Bringing Science Back Kirsty Duncan's gambit / **Skule Spirit** A nickname's origins / **Gang Life** Up close with the Maravilla
Scaling Up Rotman's global ambitions / **Know Thy Selfie** Viral vanity / **Brick Artist** Graeme Dymond's unique creations

U of T Magazine

AUTUMN 2016

The Hidden Epidemic

One prof's quest to help survivors of child abuse

HOW DO YOU FIND THE DREAM JOB YOU NEVER KNEW EXISTED?

U of T affinity products support mentorship programs that help new grads imagine their future.

What exactly are affinity products? Value-added services like the insurance options offered by TD Insurance. They generate revenue that supports initiatives such as Backpack to Briefcase, a program where established alumni mentors provide guidance and career advice to students and recent grads. Last year, more than 1,500 students and 400 alumni volunteers took part. Backpack to Briefcase is just one of many programs supported by alumni and friends through the purchase of U of T affinity products.

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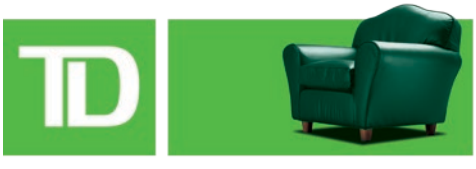

Autumn 2016

Volume 44, No. 1

38 Scaling Up

Tiff Macklem aims to place the Rotman School of Management among the world's best, drawing on a $30-million gift from U of T's biggest benefactor

BY JOHN LORINC

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Can alumna Kirsty Duncan rejuvenate Canadian discovery and innovation?
BY MARGARET WEBB

32 The Hidden Epidemic
Prof. Esme Fuller-Thomson has spent much of her career researching the devastating effects of child abuse on health. Now she wants to ensure all survivors get the help they need
BY JOHN BARBER

COVER: GRACIA LAM; ABOVE: SANDY NICHOLSON

UofTMagazine

AUTUMN 2016 VOLUME 44 NO.1

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UNIVERSITY OF TORONTO

Departments

Allah has 99 names and bigotry, hate and homophobia are not among them

– Shawn Ahmed (BA 2005 Trinity), who is gay and Muslim, on why Muslims should choose love over hate when it comes to the LGBTQ community, p. 52

16 Did you know U of T now has one of the biggest university galleries in Canada?

47 Margaret Froh (LLB 1996) is the first woman to lead the Métis Nation of Ontario

21 Not long ago, most CEOs were complacent about competition from tech-savvy innovators. Now they're downright paranoid about it. But should they be?

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Feedback

Readers tweeted many responses to our all-digital summer issue. Some loved the profile of U of T engineering grad Jonathan Sun, who has gained a huge Twitter following as "Jomny Sun, an aliebn confuesed abot humamn lamgauge." Some, it seemed, just really loved *him*.

You're a great tweeter. One of the best who ever twote.
Emma B @Emm_Belle

I was not aware you went to U of T. That's awesome! Didn't even know you were Canadian!
Wade Stokan @WadelyWade

Congrats, you are truly a gem and one of the absolute high-lights of my Twitter experience.
I am Irony Man @met2art

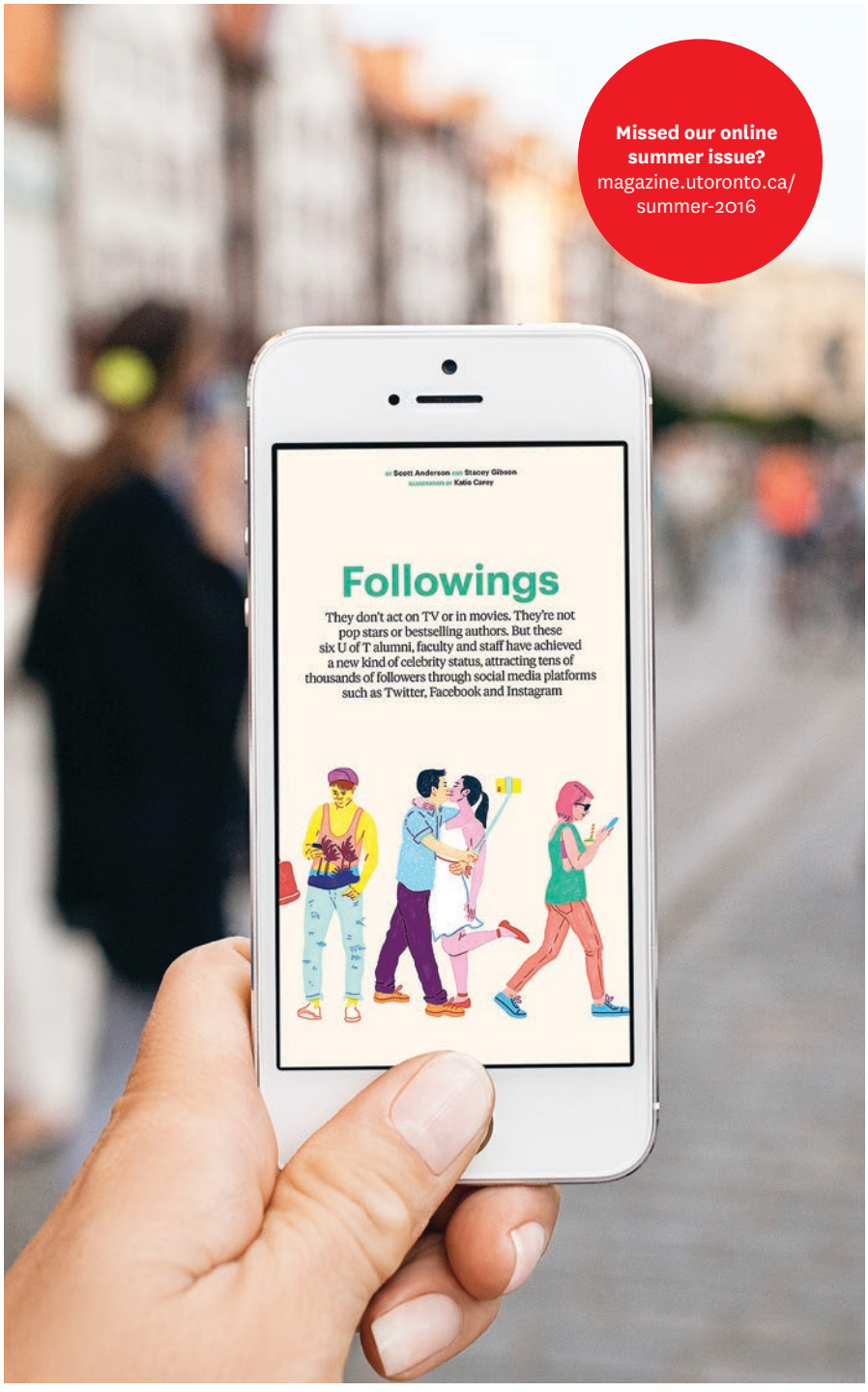
Others told us that they appreciated our cover story on trans students…

