty of Health Sciences (FHS) was created in 2005 with a focus on the integration of social and natural science research with population outcomes, societal application, health equity, and policy analysis. The successful candidate will join a dynamic group of more than 50 multi-disciplinary faculty members and will have the opportunity to engage with outstanding students in the PhD, MSc, MPH, and BA/BSc programs. FHS hosts the CIHR Institute of Aboriginal Peoples' Health, and maintains collaborative agreements and partnerships with the BC government, regional health authorities, research centres, and provincial, national and international health agencies. The faculty includes five Canada Research Chairs, four Endowed Chairs, and seven additional faculty members with external salary awards.

St. Paul's Hospital is operated by Providence Health Care (PHC), a leading care, teaching and research organization and the provincial referral centre for Cardiac, HIV/AIDS and Renal Care. Driven by its vision of compassion and social justice, PHC is at the forefront of exceptional care and innovation. PHC is known for its 'Centres of Excellence' and recognized for a number of specialty programs and services across the continuum of care from acute to elder care. With the BC Centre for Excellence in HIV/AIDS at St. Paul's Hospital, there exists a dynamic addiction research and education program that is host to the CIHR Canadian Research Initiative on Substance Misuse (CRISM) and a range of basic science, clinical, epidemiology and qualitative research activities funded by the US National Institute on Drug Abuse. Please see here for additional information: www.providencehealthcare.org/hospitals-residences/st-paul's-hospital

The recipient of the Endowed Chair in Addictions Research will be appointed as Assistant, Associate, or full Professor in the Faculty of Health Sciences at Simon Fraser University. She or he will provide research leadership, promote interdisciplinary scholarship in addictions research and education, and will supervise graduate trainees. The candidate will be expected to teach 1.5 courses per year in the area of mental health and addictions.

To apply for this position, candidates should submit a full curriculum vitae, a letter of application, and a brief descriptive statement (two pages) of research plans for the next five years. These materials, along with the names of six academic references should be submitted electronically to: fhs_recruit@sfu.ca. We will begin to review applications on December 30, 2015. The position will remain open until filled.

Simon Fraser University is committed to employment equity and encourages applications from all qualified women and men, including visible minorities, Aboriginal people, and persons with disabilities. All qualified applicants are encouraged to apply; however, Canadian citizens and permanent residents will be given priority. Positions are subject to final budgetary approval. Under the authority of the University Act, personal information that is required by the University for academic appointment competitions will be collected. For further details of this policy see: www.sfu.ca/vpacademic/Faculty_Openings/Collection_Notice.html



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ences is a multi-disciplinary community of scholars committed to excellence in both research and teaching. The department offers degrees in Medical Science, Biomedical Science, Public Health (with co-op), Child Health and Community Health. The Department of Health Sciences is well equipped for research and teaching. Brock University is host to the Cairns Family Health and Bioscience Complex, opened in 2013. This \$112-million complex houses 176,000 square feet of labs, purpose-built teaching and research space as well as cutting-edge facilities with housing for research organisms. Qualifications: Ph.D. in pathology or related field, and a track record of scientific excellence. Doctorate in human pathology or a closely related discipline is required. Proven success in research and teaching experience, in the field of human pathology and/or anatomy. Appointments at a higher academic rank of Assistant Professor will also be considered, commensurate with qualifications. Candidates with research expertise in one or more areas of pathology subspecialty will be given priority. The appointment will commence on July 1, 2016, subject to budgetary approval. Applications should include: 1) a cover letter outlining proposed research program as well as teaching interests and philosophy, 2) a curriculum vitae, and 3) three letters of reference. Deadline for applications is February 1, 2016. All applicants will receive confirmation of receipt of their complete application by email. Short-listed applicants shall be contacted for an interview. Interested applicants should send the required documentation to: Dr. Brent E. Faught, Chair - Department of Health Sciences, Brock University, 500 Glenridge Avenue, St. Catharines, ON Canada L2S 3A1; Email: bfaught@brocku.ca. All qualified candidates are encouraged to apply; however Canadian citizens and permanent residents will be given priority. Brock University is actively committed to diversity and the principles of Employment Equity and invites applications from all qualified candidates. Women, Aboriginal peoples, members of visible minorities, and people with disabilities are especially encouraged to apply and to voluntarily self-identify as a member of a designated group as part of their application. Candidates who wish to have their application considered as a member of one or more designated groups should fill out the Self-Identification Form available at www.brocku.ca/webfm_send/26360 and include the completed form with their application. Brock University is an equal opportunity employer committed to inclusive, barrier-free recruitment and selection processes and work environment. We will accommodate the needs of the applicants under the Ontario Human Rights Code and the Accessibility for Ontarians with Disabilities Act (AODA) throughout all stages of the recruitment and selection process, per the University's Accommodation for Employees with Disabilities Policy (www.brocku.ca/webfm_send/6557). Please advise the

Human Resources Department to ensure your accessibility needs are accommodated throughout this process. Information received relating to accommodation measures will be addressed confidentially. Information regarding the Department of Health Sciences can be found at <http://brocku.ca/applied-health-sciences>. More information on Brock University can be found on the University's website www.brocku.ca. [34026]

International Studies

Glendon College/York University

The new program in Business Administration in the Department of International Studies at York University, Glendon College, invites applications for two tenure-stream positions at the rank of Assistant Professor, commencing July 1, 2016, subject to budgetary approval. We seek candidates who hold a PhD in Business Administration or Management and can teach in one of the following areas: 1) Management, Organization Theory and core introductory Business subjects; 2) Entrepreneurship or Project/Operations Management. For complete job descriptions and application details, visit www.yorku.ca/acadjobs. York University is an Affirmative Action (AA) employer and strongly values diversity, including gender and sexual diversity, within its community. The AA Program, which applies to Aboriginal people, visible minorities, people with disabilities, and women, can be found at www.yorku.ca/acadjobs or by calling the AA office at 416-736-5713. All qualified candidates are encouraged to apply; however, Canadian citizens and permanent residents will be given priority. [34517]

Mechanical Engineering

McMaster University

The Department of Mechanical Engineering at McMaster University is seeking an outstanding individual for a Contractually Limited Appointment in Mechanical Engineering at the rank of Assistant Professor. The Faculty of Engineering at McMaster University has a reputation for innovative programs, cutting-edge research, leading faculty, and aspiring students. It has earned a strong reputation as a centre for academic excellence and innovation. The Faculty has approximately 160 faculty members, along with close to 4,000 undergraduate and 750 graduate students. The Faculty of Engineering promotes a nurturing and inclusive environment where opportunities are made available for personal growth and professional development (www.eng.mcmaster.ca/fda/). The Department of Mechanical Engineering has a high reputation in both research and teaching, as one of the top Departments for Mechanical Engineering in Canada. We have 22 faculty members with expertise in mechanics and design, manufacturing, thermofluid sciences, and biomechanics. The candidate will have a significant role in supporting the teaching of biomedical engineering and fluid mechanics. The candi-

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**For more information,
please visit our website at
yorku.ca/acadjobs**

Consistently ranked in the top tier of the world's best business schools and #1 in Canada, the **Schulich School of Business** is known for its global reach, innovative programming and the diversity of its student body, faculty and staff. Schulich enrolls some 3,000 students in undergraduate, graduate and postgraduate business degree programs leading to careers in the private, public and not-for-profit sectors. Located in Toronto, Canada, the School's multimillion-dollar, award-winning complex is on York University's main campus. Schulich's downtown Miles S. Nadal Management Centre is situated in the heart of the city's financial district.

Schulich School of Business

Erivan K. Haub Chair in Business and Sustainability

The Schulich School of Business at York University in Toronto is seeking an outstanding scholar at the rank of senior Associate Professor or Full Professor for the tenure-stream position of **Erivan K. Haub Chair in Business and Sustainability**. The position would be effective **July 1, 2016**, or as soon as possible thereafter.

The Erivan K. Haub Chair in Business and Sustainability was one of the first of its kind in North America. For more than two decades, the Chair has been an integral part of the Schulich School of Business, helping the school to become a globally recognized leader in sustainability research and teaching. Now, as part of the school-wide Centre of Excellence in Responsible Business, the Erivan K. Haub Chair in Business and Sustainability offers a unique opportunity to join a thriving, vibrant community of scholars, students and practitioners engaged in driving the transformation of business education towards a sustainable future. Preferred candidates for the position will possess a PhD degree, have evidence of excellence in teaching at the university level, have an outstanding and ongoing program of academic research and publishing in top-tier journals on the subject of business and sustainability, have demonstrated leadership in the research field of

business and sustainability, be expected to provide leadership in the areas of teaching, curriculum development, student engagement and extra-curricular activities in business and sustainability, be expected to provide engagement and outreach to the broader practitioner community and be eligible for prompt appointment to the Faculty of Graduate Studies. Salary and benefits are competitive. All York University positions are subject to budgetary approval. Applicants should send an electronic application, including an application letter, a curriculum vitae, the names of three referees, and information regarding teaching performance, to **Haub-recruiting@schulich.yorku.ca**. Informal inquiries about the position can be made to either of the Co-Chairs of the Search Committee: Professor Andrew Crane (acrane@schulich.yorku.ca) or Professor Dirk Matten (dmatten@schulich.yorku.ca). The deadline for applications is **February 12, 2016**.

York University is an Affirmative Action (AA) employer and strongly values diversity, including gender and sexual diversity, within its community. The AA Program, which applies to Aboriginal people, visible minorities, people with disabilities, and women, can be found at www.yorku.ca/acadjobs or by calling the AA office at 416.736.5713. All qualified candidates are encouraged to apply; however, Canadian citizens and Permanent Residents will be given priority.



date's research area will focus on biomedical engineering. The Contractually Limited Appointment will commence July 1, 2016 for a period of up to three years. Applicants will hold a doctorate in Mechanical Engineering or a related branch of engineering. Applicants must demonstrate a successful record of research, reflected in extramural grant acquisition and publication in high quality peer-reviewed journals. The recruited individual will teach both undergraduate and graduate level courses, develop graduate level courses, and support departmental growth in biomedical engineering. He/she will also be expected to establish a strong externally funded research program, supervise graduate stu-

dents, and foster existing or new collaborations with other departments and faculties. The successful applicant must possess a demonstrated ability to work effectively with individuals from diverse communities and cultures. The applicant will be a licensed Professional Engineer or will have the qualifications to immediately apply for licensure. Applicants should send a letter of application, full CV including a list of publications, statements of teaching and research interests, a selection of no more than four research publications, and the names of at least three references (with postal and email addresses). To comply with the Government of Canada's reporting requirements, the University is obliged to gather information

about applicants' status as either Permanent Residents of Canada or Canadian citizens. Applicants need not identify their country of origin or current citizenship, however, all applications must include one of the following statements: Yes, I am a citizen or permanent resident of Canada, or No, I am not a citizen or permanent resident of Canada. Applications will be accepted until December 31, 2015. Please send application materials to the attention of: Dr Marilyn Lightstone - Professor and Chair, Department of Mechanical Engineering, McMaster University, 1280 Main Street West, JHE-316, Hamilton, Ontario, Canada L8S 4L7; Email: chairme@mcmaster.ca. All qualified candidates are encouraged to

apply. However, Canadian citizens and permanent residents will be given priority. McMaster University is strongly committed to employment equity within its community and to recruiting a diverse faculty and staff. The University encourages applications from all qualified candidates, including women, persons with disabilities, First Nations, Metis and Inuit persons, members of racialized communities and LGBTQ-identified person. If you require any form of accommodation throughout the recruitment and selection procedure, please contact the Human Resources Service Centre at 905-525-9140 ext. 222-HR (22247). <http://www.workingatmcmaster.ca/careers/index.php1345711>

Psychology

University of Victoria - Located in Victoria, British Columbia close to Vancouver and Seattle, the Department of Psychology at the University of Victoria invites applications for a tenure-track appointment at the Assistant Professor level. Candidates should have expertise in the statistical and mathematical modeling of psychological processes, research methodology, and applied analysis of multilevel, experimental, and/or longitudinal data. The position begins on July 1, 2016. Applicants must have a Ph.D. in quantitative methods or have evidence of expertise in advanced statistical methods within social, environmental, cognitive, or developmental/aging areas and demonstrate research excellence as evidenced by publications and grant funding appropriate to level of experience. Applicants must also present evidence for potential excellence in teaching at the graduate and undergraduate levels. This position will require the teaching of courses in both basic and advanced statistics, research methodology, and psychometrics, incorporating training in the use of statistical software including R, SAS, SPSS, and Mplus. Postdoctoral experience is desirable for candidates at the assistant level. We are seeking candidates with the ability to actively contribute to the operation of our training in statistical methods and research design across areas of our department. Our aim is to build on our strengths, and therefore, we are seeking applicants whose research interests would contribute to collaborations with other faculty and students. Preferred sub-fields of specialization include cognitive, social, environmental, or lifespan psychology. Duties will include maintaining a successful program of research (as evidenced by publications and external grant support), teaching and student supervision at the undergraduate and graduate levels, consultation with colleagues, and contributions to the collegiality, reputation, and day-to-day operation of the Department and the University (e.g., collaborative research, curriculum development, committee service). Visit the Department of Psychology at www.uvic.ca/socialsciences/psychology/ and the Faculty of Social Sciences at www.uvic.ca/socialsciences/. The Department of Psychology offers opportunities for research

collaborations with colleagues in the Cognition and Brain Sciences, Lifespan Development, Social Psychology, Clinical Psychology, and Individualized Programs associated with the University's Centre for Youth and Society, Centre on Aging, Centre for Addictions Research of BC, and CanAssist. Faculty and librarians at the University of Victoria are governed by the provisions of the Collective Agreement. Members are represented by the University of Victoria Faculty Association. To apply, please convert the following application materials in PDF format, and email to the Chair of the committee at smhofer@uvic.ca, copied to the Departmental Secretary at psycdept@uvic.ca: 1) a curriculum vitae, 2) a description of research and teaching experience and plans, 3) copies of relevant scholarly publications, and 4) available evidence of teaching effectiveness. In addition, please arrange to have three letters of reference emailed to the same email addresses. In all emails, please ensure that your name is included on the subject line. Application review will begin on December 17, 2015 and continue until the position is filled. The University of Victoria is an equity employer and encourages applications from women, persons with disabilities, members of visible minorities, Aboriginal Peoples, people of all sexual orientations and genders, and others who may contribute to the further diversification of the University. All qualified candidates are encouraged to apply; however, in accordance with Canadian Immigration requirements, Canadians and permanent residents will be given priority. Persons with disabilities who anticipate needing accommodations for any part of the application and hiring process, may contact Grace Wong Sneddon, Adviser to the Provost on Equity and Diversity at 250-721-6143. Any personal information provided will be maintained in confidence. [34509]

Religious Studies

McGill University - The Faculty of Religious Studies at McGill University, Montreal, Canada, invites applications for a tenure-track faculty position at the rank of Assistant Professor or Associate Professor in the area of Japanese Religions. We seek a dynamic scholar capable of expanding and enriching the Asian Religions program at

McGill through a primary research expertise in one or a combination of Zen Buddhism, Pure Land Buddhism, and the Kyoto School of Philosophy, contextualized within wider debates on Asian religious and cultural traditions and their mutual intersections. Expertise in relevant theoretical and methodological approaches to religious studies may be complemented by disciplinary training in anthropology, history, cultural studies, philosophy, and sociology of Japanese religions. The ideal candidate will possess broad supervisory competence in Japanese religious traditions; knowledge of Japanese language (classical and contemporary); and, ideally, additional research competence in a second East Asian language. The ability to teach introductory courses that cover Buddhist traditions and their interface with other religious traditions is essential, as is the ability to supervise graduate theses in the wider fields of East Asian Studies and Buddhism. The appointment is available from August 1, 2016. The candidate is expected to have received the PhD prior to appointment. The Search Committee began reviewing applications on November 15, 2015, and will continue to do so until a suitable candidate is found. We are looking for a dynamic scholar capable of expanding and enriching an already strong program in Asian Religions at McGill. Salary will be negotiable, according to qualifications and experience. For more information about the Faculty of Religious Studies, visit www.mcgill.ca/religiousstudies/. Applicants should send a letter of application (addressing qualifications, research, and teaching interests), a curriculum vitae, relevant teaching evaluations, three letters of recommendation, and one presentative writing sample or scholarly publication to: Prof. Lara Braitstein, Chair - Japanese Religions Search Committee, Faculty of Religious Studies, McGill University, 3520 University Street, Montreal, QC H3A 2A7 Canada. Electronic materials should be addressed to Luvana Di Francesco, Administrative Officer, Faculty of Religious Studies, by email, at luvana.di francesco@mcgill.ca. McGill University is committed to diversity and equity in employment. It welcomes applications from women, Aboriginal persons, persons with disabilities, ethnic minorities, persons of minority sexual orientation or gender identity, visible minori-

ties, and others who may contribute to diversification. All qualified applicants are encouraged to apply; however, in accordance with Canadian immigration requirements, Canadians and permanent residents will be given priority. The language of instruction at McGill is English, but a working knowledge of French is an asset. [34504]

Sport Management

Brock University - The Department of Sport Management at Brock University invites applications for a tenure-track position at the rank of Assistant Professor, effective July 1, 2016. The position is subject to final budgetary approval. The successful candidate will be expected to teach both graduate and undergraduate courses, engage in a program of research in the chosen area of sport management expertise, and participate in the affairs of the Department and fulfill service commitments to the Department and University. Qualifications are a completed or near completed Ph.D. in Sport Management or a related discipline. Postdoctoral experience and/or other university appointments would be considered assets. The applicant must demonstrate research and teaching competencies in one or more Sport Management sub-disciplines with preference to Law, Quantitative Analysis and Statistics, and Digital Media. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. Brock University is actively committed to diversity and the principles of Employment Equity and invites applications from all qualified candidates. Women, Aboriginal peoples, members of visible minorities, and people with disabilities are especially encouraged to apply and to voluntarily self-identify as a member of a designated group as part of their application. Candidates who wish to have their application considered as a member of one or more designated groups should fill out the Self-Identification Form available online at: <http://www.brocku.ca/hr/SelfIdentification.pdf>. Please include the completed form with the application. The Department of Sport Management is one of five departments in the Faculty of Applied Health Sciences. It is home to 12 full-time faculty members and three staff members. The Department of Sport Management

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For more information, visit our website at yorku.ca/acadjobs

York University's **Faculty of Environmental Studies (FES)** is a unique interdisciplinary Faculty that adopts a broad definition of environment, including natural, built, institutional and social environments. The Faculty has a strong social and environmental justice commitment, and values community-engaged learning and action, including arts-based inquiry, production and dissemination. More information about FES is available at www.yorku.ca/fes.

Faculty of Environmental Studies

Alternate-Stream Appointments

The start date for the positions is July 1, 2016, and the deadline for applications is **January 15, 2016**. All York University positions are subject to budgetary approval.

Environmental Justice and Arts Practice

Applications are invited for a tenure-track alternate-stream appointment at the rank of Assistant Lecturer in **Environmental Justice and Arts Practice**. A PhD in a related field or equivalent (must include a graduate degree and extensive professional experience) is required at the time of appointment. The responsibilities of this position are centred on teaching, advising, and service. We are seeking applications from candidates with excellent teaching records, especially suited to the student-directed, interdisciplinary, experiential and equity-oriented pedagogy of our Faculty, as well as significant creative accomplishment. "Arts" for the purposes of this job are broadly defined; we are especially interested in accessible new media, community arts, contextual artistic practice, indigenous arts, and arts of the African diaspora. A commitment to the social justice and environmental protection mandate of the Faculty is important; teaching experience should include teaching about the environment in relation to race, disability, gender identity, sexuality and class.

Equity Planning and Policy

Applications are invited for a tenure-track alternate-stream appointment at the rank of Assistant Lecturer in **Equity**

Planning and Policy. A PhD in a related field or equivalent (must include a graduate degree and extensive professional experience) is required at the time of appointment. Membership in the Ontario Professional Planners Institute (OPPI) and/or Canadian Institute of Planners (CIP) is also required. The Faculty of Environmental Studies supports a large accredited graduate program in Planning and a large specialization in Urban and Regional Environments in our BES program. The responsibilities of this position are centred on teaching, advising, and service. We are seeking applications from candidates with excellent planning and teaching records, especially suited to the student-directed, interdisciplinary, experiential and equity-oriented pedagogy of our Faculty. The successful candidate should be able to contribute to both the undergraduate and the graduate programs. A commitment to the social justice and environmental protection mandate of the Faculty is important; teaching experience should include teaching about the environment in relation to race, disability, gender identity, sexuality and class. Areas of expertise could include transportation, housing, immigration, infrastructure, and community development, among others.

For complete job descriptions and application details, visit www.yorku.ca/acadjobs.

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environmental
studies



offers the only Bachelor of Sport Management (BSM) Honours degree in Canada and was recently ranked fourth in the world among undergraduate sport management programs in Sport Business International. In addition, the Department supports graduate studies offering a Master of Arts, and Ph.D. in the field of Sport Management. Brock University is located in St. Catharines Ontario atop the Niagara Escarpment. The scenic location within the Niagara Peninsula boasts an expanding wine-making and tourism sector with over 12 million visitors touring the natural beauty of Ontario's vineyard country, Niagara Falls, and historical landmarks. Just a 30-minute drive to New York State and within an hour's drive

to Hamilton and Toronto, St. Catharines has a population of approximately 130,000 people and is accessible to a dynamic market of professional and amateur sport and an exceptional range of leisure and recreation opportunities. More information on Brock University and the Department of Sport Management can be found on the university website www.brocku.ca. Also, information about the City of St. Catharines can be found on the city's website, at www.st.catharines.ca. Brock University is an equal opportunity employer committed to inclusive, barrier-free recruitment and selection processes and work environment. We will accommodate the needs of the applicants under the Ontario Human Rights

Code and the Accessibility for Ontarians with Disabilities Act (AODA) throughout all stages of the recruitment and selection process, per the University's Accommodation for Employees with Disabilities Policy (www.brocku.ca/webfm_send/6557). Please advise the Human Resources Department to ensure that your accessibility needs are accommodated throughout this process. Information received relating to accommodation measures will be addressed confidentially. More information on Brock University can be found on the University's website www.brocku.ca. Applicants should submit by February 15, 2016, a letter of application (indicating file number stated above), curriculum vitae, selected reprints/

preprints of scholarly publications, evidence of successful teaching (e.g., teaching evaluations if available), a statement of teaching philosophy, and arrange for three letters of reference to be sent to: Dr. Lisa Kikulis - Chair, Department of Sport Management, Brock University, Niagara Region, 1812 Sir Isaac Brock Way, St. Catharines, Ontario, Canada L2S 3A1; Email: lkikulis@brocku.ca; Tel: 905-688-5550 ext. 5004. Closing date for the application is February 15, 2016, or until a suitable candidate is found. This position is subject to final budgetary approval. [34480]



Insights from two recent graduates

How to become an academic librarian

by Catherine McGoveran and Laura Thorne

**“As the dynamic of the
academic environment is
constantly shifting, the
ability to adapt is essential.”**



AS RECENT GRADUATES OF library and information studies programs, we've embarked on a research study that examines the transition process from LIS student to academic librarian in Canada. Using surveys and interviews, our study analyzes data collected from three groups: LIS students and recent graduates, new academic librarians, and hiring managers and supervisors. Several interesting themes are emerging from the data that provide some valuable insight into the priorities, expectations and challenges associated with making the transition.