+1 to @uoftmagazine for featuring @Kinnon_Ross and covering experiences of #trans students and faculty.
emmy @_saskeah

…and that the piece about sociology prof Jooyoung Lee's study of aspiring L.A. hip-hop artists got them thinking.

Nice story about @theyoungjoo +hiphop/youth culture in @uoftmagazine - wondering sims/diffs w/ youth + sports
John Paul de Silva @jp9desilva

Follow *U of T Magazine* on Twitter @uoftmagazine.



Some readers submitted comments on stories via our website…

Update Your Vocabulary
Regarding the cover feature "Generation T" (Summer 2016), please stop using the word "transgenderism" if you value your progressive reputation. The medical profession uses terms like "transgenderism" and "transsexualism" to pathologize trans people. Why not just write "the neuroscience of being trans"? It would be more humanizing.

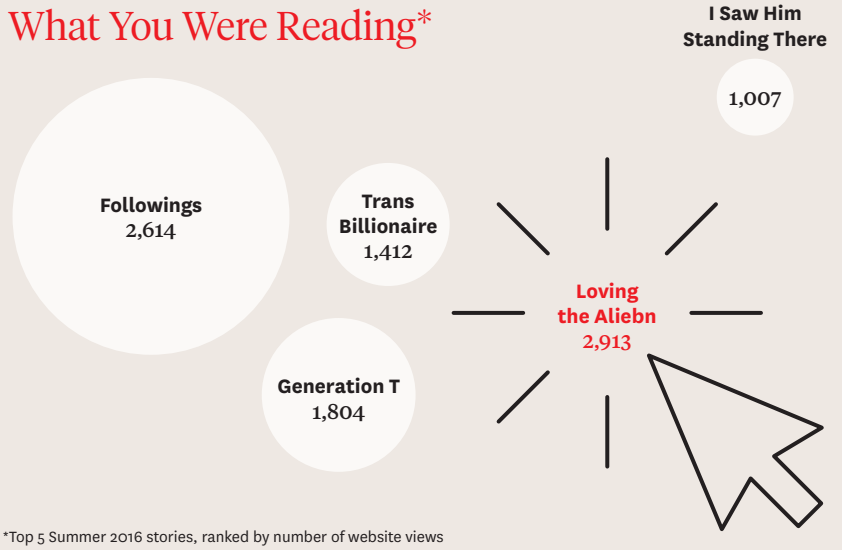
AMANDA PEET
DEPARTMENT OF PHYSICS, U OF T

Surviving the Crash
The Time Capsule story in the summer issue mentioned the dim prospects for new grads, especially women, following the market crash of 1929. In June 1930, my mom had completed her second year in household science at Victoria College. She was able to get summer employment in the dining room at Bigwin Inn on Lake of Bays, a favourite Ontario vacation spot for still-wealthy Americans.

KEN KOEHLER
BComm 1963, MBA 1964, DORSET, ONTARIO

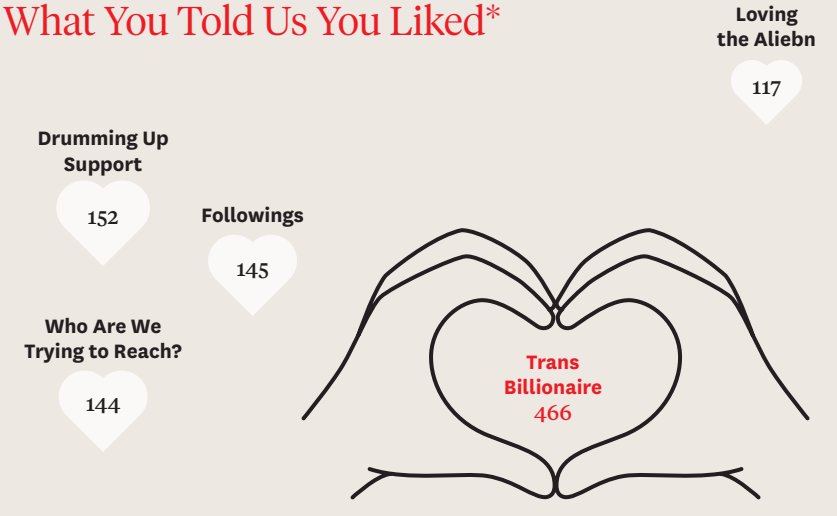
Write to us!
U of T Magazine welcomes letters at uoft.magazine@utoronto.ca. Read the Summer 2016 issue online at magazine.utoronto.ca/summer-2016.

What You Were Reading*



*Top 5 Summer 2016 stories, ranked by number of website views

What You Told Us You Liked*



*Top 5 Summer 2016 stories, ranked by number of Facebook likes

UNIVERSITY OF TORONTO

BOUNDLESS

WHAT TOOK MEIMEI TO A 17TH-CENTURY POLISH BURIAL SITE?

A PASSION FOR FORENSICS.

Legacy giving makes it possible. Meimei Fong (BSc 2017 UC) absorbs everything she can in her biological anthropology class. But for an aspiring forensic scientist, being on the ground is essential. The Cloister Educational Foundation Award made Meimei's studies abroad possible. Established by the estate of alumna Marjorie Moore, the award helped Meimei travel to Poland, where she was able to study human remains in the field, beyond the boundaries of the classroom. By making a bequest to the University of Toronto, you too can create extraordinary educational opportunities for our students.