LIS students are often told they need to not only understand theory and methodology, but also gain the practical skills required to work as a librarian. Many LIS programs are integrating experiential learning opportunities into the curriculum, while practicum and internships are actively encouraged, if not required. The value of practical experience and a contextual understanding of different workplaces cannot be understated, and our research clearly identified both as priorities for new librarians.

In our study, we asked each of the participant groups to list the top five skills they felt were necessary to succeed as an academic librarian. Four of the top five that were identified by all three participant groups include interpersonal, instruction and change-management skills, as well as experience with and an understanding of technology. Outliers include reference skills, which were identified by students and new graduates, while both new librarians and supervising librar-

ians listed communication skills in the top five.

Interpersonal skills can encompass a variety of abilities that are essential to managing professional relationships with a variety of people. The ability to collaborate with others, develop a professional identity, resolve conflict and remain sensitive to diverse groups will all come into play as a librarian. Instruction skills, such as knowledge of instruction methodologies and experience with one-on-one and classroom teaching, can be difficult to develop before gaining professional experience. Shadowing librarians as they teach, participating in practicums, internships or student associations, and taking instruction methodology courses are some of the many strategies to support learning in this area.

Technology, again, encompasses a wide range of abilities, from specific skills such as web design to being comfortable experimenting with new technologies and engaging in self-directed learning to explore new trends. Skills related to all aspects of technology are in high demand and can often provide excellent examples of concrete, demonstrable skills to employers.

Finally, as the dynamic of the academic environment is constantly shifting, the ability to adapt becomes essential, but also provides opportunities to acquire new skills and develop as a professional. The significant overlap in top skills between all three participant groups should provide some relief for LIS students and job seekers considering academic librarianship, as it demonstrates that the expectations they have match well with the skills deemed valuable by new

librarians and essential by supervisors.

To complement the list of top skills from all three participant groups, we asked new academic librarians to identify the skills they felt they were lacking when they started their positions. The results include skills pertaining to collections management, instruction, research, navigating institutional structure and politics, and liaison. Some of these skills relate to duties that are contextually dependent. Each institution has its own collections processes and liaison practices. The politics and internal structure of each institution will be different, too, and research requirements or allowances are often dependant on the terms of the collective agreement or contract. That said, identifying these skills as priority areas is an important first step in helping all members of the LIS community explore strategies to support skills development.

What can we take away from these findings? Context is important and gaining insights can be essential for current students and recent graduates. Practical experience can be gained through a number of avenues, including job shadowing, practicums, internships, networking and volunteering – be creative! Reaching out to and connecting with practitioners in the field can help new professionals gain important contextual insights into the realities of academic librarianship. Librarians are in the business of sharing information and whether you reach out in person, by email, on Twitter, or through formal or informal mentorship programs, all involved are likely to learn a lot. **UA**

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Knowledge is beautiful.

Researchers in the College of Pharmacy and Nutrition are developing lipid-based soft nanoparticles, polymer nanoparticles and nanodiamond-based gene delivery systems to deliver genetic material into the cells to combat cancer, and to encapsulate anti-cancer drugs to reduce the toxicity and improve the pharmacokinetic profile.

In other words, U of S researchers are creating ways to get medicine into cancerous cells without affecting healthy cells, which could lead to vastly improved treatments for cancer patients.

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CANADA'S
INNOVATION
LEADERS2015

Wanted: Research Partnerships

Turning science into solutions requires a team effort evolving academia, industry and government



By Debbie Lawes

Many believe it to be one of the greatest challenges – and opportunities – of our time. How to turn billions of dollars of research spending into solutions that create jobs, boost productivity, improve our health and wellbeing and safeguard our environment.

Throwing more money at a problem doesn't always work. Neither does a go-it-alone attitude. Instead, countries everywhere have become big believers in the power of public-private partnerships to put good research to good use.

"One of the best ways to address this innovation gap is for academia, government and industry, including small businesses and start-ups, to work more collaboratively on common initiatives," says Dino Trevisani, president of IBM Canada, one of Canada's top 10 industrial research spenders. IBM's model is three-pronged: rapidly transform academic innovation into commercial products and services; leverage the global scale of companies like IBM; and export these made-in-Canada innovations globally.

"Our view can be summed up in four

words: collaborate, innovate, incubate, commercialize," he says.

The Southern Ontario Smart Computing and Innovation Platform (SOSICIP), for example, is a collaboration between IBM Canada Research and Development (R&D) Centre, the Ontario and Canadian governments, the Ontario Centres of Excellence and 14 academic partners. SOSICIP makes it possible for academic and industry researchers to share Canada's fastest supercomputer and the world's largest analytics cloud – rather than duplicating expensive infrastructure.

To date, the partnership has launched 50 projects in areas as diverse as agile computing, health, water, energy, cities, mining, advanced manufacturing, digital media and cybersecurity. It has spun out 38 small businesses and established a pipeline of nearly \$2 billion in revenue for these firms.

One project created a new data management platform that will help protect drinking water, predict floods and safeguard fragile ecosystems along the Grand River, Southern Ontario's longest river. Based on IBM hardware and software, the platform collects and analyzes data every 15 minutes from 120 sensors over 80 square kilometers. Having instant access to data will make it possible to respond more rapidly to heavy rainfalls and other extreme weather events driven by a changing climate.

"These breakthroughs will not only improve the lives of Canadians, but they also represent homegrown technology we can develop and export around the world," says Trevisani.

The need to boost exports while adapting to the effects of climate change is also top of mind in Canada's wheat industry, which generates more than \$5 billion in export revenues every year.

Again, partnerships are becoming the norm. The National Research Council (NRC)

has teamed with Agriculture and Agri-Food Canada, the province of Saskatchewan and the University of Saskatchewan to form the Canadian Wheat Alliance (CWA). Together, they are developing new wheat varieties that increase yields, use less fertilizer and are more resistant to environmental stresses like disease, heat, cold, drought and flood.

In one project, two of the world's leading plant breeding companies, KWS and Syngenta Inc., are working with CWA to develop high-quality wheat plants by improving doubled haploid technologies, which breeders can use to bring new varieties to market faster. Traditional methods can be costly, inconsistent and time-consuming.

"And we're trying to do it all without resorting to GMO techniques so we can maintain access to (global) markets," says NRC president John McDougall. "If we do this, we will have changed the dynamics and economics of the Canadian wheat industry with a very big benefit to Canada, and with technologies that other people can apply in different ways in other parts of the world."

The NRC was established in 1916 to advise government on matters of science and industrial research. More than a century later, it continues to focus on what McDougall describes as "mission-oriented research".

"We're not trying to invent knowledge as much as we're trying to put existing knowledge to work and that takes a lot of time and effort," says McDougall. "It's not about stuffing knowledge down people's throats. It's about ensuring that what you do is likely to be deployed and that requires understanding industry in a holistic way and the challenges they are facing."

BRIDGING THE INDUSTRY-ACADEMIC DIVIDE

Bridging the cultural divide between academia and industry requires mutual trust

and understanding – something that can take years to nurture. One bad experience can prove toxic to future collaborations.

To reduce that risk, the Natural Sciences and Engineering Research Council of Canada (NSERC) has established two types of 'get to know each other' programs – Engage and Connect. They provide small grants of up to \$25,000 for activities like networking, research planning or short-term R&D projects.

Short-term
R&D projects help
companies and academics
get to know each other

"These programs make it very convenient for that first date between academic researchers and business leaders. There's minimum red tape and turnaround time for these applications is only 21 days," says Dr. Mario Pinto, president of NSERC, which works with about 3,500 companies each year.

Some 20% of the companies that worked on Engage projects have since established more formal partnerships with their university partners. As well, one in six students who work on Engage projects end up with full time jobs with the company after graduation. Last year alone, the program supported academic collaborations with nearly 1400 companies.

"We're trying to set up a relationship that is long-term so that when an industrial client has a need – unanticipated at present – they will know who to come back to," says Dr. Pinto.

He cites the example of Dr. Jeff Dahn at Dalhousie University in Halifax who has worked with 3M for 35 years. The Fortune 500 company has brought to market several patented materials based on technology developed by Dahn, including a nickel-manganese-cobalt positive electrode material found today in most electric vehicles and power tools. Starting in 2016, Dr. Dahn will begin a new five-year partnership with Tesla Motors to develop better lithium-ion battery technology. It marks the first time Tesla has collaborated with a Canadian university.

For homegrown multinationals like Bombardier Aerospace, partnering with local universities is a competitive necessity. "I don't know of a single aerospace company in the world that doesn't partner with academia. For us, the bulk of our research activities and partnerships are done in Canada," says Jonathan Hack, Bombardier's manager of strategic technology, university and government relations.

Some of that research is done under the auspices of the Green Aviation R&D Network (GARDN), a Business-Led Network of Centres of Excellence where 30 partners from industry and academia share both the cost and the risk of developing made-in-Canada technologies that reduce the environmental footprint of next generation aircraft, engines and avionics systems.

Such research requires access to specialized facilities like the anechoic (echo-free) wind tunnel at the University of Toronto Institute for Aerospace Studies. The tunnel had fallen into disrepair and Bombardier helped to refurbish it. That investment allowed UTIAS to expand its noise research and Bombardier to test new methods to reduce aircraft noise levels.

Continued on page 10

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GAME ON!

Champions thrive on the best. So when the Toronto Blue Jays wanted a natural grass playing surface at the Rogers Centre, they turned to University of Guelph turfgrass researchers for help. This research partnership is one reason funding awarded to the University of Guelph from business and industry overall rose to nearly \$22 million last year, almost a 60 per cent increase.

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Research that gave birth to the laser, MRI and the computer transformed society in the first quantum revolution. Today, the **University of Waterloo's Institute for Quantum Computing** is at the forefront of the next great technological age.

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Canada's TOP 50 RESEARCH UNIVERSITIES 2015

Rank		University	Sponsored Research Income			Faculty**	Research Intensity	Province
2014	2013		FY2014 \$000	FY2013 \$000	% Change 2013-2014	2013-2014 #	\$ per Faculty \$000	
1	1	University of Toronto* ++	\$1,041,374	\$1,110,663	-6.2	2,600	\$400.5	Ontario
2	3	Université de Montréal* (a)	\$548,849	\$527,971	4.0	1,879	\$292.1	Quebec
3	2	University of British Columbia*	\$547,027	\$566,789	-3.5	2,395	\$228.4	British Columbia
4	4	McGill University*	\$477,843	\$465,209	2.7	1,696	\$281.7	Quebec
5	5	University of Alberta*	\$462,891	\$417,757	10.8	1,703	\$271.8	Alberta
6	8	Université Laval*	\$324,803	\$306,831	5.9	1,519	\$213.8	Quebec
7	6	University of Calgary*	\$324,212	\$328,736	-1.4	1,525	\$212.6	Alberta
8	7	McMaster University*	\$310,608	\$322,502	-3.7	915	\$339.5	Ontario
9	9	University of Ottawa*	\$275,266	\$297,813	-7.6	1,281	\$214.9	Ontario
10	10	Western University*	\$237,894	\$254,457	-6.5	1,245	\$191.1	Ontario
11	14	University of Saskatchewan*	\$195,264	\$157,976	23.6	1,117	\$174.8	Saskatchewan
12	12	University of Waterloo	\$177,425	\$166,920	6.3	1,106	\$160.4	Ontario
13	16	University of Manitoba*	\$154,280	\$137,281	12.4	1,252	\$123.2	Manitoba
14	11	Queen's University*	\$148,486	\$189,990	-21.8	768	\$193.3	Ontario
15	13	University of Guelph	\$146,657	\$158,255	-7.3	738	\$198.7	Ontario
16	15	Dalhousie University*	\$128,084	\$148,879	-14.0	1,037	\$123.5	Nova Scotia
17	19	Université de Sherbrooke*	\$121,938	\$120,969	0.8	1,134	\$107.5	Quebec
18	20	Simon Fraser University	\$103,130	\$102,643	0.5	831	\$124.1	British Columbia
19	18	University of Victoria	\$95,428	\$124,779	-23.5	700	\$136.3	British Columbia
20	17	Memorial University of Newfoundland* (b)	\$87,782	\$127,816	-31.3	935	\$93.9	Newfoundland
21	21	York University	\$78,719	\$72,040	9.3	1,348	\$58.4	Ontario
22	22	Université du Québec à Montréal	\$70,384	\$71,262	-1.2	1,139	\$61.8	Quebec
23	23	Institut national de la recherche scientifique+	\$61,903	\$55,778	11.0	149	\$415.5	Quebec
24	24	Carleton University	\$59,144	\$55,160	7.2	748	\$79.1	Ontario
25	26	Concordia University	\$45,670	\$44,358	3.0	777	\$58.8	Quebec
26	25	University of New Brunswick	\$42,505	\$49,115	-13.5	440	\$96.6	New Brunswick
27	27	Ryerson University	\$40,782	\$32,400	25.9	794	\$51.4	Ontario
28	28	University of Windsor	\$30,486	\$29,734	2.5	471	\$64.7	Ontario
29	29	Université du Québec à Chicoutimi	\$27,436	\$27,418	0.1	236	\$116.3	Quebec
30	31	École de technologie supérieure+	\$26,614	\$23,883	11.4	155	\$171.7	Quebec
31	30	Université du Québec à Trois-Rivières	\$22,942	\$24,039	-4.6	418	\$54.9	Quebec
32	32	Lakehead University*	\$22,717	\$22,465	1.1	325	\$69.9	Ontario
33	34	Université du Québec à Rimouski	\$18,742	\$20,580	-8.9	200	\$93.7	Quebec
34	33	University of Regina	\$18,472	\$20,778	-11.1	398	\$46.4	Saskatchewan
35	36	University of Lethbridge	\$18,227	\$17,228	5.8	335	\$54.4	Alberta
36	38	Laurentian University*	\$17,139	\$16,442	4.2	400	\$42.8	Ontario
37	41	Brock University	\$16,391	\$14,285	14.7	568	\$28.9	Ontario
38	39	Royal Military College of Canada	\$16,021	\$14,962	7.1	186	\$86.1	Ontario
39	40	Trent University	\$14,575	\$14,310	1.9	257	\$56.7	Ontario
40	37	Université du Québec en Abitibi-Témiscamingue	\$14,343	\$16,511	-13.1	102	\$140.6	Quebec
41	35	University of Prince Edward Island	\$13,236	\$17,391	-23.9	239	\$55.4	Prince Edward Island
42	42	Wilfrid Laurier University	\$12,737	\$12,961	-1.7	534	\$23.9	Ontario
43	44	University of Northern British Columbia	\$12,323	\$10,105	21.9	173	\$71.2	British Columbia
44	47	Université de Moncton	\$10,763	\$8,596	25.2	353	\$30.5	New Brunswick
45	43	University of Ontario Institute of Technology	\$9,820	\$10,562	-7.0	187	\$52.5	Ontario
46	48	Saint Mary's University	\$8,735	\$8,306	5.2	247	\$35.4	Nova Scotia
47	45	St. Francis Xavier University	\$8,643	\$8,845	-2.3	221	\$39.1	Nova Scotia
48	46	Université du Québec en Outaouais	\$8,067	\$8,704	-7.3	219	\$36.8	Quebec
49	49	University of Winnipeg	\$7,851	\$8,177	-4.0	265	\$29.6	Manitoba
50	50	Acadia University	\$7,017	\$6,966	0.7	202	\$34.7	Nova Scotia

Notes:

1. Sponsored research income includes all funds to support research received in the form of a grant, contribution or contract from all sources external to the institution.
2. Financial data were obtained from Statistics Canada.
3. Fiscal 2013 research income figures may have been adjusted as more accurate information became available.
4. Faculty data were obtained from RESEARCH Infosource Canadian University R&D Database.
5. All data are provided for the main university/college including its affiliated institutions, where applicable.
6. All institutions are members of the Canadian Association of University Business Officers (CAUBO).

*Has a medical school

*Not a full-service university

**Sponsored research income administered by affiliated hospitals was reported one fiscal year in arrears

(a) Faculty count based on 2011-2012 data as 2013-2014 data were not available.

(b) Faculty count based on 2012-2013 data as 2013-2014 data were not available.

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Research Universities of the Year 2015

Three universities gain RESEARCH Infosource's designation of *Research University of the Year* in their category for their performance on a balanced set of input, output and impact measures for FY2014. These universities demonstrated superior achievement both in earning research income and in publishing research in leading scientific journals.

Rank	Medical/Doctoral	Score*	Rank	Comprehensive	Score*	Rank	Undergraduate	Score*
1	University of Toronto	100.0	1	University of Waterloo	95.2	1	Lakehead University	89.3
2	McGill University	68.4	2	University of Guelph	81.6	2	Université du Québec à Rimouski	84.0
3	University of British Columbia	64.4	3	Simon Fraser University	70.3	3	Trent University	83.2

*The Score in each category is out of a possible 100 points based on the following indicators and weighting: 2 input measures: total sponsored research income (20%), and research intensity (20%); 2 output measures: total number of publications in leading journals (20%) and publication intensity (20%), and 1 impact measure: publication impact (20%). For each measure, the top ranking institution is assigned a score of 100 and the other institutions' scores are calculated as a percentage of the first ranked institution. To be eligible to be included in the Research Universities of the Year Tier Group rankings, universities must first have ranked in the top 50% in their respective tier group for all 5 measures. See www.researchinfosource.com for details.

CANADA’S TOP 50 Research Universities

RESEARCH INCOME REVERSES COURSE

For the first time in 14 years the combined research income of Canada’s Top 50 Research Universities declined by -1.6% in Fiscal 2014. This follows several years of weak growth in the 1% range. Total research income slipped to \$6.67 billion in Fiscal 2014 from \$6.78 billion in Fiscal 2013. Research intensity – research income per faculty position – declined by -1.4%, moderated by a -0.2% drop in faculty numbers. Average research intensity fell to \$173,500 from \$175,900 the year before.

The drop in Top 50 research funding resulted from a cascade of funding declines, including a fall of -1.0% in funds available from a number of major national granting agencies. Resources from the Natural Sciences and Engineering Research Council fell by -2.8%, and money received from the Canada Foundation for Innovation fell by -3.2%. However, grants from the Canadian Institutes of Health Research rose by 1.3%, as did funding from the Social Sciences and Humanities Research Council, which rose by 0.9%. Total Federal Government funding declined by -2.6%, whereas Provincial Government funding fell by -6.7%. In addition, universities reported a striking -20.0% fall in funding by Individuals and a -2.3% fall in Corporate funding. On a more positive note, Non-Profit funding (9.2%) and Foreign Government funding (7.5%) both had solid increases in Fiscal 2014.

THE \$100 MILLION CLUB

The disappointing overall Top 50 results were mirrored in the composition of RESEARCH Infosource’s \$100 Million Club – an elite group of universities that attracted \$100 million or more of research funding in Fiscal 2014. The Club’s membership declined to 18 from 20 last year as Memorial University of Newfoundland and University of Victoria fell off the list.

In Fiscal 2014, the \$100 Million Club universities reported research income of \$5.73 billion, a drop of -5.1% over last year. Research income fell at 9 of the 18 Club institutions. With 2 universities leaving the Club, its share of Top 50 research income dropped to 86% of the total in Fiscal 2014 from 89% in Fiscal 2013.

PROVINCIAL PERFORMANCE

With 18 universities, Ontario led the way among provinces, accounting for 40% of total research income

in Fiscal 2014, down from 41% last year. Quebec’s 13 institutions increased their share of the total to 27% from 25% in Fiscal 2013. Alberta’s 3 universities accounted for 12% of total research income, up from 11% the previous year. British Columbia’s 4 universities accounted for 11% of the total compared to 12% the year before. Disappointingly, research income fell in all 4 Atlantic Provinces by a combined -18.4%, as it did in British Columbia (-5.8%) and Ontario (-5.0%). However, each of the 3 Prairie Provinces saw their research income increase – notably by 19.6% in Saskatchewan, 11.5% in Manitoba and 5.4% in Alberta. Research income also increased in Quebec (3.3%).

Top 50 – Leading Provinces	
Province	% of Total
Ontario (18)	40
Quebec (13)	27
Alberta (3)	12
British Columbia (4)	11

RESEARCH INCOME GROWTH

Overall in Fiscal 2014, 27 universities recorded gains in research income versus 23 where research income dropped. This compares with Fiscal 2013 when 29 universities posted research income growth versus 21 where research income dropped.

The top 10 universities for research income growth were led by Ryerson University, where research income expanded by 25.9%, closely followed by Université de Moncton (25.2%), University of Saskatchewan (23.6%), University of Northern British Columbia (21.9%) and Brock University (14.7%).

RESEARCH INTENSITY

Overall research intensity – research income per faculty position – fell by -1.4% in Fiscal 2014, due both to declines in research income and in faculty numbers. On average, the Top 50 had research intensity of \$173,500, down from \$175,900 the year before. Institut national de la recherche scientifique (\$415,500 per faculty), University of Toronto (\$400,500) and McMaster University (\$339,500) led the ranking.

TIER GROUPS

The combined research income at the 16 Medical/Doctoral universities fell by -1.7% to \$5.39 billion in Fiscal 2014, as did the research income at the

12 Comprehensive universities (-2.2%) to \$929.9 million. Research income at the 22 Undergraduate universities, on the other hand, posted an overall increase of 2.9% to \$355.1 million.

RESEARCH UNIVERSITIES OF THE YEAR

RESEARCH Infosource is pleased to highlight the achievements of 3 *Research Universities of the Year* – the leading institutions that excelled on a balanced scorecard of research input and output/impact indicators. This year’s winners are: University of Toronto in the Medical/Doctoral category, University of Waterloo in the Comprehensive category and Lakehead University in the Undergraduate category.

SPOTLIGHT ON CORPORATE AND NON-PROFIT RESEARCH PARTNERSHIPS

RESEARCH Infosource shined the spotlight on university research partnerships as measured by grants or contracts received from corporate and non-profit sources during the period FY2010-FY2014 for the following metrics:

Total corporate research income: winners were McMaster University (\$588.7 million) in the Medical/Doctoral category, University of Guelph (\$98.6 million) in the Comprehensive and Université du Québec à Chicoutimi (\$38.3 million) in the Undergraduate category.

Total non-profit research income: winners were University of Toronto (\$1.24 billion) in the Medical/Doctoral category, University of Waterloo (\$98.8 million) in the Comprehensive category and Lakehead University (\$18.3 million) in the Undergraduate category.