To talk about legacy giving, contact:
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Needed:
Three Alumni

Are you an alumnus or alumna committed to the mission of Canada's leading institution of learning, discovery, and knowledge creation? Are you looking for a way to make a significant volunteer contribution to the University of Toronto?

If so, consider applying for one of 3 alumni governor seats on the Governing Council, the senior body that oversees the University's academic, business, and student affairs.

Collectively and individually, governors are stewards of the University who:

- support and advance its mission;
- provide relevant input into its vision; and
- advise on, oversee, and approve a range of University matters, within the framework of delegated authority.

CALL FOR APPLICATIONS

We are seeking candidates who are inspired to enrich the University with special perspectives, experiences, and connections; who will actively participate in the governance of the University; and who will reflect the diversity of the University's alumni.

Application forms will be available on the Governing Council website from *12:00 noon on Thursday, November 17, 2016* until the submission deadline of *5:00 p.m. on Thursday, December 15, 2016*.

WWW.GOVERNINGCOUNCIL.UTORONTO.CA

UNIVERSITY OF TORONTO

The Globally Engaged University

An international strategy to build on U of T's distinctive strengths

The rise of the University of Toronto from a small, regional institution to one of global influence parallels that of Canada itself. We grew somewhat tentatively until the early 20th century, and then in several phases we threw open our arms to the world.

Our outlook is now decidedly international. It is inspired by the fact that addressing the great challenges of our time increasingly requires collaboration among the world's best scholars. It is also driven by our desire to help our students develop the global fluency and cross-cultural perspectives they'll need to lead us forward.

Last December, for example, Alexa Waud, a third-year student at the Munk School of Global Affairs, travelled to Brazil to study its remarkable track record in poverty reduction. Over 11 days, as part of a small-group course on global innovation with Prof. Joseph Wong, Waud interviewed government officials in Brasilia, spoke with social-assistance workers, and toured public health clinics and community centres.

Our ability to provide students with this sort of experience – and to act as a magnet for the brightest students and faculty from around the world – is a testament to the distinctive strengths of the University of Toronto as a global institution. But we need to be even more deliberate and strategic in cultivating this key advantage.

In the past year, I've been working with Prof. Janice Stein, the former director of the Munk School of Global Affairs, and Prof. Ted Sargent, who was recently appointed U of T's vice-president, international, to develop a plan to advance the university's international strategy in four crucial areas.

STUDENT AND FACULTY RECRUITMENT. U of T already recruits more than one in five students internationally, compared to one in 25 a generation ago. These students enrich our community with a variety of perspectives and offer many of their Canadian peers their first taste of global fluency. Looking ahead, we'll refine our recruitment efforts to diversify our student body further and, at the graduate level, help more of the very best students pursue research opportunities at U of T.

Leading scholars from around the world currently make up close to 50 per cent of new faculty hires. We hope to work with the federal government to ensure that, when we do identify the best person for a position, the immigration process is as smooth as possible.

RESEARCH AND INSTITUTIONAL PARTNERSHIPS. U of T has dozens of partnerships with universities around the world and almost half of our scholars' research publications now include an international co-author. In coming years, we aim to strengthen our collaborations with top peer institutions in the US, UK, Germany, Brazil, China, India and elsewhere who share our global outlook, our focus on enhancing student experience, and our determination to leverage our location in a dynamic urban environment.

LEARN ABROAD PROGRAMS. As part of these enhanced collaborations, we aim to expand the menu of international experiences for students to include, in addition to a summer or term abroad, shorter work and research placements and mentorships across *all* faculties and departments. One of our first tasks will be to catalogue current programs and to improve our tracking of the number of students using them.

ALUMNI RELATIONS. U of T's global alumni network is unparalleled among Canadian universities. What's particularly exciting is that many alumni are already helping the university to achieve its international goals – by assisting with student recruitment in other countries, by identifying placements for students abroad and by acting as international mentors. As we expand programming in these areas, we'll be inviting even more alumni to participate.

It's worth noting that the separate elements of our international strategy don't work in isolation. They are designed to be mutually reinforcing, so that the whole is greater than the sum of its parts. For example, international graduate students will generate new connections between faculty members at U of T and at other universities, making new research collaborations possible.

By deepening U of T's partnerships with a select group of great universities in dynamic world cities, we aim to help our students become global citizens in a highly interconnected era, find solutions through research to our most pressing problems, and encourage the best and brightest in the world to bring their experience and expertise to U of T.

Sincerely,
Meric Gertler

Calendar

MORE EVENTS!
Check out the latest campus happenings at **utoronto.ca.**

Tideline at Hart House Theatre

SEPTEMBER 16 TO OCTOBER 1

Tideline

When you've grown up an ocean away from your birthplace, what do you ultimately call home? Wajdi Mouawad's *Tideline* – winner of the Governor General's Award for drama and France's Prix Molière – is a play about the displacement of self. After the sudden death of his father, Wilfrid is forced to confront a host of family secrets, including the foundation of his own existence. A dream-like journey through a war-torn landscape inhabited by some equally lost and peculiar survivors, *Tideline* is a darkly humorous fable and the first of Mouawad's tetralogy of plays.

$28 ($17 seniors; $15 students). Week One: Sept. 16–17, 8 p.m. Week Two: Sept. 21–24, 8 p.m. Week Three: Sept. 28–Oct. 1, 8 p.m. (Additional Oct. 1 matinee at 2 p.m.) Post-show talkbacks: Sept. 17 and 22. Pre-show artist chat: Oct. 1 at 1 p.m. Hart House Theatre, 7 Hart House Circle. Tickets: 416-978-8849. Info: harthouse.ca/tideline.

Alumni

September 21
Montreal
U of T Where You Are. Prof. Gordon Foote will be speaking on "The Continuing Evolution of Jazz and Its Impact on Jazz Studies at U of T." Free. 6 p.m. Location TBA. Register at alumni.utoronto.ca/events/regional.

September 22
New York
Chancellor's Reception for alumni and friends, hosted by Chancellor Michael Wilson. Prof. Patrick Gunning will be speaking on "The Beginner's Guide to Killing Cancer Cells." Free. 6 p.m. Location TBA. Register at alumni.utoronto.ca/events/regional.

September 24
Washington, D.C.
Canadian Universities Alumni Lunch for U of T alumni and friends, and grads from other Canadian institutions. Register at alumni.utoronto.ca/events/regional. $35 (includes meal). 12:15–3 p.m. Ella's, 610 9th St. NW.

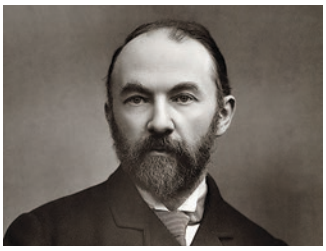
October 13
London, UK
Canadian Thanksgiving Pub Night. U of T alumni and friends are invited to celebrate Canadian Thanksgiving together. Free. 6:30–8:30 p.m. Venue TBA. Register at alumni.utoronto.ca/events/regional.

October 21
Calgary
Calgary Stampeders vs. Toronto Argonauts Game. Pick a team to cheer for with U of T alumni and friends. $37. 8–11 p.m. McMahon Stadium, 1817 Crowchild Trail NW. Register at alumni.utoronto.ca/events/regional.

October 23
U of T Scarborough
UTSC Alumni Association Afternoon Tea. Enjoy tea and

PHOTO: COURTESY OF HART HOUSE THEATRE

An exhibition about author Thomas Hardy starts at the Thomas Fisher Rare Book Library Oct. 24



conversation with UTSC alumni. Free. 2–4 p.m. Ralph Campbell Lounge (BV380), 1265 Military Trail, alumni@utsc.utoronto.ca.

November 17
U of T Scarborough
UTSC Alumni Connections. Seeking U of T Scarborough alumni for an evening of speed networking with students. Spaces are limited. Free. 6:30–8:30 p.m. Instructional Centre Atrium. 1095 Military Trail. alumni@utsc.utoronto.ca.

December 2
Young People's Theatre, Toronto
PA Day Family Alumni Event: Seussical. A musical based on the works of Dr. Seuss. Recommended for ages 5 and up. $15 per person; includes ticket and ice-cream party. 2 p.m. 165 Front St. E. For info: dua.events@utoronto.ca. To register: alumni.utoronto.ca/events/calendar.

Exhibitions

To December 10
The Art Museum at the University of Toronto
Form Follows Fiction: Art and Artists in Toronto. Curated by Luis Jacob. This exhibition considers the ways that artists visualize Toronto and features the work of 95 artists. Free. Tues. to Sat., 12–5 p.m.; Wed. 12–8 p.m. 7 Hart House Circle. 416-978-1838, artmuseum@utoronto.ca or artmuseum.utoronto.ca.

September 14 to October 22
Doris McCarthy Gallery, UTSC
Outdoor School is a series of artist-directed activities on and around the UTSC campus. Involving artist-led plant walks, explorations of landscapes and more, *Outdoor School* aims to deepen and complicate our relationship to the outdoors. Free. Mon. to Thurs., 11 a.m.–4 p.m., Wed. to 8 p.m., Sat. 12–5 p.m. 1265 Military Trail. 416-287-7007. utsc.utoronto.ca/dmg.

October 24 to February 24
Thomas Fisher Rare Book Library
"Moments of Vision": The Life and Work of Thomas Hardy. Free. Mon. to Fri., 9 a.m.–5 p.m., Thurs. to 8 p.m. 120 St. George St. 416-978-5285.

November 2 to December 10
Doris McCarthy Gallery, UTSC
Meryl McMaster: Confluence, curated by Heather Anderson. McMaster's photographs explore the fluid domain of identity. Free. Mon. to Thurs., 11 a.m.–4 p.m., Wed. to 8 p.m., Sat. 12–5 p.m. 1265 Military Trail. 416-287-7007. utsc.utoronto.ca/dmg.

Lectures and Symposia

September 22
Rotman School of Management
Big Ideas Speaker Series @ Rotman. Dan Levitin, professor of psychology and behavioural neuroscience at McGill University, and author of *A Field Guide to Lies: Critical Thinking in the Information Age*. $32 plus HST (includes one copy of *A Field Guide to Lies* and one seat). 4–5 p.m. Fleck Atrium, 105 St. George St. To register: rotman.utoronto.ca/events. For info: 416-978-4193 or events@rotman.utoronto.ca.

November 9
Innis Town Hall
Harold Innis Lecture: George Elliott Clarke. The Canadian Parliamentary Poet Laureate explores the intersection of Canadian cultural identity, communications technology and multiculturalism. Free. 6:30 p.m. Reception to follow. 2 Sussex Ave. 416-978-3424, alumni.innis@utoronto.ca or alumni.innis.utoronto.ca.

Music

November 24–27
MacMillan Theatre
Orpheus in the Underworld. The irreverent parody of mythology's greatest lovers is Jacques Offenbach's masterpiece. It will be sung in the original French with new English dialogue by Michael Patrick Albano who also directs. The U of T Symphony Orchestra will be conducted by Russell Braun. Nov. 24–26, 7:30 p.m.; Nov. 27, 2:30 p.m. $40 ($25 senior, $10 student). Edward Johnson Building, 80 Queen's Pk. Box office: 416-408-0208. music.utoronto.ca.

Special Events

October 6
Hart House
Thanksgiving Feast. A traditional Canadian Thanksgiving feast, prepared by Chef Marco Tucci, will feature turkey with all the trimmings, local side dishes and more. Price TBA. Time TBA. Great Hall, 7 Hart House Circle. 416-978-2452, inquiries@harthouse.ca or harthouse.ca.

October 23
U of T Mississauga
U of T Mississauga Fall Campus Day. UTM opens its doors to high school students, parents, teachers and others. Fall Campus Day includes an academic fair and showcases UTM's student services and organizations. Free. 11 a.m.–3 p.m. UTM campus, 3359 Mississauga Rd. utm.utoronto.ca/fcd.

October 28
Hart House
Halloween Party. Come enjoy the biggest Halloween party on campus. Price TBA. Time TBA. Great Hall, 7 Hart House Circle. 416-978-2452, inquiries@harthouse.ca or harthouse.ca.

November 11
Soldiers' Tower
Service of Remembrance. 10:15–11 a.m. A carillon prelude and postlude. Free. 7 Hart House Circle. For more information: Kathy Parks, 416-978-3485 or soldiers.tower@utoronto.ca.