Corporate research income as percent of total university research income: winners were McMaster University (35.1%) in the Medical/Doctoral category, University of Regina (12.9%) in the Comprehensive category and Université du Québec à Chicoutimi (31.7%) in the Undergraduate category.

Non-profit research income as percent of total university research income: winners were University of Toronto (24.8%) in the Medical/Doctoral category, Simon Fraser University (14.6%) in the Comprehensive category and Université de Moncton (21.3%) in the Undergraduate category.

THIS YEAR AND NEXT

Last year we wrote that “overall next year looks to be one of restrained funding growth”. As indicated by this year’s disappointing findings we were somewhat optimistic. Most of the key indicators suffered declines. Because government sources account for the bulk of university research funding, as go their budgets so goes research funding in the higher education sector.

The raw research income data tend to mask a difficult underlying situation. Although general price inflation is currently low, research input costs typically rise somewhat faster than overall prices. This places additional pressure on available resources.

The \$100 Million Club		
2014 Rank	University	Research Income \$000
1	University of Toronto*	\$1,041,374
2	Université de Montréal*	\$548,849
3	University of British Columbia*	\$547,027
4	McGill University*	\$477,843
5	University of Alberta*	\$462,891
6	Université Laval*	\$324,803
7	University of Calgary*	\$324,212
8	McMaster University*	\$310,608
9	University of Ottawa*	\$275,266
10	Western University*	\$237,894
11	University of Saskatchewan*	\$195,264
12	University of Waterloo	\$177,425
13	University of Manitoba*	\$154,280
14	Queen’s University*	\$148,486
15	University of Guelph	\$146,657
16	Dalhousie University*	\$128,084
17	Université de Sherbrooke*	\$121,938
18	Simon Fraser University	\$103,130

*Has a medical school

Top 10 Research Intensive Universities			
2014 Rank	Research Intensity Overall	University	Research Intensity (\$ per faculty) \$000
1	23	Institut national de la recherche scientifique+	\$415.5
2	1	University of Toronto*	\$400.5
3	8	McMaster University*	\$339.5
4	2	Université de Montréal* ++	\$292.1
5	4	McGill University*	\$281.7
6	5	University of Alberta*	\$271.8
7	3	University of British Columbia*	\$228.4
8	9	University of Ottawa*	\$214.9
9	6	Université Laval*	\$213.8
10	7	University of Calgary*	\$212.6

*Has a medical school ++Not a full-service university
**Based on 2011-2012 faculty counts; 2013-2014 were not available

Top 10 Universities by Growth				
2014 Rank		University	% Change 2013-2014	
Income Growth	Overall			
1	27	Ryerson University	25.9	
2	44	Université de Moncton	25.2	
3	11	University of Saskatchewan*	23.6	
4	43	University of Northern British Columbia	21.9	
5	37	Brock University	14.7	
6	13	University of Manitoba*	12.4	
7	30	École de technologie supérieure ⁺	11.4	
8	23	Institut national de la recherche scientifique ⁺	11.0	
9	5	University of Alberta*	10.8	
10	21	York University	9.3	

*Has a medical school ⁺Not a full-service university

LAKEHEAD CELEBRATES 50 YEARS AND IS RANKED RESEARCH UNIVERSITY OF THE YEAR IN THE CATEGORY OF UNDERGRADUATE UNIVERSITIES BY RESEARCH INFOSOURCE

WE’RE CREATING LEADERS.

When I decided to pursue an HBSc in biology, I struggled with where to go. I looked at big schools, small schools, and even a few out-of-province schools, and then I came to Thunder Bay. My decision was made from the moment I set foot on campus.

Not because Maclean’s ranks Lakehead as one of the top ten undergraduate universities in the nation, but because I love the people who choose Lakehead. My professors know my name. They care about how I do in their class. From undergraduate through doctoral research, Lakehead offers all students the opportunity to work with brilliant, innovative researchers, who challenge convention while looking for solutions to real-world problems.

I hope to join the long tradition of innovators and leaders who have come from Lakehead. Dr. Andrew Dean, Lakehead’s VP of Research and Innovation, is already reaching out to provide me with the resources to make my start.

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PARTNER PERSPECTIVE

ULaval takes Northern Research to New Heights

By Debbie Lawes

Canada is stepping up its game when it comes to monitoring the rapid changes underway in the Arctic. In July, the federal government announced that its largest investment ever in northern research would go to a Quebec university with the world’s largest concentration of scholars specializing in northern and Arctic studies.

Université Laval, which jumped to #6 from #8 in the current Top 50 Research Universities ranking, is also a global leader in photonics, neuroscience, cardio-metabolic health, microbiology and food and nutrition.

The \$98-million grant from the highly competitive Canada First Research Excellence Fund (CFREF) – Laval’s biggest research award ever – enables the university to link these specialties to develop better

tools for probing and predicting the effects of climate change and industrialization on northern ecosystems and populations.

Sentinel North brings together researchers from 15 universities from around the world, indigenous organizations and communities (e.g. Nunavut Research Institute and the Grand Council of the Crees) and provincial, territorial and federal governments. Also participating are some 20 companies, including those working in photonics (e.g. Ericsson Canada Inc. and TeraXion), drug discovery (Pfizer Canada), natural health products (Nutra Canada and Atruim Innovation) and transportation (e.g. Airbus).

One priority is to create a network of connected sensors robust enough to withstand the unforgiving conditions of northern regions. These devices need to be portable, energy conserving, remotely accessible and

sensitive enough to measure changes as they happen.

“We have 8 field stations currently monitoring conditions in the north, but the technologies they use take longer to produce results and they monitor mostly for weather and climatic conditions,” explains Dr. Edwin Bourget, VP research and innovation at Laval. “With Sentinel North, we will be able to accelerate and expand how we monitor these changes and develop solutions faster.”

As well, researchers are using new materials in optic photonics to build remote sensors with higher resolution to better understand the effects of a changing north on food chains, pollution, urbanization and infrastructures. One of the leaders in this space is Dr. Marcel Babin, who returned to Canada after working in France for 18 years.

Babin is a Canada Excellence Research Chair (CERC) in Arctic

remote sensing and one of three Laval-based CERCs involved in Sentinel North. His is currently developing an “Arctic-proof” drone that can plunge to depths of nearly 2 kilometres under the Arctic Ocean to collect data about marine organisms. The drones will fill an important gap in a global network of ocean-observing beacons.

Sentinel North is also led by Dr. Yves de Koninck, a Laval neuroscientist who will study the effects of a changing north and high-risk diets on people’s health. Research will also focus on brain diseases caused, for instance, by consuming seafood with trace amounts of heavy metals.

Two other key contributors are Drs. Younes Messaddeq and Pierre Marquet. Messaddeq left Brazil in 2010 to accept a CERC at Laval in optical materials, including new types of fibres and glass. He made headlines a year ago with his inven-

tion of “smart” clothes that monitor a wearer’s glucose levels, heart rhythm and brain activity and then transmit these data instantly to a doctor via wireless networks.

Marquet is an expert in the emerging science of neurophotonics, which uses photons – or quantum units of light – to study molecular processes in the brain.

Bourget stresses that Sentinel North’s research is designed to focus on solutions that detect and treat problems early.

“We’re talking about an investment that will have lasting and tangible benefits in areas including health, resource management and socioeconomic development,” he says.

LONG-TERM PARTNERSHIPS ARE KEY

Bourget credits Laval’s success in winning a CFREF grant to several factors: the establishment of dozens of new

research chairs; a growing number of researchers who work across disciplines; and a rapid rise in the number of partnerships with companies.

In 2008, Bourget embarked on an ambitious plan to more than double Laval’s 80+ research chairs. Today, the university has 84 federally funded Canada Research Chairs, more than 75 partnership research chairs and three prestigious CERCs.

“The biggest change we’ve seen from these partnerships is a switch from short-term research investments to longer-term partnerships with companies and organizations,” says Bourget. “It has fundamentally changed how many businesses think of university collaborations. Partnering over five or ten years gives companies a competitive edge well into the future.”

Debbie Lawes (Debbie@dovercourteditorial.ca) is an Ottawa-based science writer.

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- Genome Canada
- Inria, France
- Gordon and Betty Moore foundation, United States
- Western University

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› The senior with osteoarthritis who regains quality of life because of biomedical engineering

› The high-potential teen who can test her leadership skills in a safe environment

› The farmer who uses satellite imagery and spatial positioning to do precision agriculture

› The young mother struggling with chronic disease who can now care for her children without pain

› The engineer reinventing an oil and gas company so that it positively contributes to the environment *and* generates profit

Every day, our scientists, researchers and students are making discoveries, creating new knowledge and tackling emerging and persistent global challenges in key areas where our particular strengths meet the world’s most pressing challenges: **energy; brain and mental health; biomedical engineering; infections, inflammations and chronic diseases; Earth-space technologies; and human dynamics in a changing world.**

In the end, research is really about improving quality of life, benefiting communities at home and around the world, and creating new understanding of our place in the world.

We should *all* care.

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SPOTLIGHT ON University Corporate and Non-Profit Research Partnerships 2010-2014

RESEARCH Infosource shines the spotlight on university research partnerships as measured by grants or contracts received from corporate and non-profit sources during the period FY2010-FY2014.

Corporate Research Income		
Rank	Medical/Doctoral	\$000
1	McMaster University	\$588,745
2	Université de Montréal*	\$382,267
3	University of Toronto	\$358,695
Tier Average (16)		\$189,709
Rank	Comprehensive	\$000
1	University of Guelph	\$98,630
2	University of Waterloo	\$71,188
3	Institut national de la recherche scientifique+ *	\$35,263
Tier Average (11)		\$30,582
Rank	Undergraduate	\$000
1	Université du Québec à Chicoutimi*	\$38,285
2	Laurentian University**	\$17,261
3	Ryerson University	\$16,994
Tier Average (15)		\$8,110
Overall universities average \$000 (42) = \$83,176		

Corporate Research Income as a % of Total University Research Income		
Rank	Medical/Doctoral	%
1	McMaster University	35.1
2	Dalhousie University	22.5
3	Queen's University	18.2
Tier Average (16)		11.3
Rank	Comprehensive	%
1	University of Regina	12.9
2	University of Guelph	12.8
3	Institut national de la recherche scientifique+ *	11.7
Tier Average (11)		8.3
Rank	Undergraduate	%
1	Université du Québec à Chicoutimi*	31.7
2	Laurentian University**	21.3
3	Ryerson University	11.0
Tier Average (15)		9.6
Overall universities average (42) = 10.8%		

Non-Profit Research Income		
Rank	Medical/Doctoral	\$000
1	University of Toronto	\$1,235,163
2	University of British Columbia	\$539,408
3	Université de Montréal*	\$320,584
Tier Average (16)		\$257,520
Rank	Comprehensive	\$000
1	University of Waterloo	\$98,819
2	Simon Fraser University	\$70,097
3	University of Guelph	\$56,920
Tier Average (9)		\$35,471
Rank	Undergraduate	\$000
1	Lakehead University**	\$18,325
2	University of Northern British Columbia	\$11,006
3	Université du Québec à Trois-Rivières*	\$10,391
Tier Average (15)		\$6,771
Overall universities average \$000 (40) = \$113,528		

Non-Profit Research Income as a % of Total University Research Income		
Rank	Medical/Doctoral	%
1	University of Toronto	24.8
2	University of Ottawa	20.5
3	University of British Columbia	19.2
Tier Average (16)		15.3
Rank	Comprehensive	%
1	Simon Fraser University	14.6
2	University of Waterloo	12.8
3	University of Guelph	7.4
Tier Average (9)		8.3
Rank	Undergraduate	%
1	Université de Moncton	21.3
2	University of Northern British Columbia	17.5
3	Lakehead University**	16.9
Tier Average (15)		8.1
Overall universities rate (40) = 14.2%		

Notes:

1. Based on universities on the 2015 Top 50 Research Universities list and reported research income from corporate or non-profit sources in the form of a grant or contract for all 5 years FY2010-FY2014.
2. Financial data were obtained from Statistics Canada.
3. See www.researchinfosource.com for details.

*In Fiscal 2011, Quebec universities reported data for only 11 months due to a fiscal year-end change

**Has a medical school

+Not a full-service university



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McMaster is research intensive to be sure. But we're also research infused: discovery is something we live and breathe. It shapes our teaching, inspires our collaborations, and commits us to sharing our knowledge throughout our communities – be they around the corner or across the globe. Our researchers, like **Abigail Payne**, director of MacDATA, are partnering with the private and public sectors to ensure our knowledge is placed directly into the hands of those who can use it best, driving social, cultural, and economic prosperity.



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The Next Generation of Entrepreneurs and Innovators



Dr. Martha Crago
Vice President Research
Dalhousie University

Looking ahead to Canada's future as an innovative nation means thinking about the next generation of entrepreneurs and innovators as well as the next generation of innovations. First let's consider the people involved in entrepreneurship and innovation from a few different perspectives: that of emerging and retiring professors and that of university students.

The abolition of mandatory retirement of university professors

combined with an unsteady economy may well have created a precarious science future for our country. The two together mean that there are many less young professors in our universities. This, in turn, over time will lead to a gap in experienced researchers, those at the associate and full professor level. At present, we have a number of senior professors who are not active in innovation and have not been a part of the culture that sees universities as places for innovation. This means that they are often unable to mentor their students or junior colleagues in this regard. The importance of keeping new researchers coming into Canadian universities is critical, and once they are in place, they will need adequate support to build their research and innovation capacity. They will also need a university culture that recognizes, builds and rewards the innovation and entrepreneurship side of their careers.

The students who may become the scientific and social innovators and entrepreneurs of tomorrow need similar support, opportunities and

motivators. Exposure to research experience, mentoring in innovation and entrepreneurship, co-located practice spaces, rewards, cross-disciplinary training, co-ops and experiential learning are all becoming increasingly important in today's university education.

Eric Grimson, a Canadian, is the Chancellor for Academic Advancement at MIT. He has been gracious enough to share with university, government and industry people in Nova Scotia many of the ideas that his university has put in place to meet the needs and encourage innovation and entrepreneurship for both students and professors. His talks have inspired ideas and optimism. He has described how MIT has worked to "interweave innovation and entrepreneurship with education to advance the capabilities of its students, postdocs, staff, faculty, and alumni to change the world through research, invention, innovation, leadership and intrapreneurship, entrepreneurship, service learning opportunities and research". In doing so, he said that

its goal is to demonstrate global leadership in innovation and entrepreneurship within an educational enterprise. Here are some of the elements for making that happen at MIT: educational programs (curricular and co-curricular activities at all levels), research projects at all levels, organizational collocation of activities, spaces to encourage innovation and team-building, linkages to the neighboring innovation ecosystem. This has led to 20 significant activities, spread across the institute, approximately 54 classes across multiple units, spaces for innovation spread across multiple locations, cross-disciplinary approaches, links across departments with no one unit "owning" entrepreneurship, direct connections with the research engine, incentives for inventors and policies to encourage student start-up activities, and student-run competitions all year long. The result is very impressive. Dr. Grimson reported that these initiatives have led to more than 130 companies with aggregate exit-values of \$2.5

billion captured and a market cap of over \$15 billion. Furthermore, these companies have generated more than 2,500 jobs and have received \$770 million in venture capital funding.

At the professorial level, according to Dr. Grimson, MIT has put in place a variety of incentives and supports such as a royalty policy with one third of royalty stream to inventors, a leave policy for the creation of a start-up of up to 2 years of unpaid leave. Professors are encouraged to spend up to one day a week in outside professional and consulting activities without the fees being counted against salary. MIT also provides ignition grants to provide seed funds for start-ups led by faculty and help in obtaining venture capital.

As Canada continues to build its innovation and entrepreneurship capacity into the future, there is much to learn from the MIT experience. In fact, many of our universities are already moving forward in similar directions.

Finally, but importantly, the next

generation of innovation needs to be developed with the sustainability of our planet clearly in sight. Science and technology take place in the context of society and must serve societies and their needs for many generations to come. As an example, many of the innovative products of today have life spans that far out live the product. Many such products are then discarded and end up in developing countries which do not have the capacity to recycle them. The manufacturers of products made from advanced energy-saving materials need to consider the energy resources needed to produce such materials. The latter may outweigh the former. Robotics and advanced information technologies have changed and will continue to change the labor market. Education of our youth must take these changes in employment possibilities into account. In a variety of ways, as we move forward to a next generation of innovation, the development of science, technology and society need to progress hand-in-hand toward a sustainable future.

>>>>>> Leaders' Corner <<<<<<<



The University of Waterloo is defining innovation in Canada with a unique blend of scholarship, real-world work experiences and a distinctively entrepreneurial culture. Universities, especially those intensively engaged in research, are equipped to bring together the essential ingredients that will produce the type of people the disruption economy needs to thrive.

*Feridun Hamdullahpur
President and Vice-Chancellor
University of Waterloo*



At Lakehead University, the strength of our research and innovation lies within our diversity of ideas. Lakehead takes pride in instilling a research culture into the curriculum from the undergraduate to the doctoral level. New questions require new ideas and we will continue to excel at generating these ideas through fundamental and applied research and meaningful partnerships. Global economic prosperity will depend upon innovation. Lakehead is well positioned to be the driver of that innovation through our strong focus on research and training.

*Andrew P. Dean, Ph.D.
Vice-President, Research & Innovation
Lakehead University*



Queen's distinguishes itself as one of the leading research-intensive institutions in Canada. The research mission is to advance research excellence, leadership and innovation, as well as enhance Queen's impact at a national and international level. Through undertaking leading-edge research, Queen's is addressing many of the world's greatest challenges, and developing innovative ideas and technological advances brought about by discoveries in a variety of disciplines.

*Dr. Steven N. Liss
Professor and Vice-Principal (Research)
Queen's University*



Solutions to daunting global challenges – food, water and energy security – will not come from any one government, university or industry but from all of us working together in multi-sectoral partnerships across national and disciplinary boundaries. That's the new paradigm needed to make Canada the most innovative country in the world.

*Peter Stoicheff
President
University of Saskatchewan*



Over a century ago, our founding researchers made remarkable discoveries and developed exceptional innovations that transformed disciplines, and improved lives and livelihoods. This tradition inspires University of Guelph research today – we create and mobilize knowledge that promotes the health and well-being of humans, animals, the environment, agriculture and society on a global scale.

*Malcolm M. Campbell, Ph.D.
Vice President Research
University of Guelph*



The complexity and magnitude of today's challenges – climate change, terrorism, social inclusivity, economic development, renewable energy, early child development, the genetics underlying human health and disease – demand the collective effort of the world's very best researchers, regardless of country or academic discipline. CIFAR currently draws on 400 researchers from Canada and 17 other countries in 115 institutions to create transformative knowledge and address questions of importance to the world. In so doing, CIFAR is helping to ensure that Canada is positioned to compete and contribute in today's globalized world.

*Alan Bernstein, O.C., Ph.D., FRSC
President and CEO
Canadian Institute for
Advanced Research*



Your partner at the heart of innovation! R&D staff at Collège communautaire du Nouveau-Brunswick are on a mission to hone their skills to literally become a new economic development tool for the benefit of New Brunswick businesses, communities and government partners.

*Sylvain Poirier, Ph.D.
Executive Director
Entrepreneurship & Innovation
CCNB*



The scope of research questions and the necessary infrastructure to study these questions, require researchers to work collaboratively across scientific boundaries. Our researchers are pooling their expertise and resources to generate a new way of thinking and achieving excellence. Effective and bold research leadership, combined with imaginative ideas and partnerships, are key to turning challenges into successes.

*Edwin Bourget
Vice-President Research and Innovation
Université Laval*



Providing opportunities for students to engage in scholarship, research and creative activities with faculty and external partners is a guiding principle in our journey to become Sheridan University. Our dedication to hands-on learning is part of our tradition as an applied learning institution, and will remain a cornerstone of our future evolution.

*Dr. Jeff Zabudsky
President and CEO
Sheridan College*



Researchers working in Science, Technology, Engineering and Math (STEM) often make new discoveries and develop disruptive technologies and processes. However, if these are not adopted, there actually is no innovation. Interdisciplinary approaches including Social Sciences and Humanities scholars are critical to understanding the context, the users, and the organizational and political issues that drive and impede innovation.

*Wendy Cukier
Vice-President, Research & Innovation
Ryerson University*



At Niagara College, every applied research project we do involves an industry partner. And the company is in on every aspect of the project: problem formulation, scoping, project execution, and knowledge transfer. By the time the intellectual property is transferred, they know it inside out and it is THEIR solution.

*Dr. Marc Nantel
Assoc. Vice President
Research & Innovation
Niagara College*



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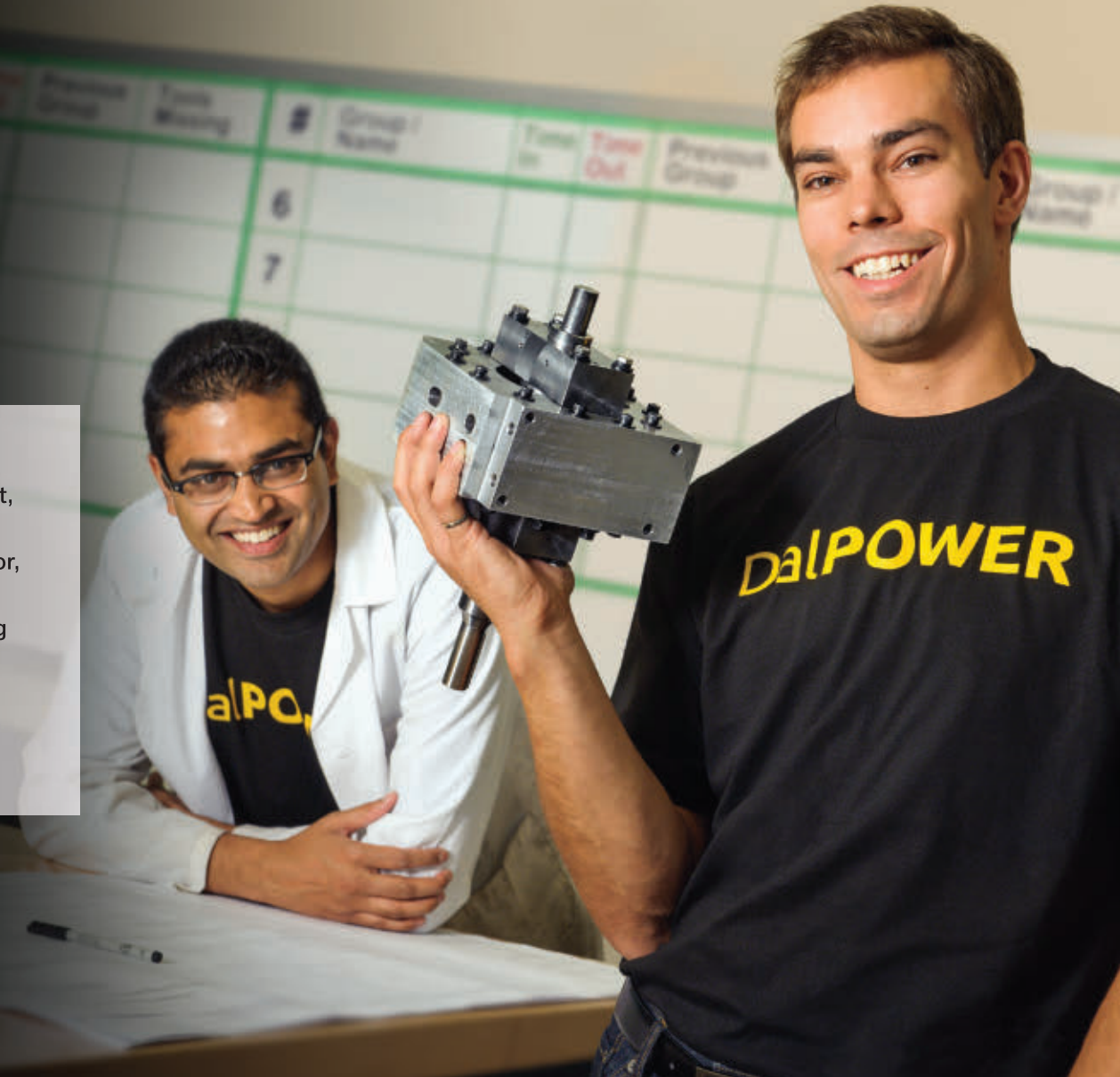
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As a graduate student, Braden Murphy believed he could build a better engine - one that's more efficient, lighter and easier to maintain. With help from Dr. Darrel Doman, his Dalhousie University supervisor, he did just that. But Braden didn't stop there. He started a new company, signed a worldwide licensing agreement and now, his company is developing and building technology right here, right now. It's clear: Our Dalhousie students and professors are taking care of business.