December 13–15
Hart House
Winter Buffet. Break bread with friends and colleagues at one of these luncheons, featuring Chef Marco Tucci's traditional stuffed turkey and other locally sourced dishes. Price TBA. Time TBA. Great Hall, 7 Hart House Circle. 416-978-2452, inquiries@harthouse.ca or harthouse.ca.

Sports

October 6
Varsity Stadium
Football Turkey Bowl. Varsity Blues vs. Laurier Golden Hawks. 7 p.m. 299 Bloor St. W. varsityblues.ca/tickets.

October 15
Varsity Stadium
Football. Varsity Blues vs. Waterloo Warriors. 1 p.m. 299 Bloor St. W. varsityblues.ca/tickets.

November 3–6
St. George Campus
2016 CIS Field Hockey Championships. Time TBA. Back Campus Fields. varsityblues.ca/tickets

Theatre

November 4–19
Hart House Theatre
Much Ado About Nothing by William Shakespeare. The soldiers may be returning from war, but between Benedick and Beatrice, the battle is just beginning. This is a lively showdown between the sexes. $28 ($17 seniors, $15 students). Nov. 4 and 5, 8 p.m.; Nov. 9–12, 8 p.m.; Nov. 16–19, 8 p.m. (additional Nov. 19 matinee at 2 p.m.) Post-show talkbacks: Nov. 5 and 10. Pre-show artist chat: Nov. 19 at 1 p.m. 7 Hart House Circle. For tickets: 416-978-8849. harthouse.ca/much-ado-about-nothing.

PHOTO: COURTESY OF THOMAS FISHER RARE BOOK LIBRARY

HOW COULD THIS BE MORE BEAUTIFUL?

Exploring the world with like-minded people makes the experience all the more vivid. The University of Toronto Alumni Travel Program offers wide-ranging opportunities to connect with alumni and other travellers who share your sense of adventure. These tours criss-cross the globe. They're always fascinating, enriching and meticulously planned—down to every detail and flavour. What will turn your trip into a journey are the people you meet along the way.

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UNIVERSITY OF TORONTO

BOUNDLESS

Life on Campus

"If someone is angry, I want to show the anger. If they're in pain, I want to show the pain"

Prof. Randol Contreras on writing about the Maravilla gangs of Los Angeles

p. 13

An Historic Investment in Canadian Science and Innovation

$190 million will be spent upgrading U of T's research labs

IN WHAT UNIVERSITY OF TORONTO PRESIDENT Meric Gertler called "an historic investment in Canadian science and innovation," the federal and provincial governments are joining with the university to provide almost $190 million to upgrade nearly half of U of T's research labs over the next two years.

The Lab Innovation for Toronto (LIFT) project, announced in July, will lead to a full renovation of 546 labs – providing state-of-the-art research facilities to an estimated 1,100 researchers and 5,500 students. Work has already begun and will be complete by the spring of 2018.

"These investments will help us attract and retain talent from around the world and across the country. It's really critical," said President Gertler. "We're very well known as a research powerhouse but…if the [lab research] space is substandard it limits what this talent and faculty and student body can do. By modernizing that space the sky is really the limit." ›

PHOTO: KEN JONES

Trevor Young, dean of medicine

IN CASE YOU MISSED IT

Rainbow Connection

The University of Toronto was awash in the bright colours of the rainbow flag during this year's Pride Day on June 23. U of T members from all three campuses decorated their spaces to the hilt – from Innis College's balloon archway, to streamers in Hart House – to celebrate sexual and gender diversity as part of the Display Your Pride event.

Dean Trevor Young of medicine took part by adding paper loops to an installation at the Medical Sciences Building. People were encouraged to add a loop to the display, and post a photo to social media, in support of a positive, inclusive space.

"It's a way to celebrate Pride in a fun way," says Allison Burgess, U of T sexual and gender diversity officer. "[The event] helps to increase visibility, which is an important part of destigmatizing discrimination against sexual and gender identities."

Display Your Pride, started by Ryerson University, was adopted by the University of Toronto's Positive Space Committee last year. **– SALLY CHOI**

The LIFT project will affect all three campuses and nine academic divisions. The facilities to be renovated include not only medical, dental, biology, chemistry and engineering labs, but also a former horse barn north of Toronto now used for ecological research, a green roof on the historic 1 Spadina Avenue building (the new home of the John H. Daniels Faculty of Architecture, Landscape, and Design), an electro-acoustic music studio at the Faculty of Music and many others. At the University of Toronto Scarborough, the campus vivarium and the S-Wing research labs will undergo $17.8 million in renovations, while the University of Toronto Mississauga's Davis Building will get a $17.1 million upgrade.

The labs to be renovated by the project are, on average, 50 years old and comprise more than 50,000 square metres of inefficient space – the equivalent in total size to 15 soccer pitches, said Scott Mabury, vice-president, university operations. If U of T was building all-new labs instead of rejuvenating existing facilities, the cost per square metre would be approximately $12,000, totalling close to $650 million, he added. "The renovations will modernize U of T's research labs to increase usable space and enhance the quality of the research and learning environment," Mabury said. "They will also improve air handling, climate and electrical systems."

The university will provide $91.8 million, while the federal and provincial governments will contribute $83.7 million and $14.3 million respectively for a total of $189.8 million. "The LIFT project will equip our brilliant scholars, students and staff with the cutting-edge facilities they need to learn, collaborate and discover," said President Gertler. "The modernization of these labs will also reduce our greenhouse gas emissions significantly. The University of Toronto greatly appreciates the federal and provincial governments' support of postsecondary education and research, and their leadership in ensuring Canada secures its place among global leaders of science and technology."

Mario Ostrowski is one of the researchers who will benefit from the renovated research facilities. A renowned HIV scientist affiliated with St. Michael's Hospital and U of T's Faculty of Medicine, Ostrowski said there is fierce competition among research institutions for graduate students and post-docs. State-of-the-art labs will help U of T recruit the best and the brightest students, he said, and will also inspire existing researchers and students to greater achievements. "Just like great architecture inspires people every day to achieve excellence, if you've got a nice lab that's state of the art, it inspires and stimulates people to produce excellence."

– TERRY LAVENDER WITH FILES FROM JENNIFER ROBINSON

PHOTO: JULIA SOUDAT

The feud between the Maravilla gangs and the Mexican Mafia started because the Maravilla refused to give the Mafia a cut of their criminal earnings

Randol Contreras

The Inner Lives of Gang Members

Professor Randol Contreras spends time with the Maravilla in Los Angeles

SOCIOLOGY PROFESSOR RANDOL CONTRERAS is back in the classroom this fall after spending much of the summer with Mexican American gang members on the streets of Los Angeles. What sounds like a very atypical vacation choice was, in fact, integral to his ongoing research into what drives people to crime in marginalized urban communities. "Academics often treat these individuals as objects and analyze them from a distance," says Contreras, who joined U of T Mississauga in 2014.

Contreras had his own unsuccessful stint as a crack dealer before a concerned friend signed him up for community college, so he empathizes with many of his interview subjects. "I try to get to the everyday struggles and anguish that individuals feel by developing relationships with them," he says.

Contreras became interested in the Maravilla gangs in 2013 while working at California State University, Fullerton. (Maravilla is the original name for East L.A., and there are Maravilla gangs in almost 20 neighbourhoods in the area.)

His research aims to explain how large social and economic forces lead to despair in underprivileged neighbourhoods, generating a downward spiral of violence, drugs and criminality. With the Maravilla gangs, he is examining how the economic recession of 2008–2009 and the uneven recovery in the U.S. have affected aging gang members, who, as ex-convicts with histories of addiction, face extremely limited job prospects.

He is also interested in the consequences of an incident in the early 1990s when the Maravilla gangs defied California's dominant gang, the Mexican Mafia. This led to them being "green-lighted" by the Mexican Mafia: Mafia members were ordered to attack or kill them on sight, increasing the violence and victimization experienced by Maravilla members. (The green-light is in force today on several Maravilla gangs that continue their resistance.)

Contreras, who returns to L.A. on winter and summer breaks, always tells the gang members he is a researcher, but he slowly earned their trust by dressing like them, volunteering to teach handball – one of their favourite sports – at a local community centre, and simply hanging out on the street listening to their tales of violence, gang honour and economic hardship.

His aim is to publish a book that offers new insight into why offenders do what they do, and the consequences. "The research is risky, especially because it involves the Mexican Mafia," says Contreras. "People have told me that once I publish it I can never go back to L.A."

This is not the first time Contreras has documented the criminal underworld from the inside. His book *The Stickup Kids,* based in South Bronx where he grew up, details how the fall of the crack economy led his friends to switch from drug dealing to robbing drug dealers. "As sociologists, we're doing science, but this is not a laboratory where we study behaviours without understanding how people feel," he adds. "If someone is angry, I want to show the anger. If they're in pain, I want to show the pain." – **MEGAN EASTON**

NAMECHECK

Skule

It's well known that the U of T engineering community goes by the quirky name of "Skule" – but why? The roots lie in the School of Practical Science – the predecessor to the Faculty of Applied Science and Engineering. Almost a century ago, engineering students dubbed it "the Skule" – playing on the idea that they were rotten spellers. Some found this derisive, but the cheeky moniker took hold, and intentional misspellings carried on throughout the history of U of T engineering – most notably, in the Lady Godiva Bnad.

The first recorded use of Skule was in a 1943 programme for Skule Nite – the engineering students' annual revue. The Engineering Society trademarked the name in 1984, and now it is synonymous with U of T engineers and their fun-loving frame of mind. "Skule embodies the spirit and energy that defines the student and alumni communities. It's the work hard, play hard attitude," says Sonia De Buglio, director of alumni relations at Applied Science and Engineering. "It is both a noun, in that it is the U of T engineering community, and an adjective in the way it describes the intangible spirit and energy." – **STACEY GIBSON**

Ursula Franklin pioneered the field of archaeometry, applying modern materials science to the dating of archeological artifacts

Chris Primerano and Heather Shanahan

A Mystery Intruder at UTM?

A new mobile game from U of T Mississauga's Office of Student Transition is helping orient frosh to the western campus.

Guardians of UTM is an iOS or Android app designed to help new students find their way around and learn how to access important services. The quest-based game's storyline involves a mystery intruder selling UTM's secrets to other schools. Someone has to find the mole and stop the leaks; players join secret society teams led by UTM mascots.

To solve the game, players must physically visit locations around campus – such as the Book Store or the Hazel McCallion Academic Learning Centre – completing challenges and then scanning a QR code to proceed. The game takes about six weeks to complete, culminating in a real-life *Amazing Race*-style day during Fall Reading Week that will bring together all players to solve the final challenge.

Computer science student Chris Primerano, along with students in art and art history (including Heather Shanahan), and commerce, planned the story arc, wrote scripts, designed avatars and created code. "It's about building pride at UTM," says Primerano. "This will help students feel like they're part of UTM's campus community."

– BLAKE ELIGH

SOUND BITES

Is there a scientist who inspires you?

[Late U of T prof.] Ursula Franklin: I am grateful that I had the opportunity to meet this amazing woman who paved the way for women profs in engineering.
@StormWater_TO

U of T prof Helen Hogg, who worked in the Dunlap Observatory in the '30s with her baby with her in a basket.
@KerryReads

Alexis Carrell, vascular suturing, transplantation, 1912 Nobel Prize
@UofTVascular

Join the conversation at twitter.com/uoftmagazine.

Poll | How many languages do you speak?

U of T students hail from 168 countries, so it is not surprising that these polled students speak 28 languages among them. The most popular, outside of English, are Mandarin (28 per cent), French (16 per cent) and Hindi (7 per cent). Other languages range from Konkani to Russian and Vietnamese. Besijani Mati, who studies math and statistics at Trinity College, speaks an impressive four: "My native language is Albanian…and most of the TV I watched in Albania was in Italian, so I just acquired the language." She also studied French, and learned English upon moving to Canada. Esther Nshimirimana, an international development and French student of Burundian descent, also speaks four. Like her parents, she speaks English, French and Kirundi (the official language of Burundi, Africa) – then was inspired to learn Mandarin by Toronto's diversity: "You're able to understand more about a culture when you learn its language." **– SALLY CHOI**

This highly unscientific poll of 100 U of T students was conducted at Sidney Smith Hall on St. George Campus in July.