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PARTNER PERSPECTIVE

PRACTICING WHAT WE TEACH: Innovative Universities for the 21st Century

Wendy Cukier
Vice President Research & Innovation
Ryerson University

Universities in Canada have been challenged as never before with new forms of competition, the erosion of funding, increasing demands for accountability, and questions about their very mission. Questions centre around value for money, the payback from investments in research, the quality of teaching, and their universities' contribution to innovation and economic and social development. Discussions on the innovation gap and Canada's descent in global innovation rankings, have driven widespread talk of strategies to build a "culture" of innovation and the role of the university. It's time to take a fresh look at what we do and how we do it.

Not only is Canada's Information and Communications Technology sector critical to our economic growth, but digital technologies also have the potential to transform virtually every sector. Evidence shows that under-investments in technology impede growth and productivity improvements – whether in advanced manufacturing, health care, or education. Among small and medium-sized enterprises (SMEs), recognized as the engines of economic growth in Canada, more than 40 per cent do not have even basic technology infrastructure. And our recent study of mobile technology shows that although Canada is a leader in consumer adoption of these tools, our companies, government, and educational

institutions are global laggards in the use of these technologies. As such, our efforts to drive innovation must not just focus on creating new technologies but must also recognize the factors that drive or impede their adoption.

Entrepreneurship focuses on the creation of something new, a product or a service. Innovation, on the other hand, requires the adoption of something new – a new product or service – to fundamentally change the way we do things. While it is true that many transformative discoveries have emerged from labs and had impacts that could not have been planned or predicted, we also know that there is need for market-driven research with specific aims to solve real-world problems. The prevailing lab-to-market model of innovation, the assumptions that underlie it, and the programs aimed at accelerating it tend to focus primarily on the supply of new technologies without reference to the demand.

Consider this comment on e-health, which appeared in the Journal of the Medical Records Association: *The future of medical computing is bright. Obstacles to the practical use of the computerized medical record exist, but we may expect these to vanish within a few years. We have a golden opportunity to avoid a new round of escalating medical costs.* It was written in 1990 – 25 years ago! The technology needed to improve the management of health information has existed for decades. Technology is not the primary obstacle to moving forward. The critical challenges are human and organizational factors – politics and regulatory issues.

There is no doubt that strong grounding and investments in Science, Technology, Engineering and Math (STEM) are fundamental. However, a focus exclusively on the invention or creation of technologies, on the supply side, tends to obscure the critical importance

of the social sciences and humanities (SSH) and design disciplines in addressing the factors that actually drive and impede innovation. At Ryerson, researchers work closely with partners to develop next-generation technological solutions, but they also explore the strategic, organizational, and individual factors affecting the adoption of these technologies in order to inform approaches to innovation.

For example, Ryerson's Centre for Cloud and Context-Aware Computing (RC4) partners with industry to develop leading-edge technology and tools, but also examines the impediments and drivers of mobile technology adoption and develops evidence-based strategies to promote them. We know, for example, that short-term business priorities often prevent companies from investing in ICT solutions even though, over time, these investments improve growth and productivity. Our action-oriented research, with partners like the Ontario Chamber of Commerce and our new Innovation Portal, is designed to help SMEs develop the capacity to innovate.

In our Advanced Manufacturing, Design and 3D Printing Lab, researchers work with leading 3D augmented reality companies to develop applications that solve real world needs for both consumers and businesses. And we also have interior designers, social psychologists, and consumer behavior experts working with aerospace engineers to design aircraft interiors that will create outstanding user experiences.

In health care, our researchers have built a game-changing surgical navigation system and complementary surgical tools for use in spinal fusion surgeries. But we recognize that it is not a shortage of leading-edge technology that is impeding innovation in Canadian health care. To help drive transformation, we also examine patient-centered care,



In Ryerson's Advanced Manufacturing, Design and 3D Printing Lab, researchers work with leading 3D augmented reality companies to develop applications to solve real world needs for both consumers and businesses.

health innovation processes, organizational structures, and policies.

Too often, we talk about innovation as if it is a single process. We need to recognize that while innovation models have common features, there are enormous differences in the stakeholders, the investments, the processes, and the timelines between, for example, the search for a cure for cancer and the development of a new app. The implications for programs and supports are immense.

If we look at the programs currently in place to support commercializing university-based research and to incubate university-based start-ups, the underlying assumptions have tended to be predicated on lab-to-market models, and often the assumption that we need to turn researchers into entrepreneurs. Although some academics do become successful entrepreneurs, the mindset, personality traits, and interests that drive someone

to scholarship are not necessarily the same as those driving entrepreneurs. Too much of our innovation strategy has rested on a hope and a prayer that someone will discover something in a lab and take it to market. We need to recognize that there are many exciting and commercializable discoveries in labs and on benches around the country, but we currently lack the right kind of infrastructure to identify these opportunities and to successfully take them to market. While many rightly decry the erosion of funding for fundamental research, we also need more appropriate support for collaborative, research focused on solving real world problems.

There needs to be better alignment between the stated commitments to commercialization and innovation and the supports and incentives in place to promote them. The criteria, the adjudication processes, and the people making the decisions need to fit with the

goals. Today, professors are generally rewarded – hired, given tenure and promoted – for publishing articles and sometimes for teaching, but not for the impact of their work.

Fundamentally, many of the old dichotomies that dominated universities in the past need to be eroded. This includes the medieval battles which pitted the "town versus the gown", more recent debates about a focus on theory and critical thinking, skills versus practical skills and employability. The relative importance of teaching versus research and the centrality of STEM versus SSH. And, most importantly, the tension between research excellence versus relevance. Universities for the 21st Century are critical to Canada's economic, social, and cultural development, and our place in the world. We need to rethink institutions that were designed for a very different time and very different challenges, retaining what is valuable while adapting to a new reality.

Growing our research strengths

As a university, we understand how important it is to face challenges of global importance.

Our recent growth in research funding is helping us do just that. In 2013-14, our research revenue grew \$37 million, the third highest growth of any university in Canada. And we didn't stop there.

We are proud to be one of five universities awarded major program funding by the Canada First Excellence Research Fund, and to be leading or co-leading four of Genome Canada's 11 recently awarded projects.

These investments will help us find new solutions to some of the world's most complex problems, such as how to feed a growing global population.

And when knowledge can be turned into real-world solutions, that is truly beautiful.

Knowledge is beautiful.

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PARTNER PERSPECTIVE

York U Research Accelerates Scientific and Societal Solutions



Robert Haché
Ph.D., Vice-President
Research & Innovation
York University

York's researchers and trainees are actively changing the way we think about the world. York's faculty are a cohort of world-class leaders who work to advance research and innovation across a breadth of disciplines from the social sciences, to business, law health, science and engineering in

areas that range from biological and computational vision, to rehabilitation, big data, digital media, environmental sciences and transportation.

As one of Canada's leading universities, with 24 active research centres and institutes, and a wide-ranging complement of Research Chairs, York's researchers are working together with industry, government, community groups, not-for-profits and international academic partners to create new knowledge and discoveries that accelerate the development of cutting-edge solutions to today's most pressing scientific questions and societal challenges.

York's researchers have played key roles in some of the most important research discoveries in the past half-century, including:

- ✓ Discovering a brainstem center that controls both 3D eye orientation and 3D head orientation, leading to the creation of models that have been used to guide neurosurgical

procedures and promise new treatments for movement disorders

- ✓ Actively contributing to an international team of researchers that discovered the Higgs Boson particle, which is the foundation upon which our current understanding of the material universe is built

- ✓ Detecting water on Mars, made possible by an instrument on the NASA Mars Phoenix Lander that was developed at York

- ✓ Leading research studies demonstrating that the lifelong use of two or more languages helps to prevent the onset of Alzheimer's and other forms of dementia

York University's commitment to excellence in research and scholarship reflects a world-class research university. Our vibrant community of researchers is central to driving discoveries, entrepreneurship and critical thinking required to make a difference in the world. This is innovation.

From Quantum Science to Quantum Technologies

Our scientific and knowledge mobilization strategy will provide a business friendly ecosystem that will boost discoveries, stimulate and increase collaboration with industry, foster entrepreneurship, competitiveness and productivity in strategic socio-economic sectors.



Prof. Alexandre Blais
Canada First Research Excellence Fund
Project Leader

PARTNER PERSPECTIVE

Mixed Campuses to Foster Inter-university and Industrial Partnerships



Daniel Coderre, PhD
Rector
INRS University

Competition amongst universities to attract both students and faculty can often give rise to a perception that it comes at the expense of limiting the return on the significant investments made by governments on behalf of society as a whole. Undeniably, the funding formulas which are weighted heavily on the number of registered

students do to a certain extent drive a numbers race in the delicate balance between financial viability and the preservation of academic excellence. Moreover, the environment in which researchers from different universities compete for government research dollars and private sector contracts contributes to this notion of inter-university competition. The fact that stringent criteria are applied in assessing the quality of proposals put forward and the strength of their proponent researchers, and are both measured against high standards of research excellence is however a desirable feature of the granting process for individuals and teams of researchers, and must remain the basis for attribution of funds.

For their part, university administrators have a role to play in balancing the above competitive forces through collaborative efforts between universities as a means of creating optimal conditions for conducting research, thus

maximizing public and private returns. In so doing, institutions can achieve their ultimate goals of formation of highly qualified personnel, the pursuit of knowledge and the socio-economic development of the country and welfare of its citizenry. The establishment of partnerships among universities is especially critical in periods of economic austerity as the demonstration of value for money spent becomes all the more important.

Hence, both governments and university officials must make efforts to instigate and support new groupings of researchers by embracing a multidisciplinary approach, building upon the best available research talent, regardless of their organizational affiliation. Gone are the days of private academic fiefdoms and the belief that research excellence must be concentrated only in a handful of prestigious universities. The future direction of research resides in developing new partnerships, clusters and

networks of outstanding researchers with complementary skillsets, dedicated to addressing emerging societal needs as well as the upcoming challenges of the twenty-first century.

Governments at both the federal and provincial levels have taken several measures to foster greater collaboration between researchers and promote partnerships with the private sector and other end-users of the resulting research knowledge. In this regard, the government of Quebec has been at the forefront of this activity through its significant investments in the creation of large research consortiums, focused on its key economic sectors, the upshot of which has been to yield major benefits and sustainable, long-term partnerships. Similarly, federal programs which require co-financing of research projects are also effective in promoting partnerships.

Without diminishing in any way the success the above measures

have achieved both in this country and abroad, there is however one approach which has barely been exploited in Canada and could work to enhancing the benefits of university and industrial research partnerships. It entails the creation and development of mixed campuses, combining various universities in a single location, along with governmental and industrial research centres, all targeting the same thematic fields. This form of collaborative model drastically changes the classical university paradigm; while remaining administratively attached to their home institutions, researchers nevertheless share the same physical surroundings, enabling daily contact with their university and industry colleagues involved in similar or complementary disciplines, all focused on common research endeavors.

The benefits of this physical proximity are several fold. Firstly, it offers the possibility of making available and therefore increasing the accessibility to large platforms of leading edge scientific research equipment. Through programs of the Canada Foundation for Innovation, Canada has invested considerable

sums over the past several years in major research infrastructure and expects to continue to do so in coming years. The sharing by many researchers of this world-class equipment would constitute an important gain by optimizing the level of Canadian research and its spin off transfer to industry. For researchers, availing themselves of this caliber of equipment which otherwise would be difficult to access, provides a clear advantage in areas of applied research and the economic benefits it produces for the country. The recently implemented Canada First Research Excellence Fund program would also be enriched by consortiums such as these.

The second positive outcome would be enhanced training of students, especially at the masters and doctorate levels. It would also facilitate the co-direction of inter-university activities, improve the interface with industry and its access to high performance technology parks, to name but a few examples of how the model would benefit the university sector and its partners. The support of governments for such innovative approaches should be favored in coming years.



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PARTNER PERSPECTIVE

The Power of Partnerships



Patrick Deane
President & Vice-Chancellor
McMaster University

Partnerships. They’re in our DNA. It was, after all, a partnership – a consortium of community and business leaders – that brought us from our original home in Toronto to Hamilton some 85 years ago.

Indeed, it was in these early days that we learned the true power of partnerships – partnerships that are

as much a part of our tradition as they are our current practice and our future plans.

Working with our partners, we’ve capitalized on our community’s inherent strengths – manufacturing and health – while diversifying our economy to build our collective capacity.

The McMaster Innovation Park is a case in point – a brownfield turned innovation hub, it is now home to world-class facilities like the CANMET-Materials Technology Laboratory, the United Nations University – Institute on Water, Environment and Health, and the McMaster Automotive Resource Centre. Each of these acts as a magnet for future partners.

We also learned early on that some of the most fruitful partnerships are those that occur, quite naturally, within the boundaries of our own campus – when researchers

from an array of disciplines come together to tackle a single issue from a variety of perspectives.

In fact, it may be our multidisciplinary approach to research that defines McMaster best.

In many cases, these cross-Faculty partnerships precipitated the creation of our 70-plus world-class research centres and institutes. While unique in their various themes – be it aging, infectious disease, population health, peace studies, big data, healthier environments, transportation and logistics, or materials research – they share a similar philosophy when it comes to solving problems: work collaboratively, leave no stone unturned and investigate the problem from every possible angle.

Our first place ranking in Research Infosource’s corporate sponsored research income category confirms that McMaster researchers are recognized leaders in their

fields. The ranking is a testament to the many ways in which their discoveries are contributing to the nation’s economic prosperity – a critical function of a research intensive university.

But beyond our contributions to building a stronger economy, we are committed to strengthening social and cultural prosperity – whether by engaging with local municipalities around policies to reduce poverty and improve living conditions, or working with developing countries to remediate and manage polluted ecosystems.

McMaster’s ability to attract sponsored research income has placed us among the top three research intensive universities in the country – a standing of which we are particularly proud, especially given our size. But we are not just research intensive, we are research infused: discovery is something we live and

breathe. It shapes our research and our teaching. And our students – both undergraduate and graduate – reap the rewards.

In true McMaster style, our researchers have a longstanding tradition of turning the process of discovery into a pedagogical tool. As a result, our students are nurtured in a culture of curiosity and inquiry, and continue to think critically when they enter the workplace and throughout their lives. They are, after all, our future leaders.

Our commitment to excellence ensures we continue to secure research grants across the disciplines, and our partnerships enable our research to be translated into practice. The income measure is certainly significant, but beyond our income, the true value of our research is best measured by its outcomes. It’s how our faculty and students use their research to advance and serve our broader society that really matters – whether that’s through the creation of new knowledge, policies, products, technologies or services. I am proud that the work of our researchers is making a huge difference and having

a profound impact on the lives of those in Canada and beyond.

The appeal and the value of partnerships – whether they’re with the private or public sector, around the block or around the globe – is that they allow us to put our knowledge directly into the hands of those who can use it best. From the way that we teach our students to the way we develop our partnerships, we are continually mobilizing our knowledge and transferring our technologies for the benefit of society.

And what’s best is that partnerships go both ways. The flow of information is by no means in one direction, rather we learn as much from our partners as they learn from us. Their insights, experience and challenges guide and inspire our research and inform the way we teach our students.

Together we are combining our human, financial, physical and intellectual capacity to create and support prosperity through research and innovation. Pooling our resources in this way truly means that the whole is greater than the sum of its parts.



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technologies

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The *Observatoire des sciences et des technologies (OST)* was the first Canadian institution dedicated to the production and analysis of bibliometric and patent indicators.

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FOCUS ON

Partnerships

RESEARCH

Partnerships a Cornerstone of Research With Impact

This year's *Canada's Innovation Leaders* theme is "Knowledge Transfer Through Research Partnerships" – focussing on how research partnerships are key to effective research, training and applications. Talk to research leaders across the country (see feature article page 1) and they'll inevitably speak of the power of research partnerships for facilitating and enriching research and moving ideas out of the laboratory into the marketplace and broader society. Whereas solid funding of basic academic research and applied industrial research are necessary conditions for success of Canada's research enterprise, partnerships can take the research to new levels. How?

In the first instance, partnerships can bring additional financial resources – cash and in-kind – to academic research in our universities, colleges and hospitals and expand its scope beyond available core funding. Many companies and charities, for example, are investing substantial sums to initiate or top-up research in our publicly-funded research institutions. Partnerships among the academic, industrial and government sectors can similarly expand the scale and scope of research conducted in industry.

But partnerships are about more than money. They are equally about expertise and know-how, and how expertise and know-how from different partners are brought together to address scientific and engineering challenges and opportunities. In these instances each partner brings its own capabilities to the table. Combining, say, the academic knowledge of a university researcher with the manufacturing knowledge of a medical device company can improve the chance

of commercial success of, for instance, a mobility device for people with disabilities.

Partnerships can also expand the reach and impact of publicly-funded research infrastructure – facilities and equipment that have been paid for with tax dollars. Many companies rely on the research infrastructure in university and government labs to gain access to facilities and equipment they cannot afford on their own, to develop or test technologies and products. Occasionally, academic researchers benefit from the research infrastructure in companies.

Most academic research is actually undertaken by graduate students or in the case of colleges, undergrads who are pursuing degrees or diplomas. Increasingly, students are fulfilling their research obligations by working in and with companies. This form of hands-on research training adds value to students' experience. It also constitutes a fast-track to employment as students and employers get a chance to assess one another during the research project. It's a real win-win scenario.

So, research partnerships add value to academic and industrial research in a variety of ways. How then to measure partnerships? RESEARCH Infosource is pleased to shine a spotlight on the universities, colleges and companies that stand out in their commitment to partnerships, on a variety of indicators.

Data from Statistics Canada have allowed us to determine which universities, in a 5-year period, have attracted the most research funding from the corporate and non-profit sectors; in total, and as a proportion of their total research income. This provides a useful surrogate for the level of partnerships being formed. This special university spotlight can be found on page 6.

Data from the Natural Sciences and Engineering Research Council of Canada (NSERC) awards database provided a similar perspective on corporate research partnerships with universities and colleges and the companies that are partnering with them.

Top 20 Companies Partnering with Universities and Colleges 2010-2014		
Rank	Company	Total Partnership Grants #
1	Hydro-Québec	313
2	Atomic Energy of Canada Limited	207
3	Bombardier Inc.	181
4	General Motors of Canada Limited (fs)	152
5	Suncor Energy Inc.	146
6	IBM Canada Ltd. (fs)	136
7	Vale Canada Limited (fs)	132
8	Shell Canada Limited (fs)	128
9	Pratt & Whitney Canada Corp. (fs)	126
10	BlackBerry Limited	125
11	Syncrude Canada Ltd.	110
12	BCE Inc.	103
13	Rio Tinto Group (fs)	94
14	Glencore Canada Corporation (fs)	90
14	Manitoba Hydro	90
16	Imperial Oil Limited	89
16	Resolute Forest Products Inc. (fs)	89
18	Teck Resources Limited	85
19	Tembec Inc.	83
20	Ericsson Canada Inc. (fs)	76

Notes:

1. Based on NSERC's award database and companies that partnered with universities and/or colleges during all 5 years between FY2010-FY2014.

2. Data are provided for the current parent company including any of its affiliated companies, divisions, subsidiaries and related companies involved in mergers/acquisitions during the period that partnered with an university and/or college directly, where applicable.

fs = Foreign subsidiary

Top Universities Partnering with Companies 2010-2014		
Rank		Medical/Doctoral
1	University of British Columbia	\$76,506
2	University of Toronto	\$75,064
3	University of Alberta	\$66,292

Rank		Comprehensive
1	University of Waterloo	\$56,553
2	University of Guelph	\$29,564
3	Simon Fraser University	\$25,103

Rank		Undergraduate
1	École de technologie supérieure+	\$15,066
2	Ryerson University	\$9,658
3	Université du Québec à Chicoutimi	\$6,641

Note: 1. Based on NSERC awards database and universities that had one or more partnership grants with corporate partner(s) during all 5 years between FY2010-FY2014. *Not full-service university


Top 10 Research Colleges Partnering with Companies 2010-2014		
Rank	College	Total Partnership Grants \$000
1	SAIT Polytechnic	\$6,800
2	Cégep de Saint-Hyacinthe	\$6,092
3	Cégep de l'Abitibi-Témiscamingue	\$5,750
4	Sheridan College	\$4,942
5	Cégep de La Pocatière	\$4,848
6	Cégep de Thetford	\$4,609
7	Algonquin College	\$4,550
8	Mohawk College	\$4,208
9	Seneca College	\$4,100
10	George Brown College	\$3,977

Note: 1. Based on NSERC awards database and colleges that had one or more partnership grants with corporate partner(s) during all 5 years between FY2010-FY2014.