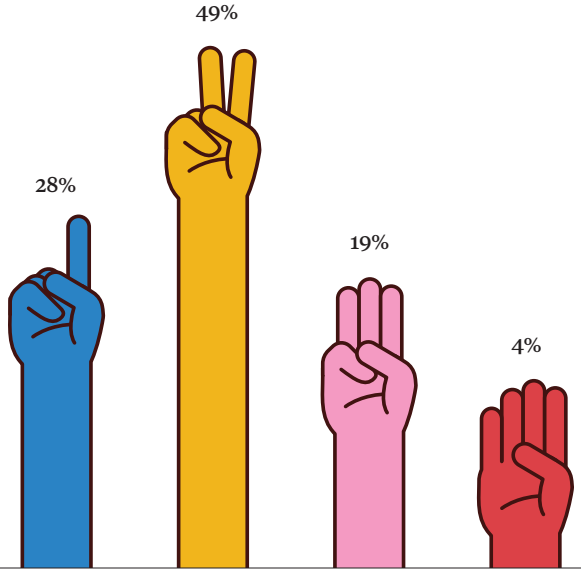


PHOTO: TOP, MARK NEIL BALSON; LEFT, JACKIE GOODMAN

Prime Minister William Lyon Mackenzie King used to visit Toronto brothels as a young man, says Prof. Laurie Bertram

Helping Undergrads Refine Their Skills

New feedback tools from engineering will help students home in on weaknesses – and strengths

Researchers in the Faculty of Applied Science and Engineering are testing a new way to provide feedback on undergraduate assignments that would give students more useful information about their strengths and weaknesses in career and life skills.

The feedback instruments are being developed to give students more consistent and detailed descriptions of their performance in five areas – communication, teamwork, problem-solving, design and investigation skills.

Graduates of all Ontario universities are expected to perform well on these skills and others – called "learning outcomes" or, in engineering, "graduate attributes."

These new feedback tools are also being developed to help bring greater consistency to how students are assessed throughout their university career, says Susan McCahan, vice-provost of innovations in undergraduate education. The tools would also make it easier for undergraduates to recognize the specific skills they need to improve, she says.

As McCahan explains, with the current approach, a student may score 60 per cent in a course on game theory and 80 per cent in Canadian literature and conclude he is just not very good at game theory. But if students are assessed in different courses on a consistent set of skills (as well as the content related to that course), they may discover that they need to improve their problem-solving, for example, or learn to construct written arguments better. "They could then seek another course that supports learning in this area," she says.

Another option for students would be to look for a co-curricular activity that supports relevant skill development. The point, says McCahan, is to enable students to tailor their university experience so they acquire the skills and experience they want, rather than trying to design a curriculum that will slot them into a specific job. "That's not what universities should be designed to do," she says.

McCahan emphasizes that learning outcomes are one way of helping students get more out of their university education: "It's like when you go through an art exhibit and someone tells you about the art, the artist and how their work relates to other art. It's not about reducing your experience of the art to just those facts. It's about enriching your overall experience."

Although the new feedback tools are being developed – and tested – in the Faculty of Engineering, they have been designed for use across the university. The tools will be available on a public website for any instructor to use, says McCahan. – **SCOTT ANDERSON**

Laurie Bertram (far right) with students

THERE'S A COURSE FOR THAT

"The Oldest Profession in Canada"

Students are exploring the impact of the world's oldest profession in Prof. Laurie Bertram's seminar on sex work in Canadian history. Through research in the Thomas Fisher Rare Book Library, students examine a history that is often hidden from descriptions of 19th and 20th century Canadian society. Her seminar encourages students to think critically about the differences between stereotypes and the more diverse lived realities of those involved in the sex trade.

Students work on a digital map that illuminates the history of the sex trade in Toronto in the late 19th century. Each student researches the life of one sex worker who appears in police records – adding a human face and story to this often hidden history. "This course is really about honouring the history of the sex workers in Canada," says Bertram. "And when we honour that, I think we also honour their present and future." – **STAFF**

PHOTO: TOP, JASON KRYGIER-BAUM; BOTTOM, JOHN GUATTO

P.O.V.

The Art of the Deal

U of T Art Museum's Barbara Fischer talks about the merging of two campus galleries – and what it means for visitors

EARLIER THIS YEAR, the Art Museum of the University of Toronto was born – a federation of the U of T Art Centre (UTAC) in University College and Justina M. Barnicke Gallery in Hart House that includes more than 7,000 holdings. **Barbara Fischer**, executive director and chief curator – as well as associate professor, teaching stream, at the Daniels Faculty of Landscape, Architecture, and Design – talks to Stacey Gibson about the change.

What does this cultural merger mean? Two of U of T's galleries – UTAC and the Justina M. Barnicke Gallery – are only 40 metres apart. For most of our history, we operated independently of each other, and that made it complex to communicate to a broader public. The federation is an opportunity to make both galleries more impactful, more effective in their operation and more visible, and to simplify how we communicate the larger program of exhibitions. The Art Museum is the umbrella term for these two galleries.

What is the function of the Art Museum? Overall the purpose is really to bring the university to the city, and bring the city to the university – and to bring the world to the university. We're a gateway in some ways: for research, for knowledge about art in its multiple manifestations and, through art, to the world.

The Art Museum also offers multiple opportunities for students. For instance, through Hart House we have a volunteer group of students who are involved in educational events, including the acquisition of a work of art each year. We also employ many work-study students from various walks of learning. Annually, we host exhibitions by students from visual studies, curatorial studies and museum studies.

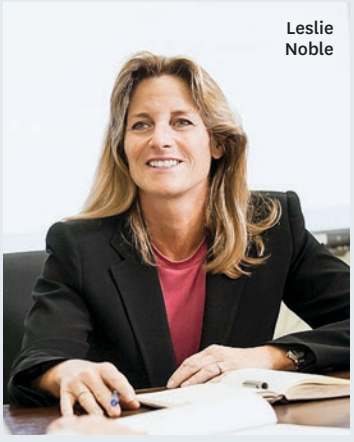
The Art Museum offers an *experiential* connection to intellectual and academic work. It's almost what a lab is to science – with the difference that we are able to present that work through exhibitions and public events all year round to a public.