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Where Next Happens



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Campus-Linked Accelerators (CLA) and OnCampus Entrepreneurship Activities (OCEA)

• Launched in spring of 2014

• Jobs created or retained: 1,321

• Start ups supported: 938

• 42 colleges and universities engaged in 30 communities across Ontario

On-Campus Entrepreneurship Activities (OCEA)

• Guelph University

• Georgian College

• Northern College

• Humber College

• St. Clair College

• Laurentian University/ Cambrian College/ Collège Boréal

• Conestoga College

• Lambton College

• Brock University

• Seneca College

• George Brown College

• Niagara College

• Mohawk College

• Algoma University/Sault College

• Loyalist College of Applied Arts and Technology

• York University

• Lakehead University/ Confederation College

• La Cité Collégiale

• Canadore College/ Nipissing University

• University of Ontario Institute of Technology/ Durham College/Trent University/Fleming College

Campus-Linked Accelerators (CLA)

• Ottawa: Carleton University, University of Ottawa, Algonquin College

• McMaster University

• Centennial College

• Western University/ Fanshawe College

• OCAD University

• Queen's University

• Ryerson University

• University of Toronto

• University of Waterloo/ Wilfred Laurier University

• University of Windsor

Wanted: Research Partnerships

Continued from page 1

Bombardier has also designated Centennial College in Toronto as the “trainer of choice” for its assembly plant in Downsview ON. “The average age of our shop floor workers is 53 years old,” says Hack. “We’re looking to retain those people but also train a generation of aircraft mechanics for our service organization as well.”

A PROVEN MODEL GOES NATIONAL

Canada's aerospace industry has pioneered a collaborative R&D approach that is attracting international attention. Modelled on the highly successful Consortium for Research and Innovation in Aerospace in Quebec (CRIAQ), the Consortium for Aerospace Research and Innovation in Canada (CARIC) brokers R&D partnerships between industry, universities, colleges and research institutions.

“Since OEMs (original equipment manufacturers) don't compete in Canada, that allows us to work together to develop technology that benefits the whole industry,” says Walter Di Bartolomeo, VP engineering at Pratt & Whitney Canada (P&WC). “And these partnerships extend to SMEs (small- and medium-sized enterprises) who can

develop materials, manufacturing and supply chain logistics – technologies they can offer not to just to P&WC but to any OEM.”

In one CARIC project, P&WC and partners are working to explore how additive manufacturing – also known as 3D printing – can optimize the design of metallic parts to develop more compact jet engines that make airplanes lighter and more fuel efficient.

Last December, P&WC announced that it would invest \$1 billion in R&D over the next four years to develop a new generation of lighter and quieter engines that use less fuel and produce fewer emissions.

“We will take some of the technologies that we have incubated with universities over the last 15 years and start to materialize them into commercial offerings,” including projects developed as part of CRIAQ and CARIC, says Di Bartolomeo.

Similar challenges face automotive companies. Fierce competition, growing consumer demands and tougher regulations put constant pressure on automakers to produce vehicles that are safer, more fuel efficient and less polluting. Brian Tossan, director of Canadian engineering at GM Canada, predicts the sector will see more changes in the

next five years than have occurred in the last 50, driven by technological advances like the “connected car”.

“We've been looking to our research partners, our university partners and our supply base to help us define what the connected car of the future will look like,” says Tossan.

Partnerships extend throughout the supply chain

Much of that research will happen at the company's engineering centre in Oshawa which is in the process of hiring 100 more software and control engineers. GM Canada's 20-year history of collaborating with Southern Ontario universities, and the skilled students these institutions produce, were key factors in the company's decision to expand its Oshawa operations.

To help identify top talent, GM Canada also works with universities to sponsor student competitions, like the EcoCAR, which challenges

competitors to build next-generation vehicles that use alternative fuels.

“By sponsoring these types of competitions we're able to give students and faculty real projects to work on with fundamental deliverables that will result in a working vehicle ... We find those types of interactions have been highly effective in us finding talent that comes to work for General Motors,” says Tossan.

It's not only universities and government labs partnering with industry. Increasingly, companies are turning to colleges and polytechnics when they need a fast solution to an immediate problem.

“We complement what universities do by taking lab-scale results and developing them to a demonstration scale technology or prototype for imminent commercial use,” explains Dr. John Fallavollita, director, Applied Research and Innovation Services (ARIS) at SAIT Polytechnic in Calgary. “If a company comes and says they need this done in four months we can help because we deliver products at the speed of industry.”

Over the past five years, more than 1,250 SAIT students have worked with 1,030 SMEs on 575 research projects to produce nearly 400 prototypes. The numbers are expected to rise with the launch this year of Kinetica Ventures. SAIT will provide the industry-led energy technology

accelerator with prototyping, design, testing and small-scale manufacturing services to help start-ups de-risk and accelerate technology in four areas: hydrocarbon recovery; energy transport; carbon capture, re-use and disposal; and renewable energy.

While low oil prices are driving down production in Alberta, Fallavollita said in a recent interview that this is a perfect time for companies to work with academia on innovations that will help the industry remain profitable and sustainable over the long term. “I'm meeting with COSIA (Canada's Oil Sands Innovation Alliance) this afternoon with one of our staff who leads environmental and energy technology. We're working with COSIA to help them and the companies they represent to cost effectively develop new technologies.”

There's a saying that “the best technology transfer walks on two feet”, referring to the students who learn job-ready skills by working directly with companies on real-world problems. This type of experiential learning is what today's employers need and what more universities and colleges are now offering.

“Part of the key to solving our innovation challenge is to ignite the fire of innovation in the next generation. You do this by giving them problems to solve and allowing them the leeway and opportunity to get creative,” says Dr. Darren Lawless, dean

of undergraduate research at Sheridan College in Oakville Ontario.

Increasingly, that means drawing on expertise from different faculties, including business, marketing and information technology.

“Instead of a company hiring five different people with different skill sets, our research group can pull together a team that looks at addressing a problem from different angles,” says Lawless. “Innovation is not just technology; it's a more holistic approach. What's going to entice someone to reach into their pocket and buy your product?”

IT'S NOT ABOUT THE MONEY

Public-private partnerships leverage more money for R&D, but everyone interviewed for this article insisted the larger cash pie is secondary to the on-the-ground impact such partnerships are having. The rationale is simple: if you want to produce a technology people will use, involve the people who will be responsible for making it, selling it and ultimately using it.

“We used to think we had all the answers,” says Dr. Alain Beaudet, president of the Canadian Institutes of Health Research (CIHR). “But working with partners made me realize we had a lot to learn: are you nimble, are you listening to patients and the people who actually use the

Continued on page 11

PARTNER PERSPECTIVE

Unleashing the Power of the Body’s own Immune System to Fight off Deadly Cancers

Bristol-Myers Squibb Canada






With one in twelve Canadians being diagnosed with lung cancer in his or her lifetime, during this month’s lung cancer awareness month many health care professionals and patient groups are focusing their attention on an innovative therapy that has the potential to bring long term survival to more Canadian patients.

“Immuno-oncology” or “Immunotherapy” represents an innovative approach to cancer research that seeks to harness the body’s own immune system to fight tumor cells. Unlike the traditional approaches to cancer treatment that attack the cancer cell itself – surgery, radiation, chemotherapy and targeted therapy – immunotherapies are drugs that release the natural brakes on the body’s own immune system so it can fight and kill the cancer cells.

Aimed at patients with advanced or metastatic cancer, and acting on the patient’s immune system to restore and eliminate cancer cells, immunotherapy is being tested in multiple tumor types. At the moment, immunotherapy

The Different Types of Cancer Treatment

Traditional cancer treatments are directed towards cancer cells.

<p>Immuno-Oncology</p> 	<p>Chemotherapy</p> 	<p>Radiation</p> 	<p>Surgery</p> 	<p>Targeted therapy</p> 
<p>Immuno-Oncology treatments use your body's own immune system to help fight cancer.</p>	<p>Chemotherapy is the use of medicines that kill cancer cells.</p>	<p>Radiation uses high-energy particles or waves to destroy cancer cells.</p>	<p>Surgery is an invasive procedure that is used to remove tumor tissue in an attempt to reduce cancer cells or improve symptoms in a patient.</p>	<p>Targeted therapy uses drugs or other treatments to more precisely identify and attack cancer cells directly.</p>

treatment options are already available for patients with metastatic melanoma in Canada, with worldwide clinical trials also underway in other tumors such as lung, kidney, bladder, glioblastoma, and certain breast cancers.

Competition in the immunotherapy space is fast and fierce, with numerous pharmaceutical companies engaged in clinical trials in similar tumors. And while the potential of numerous therapies is good news for Canadians

fighting deadly cancers, the Canadian health system will face a challenge in managing and paying for the flow of new treatments the industry will continue to bring to patients.

“Research into innovative cancer

therapies is moving very fast” said Dr. David Hogg, Professor, Department of Medicine, University of Toronto and Attending Physician, Princess Margaret Hospital. “When you consider the speed at which things are evolving, all the different

tumor types and all the possible combinations that can be tested, there are suddenly some really interesting opportunities. Through immunotherapy we may well be looking at a revolution in cancer care in Canada.”

Wanted: Research Partnerships

Continued from page 10

research? Can you do things more efficiently and less bureaucratically? Through our partnerships we learned on all these fronts.”

More than half of CIHR’s funding still goes to early-stage discovery research where it could take decades for the discovery of a new gene, for example, to become a regulatory approved drug. The other half of its grants envelope goes to priority-driven research that addresses more immediate issues, like the health needs of an aging population.

Sometimes those partnerships are between CIHR and the provinces, or between federal agencies. Such was the case with the recent development of a vaccine for Ebola – the result of a collaboration between CIHR, the Public Health Agency of Canada, the International Development Research Centre and the Department of Foreign Affairs, Trade and Development.

“We focused our efforts, energy and funding collectively into a phase 1 trial for a vaccine in Canada using the talent and capacity we already had in the country, and the network for vaccine testing that we had developed a long time ago first dealing with SARS and then H1N1,” says Beaudet.

Based on the success of the phase 1 trial, human trials were launched in Guinea led by the World Health Organization, involving CIHR, PHAC, the governments of Guinea, Médecins Sans Frontières and Britain’s Wellcome Trust charity. Early results this year showed the vaccine protected 100% of trial participants from getting the virus.

At the University Health Network (UHN) in Toronto, it was an expertise in engineering, physics and software that helped commercialize a non-invasive radiosurgery that treats brain disorders without scalpels and incisions. Most patients are in and out of the hospital that same day and back to their normal routines soon after treatment. The underlying software is now part of an imaging device marketed by a Swedish company.

“The device company knows about the marketplace – expertise we wouldn’t necessarily have,” says Dr. Christopher Paige, VP research at UHN and senior scientist at Princess Margaret Cancer Centre.

UHN medical physicists also invented a sensor called an integral quality monitor, which ensures that the correct dose of radiation therapy is safely and precisely given to a tumour. UHN worked with a German company to refine the technology, which is now bringing the product to market.

“You can’t expect to help patients unless at some time along the development of a new discovery you don’t bring the private sector in,” adds Paige. “We’re 100% in favour of merging the interests of the hospital with the interests of the private sector.”

Made-in-Canada

Ebola vaccine

a first

That view is echoed at Innovation York, launched three years ago to provide companies with a single point of entry for York University’s 11 faculties and 24 research institutes and centres in the Greater Toronto Area.

“Innovation York connects people to everything that’s being done at the university,” says Dr. Robert Haché, the university’s VP of research and innovation. “As a result, our research agreements have been growing at about 20% a year over the last three years.”

One of York’s biggest projects is Connected Health and Wellness, involving 19 university, health-care and industry partners, including heavyweights like BlackBerry, Rogers and NexJ Systems. The \$38-million project is integrating mobile, cloud-based computer technology to enable patients – for the first time ever – to access and share their health records with family, friends and care teams.

“York is a leader in what is often termed knowledge mobilization, or the transfer of knowledge from beyond technology-driven disciplines into productive users for society,” says Haché.

Of course, not all research ends up

in a new gadget, therapy or service. One example is communityBUILD, a partnership between York, the ventureLAB regional innovation centre, Seneca College and United Way York Region. Described as “grounded in community, guided by research and driven by entrepreneurship”, the program offers a system of supports to help for-profit social enterprises address regional challenges such as food security and youth employment.

SHARING BUSINESS EXPERTISE WITH SOCIAL ENTERPRISES

Another new project led by the University of Ottawa – Linking natural capital and productivity – is developing new approaches to measuring productivity that take into account the state of the environment. The goal is to examine the link between environmental and economic successes to help governments and industries optimize best practices and develop good policies. Partners include five universities, three federal departments, the Forest Protects Association of Canada and Shell Canada.

“Here you have all these partners working together to find ways to ensure profitability but in ways that are environmentally prudent,” says Dr. Ted Hewitt, president of the Social Sciences and Humanities Research Council of Canada, which funded the three-year study.

He adds that tech transfer needs both partnerships and participation from social scientists to be successful. “Technology has very little value until one contemplates how it will be used. That may include developing business plans or knowledge mobilization plans, or studying precisely how one intends to use a technology.”

As for the role of partners, Hewitt insists it’s a no brainer. “If you want to do knowledge translation and have relevant research you have to have partners. It allows you to get at some of these more sophisticated, difficult and more complicated challenges – and ultimately have a bigger impact in the end.”

Debbie Lawes (Debbie@dover-courteditorial.ca) is an Ottawa-based science writer.

Our commitment to

research that has impact

Dr. Carrie Bourassa, a professor at the First Nations University of Canada, is looking to change the way health care is delivered to Indigenous women infected with HIV/ AIDS and Hepatitis C. Her approach may seem simple – she plans to ask them to share their experiences; it may also result in profound changes in health care delivery, and aid in developing a model for culturally-safe health care in Canada.

Bourassa, an inductee in the Royal Society of Canada, College of New Scholars, Artists and Scientists, in partnership with a community-based team, is leading a Canadian Institutes of Health Research funded initiative that will oversee more than 300 interviews with Indigenous women who have HIV/AIDS or Hepatitis C. The team includes co-principal investigator Margaret Poitras, executive director for All Nations Hope Network; two community-based navigators; and the involvement of groups such as the Canadian Aboriginal AIDS Network (CAAN).

“This is not research that is being done "on" or "to" a community," says Bourassa, who hopes this work will help educate health care providers about the issues, challenges and stories of the women who seek their services.

“The only way we are going to be able to change how care is delivered is if we ask," adds Bourassa. "They are the ones that know."



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Canada's TOP 40 RESEARCH HOSPITALS 2015

Rank		Hospital/Health Authority	Research Activity			Research Intensity		Prov	Research Institute(s)/Centre(s)
			FY2014 \$000	FY2013 \$000	% Change 2013-2014	Researcher** (\$ per Researcher \$000)	Institution (Research \$ as a % of Total Activity)		
2014	2013								
1	1	University Health Network	\$303,100	\$298,200	1.6	\$550.1	15.5	ON	Princess Margaret Cancer Centre, Toronto General Research Institute, Toronto Rehabilitation Institute, Toronto Western Research Institute, Techna Institute
2	2	Hamilton Health Sciences	\$212,017	\$182,101	16.4	\$441.7	16.5	ON	Population Health Research Institute, Thrombosis and Atherosclerosis Res. Institute, Escarpment Cancer Research Institute
3	3	The Hospital for Sick Children	\$199,927	\$174,916	14.3	\$331.6	25.6	ON	Peter Gilgan Centre for Research and Learning
4	4	McGill University Health Centre (MUHC)	\$190,309	\$175,554	8.4	\$530.1	17.8	QC	Research Institute of the MUHC
5	6	Provincial Health Services Authority*	\$142,381	\$128,101	11.1	\$193.5	5.2	BC	BC Cancer Research Centre, BC Children's Hospital - Child & Family Research Institute, BC Centre for Disease Control
6	7	Vancouver Coastal Health Authority*	\$124,057	\$117,971	5.2	\$298.2	3.9	BC	Vancouver Coastal Health Research Institute, Providence Health Care Research Institute
7	5	The Ottawa Hospital	\$123,691	\$129,800	-4.7	\$332.5	9.1	ON	The Ottawa Hospital Research Institute, The Ottawa Heart Institute Research Corporation
8	8	London Health Sciences Centre/St. Joseph's Health Care London ^(a)	\$113,381	\$114,211	-0.7	\$197.2	7.1	ON	Lawson Health Research Institute
9	11	Sunnybrook Health Sciences Centre	\$94,215	\$81,224	16.0	\$329.4	9.7	ON	Sunnybrook Research Institute, Sunnybrook Research Academy
10	9	Mount Sinai Hospital, Joseph and Wolf Lebovic Health Complex ⁺	\$88,296	\$103,493	-14.7	\$663.9	17.8	ON	Lunenfeld-Tanenbaum Research Institute
11	10	CHU de Québec - Université Laval*	\$85,457	\$84,113	1.6	\$240.0	6.9	QC	Centre de recherche du CHU de Québec - Université Laval
12	13	St. Michael's Hospital	\$69,342	\$62,688	10.6	\$335.0	10.9	ON	Keenan Research Centre for Biomedical Science, Li Ka Shing Knowledge Institute
13	12	Centre hospitalier de l'Université de Montréal (CHUM)	\$66,029	\$66,143	-0.2	\$181.4	6.9	QC	Centre de recherche du CHUM
14	14	Sir Mortimer B. Davis Jewish General Hospital ⁺	\$61,129	\$59,856	2.1	\$252.6	13.1	QC	Lady Davis Institute for Medical Research
15	15	Centre for Addiction and Mental Health	\$57,269	\$49,658	15.3	\$540.3	15.3	ON	Campbell Family Mental Health Research Institute, Research Imaging Centre, Temerty Centre for Therapeutic Brain Intervention
16	17	Institut de Cardiologie de Montréal	\$54,320	\$57,344	-5.3	\$705.5	26.0	QC	Centre de recherche de l'Institut de Cardiologie de Montréal
17	16	CHU Sainte-Justine	\$39,333	\$40,260	-2.3	\$193.8	9.1	QC	Centre de recherche du CHU Sainte-Justine
18	19	Institut universitaire de cardiologie et de pneumologie de Québec - Université Laval	\$33,924	\$33,347	1.7	\$230.8	11.9	QC	Centre de recherche de l'Institut universitaire de cardiologie et de pneumologie de Québec
19	21	St. Joseph's Healthcare Hamilton	\$27,952	\$26,406	5.9	\$188.9	5.2	ON	Firestone Institute for Respiratory Health, Programs for Assessment of Technology in Health (PATH) Research Institute, Peter Boris Centre for Additions Research, Boris Family Centre of Robotic Surgery, Hamilton Centre for Kidney Research
20	22	Winnipeg Regional Health Authority (WRHA) ^(b)	\$27,090	\$24,742	9.5	\$118.8	1.5	MB	Children's Hospital Research Institute of Manitoba
21	20	Children's Hospital of Eastern Ontario	\$24,209	\$27,627	-12.4	\$128.8	9.0	ON	CHEO Research Institute
22	23	Douglas Mental Health University Institute ⁺	\$22,522	\$21,358	5.4	\$417.1	15.6	QC	Douglas Hospital Research Centre
23	24	Institut universitaire en santé mentale de Québec ⁺	\$19,754	\$19,347	2.1	\$299.3	14.2	QC	Centre de recherche de l'Institut universitaire en santé mentale de Québec
24	28	Capital District Health Authority ⁺	\$19,049	\$17,368	9.7	\$76.2	1.9	NS	
25	18	Centre hospitalier universitaire de Sherbrooke (CHUS) ⁺	\$18,290	\$16,878	8.4	\$81.7	3.6	QC	Centre de recherche du CHUS (CRCHUS)
26	25	Hôpital Maisonneuve-Rosemont ⁺	\$16,891	\$14,122	19.6	\$203.5	4.0	QC	Centre de recherche de l'Hôpital Maisonneuve-Rosemont
27	26	Baycrest	\$16,855	\$18,975	-11.2	\$581.2	10.6	ON	Rotman Research Institute, Kunin-Lunenfeld Applied & Evaluative Research Unit
28	27	Kingston General Hospital	\$16,331	\$16,885	-3.3	\$89.2	3.7	ON	Kingston General Hospital Research Institute
29	30	St. Boniface Hospital	\$15,596	\$12,896	20.9	\$389.9	4.3	MB	St. Boniface Hospital Research Centre
30	29	IWK Health Centre	\$14,080	\$15,000	-6.1	\$140.8	5.2	NS	Biomedical Translational Imaging Centre, Canadian Center for Vaccinology, Centre for Pediatric Pain Research, Centre for Research in Family Health, Maritime Human Genetics Research Centre
31	31	Women's College Hospital	\$12,155	\$9,479	28.2	\$347.3	10.0	ON	Women's College Research Institute
32	32	Hôpital du Sacré-Coeur de Montréal ⁺	\$10,879	\$10,273	5.9	\$78.8	3.0	QC	Centre de recherche de l'Hôpital du Sacré-Coeur de Montréal
33	36	Holland Bloorview Kids Rehabilitation Hospital	\$9,038	\$7,079	27.7	\$430.4	11.2	ON	Bloorview Research Institute
34	34	Institut universitaire de gériatrie de Montréal ⁺	\$7,749	\$7,508	3.2	\$138.4	11.9	QC	Centre de recherche de l'Institut universitaire de gériatrie de Montréal
35	37	Thunder Bay Regional Health Sciences Centre	\$7,597	\$7,295	4.1	\$135.7	2.4	ON	Thunder Bay Regional Research Institute
36	40	Health Sciences North (HSN)	\$7,401	\$7,654	-3.3	\$92.5	1.7	ON	Advanced Medical Research Institute of Canada
37	35	Saskatoon Regional Health Authority*	\$7,157	\$7,433	-3.7	\$30.2	0.6	SK	Saskatoon Centre for Patient-Oriented Research, Cameco MS Neuroscience Research Center
38		Hôpital Montfort	\$6,626	\$5,899	12.3	\$147.2	3.1	ON	Institut de recherche de l'Hôpital Montfort
39	33	The Royal	\$6,319	\$5,773	9.5	\$92.9	4.0	ON	University of Ottawa Institute of Mental Health Research
40	38	Bruyère Continuing Care	\$6,071	\$6,439	-5.7	\$202.4	4.4	ON	Bruyère Research Institute

Notes:

- Data were obtained through a survey of research hospitals or from financial statements. Information for Alberta Health Services and Newfoundland was not available. Information for Ontario was coordinated in part through CAHO (Council of Academic Hospitals of Ontario).
- Research activity includes all income/expenditure (direct and indirect) received/spent from all sources (internal and external) to support research. Some hospitals (indicated with an asterisk *) provided research income data. Other institutions provided research expenditure data.
- FY2013 figures may have been adjusted as more accurate information became available.
- Data are provided for the main hospital(s) including their affiliated hospitals and research institutes/centres, where applicable.

*Reported research income data.

**Based on a head count of researchers/scientists/investigators/clinician-researchers conducting research. Does not include research fellows/post docs, technicians, students or support staff.

^(a) Not current name

^(b) Research expenditure amounts were combined as these hospitals have one research institute.

^(c) Data for St. Boniface Hospital are not included with WRHA.

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CANADA'S TOP 40 Research Hospitals

HOSPITAL RESEARCH RESOURCES GAIN

Research activity at Canada's Top 40 Research Hospitals rose by a combined 5.0% in Fiscal 2014. Hospitals, Hospital Networks and Health Authorities reported that their research expenditures (or in 4 instances, research income) increased to \$2.38 billion from \$2.27 billion in Fiscal 2013. (Detailed data for Alberta hospitals, which were not available in time for publication, would have added \$165 million to the total.) The number of hospital researchers increased by 4.5% to 8,572 from 8,205 the prior year. New to the Top 40 list this year is Ottawa's Hôpital Montfort.

The country's largest hospital research performer was Toronto's University Health Network, which reported \$303.1 million of spending on research, up 1.6% from Fiscal 2013. Hamilton Health Sciences occupies 2nd place with \$212.0 million of spending, an increase of 16.4%. The Hospital for Sick Children took third place with spending of \$199.9 million, up 14.3% on the year prior. With \$190.3 million of spending (up 8.4%) McGill University Health Centre captured 4th place on the Top 40 list, followed by B.C.'s Provincial Health Services Authority at \$142.4 million, up 11.1%. In total, 27 institutions reported activity gains against 13 where activity declined.

RESEARCH INTENSITY

Research Infosource measures research intensity in two ways: by researcher (research income/expenditure per researcher), and by institution (institution research activity as a percent of total institution income/expenditure). Institut de Cardiologie de Montréal (ICM) posted the highest level of researcher-intensity with \$705,500 of expenditure per researcher. Next was Mount Sinai Hospital, Joseph and Wolf Lebovic Health Complex (\$663,900), Baycrest (\$581,200), University Health Network (\$550,100), and Centre for Addiction and Mental Health (\$540,300).

Measured by institutional intensity (proportion of total activity that research comprises – i.e. institution budget), Institut de Cardiologie de Montréal ranked

The \$100 Million Club		
2014 Rank	Research Hospital	Research Activity \$000
1	University Health Network	\$303,100
2	Hamilton Health Sciences	\$212,017
3	The Hospital for Sick Children	\$199,927
4	McGill University Health Centre (MUHC)	\$190,309
5	Provincial Health Services Authority*	\$142,381
6	Vancouver Coastal Health Authority*	\$124,057
7	The Ottawa Hospital	\$123,691
8	London Health Sciences Centre/ St. Joseph's Health Care London ^(a)	\$113,381

highest among the Top 40, with research activity at 26.0% of total hospital expenditure. ICM narrowly displaced last year's leader, The Hospital for Sick Children (25.6% intensity). McGill University Health Centre and Mount Sinai Hospital, Joseph and Wolf Lebovic Health Complex were tied at 17.8% intensity.

THE \$100 MILLION CLUB

With activity topping \$100 million each, 8 hospitals gained membership in Research Infosource's \$100 Million Club, compared with 9 hospitals the year before. Combined activity among the 8 Club members expanded by 6.7%, to \$1.41 billion, slightly above the 5.0% all-institution increase. Club members accounted for 59.3% of the Top 40 total research activity.

PROVINCIAL PERFORMANCE

The province of Ontario had half the nation's total – 20 of the Top 40 Research Hospitals – and accounted for 59.0% of total national research activity, about the same as last year. Quebec's 13 institutions comprised 26.4%

Top 40 – Leading Provinces	
Province	% of Total
Ontario (20)	59.0
Quebec (13)	26.4
British Columbia (2)	11.2

of the total, followed by 2 British Columbia members of the Top 40, which accounted for 11.2% of total activity. From a provincial standpoint, growth was strongest in Manitoba, where activity at 2 reporting institutions increased by 13.4%. Gains were also stronger than the national trend in British Columbia (up 8.3%) and Ontario (up 4.9%).

PERFORMANCE BY TYPE

Research Infosource's Top 40 Research Hospitals list is in fact an amalgam of 3 types of institutions: stand-alone Hospitals, Hospital Networks and Health Authorities. There are 22 Hospitals on the Top 40 list, accounting for a combined \$759.9 million of research activity and a total 6.9% year-on-year increase. Hospital Networks include 13 organizations with \$1.3 billion of research, up 3.1% on Fiscal 2013. The Top 40 also includes 5 Health Authorities, which reported \$319.7 million of research, an increase of 8.2%.

RESOURCE GROWTH

Eleven of the Top 40 hospitals recorded research growth in double-digits. Research activity at Toronto's Women's College Hospital increased by 28.2%, followed by Holland Bloorview Kids Rehabilitation Hospital (up 27.7%), St. Boniface Hospital (up 20.9%), Hôpital Maisonneuve-Rosemont (up 19.6%), and Hamilton Health Sciences (up 16.4%).

THIS YEAR AND NEXT

Research activity among the Top 40 (expenditure or income) rose by 5.0% from last year, a substantial improvement over the 1.1% gain in Fiscal 2013. As with universities and colleges, a high portion of

Spotlight on Hospital Research Intensity			
TOP RESEARCHER-INTENSIVE ORGANIZATIONS			
Rank	Large Hospitals	Researcher Intensity (\$ per Researcher**) \$000	
1	University Health Network	\$550.1	
2	McGill University Health Centre (MUHC)	\$530.1	
3	Hamilton Health Sciences	\$441.7	
Rank	Mid-sized Hospitals	Researcher Intensity (\$ per Researcher**) \$000	
1	Mount Sinai Hospital, Joseph and Wolf Lebovic Health Complex [†]	\$663.9	
2	St. Michael's Hospital	\$335.0	
3	The Hospital for Sick Children	\$331.6	
Rank	Small Hospitals	Researcher Intensity (\$ per Researcher**) \$000	
1	Institut de Cardiologie de Montréal	\$705.5	
2	Baycrest	\$581.2	
3	Centre for Addiction and Mental Health	\$540.3	
TOP INSTITUTION-INTENSIVE ORGANIZATIONS			
Rank	Large Hospitals	Institution Intensity (Research \$ as % of Total Activity)	
1	McGill University Health Centre (MUHC)	17.8	
2	Hamilton Health Sciences	16.5	
3	University Health Network	15.5	
Rank	Mid-sized Hospitals	Institution Intensity (Research \$ as % of Total Activity)	
1	The Hospital for Sick Children	25.6	
2	Mount Sinai Hospital, Joseph and Wolf Lebovic Health Complex [†]	17.8	
3	Sir Mortimer B. Davis Jewish General Hospital [†]	13.1	
Rank	Small Hospitals	Institution Intensity (Research \$ as % of Total Activity)	
1	Institut de Cardiologie de Montréal	26.0	
2	Douglas Mental Health University Institute	15.6	
3	Centre for Addiction and Mental Health	15.3	

hospital research funding comes from public sector sources – primarily federal and provincial governments. However, hospitals typically receive more of their research resources from private sources – non-profit organizations and individual donors.

One is ever hopeful, but given the current challenge to government budgets at all levels, it is hard to envisage any large expansion of resources next year. From that standpoint, steady-as-she-goes would be a positive outcome.

Notes:
1. Large hospitals = total income/expenditure of \$1 billion or more; Mid-sized = total income/expenditure between \$400 million and \$1 billion; Small = total income/expenditure of \$400 million or less.
2. Research activity includes all income/expenditure (direct and indirect) received/spent from all sources (internal and external) to support research.
*Reported research income data.
**Based on a head count of researchers/scientists/investigators/clinician-researchers conducting research. Does not include fellows/post docs, technicians, students or support staff.
†Not current name
(a) Research expenditure amounts were combined as these hospitals have one research institute.
(b) Data for St. Boniface Hospital are not included with WRHA.

Top 10 Research Hospitals by Growth			
2014 Rank			
Activity Growth	Overall	Research Hospital	% Change 2013-2014
1	31	Women's College Hospital	28.2
2	33	Holland Bloorview Kids Rehabilitation Hospital	27.7
3	29	St. Boniface Hospital	20.9
4	26	Hôpital Maisonneuve-Rosemont [†]	19.6
5	2	Hamilton Health Sciences	16.4
6	9	Sunnybrook Health Sciences Centre	16.0
7	15	Centre for Addiction and Mental Health	15.3
8	3	The Hospital for Sick Children	14.3
9	38	Hôpital Montfort	12.3
10	5	Provincial Health Services Authority*	11.1

Spotlight on Research Activity by Type								
RESEARCH ACTIVITY BY TYPE OF HEALTH INSTITUTION								
Rank	Hospitals	Research Activity \$000	Rank	Hospital Networks	Research Activity \$000	Rank	Health Authorities	Research Activity \$000
1	The Hospital for Sick Children	\$199,927	1	University Health Network	\$303,100	1	Provincial Health Services Authority*	\$142,381
2	Sunnybrook Health Sciences Centre	\$94,215	2	Hamilton Health Sciences	\$212,017	2	Vancouver Coastal Health Authority*	\$124,057
3	St. Michael’s Hospital	\$69,342	3	McGill University Health Centre (MUHC)	\$190,309	3	Winnipeg Regional Health Authority (WRHA) ^(b)	\$27,090

PARTNER PERSPECTIVE

Making Canada Healthier, Wealthier, Smarter



Karen Michell
Executive Director,
Council of Academic Hospitals of
Ontario (CAHO)

Congratulations to all the research hospitals named in the 2015 Top 40 list. The Council of Academic Hospitals of Ontario (CAHO) represents Ontario's 24 research hospitals. We see every day how our members make important contributions to our health care system, making Ontario – and Canada – healthier, wealthier and smarter. Core to their mission, research hospitals across the country strive for bolder ideas, bigger discoveries, better treatment and

faster cures, all while stimulating our country's economy and attracting and retaining the brightest and best minds from around the world. In the past year alone, CAHO members have brought 77 health technology commercializations from the lab bench to the patient bedside. By translating research into marketable health products, CAHO member hospitals are not only generating revenue and investment, they are expediting new treatments and delivering better quality care to patients who need it today. From stem cell basic science that is on the cusp of discoveries related to diabetes, heart disease and certain types of blindness, to clinical trials that has put a patient with Mantle Cell Lymphoma into remission after being told she had 2-5 years to live, to patient-informed research that has led to technological developments

for children with disabilities, health research is having a direct and real impact everyday. As Ontario and Canada strengthens our respective role as a global health leader, through the imperative work being done in Canada led by the research hospitals on the Top 40 list, we need a shared vision for health research. This requires a collaborative approach that brings together government, health care organizations, academic facilities and industry. We need to build partnerships that sustain Canada's health research enterprise. A healthy research ecosystem can only be sustained by a strong vision, investment, support and collaboration. When bright minds collaborate, even the unimaginable becomes deliverable. Learn more at www.healthierwealthiersmarter.com and join the #onHWS dialogue on Twitter.

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November 6, 2015									
Canada's TOP 50 RESEARCH COLLEGES 2015									
Rank		College	Research Income			Faculty*	Research Intensity		
2014	2013		FY2014 \$000	FY2013 \$000	% Change 2013-2014	2013-2014 #	\$ per Faculty \$000	Prov	Main Research Institute/ Centre/Facility
1	3	George Brown College	\$14,227	\$9,269	53.5	138	\$103.1	ON	Food & Innovation Research Studio
2		Cégep de Saint-Hyacinthe	\$9,365	\$8,943	4.7	107	\$87.5	QC	Groupe CTT/CTT Group
3	5	SAIT Polytechnic	\$7,202	\$6,602	9.1	61	\$118.1	AB	Green Building Technology Access Centre
4	4	Cégep de la Gaspésie et des îles	\$7,090	\$6,665	6.4	47	\$150.9	QC	TechnoCentre éolien
5	1	British Columbia Institute of Technology	\$7,040	\$15,240	-53.8	120	\$58.7	BC	Building Science Centre of Excellence
6	7	Cégep Édouard-Montpetit	\$6,206	\$5,441	14.1	43	\$144.3	QC	Centre technologique en aérospatiale
7	35	Cégep de La Pocatière	\$5,622	\$1,513	271.6	35	\$160.6	QC	Solutions Novika
8	6	Red River College	\$5,581	\$5,821	-4.1	64	\$87.2	MB	Technology Access Centre - Aerospace & Manufacturing
9	9	Sheridan College	\$5,497	\$4,270	28.7	57	\$96.4	ON	Screen Industries Research & Training Centre (SIRT)
10	12	Niagara College	\$5,340	\$4,036	32.3	75	\$71.2	ON	Canadian Food & Wine Institute Innovation Centre
11	17	Lambton College	\$5,292	\$3,108	70.3	29	\$182.5	ON	Centre of Excellence in Energy and Bio-Industrial Technologies
12	13	Centennial College	\$5,234	\$3,941	32.8	83	\$63.1	ON	Applied Research, Innovation and Entrepreneurship Services (ARIES)
13	11	Cégep de Trois-Rivières	\$4,256	\$4,057	4.9	42	\$101.3	QC	Centre de métallurgie du Québec
14	10	Yukon College	\$4,184	\$4,256	-1.7	10	\$418.4	YT	Yukon Research Centre
15	14	Cégep André-Laurendeau	\$3,976	\$3,563	11.6	13	\$305.8	QC	OPTECH
16	16	Cégep de Thetford	\$3,787	\$3,211	17.9	40	\$94.7	QC	OLEOTEK and Centre de Technologie Minérale et de Plasturgie
17	22	Mohawk College	\$3,492	\$2,434	43.5	25	\$139.7	ON	iDeaWORKS
18	15	Cégep de Lévis-Lauzon	\$3,453	\$3,401	1.5	33	\$104.6	QC	TransBIOTech
19	28	Nova Scotia Community College	\$3,438	\$2,013	70.8	52	\$66.1	NS	Applied Geomatics Research Centre
20	33	Collège communautaire du Nouveau-Brunswick	\$2,892	\$1,723	67.8	23	\$125.7	NB	Centre pré-commercial de technologies en bioprocédés
21	27	Olds College	\$2,812	\$2,018	39.3	29	\$97.0	AB	Olds College Centre for Innovation
22	21	Cégep de Saint-Jérôme	\$2,811	\$2,515	11.8	24	\$117.1	QC	Centre de développement des composites du Québec
23	8	Seneca College	\$2,745	\$4,356	-37.0	68	\$40.4	ON	Centre for Development of Open Technology
24	31	Algonquin College	\$2,379	\$1,881	26.5	71	\$33.5	ON	Design Centre
25	32	Collège Shawinigan	\$2,337	\$1,842	26.9	15	\$155.8	QC	Centre National en Électrochimie et en Technologies Environnementales
26	26	Collège de Maisonneuve	\$1,964	\$2,150	-8.7	10	\$196.4	QC	Centre d'études des procédés chimiques du Québec
27	34	Cégep de Sainte-Foy	\$1,926	\$1,549	24.3	30	\$64.2	QC	Centre d'enseignement et de recherché en foresterie de Sainte-Foy
28	23	Justice Institute of British Columbia	\$1,792	\$2,413	-25.7	22	\$81.5	BC	Centre for Resilient Communities
29	38	Red Deer College	\$1,753	\$1,388	26.3	90	\$19.5	AB	Centre for Innovation in Manufacturing
30	18	La Cité ^(a)	\$1,704	\$3,034	-43.8	20	\$85.2	ON	Centre d'accès à la technologie en bio-innovation
31	24	Humber College	\$1,676	\$2,393	-30.0	73	\$23.0	ON	Centre for Urban Ecology
32	19	Grande Prairie Regional College	\$1,649	\$2,962	-44.3	19	\$86.8	AB	National Bee Diagnostic Centre - Technology Access Centre
33	37	Camosun College	\$1,612	\$1,397	15.4	17	\$94.8	BC	Camosun Technology Access Centre
34	36	Cambrian College	\$1,564	\$1,490	5.0	33	\$47.4	ON	Glencore Centre for Innovation
35	29	Fleming College	\$1,492	\$1,934	-22.9	33	\$45.2	ON	Centre for Alternative Wastewater Treatment
36	25	Durham College	\$1,455	\$2,282	-36.2	31	\$46.9	ON	Applied Minerology Lab
37	41	College of the North Atlantic	\$1,293	\$1,107	16.8	23	\$56.2	NL	
38	20	Lakeland College	\$1,178	\$2,613	-54.9	8	\$147.3	AB	
39	46	Holland College	\$1,140	\$969	17.6	26	\$43.8	PE	
40	40	Saskatchewan Polytechnic	\$1,121	\$1,281	-12.5	65	\$17.2	SK	Saskatchewan Polytechnic BioScience Applied Research Centre
41	44	Cégep de Sherbrooke	\$1,088	\$1,073	1.4	40	\$27.2	QC	Centre de productique intégrée du Québec
42	45	Lethbridge College	\$970	\$1,026	-5.5	15	\$64.7	AB	Centre for Applied Research and Innovation
43	48	Cégep de Sept-Îles	\$964	\$878	9.8	22	\$43.8	QC	Institut technologique de maintenance industrielle
44	39	Cégep de Rimouski	\$955	\$1,293	-26.1	16	\$59.7	QC	Service de recherche et d'expertise en transformation des produits forestiers
45	30	Conestoga College	\$939	\$1,903	-50.7	92	\$10.2	ON	Centre for Smart Manufacturing
46	47	Dawson College	\$912	\$957	-4.7	22	\$41.5	QC	Centre de recherche pour l'inclusion scolaire et professionnelle des étudiants en situation de handicap
47	43	St. Lawrence College	\$695	\$1,080	-35.6	15	\$46.3	ON	Sustainable Energy Applied Research Centre
48		College of New Caledonia	\$660	\$348	89.7	12	\$55.0	BC	CNC Research Forest
49	50	Fanshawe College	\$617	\$768	-19.7	42	\$14.7	ON	Centre for Sustainable Energy & Environments
50		Cégep régional de Lanaudière	\$611	\$422	44.8	25	\$24.4	QC	Centre d'expertise et de formation en design industriel
<div>Notes:</div> <div>1. Research income includes all funds (direct and indirect) to support applied and scholarly research received from all sources (internal and external).</div> <div>2. Data were obtained through a survey of publicly-funded colleges and from financial statements.</div> <div>3. Data are provided for the main college including affiliated research institutes/centres, where applicable.</div> <div>4. FY2013 figures may have been adjusted as more accurate information became available.</div> <div>*Head count of faculty/teaching staff and/or dedicated researchers conducting research. Does not include support staff or student researchers.</div> <div>^(a) Formerly named La Cité collégiale</div> <div>RESEARCH Infosource Inc. is Canada's source of R&D intelligence. For further information visit www.researchinfosource.com or call (647) 345-3434 ext 22.</div> <div>© RESEARCH Infosource Inc. 2015. Unauthorized reproduction prohibited.</div>									

CANADA'S TOP

50

RESEARCH COLLEGES

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CANADA'S INNOVATION LEADERS

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CANADA’S TOP 50 Research Colleges

RESEARCH TRAJECTORY SLOWING

Growth in research activity at Canada’s Top 50 Research Colleges cooled substantially in Fiscal 2014, posting a 4.7% increase compared with a 38.8% expansion in Fiscal 2013. Combined research income reached \$158.0 million, compared with \$150.8 million the previous year. In total 31 colleges reported gains in research income while 19 colleges reported declines. Because the number of college faculty engaged in research increased by 14.3%, year-on-year research intensity (income per faculty) declined by -8.3%, to \$75,054 from \$81,883.

George Brown College headed the Top 50 list, attracting \$14.2 million of research income last year, with year-on-year growth reaching 53.5%. Cégep de Saint-Hyacinthe recorded about \$9.4 million of income, followed by SAIT Polytechnic at \$7.2 million. Rounding out the top 10 were Cégep de la Gaspésie et des Îles (\$7.1 million), British Columbia Institute of Technology (\$7.0 million), Cégep Édouard-Montpetit (\$6.2 million), Cégep de La Pocatière (\$5.6 million), Red River

College (\$5.6 million), Sheridan College (\$5.5 million), and Niagara College (\$5.3 million).

PROVINCIAL PERFORMANCE

Provincially, Québec’s 17 colleges accounted for a total of \$57.3 million of research income and 36.3% of total Top 50 activity. With 16 colleges, Ontario posted income of \$54.3 million and accounted for 34.4% of national activity. Colleges in all other provinces/territories combined accounted for 29.2% of national income.

Among the 4 leading provinces with more than 1 college reporting, average per-college income was highest in Ontario (\$3.40 million), Québec (\$3.37 million), British Columbia (\$2.78 million) and Alberta (\$2.59 million). (Note that Alberta’s results were affected because NAIT and Bow Valley College did not participate in this year’s survey.)

INCOME GROWTH LEADERS

In spite of the modest national result (4.7% increase) many colleges exhibited very strong rates of growth in income last year. Income grew by 271.6% at Cégep de La Pocatière, 89.7% at College of New Caledonia, 70.8% at Nova Scotia Community College, 70.3% at Lambton College and 67.8% at Collège communautaire du Nouveau-Brunswick.

RESEARCH INTENSITY

Average Top 50 research intensity – research income per faculty – declined by -8.3% last year, to \$75,054. Research intensity was highest at Yukon College (\$418,400 per faculty), followed by Cégep André-Laurendeau (\$305,800 per faculty) and Collège de Maisonneuve (\$196,400 per faculty). Overall, 25 of the 50 research colleges posted research intensities higher than the national average.

RESEARCH PARTNERSHIPS AND PROJECTS

A key metric for college research is the number of active and completed formal research partnerships and projects that colleges have with external organizations. This year the Top 50 Research Colleges reported a total of 2,093 active research partnerships, compared with 1,810 in Fiscal 2013. Similarly, they tallied 2,021 completed projects compared with 1,782 the year before.

THIS YEAR AND NEXT

This is the third year in which Research Infosource has reported on college research activity. We thank all the participating colleges for their cooperation in providing the data that help us to track national trends. As previously indicated, total Fiscal 2014 research income expanded by 4.7%, which was well below the 38.8% growth seen in Fiscal 2013 and the 35.4% growth in Fiscal 2012. On the positive side, the number of college faculty engaged in research expanded by 14.3%. Active research partnerships grew by 15.6% and completed projects expanded by 13.4%.

Why the reduced rate of income growth, which admittedly is only one measure of research activity? It is possible (though not likely) that external funders – primarily governments and the private sector – reduced the amounts of money available for college research.

Spotlight on College Research Activity

TOP COLLEGES BY # OF PARTNERSHIPS*

Partnerships			Partnerships			Partnerships		
Rank	Large Colleges	#	Rank	Mid-sized Colleges	#	Rank	Small Colleges	#
1	George Brown College	159	1	Cégep de Trois-Rivières	137	1	Cégep de La Pocatière	125
2	Algonquin College	135	2	Cégep de Saint-Hyacinthe	75	2	Cégep de Thetford	98
3	Sheridan College	122	3	Cégep Édouard-Montpetit	60	3	Collège Shawinigan	57

TOP COLLEGES BY # OF COMPLETED PROJECTS*

Completed Projects			Completed Projects			Completed Projects		
Rank	Large Colleges	Projects #	Rank	Mid-sized Colleges	Projects #	Rank	Small Colleges	Projects #
1	Sheridan College	225	1	Cégep de Trois-Rivières	133	1	Cégep de La Pocatière	173
2	George Brown College	182	2	Cégep Édouard-Montpetit	71	2	Cégep de Thetford	92
3	Algonquin College	170	3	Collège communautaire du Nouveau-Brunswick	58	3	Cégep de la Gaspésie et des Îles	61

Notes: Large college = total income of \$100 million or more; Mid-sized = total income between \$50 million and \$100 million; Small = total income of \$50 million or less.
*Research partnerships and completed projects with external organizations in FY2013-2014 that were governed by formal written agreements. Includes research contracts and collaborative research agreements. Does not include research grants.

Or perhaps the college research model has harvested the low hanging fruit and may need to evolve in the future in order to sustain prior levels of growth. Unlike their university counterparts, college faculty generally do not have a research mandate; they are hired primarily to teach. Colleges are thus required to hire additional teaching personnel to fill in for college staff who secure research funds, a situation that creates program delivery inefficiencies. Another barrier is that colleges do not have a cadre of graduate students to do the research legwork in a sustained way. College students do an admirable job, but their time is limited compared with that of a university graduate student. Another factor might be the relative

absence of infrastructure to support additional research. Other considerations may also be at play. This year’s Top 50 Research Colleges results should encourage colleges and funders to consider future prospects and examine barriers and opportunities to growing college research.

There is no doubt that college research – typically applied in nature – fills an important space in Canada’s national research agenda. Colleges and funders are both eager to expand their role. There is a willing group of companies, government departments, community groups and others interested in working with colleges. The coming year is a good time to establish a new action plan to move the sector forward.



Pride in Partnership

Red River College is proud to lead the nation in partnership growth for 2015. Here, we understand that partnerships open doors, and innovation impacts return on investment.

Partner with us today at rrc.ca/appliedresearch

 RED RIVER COLLEGE

THE DIFFERENCE IS HERE

Barn Raising the Innovation Economy



Robert Luke, Ph.D.
Vice President, Research and Innovation
George Brown College

Of the many useful things I learned growing up in Saskatchewan, two in particular stand out as relevant to Canada’s research and innovation ecosystem. The first is the importance of cooperation. The second is the weather.

Cooperation is the cornerstone of community building on the prairies, as anywhere really. I learned from a young age that when your neighbour is building a barn, everyone

pitches in to help. “Collaborating to compete together” has real meaning: working together we create vibrant communities and resilient regional economies that amplify complementary strengths and common goals.

This form of “cooperation” defines how various actors in the research and innovation ecosystem work together. Where once we might have seen these actors try to upstage each other in a scramble for money and attention, we now see cooperation to achieve increased academic and industrial innovation and productivity.

There can be little debate about the need to increase business investment in research and development (R&D). We have too little firm spending on R&D (and new equipment and training for that matter). This translates into poor industrial productivity and innovation capacity.

For academic productivity, we are excellent in our ability to perform basic science. We need to start focusing more on leveraging and translating our basic research into practical

applications for social and economic good. Successive expert panels have all identified a systematic failure in this country to capitalize on the basic research capacity of our world leading research institutions.

Countries like Canada, with economies dependent on resource extraction industries, need to start adding value to the raw resources we extract. Basic research with little or no focus on application or commercialization becomes just one more example of how Canada exports raw commodities (in this case ideas) without adding value (commercialization of these ideas).

Polytechnics and Colleges like George Brown work with many university scientists. We help them produce PhDs, patents, publications and products, just as easily as we work with industry to get new products and services to market. Here are some examples.

In 2012, the GBC Food Innovation & Research Studio (FIRS) collaborated with scientists at Mount Sinai

Hospital / University of Toronto and Ryerson University to help test whether eating cheese fortified with Vitamin D could affect the levels of the vitamin in the body. Over the course of the study we recruited 120 students, staff, and faculty who volunteered to eat pizza – topped with Vitamin D fortified mozzarella – once a week for 8 weeks in a double-blind randomized trial. Our food scientists and chefs were able to design an optimal and delicious Italian style pizza and produce over 100 pizzas every week for 8 weeks. Leaving aside the difficulty we may or may not have had in recruiting volunteers, we were approached to participate in the study because we offered these scientists complementary expertise to help them test their hypothesis.

This project showcases a unique recipe that blended basic and applied research. The findings provide scientific support for commercialization of vitamin D fortified cheese, showing that Vitamin D3 is safe and metabolically available from

fortified mozzarella cheese, even after being cooked.

Applied research at George Brown supports firms in a range of industries from construction and Building Information Modeling through to prototyping and food product development. Companies often access more than one academic partner in their engagement with industry-academic partnerships. One such company is Clear Blue Technologies. Their “smart off-grid” street light uses solar panels and wind turbines to power street lights, networked through wireless technologies to provide cost effective and green power solutions for lights, traffic cameras and signs. The company received support from MaRS and Centennial College; at George Brown our Advanced Prototyping Lab helped take the product from prototype to production manufacturing. A graduate student from Ryerson University was also employed on the project. By working together and leveraging complementary strengths we have collectively helped propel the company from idea to invoice.

And so the weather.

Talking about the weather is a national past time, but it very nearly passes for religion on the prairies. Perhaps this is because so much of the growing season is determined by the whims of nature. Being able to talk about the weather is what is most important – predicting it, observing and commenting on it, lamenting it. The weather is something we all have in common. In this sense, weather talk is an important social lubricant, an expression of our commonality and shared experience in place.

And this is the point. Like the weather, innovation is a social activity. While innovation may involve a technical challenge, it requires us to recognize common goals and to socialize and realize we are stronger when we work together.

Place matters when it comes to innovation. By integrating the harmonizing strength of regional college, polytechnic, and university capacity, and linking this with industry, we can evolve the Canadian economy. Together we can ensure graduates from across the credential spectrum understand innovation, and can work together to stand up the innovation economy.



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Ranked #1 in College Research 2015*

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georgebrown.ca/research



*Ranking by RESEARCH Infosource, 2015

PARTNER PERSPECTIVE

Sheridan Takes Research Partnerships to New Heights



Dr. Darren Lawless
Dean of Undergraduate Research
Sheridan

Sheridan has embraced a distinctive approach to furthering creativity and innovation, which involves the integration of creative engagement campus-wide, including a unique approach to Scholarship, Research and Creative Activities (SRCA). Integral to Sheridan's SRCA activities is the engagement of our students and professors, and the communities we serve.

Research partnerships at Sheridan are beginning to take a bold new form – one where projects go beyond contract research and become part of long-term public/private partnerships with industry and community. At our Centres of Expertise, the roles of our external partners are increasingly shifting from clients to collaborators and champions on major initiatives that bring benefits to both parties. These synergies have been bolstered by our ability to effectively match small and medium-sized businesses with the right research teams, and help them tackle the right problems – leading to our ranking by Research Infosource this year as the #1 college for number of research projects completed.

Our philosophy is to identify and nurture partnerships that not only help our industry and community partners solve a technical or business challenge, but also create the best possible learning opportunities for

the students who drive the project forward.

We work closely with our partners to strategically define the right problem to solve, and then use tools such as creative problem-solving methodology and multidisciplinary teams to tackle the challenge. At each stage, our partner provides feedback and input. The outcome is an enriched experiential learning opportunity for students and professors that adds value for our partners.

This approach has allowed us to grow dynamic, multifaceted partnerships with organizations of all sizes that feed back into the curriculum and enhance our students' professional education as our partners become more involved.

As an example of this synergy at work, Sheridan's Centre for Advanced Manufacturing and Design Technologies (CAMDT) has built a unique technology playground for its local manufacturers and engineering students, enriched

by the support of leading industry partners and an engineering team that truly understands how to make the most of collaboration. Long-term partnerships have been established with leaders in the manufacturing field who are invested in seeing the Centre succeed, and have enhanced CAMDT's preparation of the next generation of engineers and the local manufacturing community. Through rich partnerships with industry leaders like Cimetrix and ABB, who share a commitment to supporting the local manufacturing sector, CAMDT offers a suite of advanced additive manufacturing, robotics and integrated energy management technology that is accessible to its SME research partners as a way of furthering technology adoption. These partnerships often involve multiple research projects with CAMDT's engineering students, as well as skills training and technology adoption initiatives for local industry. CAMDT's unique facilities are a

testament to the commitment and active role of its industry partners in the Centre's success.

Sheridan recently reached new milestones in our partnerships with Siemens Canada and Hatch that will significantly enhance our ability to deliver a premiere undergraduate engineering education through applied research at CAMDT and the School of Mechanical and Electrical Engineering and Technology's curriculum. Earlier this year, we signed Memoranda of Understanding with both companies that will promote further collaborations to foster innovation through research and enhance our engineering students' learning experience.

Dynamic social innovation partnerships are flourishing at Sheridan, too. This year, our Centre for Elder Research was thrilled to see the launch of Spirit50, an initiative developed with partner Vintage Fitness over the course of multiple projects. Spirit50 allows older adults to work with a trainer virtually to

design customized workout plans and receive support for their health and fitness goals. The launch of Spirit50 represents the hard work of 15 Sheridan students from multiple disciplines, who helped Vintage Fitness bring it to life over a span of four years.

Through the dedicated participation, leadership and support of our industry and community partners, Sheridan is taking SRCA to a new level for our students, professors, and communities. As our industry partners take a seat at the planning table to help us move forward with our innovative approach to invigorating SRCA, their involvement is helping us mature as drivers of impactful change in our communities, and as providers of high-quality learning opportunities that inspire our students to become innovation catalysts themselves. We are excited and optimistic that this will help improve Canada's innovation performance, and bring economic benefit to the country.

Turn ideas into innovations

Undergraduate Research

research.sheridancollege.ca

Creativity isn't just for artists anymore. Partner with Sheridan and use our creative campus for prototypes, feasibility studies, commercialization strategies and skills upgrading.

Sheridan

Get Creative



Research & Innovation

Solutions for Industry

With funding support from various regional, provincial and federal agencies, students and graduates are hired to work alongside faculty researchers to assist industry partners leap forward in the marketplace. We conduct many projects in collaboration with small- and medium-sized businesses.

For example, in recent months we have:

CREATED

10

NEW RECIPES for a fine meats company

1,500+

acres of grain managed with our **PRECISION AGRICULTURE ALGORITHM**

DOUBLED production capacity for **VIJ'S AT HOME** to expand sales across Canada



DESIGNED the first-ever aluminum

10 tonne

GANTRY CRANE

AGRICULTURE & ENVIRONMENT

ADVANCED MANUFACTURING

FOOD & BEVERAGE INNOVATION

BUSINESS & COMMERCIALIZATION SOLUTIONS

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Canada's TOP 100 CORPORATE R&D SPENDERS 2015

Rank		Company	R&D Spending			Revenue	Research Intensity	Industry
2014	2013		FY2014 \$000	FY2013 \$000	% Change 2013-2014	FY2014 \$000	R&D as % of Revenue**	
1	1	Bombardier Inc.*	\$2,022,340	\$2,193,719	-7.8	\$22,212,600	9.1	Aerospace
2	2	BlackBerry Limited* ++	\$785,300	\$1,324,470	-40.7	\$3,683,508	21.3	Comm/Telecom Equipment
3	3	Magna International Inc.*	\$585,385	\$576,752	1.5	\$40,469,985	1.4	Automotive
4	4	BCE Inc.	\$546,000	\$575,400	-5.1	\$21,000,000	2.6	Telecommunications Services
5	5	Pratt & Whitney Canada Corp. (fs)	\$542,000	\$544,782	-0.5	nd		Aerospace
6	6	IBM Canada Ltd. (fs)	\$466,000	\$492,000	-5.3	nd		Software & Computer Services
7	8	Canadian Natural Resources Limited	\$450,000	\$390,000	15.4	\$18,863,000	2.4	Energy/Oil & Gas
8	7	Rogers Communications Inc.	\$418,000	\$394,000	6.1	\$12,850,000	3.3	Telecommunications Services
9	9	Atomic Energy of Canada Limited+	\$346,900	\$353,600	-1.9	\$129,977	266.9	Engineering Services
10	10	Ericsson Canada Inc. (fs)	\$315,000	\$318,000	-0.9	nd		Comm/Telecom Equipment
11	12	Apotex Inc.	\$311,105	\$222,439	39.9	\$1,924,956	16.2	Pharmaceuticals/Biotechnology
12	16	Constellation Software Inc.*	\$287,518	\$190,554	50.9	\$1,843,790	15.6	Software & Computer Services
13	20	Valeant Pharmaceuticals International, Inc.*	\$271,707	\$161,473	68.3	\$9,127,036	3.0	Pharmaceuticals/Biotechnology
14	11	CGI Group Inc.	\$262,492	\$252,116	4.1	\$10,499,692	2.5	Software & Computer Services
15	14	AMD Canada (fs)	\$206,000	\$211,000	-2.4	\$432,000	47.7	Electronic Systems & Parts
16	19	Open Text Corporation*	\$195,313	\$168,916	15.6	\$1,794,480	10.9	Software & Computer Services
17	21	TELUS Corporation	\$194,000	\$161,000	20.5	\$12,002,000	1.6	Telecommunications Services
18	18	General Motors of Canada Limited (fs)	\$190,000	\$182,089	4.3	nd		Automotive
19	15	Imperial Oil Limited	\$175,000	\$199,000	-12.1	\$36,231,000	0.5	Energy/Oil & Gas
20	22	BRP Inc.**	\$158,200	\$144,900	9.2	\$3,524,700	4.5	Transportation
21		Suncor Energy Inc.	\$150,000	\$150,000	0.0	\$41,516,000	0.4	Energy/Oil & Gas
22	23	CAE Inc.	\$149,000	\$144,096	3.4	\$2,114,900	7.0	Aerospace
23	27	MDA	\$138,951	\$116,602	19.2	\$2,098,837	6.6	Software & Computer Services
24	37	Mitel Networks Corporation*	\$130,662	\$57,366	127.8	\$1,219,368	10.7	Comm/Telecom Equipment
25	24	Sanofi (fs) (a)	\$130,471	\$129,100	1.1	\$677,946	19.2	Pharmaceuticals/Biotechnology
26	13	Cenovus Energy Inc.	\$124,000	\$213,000	-41.8	\$19,642,000	0.6	Energy/Oil & Gas
27	17	Syncrude Canada Ltd.	\$112,094	\$185,165	-39.5	nd		Energy/Oil & Gas
28	25	GlaxoSmithKline Inc. (fs)	\$110,125	\$118,224	-6.9	\$868,951	12.7	Pharmaceuticals/Biotechnology
29	28	Hydro-Québec	\$106,000	\$100,000	6.0	\$13,638,000	0.8	Electrical Power & Utilities
30	29	Cisco Canada (fs)	\$104,156	\$94,554	10.2	nd		Comm/Telecom Equipment
31	34	Sierra Wireless, Inc.*	\$91,286	\$78,253	16.7	\$605,844	15.1	Comm/Telecom Equipment
32	30	Westport Innovations Inc.*	\$85,568	\$94,517	-9.5	\$144,213	59.3	Transportation
33	26	Ontario Power Generation Inc.	\$84,000	\$117,000	-28.2	\$4,963,000	1.7	Electrical Power & Utilities
34	31	PMC-Sierra Ltd.* (fs)	\$78,003	\$82,278	-5.2	\$129,928	60.0	Electronic Systems & Parts
35	35	Janssen Inc. (fs)	\$73,916	\$67,430	9.6	\$1,614,490	4.6	Pharmaceuticals/Biotechnology
36	32	Amgen Canada Inc. (fs)	\$73,900	\$79,963	-7.6	nd		Pharmaceuticals/Biotechnology
37	36	Linamar Corporation	\$70,004	\$64,274	8.9	\$4,171,561	1.7	Automotive
38	52	Redknee Solutions Inc.*	\$68,715	\$35,452	93.8	\$284,626	24.1	Software & Computer Services
39	33	Pfizer Canada Inc. (fs)	\$68,302	\$78,324	-12.8	\$1,483,463	4.6	Pharmaceuticals/Biotechnology
40	40	Evertz Technologies Limited	\$60,196	\$52,851	13.9	\$325,524	18.5	Comm/Telecom Equipment
41	38	EXFO Inc.*	\$57,901	\$55,959	3.5	\$254,925	22.7	Medical Devices & Instrumentation
42	53	Bayer Inc. (fs)	\$57,089	\$33,897	68.4	\$726,265	7.9	Pharmaceuticals/Biotechnology
43	42	NOVA Chemicals Corporation* (fs)	\$53,016	\$50,466	5.1	\$5,698,116	0.9	Chemicals & Materials
44	51	Huawei Canada (fs)	\$52,800	\$35,900	47.1	\$335,200	15.8	Comm/Telecom Equipment
45		Shell Canada Limited	\$50,000	\$100,000	-50.0	\$9,250,000	0.5	Energy/Oil & Gas
46	45	Novelis Inc.* (fs)	\$49,703	\$47,376	4.9	\$10,787,652	0.5	Mining & Metals
47	48	Pharmascience Inc.	\$45,821	\$42,455	7.9	\$725,350	6.3	Pharmaceuticals/Biotechnology
48	43	SMART Technologies Inc.*	\$45,564	\$50,271	-9.4	\$650,773	7.0	Computer Equipment
49	44	Trican Well Service Ltd.	\$45,100	\$48,700	-7.4	\$2,703,858	1.7	Energy/Oil & Gas
50	67	Tekmira Pharmaceuticals Corporation* +	\$42,759	\$22,100	93.5	\$16,516	258.9	Pharmaceuticals/Biotechnology
51		Servier Canada Inc. (fs)	\$40,245	\$35,808	12.4	\$274,996	14.6	Pharmaceuticals/Biotechnology
52	54	Dorel Industries Inc.*	\$39,885	\$33,889	17.7	\$2,957,358	1.3	Other Manufacturing
53	57	Martinrea International Inc.	\$38,835	\$31,449	23.5	\$3,598,645	1.1	Automotive
54	64	TransCanada Corporation	\$38,809	\$23,911	62.3	\$10,185,000	0.4	Energy/Oil & Gas
55	58	Enghouse Systems Limited	\$38,147	\$31,149	22.5	\$219,987	17.3	Software & Computer Services
56	70	ProMetic Life Sciences Inc.	\$36,635	\$19,520	87.7	\$23,010	159.2	Pharmaceuticals/Biotechnology
57	50	Cascades Inc.	\$36,526	\$39,213	-6.9	\$3,561,000	1.0	Forest & Paper Products
58	61	Pason Systems Inc.	\$35,427	\$27,252	30.0	\$499,272	7.1	Software & Computer Services
59	60	Monsanto Canada Inc. (fs)	\$32,309	\$27,451	17.7	\$697,196	4.6	Agriculture & Food
60	63	Descartes Systems Group Inc.* ++	\$31,011	\$26,655	16.3	\$188,715	16.4	Software & Computer Services
61		Shopify Inc.*	\$30,053	\$15,009	100.2	\$115,992	25.9	Software & Computer Services
62	49	SNC-Lavalin Group Inc.	\$28,629	\$39,900	-28.2	\$8,238,762	0.3	Engineering Services
63	62	Thales Canada Inc. (fs)	\$26,399	\$26,951	-2.0	\$349,902	7.5	Electronic Systems & Parts
64	66	AEterna Zentaris Inc.*	\$26,367	\$22,461	17.4	\$1,158		Pharmaceuticals/Biotechnology
65	96	Avigilon Corporation	\$24,689	\$11,770	109.8	\$271,411	9.1	Computer Equipment
66	75	Celestica Inc.*	\$21,759	\$17,921	21.4	\$6,219,771	0.3	Electronic Systems & Parts
67	76	Sandvine Corporation*	\$21,595	\$17,781	21.4	\$136,289	15.8	Comm/Telecom Equipment
68		Lockheed Martin Canada (fs)	\$21,032	\$19,898	5.7	\$385,355	5.5	Aerospace
69	80	Northland Power Inc.	\$21,024	\$17,512	20.1	\$760,071	2.8	Electrical Power & Utilities
70		Héroux-Devtek Inc.	\$20,982	\$12,762	64.4	\$272,034	7.7	Aerospace
71	83	Performance Sports Group Ltd.*	\$20,382	\$16,536	23.3	\$492,805	4.1	Other Manufacturing
72	78	Tembec Inc.	\$20,200	\$17,692	14.2	\$1,491,000	1.4	Forest & Paper Products
73	74	Teck Resources Limited	\$20,000	\$18,000	11.1	\$8,599,000	0.2	Mining & Metals
74	87	AstraZeneca Canada Inc. (fs)	\$19,235	\$15,116	27.2	\$640,588	3.0	Pharmaceuticals/Biotechnology
75	77	ViXS Systems Inc.* ++	\$19,206	\$17,715	8.4	\$42,430	45.3	Electronic Systems & Parts
76	68	DragonWave Inc.* ++	\$18,569	\$20,545	-9.6	\$174,253	10.7	Comm/Telecom Equipment
77	86	IMAX Corporation*	\$17,778	\$15,213	16.9	\$320,903	5.5	Other Services
78		Transition Therapeutics Inc.	\$17,614	\$9,156	92.4	\$0		Pharmaceuticals/Biotechnology
79	97	Rio Tinto Iron & Titanium Inc. (fs)	\$17,057	\$11,744	45.2	\$1,193,000	1.4	Mining & Metals
80		Kinaxis Inc.*	\$17,034	\$10,729	58.8	\$77,375	22.0	Software & Computer Services
81	89	Computer Modelling Group Ltd.	\$16,439	\$14,364	14.4	\$74,503	22.1	Software & Computer Services
82	79	Ballard Power Systems Inc.*	\$15,788	\$17,629	-10.4	\$75,902	20.8	Machinery
83	91	Winpak Ltd.*	\$15,767	\$13,487	16.9	\$868,970	1.8	Rubber & Plastics
84	71	QLT Inc.*	\$15,245	\$19,063	-20.0	\$0		Pharmaceuticals/Biotechnology
85	69	Resolute Forest Products Inc. (fs)	\$14,500	\$20,400	-28.9	\$3,168,000	0.5	Forest & Paper Products
86	93	Mediagrif Interactive Technologies Inc.	\$14,381	\$12,267	17.2	\$65,376	22.0	Software & Computer Services
87	94	Canadian Solar Inc.*	\$14,356	\$12,035	19.3	\$1,430,139	1.0	Energy/Oil & Gas
88	72	Oncolytics Biotech Inc.	\$13,824	\$18,506	-25.3	\$0		Pharmaceuticals/Biotechnology
89	98	Halogen Software Inc.*	\$13,511	\$11,226	20.4	\$62,580	21.6	Software & Computer Services
90	85	ShawCor Ltd.	\$13,053	\$15,687	-16.8	\$1,890,029	0.7	Other Manufacturing
91	95	Absolute Software Corporation*	\$12,177	\$11,771	3.4	\$100,486	12.1	Software & Computer Services
92		Novadaq Technologies Inc.*	\$11,909	\$8,213	45.0	\$51,470	23.1	Medical Devices & Instrumentation
93		Titan Medical Inc.*	\$11,795	\$5,515	113.9	\$0		Medical Devices & Instrumentation
94		Neptune Technologies & Bioresources Inc. ++	\$11,026	\$8,526	29.3	\$15,070	73.2	Pharmaceuticals/Biotechnology
95		Trillium Therapeutics Inc.	\$10,919	\$3,571	205.8	\$0		Pharmaceuticals/Biotechnology
96	59	Resverlogix Corp.*	\$10,855	\$29,668	-63.4	\$0		Pharmaceuticals/Biotechnology
97		Tesco Corporation*	\$10,574	\$8,835	19.7	\$599,734	1.8	Energy/Oil & Gas
98		Concordia Healthcare Corp.*	\$10,273	\$1,989	416.5	\$134,960	7.6	Pharmaceuticals/Biotechnology
99		Velan Inc.* ++	\$10,196	\$9,109	11.9	\$503,376	2.0	Other Manufacturing
100		Aurinia Pharmaceuticals Inc.*	\$10,106	\$2,249	349.4	\$307		Pharmaceuticals/Biotechnology

Notes:

- Data were obtained through annual reports, financial statements, securities commission filings, or through a survey.
- We have attempted, wherever possible, to provide gross R&D spending before deduction of investment tax credits or government grants.
- We have attempted, wherever possible, to provide revenue net of interest and investment income.
- FY2013 R&D spending figures may have been adjusted as more accurate information became available.
- Canadian-owned company results include worldwide revenue and R&D spending; foreign subsidiaries (fs) include revenue and R&D spending for their Canadian operations only.

*Converted to CDN\$ at annual average 2014 = 1.1045, 2013 = 1.0299 (Bank of Canada)

**Based on companies with \$2 million or more of revenue

*Not current name/acquired/merged

++Fiscal 2015 results were used for year-ended January or February

fs = Foreign subsidiary (includes revenue and R&D spending for Canadian operations only)

nd = Not disclosed

(a) Sanofi Pasteur Limited and Sanofi-aventis Canada Inc. (including Genzyme Canada).

CANADA'S TOP 100 Corporate R&D Spenders

CORPORATE R&D SPENDING HEADS SOUTH

Canada's Top 100 Corporate R&D Spenders reduced their spending on research and development by -1.6% in Fiscal 2014, as total outlays fell to \$12.3 billion from \$12.5 billion the previous year. This compares with a 4.1% rise in R&D spending among last year's Top 100 grouping. The reduced R&D flies in the face of a 7.3% rise in revenues for the 87 companies that provided revenue data.

For a third year Bombardier Inc. held on to 1st place among the Top 100, even though R&D spending fell by -7.8% to \$2.0 billion. While it managed to hold on to

second place in the ranking, R&D outlay dropped by -40.7% at BlackBerry Limited, to \$785.3 million. Auto parts manufacturer Magna International Inc. posted a small 1.5% increase in spending, to \$585.4 million, to hold on to 3rd position and narrowly edge 4th place finisher BCE Inc., where R&D levels fell by -5.1%, to \$546.0 million. Pratt & Whitney Canada Corp.'s R&D spending fell by -0.5% to \$542.0 million as the firm held on to 5th position.

The divergence between increased revenues and reduced R&D spending led to a sharp -8.0% drop in research intensity (R&D spending as a portion of revenues) for the 87 companies that reported in full. Intensity fell to 2.7% of revenues from 2.9% last year. Paradoxically, while total Top 100 R&D fell, spending did rise at 69 companies, but fell at 30 others (spending was flat at 1 company).

THE \$100 MILLION CLUB

Research Infosource is pleased to showcase 30 companies (up from 28 last year) whose spending gained them membership in the \$100 Million Club – an elite group of firms that spend \$100 million or more on R&D. The Club includes 22 Canadian companies and 8 foreign subsidiaries.

New to the \$100 Million Club are Suncor Energy Inc. (#21 overall), Mitel Networks Corporation (#24) and Cisco Canada (#30).

On a discordant note, \$100 Million Club members' Fiscal 2014 spending on research fell by -3.7% to \$10.0 billion, from \$10.4 billion the prior year. Club members accounted for 81.2% of total Top 100 spending, which is nearly the same as in Fiscal 2013.

INDUSTRY PERFORMANCE

Even though their total R&D declined by -5.5%, 5 Aerospace companies still accounted for 22.4% of total Top 100 spending, down slightly from 23.3% the year before. By growing their spending by 14.9% the 15 Software and Computer Services companies on the list accounted for 13.2% of the Top 100 total, up from 11.3% in Fiscal 2013. In contrast, 9 Communications/Telecom Equipment manufacturers saw their share of total industry spending fall to 12.9% of the total from 16.0% the prior year, as a result of a -21.0% reduction in R&D. A bright spot was the Pharmaceuticals/Biotechnology sector, where 22 firms increased their R&D levels by 23.4% and raised their share of Top 100 spending to 11.5% of the total, from 9.1% last year. Spending by 10 Energy/Oil & Gas firms fell by -12.1%, which dropped their share of the Top 100 total to 9.5% from 10.6% in Fiscal 2013. Taking all its sub-industries into account (including Medical Devices and Instrumentation) the Information

and Communications Technology sector still dominates the R&D scene, accounting for a total of 39.6% of all-industry spending.

R&D SPENDING GROWTH

While the overall Top 100 picture was weak, a number of individual firms posted strong gains in R&D spending. Heading the list was Concordia Healthcare Corp., which expanded its spending by 416.5% to \$10.3 million. At Aurinia Pharmaceuticals Inc. R&D investment grew by 349.4% to \$10.1 million. R&D spending at Trillium Therapeutics Inc. rose by 205.8% to \$10.9 million. Mitel Networks Corporation grew its R&D by 127.8% to \$130.7 million. Titan Medical Inc. expanded R&D by 113.9% to \$11.8 million.

THE TOP 10 R&D INTENSIVE FIRMS

Available data allowed Research Infosource to calculate the R&D intensity of 85 of the Top 100 firms – research spending as a percent of revenues. An eclectic mix of companies and industry sectors are represented. The 5 leading firms are AECL (now Canadian Nuclear Laboratories – up 266.9%), Tekmira Pharmaceuticals Corporation (258.9%), ProMetic Life Sciences Inc. (159.2%), Neptune Technologies & Bioresources Inc. (73.2%), and PMC-Sierra Ltd. (60.0%).

LOOKING AHEAD

This year's Top 100 results were a disappointment overall. However, analysts can take heart that spending rose at 69 of the Top 100 against a decline at 30 others (1 company was even). Total R&D expenditure was down by -1.6%. This compares with a 4.1% increase in spending among last year's Top 100 grouping. (Note that the Top 100 composition changes from year to year and results are not strictly comparable.)

The Top 100 result is heavily influenced by the performance of the leading R&D firms. Disappointingly, spending declined – often substantially – at 7 of the country's 10 largest R&D firms. With some notable exceptions – e.g. BlackBerry Inc., AECL – overall revenues increased, so revenue shortfalls cannot be blamed for the decline in research spending at most firms.

It seems to us that R&D activity is broadly holding up among most R&D firms, but suffering at the largest companies, many of which are facing well-known product or market headwinds. Last year we suggested that a declining Canadian dollar and a shift in federal research tax policy would be the primary influences on corporate R&D spending. This year resource company revenues will be a primary driver. Overall, expect next year's corporate R&D performance to mirror this year's. Also prepare for some further significant declines among the leading firms.

Top 100 – Leading Industries	
Industry	R&D Spending (% of Total)
Aerospace (5)	22.4
Software & Computer Services (15)	13.2
Communications/Telecom Equipment (9)	12.9
Pharmaceuticals/Biotechnology (22)	11.5
Energy/Oil & Gas (10)	9.5
Telecommunications Services (3)	9.4
Automotive (4)	7.2

The \$100 Million Club		
2014 Rank	Company	R&D Spending \$000
1	Bombardier Inc.*	\$2,022,340
2	BlackBerry Limited* ++	\$785,300
3	Magna International Inc.*	\$585,385
4	BCE Inc.	\$546,000
5	Pratt & Whitney Canada Corp. (fs)	\$542,000
6	IBM Canada Ltd. (fs)	\$466,000
7	Canadian Natural Resources Limited	\$450,000
8	Rogers Communications Inc.	\$418,000
9	Atomic Energy of Canada Limited+	\$346,900
10	Ericsson Canada Inc. (fs)	\$315,000
11	Apotex Inc.	\$311,105
12	Constellation Software Inc.*	\$287,518
13	Valeant Pharmaceuticals International, Inc.*	\$271,707
14	CGI Group Inc.	\$262,492
15	AMD Canada (fs)	\$206,000
16	Open Text Corporation*	\$195,313
17	TELUS Corporation	\$194,000
18	General Motors of Canada Limited (fs)	\$190,000
19	Imperial Oil Limited	\$175,000
20	BRP Inc.++	\$158,200
21	Suncor Energy Inc.	\$150,000
22	CAE Inc.	\$149,000
23	MDA	\$138,951
24	Mitel Networks Corporation*	\$130,662
25	Sanofi (fs) (a)	\$130,471
26	Cenovus Energy Inc.	\$124,000
27	Syncrude Canada Ltd.	\$112,094
28	GlaxoSmithKline Inc. (fs)	\$110,125
29	Hydro-Québec	\$106,000
30	Cisco Canada (fs)	\$104,156

Notes:
*Converted to CDN\$ at annual average 2014 = 1.1045, 2013 = 1.0299 (Bank of Canada)
**Based on companies with \$2 million or more of revenue
+Not current name/acquired/merged
++Fiscal 2015 results were used for year-ended January or February
fs = Foreign subsidiary (includes R&D spending for Canadian operations only)
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PARTNER PERSPECTIVE

Intellectual Capital is Vital to Our Innovation Ecosystem



Ian McWalter
President & CEO
CMC Microsystems

It also provides training and experience to professors, students, and industrial innovators.

Training is the value-add that gives our NDN innovators their competitive edge. Academics and students who take our courses, workshops and webinars don't just learn how to use commercial tools or processes; those learnings become jumping-off points for exploring limitations or pushing the boundaries of tools and processes.

Sometimes those investigations trigger industrial collaborations, leading to graduate hirings; and sometimes they lead to startup companies, headed by entrepreneurial faculty or students. But a particularly valuable outcome is when NDN trainees become academics themselves, because they pass on this learning and experience to their students, ensuring a new generation of micro-nano innovators.

We saw a wonderful example of this "continuity effect" recently at our annual TEXPO student research competition and exposition.

Amin Rasouli, a graduate student at Simon Fraser University, won the Huawei Microsystems Design Award for his novel resonance sensing technique. Ten years ago, the same award went to a University of Manitoba graduate student, Behraad Bahreyni. Today Dr. Bahreyni is Professor of Mechanical Engineering at SFU, a leading MEMS researcher – and Mr. Rasouli's graduate supervisor.

Another example is our past board chair and longtime member, Dr. Yvon Savaria. A TEXPO winner in 2000, today he is Professor of Electrical Engineering, Polytechnique Montréal, where he has supervised more than 130 graduate students, a large number of whom have benefited from the NDN's resources.

There are many more examples from the NDN, but they share a common lesson: that intellectual capital is a vital piece of the innovation ecosystem, and that it makes sense to continue to invest in this knowledge asset.



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PARTNER PERSPECTIVE

R&D Drives Oil Sands Reclamation at Syncrude

Canada’s oil sands industry has come a long way since a household washing machine first successfully demonstrated hot water extraction of heavy bitumen from the sand. In the decades that followed, conscious investments in research and development have transformed the oil sands into a viable and responsible industry.

At the fore of innovation is industry pioneer Syncrude Canada Ltd. It has always maintained a leadership role in creating and developing technologies to responsibly mine, extract and upgrade high quality crude oil from the oil sands, and to reclaim the land it uses.

When Syncrude was first established in 1964, it was really a research project designed to prove that oil could be produced economically from the oil sands deposits in Northern Alberta. It was an industry in its infancy where solutions to unlocking the mysteries of the oil

sands needed to be imagined, tested and implemented because they simply didn’t exist.

“There isn’t a lot of off-the-shelf technology for this industry. It was all invented here,” says Glen Rovang, Manager of Syncrude’s Research & Development Centre, in Edmonton.

Today, R&D continues to open doors to new and better ways to manage the oil sands resource.

In 2014, Syncrude invested \$107 million towards technologies and processes to improve the reliability of its operation, reduce costs and address environmental issues. In fact, over half of its research expenditures are directed to environmental projects including a reclamation research program that focuses on landscape creation and performance, with emphasis on watersheds.

The Sandhill Fen Watershed research project, located in a portion of Syncrude’s former East mine, is a unique example. Not only is it the

industry’s first and largest example of fen watershed re-establishment, it is also the first reclaimed landform in the oil sands built on a foundation of mine tailings. After just four growing seasons, it is on a trajectory toward success. “It can take a very long time for a fen to evolve naturally, and we’re trying to speed that up through reclamation,” said Jessica Piercey, Project Leader. “The lessons we learn here will help us develop future wetland areas equal in productivity to what was here before mining occurred.”

Eight multi-year research programs involving a number of universities are collecting data on hydrology, wetland and terrestrial plant response, carbon dynamics and climate conditions associated with the fen. The information being gathered will improve wetland reclamation best practices for Syncrude and the oil sands industry.

One of the participating researchers,

University of Alberta professor Lee Foote, says that “the Sandhill Fen continues to develop as a template on which natural processes and time are hard at work. Colonizing plant communities are sorting themselves out along soil gradients; hydrologic connections are evident, and; wildlife populations are re-establishing.”

Based on the success of the Sandhill Fen, Syncrude is now constructing another fen nearby.

Syncrude openly shares its research and technologies through collaborative industry groups such as Canada’s Oil Sands Innovation Alliance (COSIA).

Sharing knowledge makes Syncrude a better performer operationally and environmentally, and advances the oil sands industry in general. A dedicated effort to research and development both financially and collaboratively, ensures the oil sands industry remains at the forefront of innovation.



Syncrude’s Sandhill Fen watershed research project was built on a foundation of mine tailings in a 54-hectare section of a former oil sands mine. It was re-vegetated in 2012 with more than 40 types of native plants and an additional 80 types of native plants are growing without having been planted. Birds are now visiting and nesting in the fen. Fens are an important Boreal forest peat land and this large-scale reconstruction effort underscores Syncrude’s commitment to returning the land it uses to a condition similar to that prior to disturbance.

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INNOVATION: It’s a Constant Process



Russell Williams
President
Canada’s Research-Based Pharmaceutical Companies (Rx&D)

Innovation drives Canada’s pharmaceutical sector. It’s a constant process and it’s what propels us to find the next generation of treatments that save lives. Innovation is our ultimate goal – we are always striving to find healthcare solutions that help Canadians live longer and healthier lives.

Canada has world-class research facilities, scientists and researchers who have contributed to the numerous ground-breaking discoveries influencing global health. Canada is also a cost-competitive place to conduct research amongst developed countries.

We have a great cluster of life sciences companies and sources of investment capital in Canada. While Canada faces some hurdles with regards to intellectual property, regulatory and market access, the business environment in Canada is ripe to welcome more life sciences research.

Canada’s pharmaceutical industry contributes to over \$6-billion in global exports. Here at home, Canada’s innovative pharmaceutical sector directly employs over 12,000 people and creates over 21,000 indirect jobs.

For example, Sanofi Pasteur Limited has invested \$100-million to open a new vaccine manufacturing facility in Canada, which will serve as its North American

Centre of Excellence in global analytical and bioprocessing R&D. In addition, Hoffmann-La Roche Limited invested over \$190-million to establish a global Pharmaceutical Development in Canada, creating more than 260 jobs. This site is one of six the company has established around the world, and manages operations for all stages of global clinical trial research.

While we’re making these great contributions to intramural R&D and manufacturing, our industry is moving towards newer types of R&D investment models, such as targeted financing and virtual research and open innovation models.

By partnering with academic/clinical research institutes, commercialization centres and virtual research centres, our industry is expanding its capacity to conduct R&D work in Canada. These numerous groups are powered by approximately \$10-billion in total funding to work with industry to drive innovation.

With targeted financing, our industry contributes, along with other public and private investments, to create “risk” capital funds, allowing the industry to gain access to promising technologies while sharing the financial risk. These funds offer \$1.5-billion dedicated to life sciences companies looking to partner with larger biopharmaceutical companies.

For example, our industry has sponsored \$6.7-billion in research funding to academic and clinical research institutes. We’ve made significant contributions to universities like the University of Toronto, McGill University and the University of British Columbia to partner on research discoveries.

Two of Rx&D’s member companies, Hoffmann-La Roche Limited and Merck Canada Inc., are partnering with the Montreal Heart Institute to fund basic and translational research into cardiometabolic disease. Another two member companies, Janssen Inc. and

Pfizer Canada Inc., have partnered with the Ontario Institute for Cancer Research (OICR) to fund innovation, technology and translational research. This partnership is paying off – between 2009 and 2013, the OICR has filed for 31 licences on research discoveries.

We’re also partnering with organizations to encourage commercialization of discovered-in-Canada therapies. Across the country, the NEOMED Institute, MaRS Innovation and the Centre for Drug Research and Development benefit from industry partnerships to work on commercializing new, potentially life-saving and life-changing therapies.

Industry is also stimulating R&D through venture capital funds that provide support for the advancement and development of promising technologies, while minimizing risk. Examples include in-house, corporate venture arms, such as those like the Novartis Venture Fund (NVF) or Lilly Ventures, and partnerships

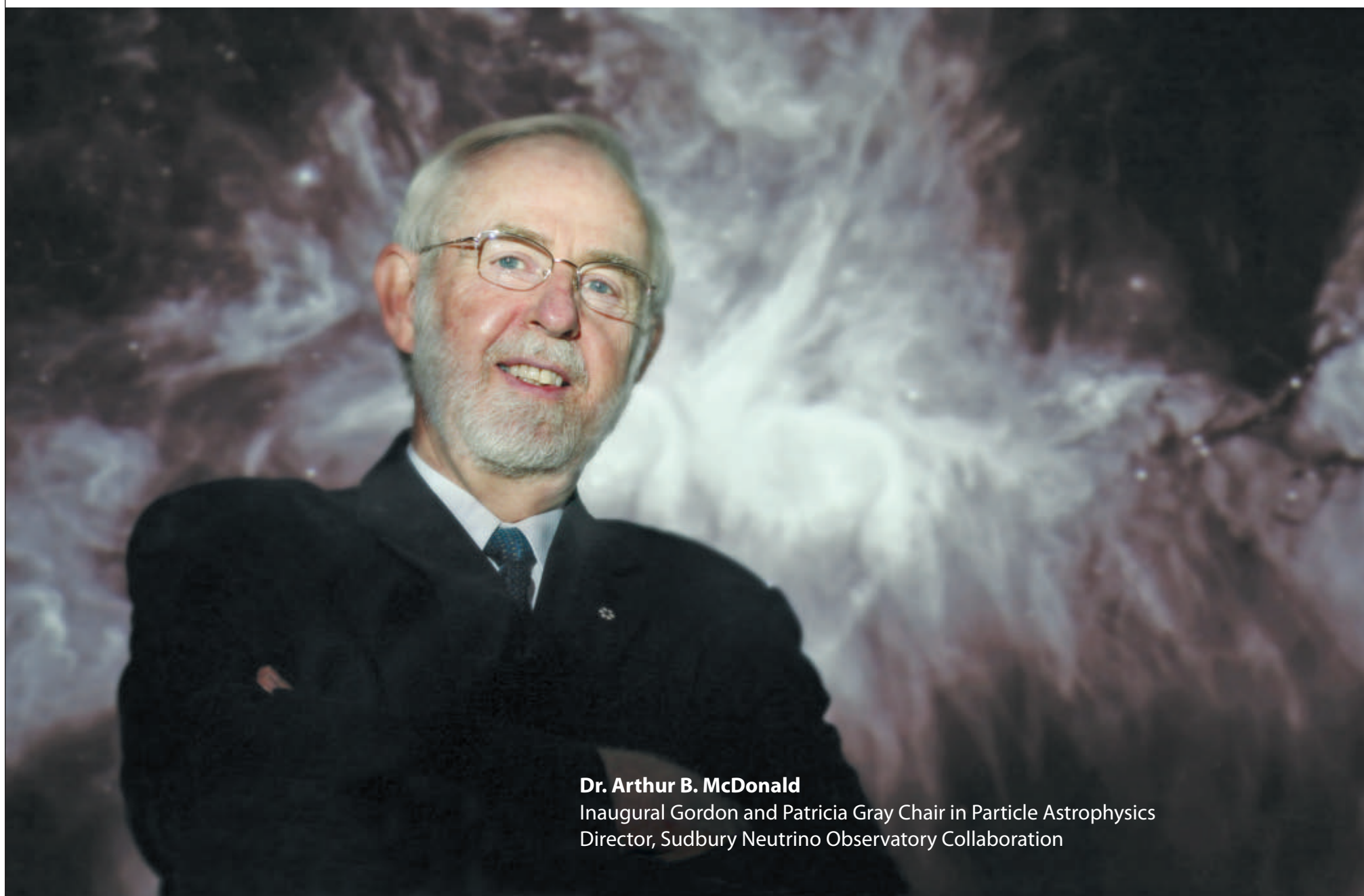
such as GSK’s venture capital firm SR One and the Life Sciences Innovation Fund in Canada.

But these new models of innovation in research and development aren’t being recognized by Canada’s Patented Medicines Prices Review Board (PMPRB). While over 28 years ago, Ottawa strengthened protection on new discoveries, our members committed to invest ten percent of annual sales revenues in pharmaceutical R&D. We’ve met that commitment over and over again, but these new models of research described above do not fit into the limited definition of what counts as scientific R&D.

It’s clear the model for life sciences research and innovation in the twenty-first century has changed. We are investing in new, more collaborative initiatives with Canadian universities, hospitals, centres of excellence, early stage biopharmaceutical companies, and health charities.

We can do more to promote Canada’s capacity for life sciences research. We must act urgently so that we can attract more global dollars and keep this high-quality research here at home.

Tiny particles Big prize



Dr. Arthur B. McDonald
Inaugural Gordon and Patricia Gray Chair in Particle Astrophysics
Director, Sudbury Neutrino Observatory Collaboration

2015 Nobel Prize in Physics

Congratulations Professor Arthur B. McDonald

Queen's University professor Arthur B. McDonald, along with Takaaki Kajita of the University of Tokyo, has been awarded the 2015 Nobel Prize in Physics. Dr. McDonald and a team of Canadian and international scientists worked deep underground unlocking the mysteries of neutrinos, fundamental building blocks of nature. Their revolutionary work redefined the basic laws of particle physics and confirmed the detailed understanding of how the sun burns. This exemplifies research at Queen's: leading-edge ideas, advances and discoveries that address the world's greatest challenges.

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