Do the exhibitions always run across both galleries? Most of the time, our exhibitions span both spaces. For instance, we currently have "Form Follows Fiction," a major exhibition that looks at 50 years of Toronto art and artists and involves nearly 100 artists [on until December 10]. But from time to time we will utilize our existing spaces to feature distinct projects.

What are your future plans? We're embarking on a major renovation, hoping to create a new entrance to the museum at UTAC, as well as a better visual link between both galleries. Our plan is also to make a better connection to the University College courtyard. We envision it becoming part of our programming – with outdoor projects, installations, receptions and more. We also need to improve wheelchair accessibility.

What do you hope people will take away from the Art Museum? Coming to the Art Musuem is an experience where instead of only reading or contemplating in your own space and time, by yourself, you can explore and talk about it with others. It creates a shared space and in that process you can become part of its possible futures.

Why I Give

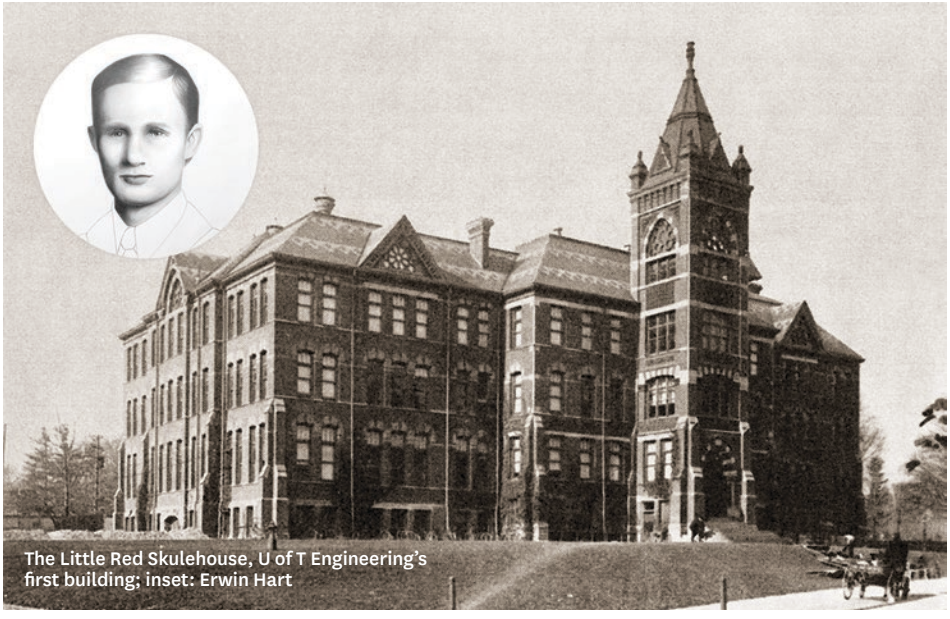

Leslie Noble

As a student, StrategyCorp founder **Leslie Noble** (BA 1984 UC) enjoyed the architectural beauty of University College. And she's now contributing $50,000 to the UC restoration project, which will revitalize the building while preserving its architectural heritage. Projects include restoring the library to its original location in the East Hall, establishing a reading room, updating academic spaces and increasing accessibility.

Leslie: When I went to University College, the building was in various stages of repair and disrepair. It's such a lovely old building, very historic. It's a wonderful place that feels like an academic setting, but I felt it didn't always reach that standard – whether that was because some of the rooms weren't in proper repair or there weren't adequate quiet study spaces available. This is a tremendous step forward, and a great way to restore the building to its natural splendour and provide ample places for students to study in a quiet but also inspirational setting.

I think it's really important to give back to the university – and the idea that we're restoring the bricks and mortar, making it a more comfortable place for people to get their education in a professional and academic situation, is really critical.

PHOTO: LEFT, JOHN GUATTO; RIGHT, COURTESY OF STRATEGYCORP



The Little Red Skulehouse, U of T Engineering's first building; inset: Erwin Hart

Alumnus Leaves Landmark $20-million Bequest to U of T Engineering

Hart Professorships will boost early-career research and more

A $20-MILLION BEQUEST from the estate of alumnus Erwin Edward Hart (BASc 1940) will bolster early-career research and education at the Faculty of Applied Science and Engineering – and provide enhanced opportunities for graduate students.

The income from the Hart Trust will fund the Percy Edward Hart and Erwin Edward Hart Professorships. Seven faculty members, each within the first 10 years of their academic career, receive $75,000 per year for three years for research and graduate student support. The recipients are nominated by their department or institute and have demonstrated a high level of research excellence and exemplary graduate mentorship. The first cohort of Hart Professors began this September.

Erwin Edward Hart was an employee of Massey-Ferguson Ltd. and served as the company's chief welding engineer. The professorships are named in honour of Erwin and his late father, Percy.

"The Hart Professorships are an outstanding example of the impact that can be made when visionary generosity meets visionary leadership," says U of T president Meric Gertler. "Mr. Hart's legacy gift will bolster the work of promising researchers at a crucial stage in their careers."

The professorships will foster the next generation of engineering research leaders and educators, and strengthen the Faculty of Applied Science and Engineering's position as one of the world's great engineering schools, says Dean Cristina Amon.

"Investments in early-career faculty will accelerate research and innovation," Amon says. "This gift will support generations of professors and deepen our faculty's culture of research and teaching excellence. It will also strengthen the faculty's ability to recruit top early-career educators and researchers from around the world. Our students will benefit by working with faculty members who are committed to mentoring the next generation of innovators." – **STAFF**

People

Liz Howard

Liz Howard describes literature and science as "twin rigours that have occupied me and continue to grow" – and both those fascinations are reflected in her debut book, *Infinite Citizen of the Shaking Tent*, which won this year's Griffin Poetry Prize. Howard – a research officer in cognitive psychology at U of T who earned a bachelor of science in 2007 from New College and took poetry courses at the School of Continuing Studies – is the youngest poet to receive the $65,000 award.

The following U of T engineering professors have been inducted as fellows of the Canadian Academy of Engineering. Prof. **Nazir Kherani** is an expert in tritium science and technology, and solar photovoltaics. Prof. **Deepa Kundur** creates key technologies for security of digital media and "smart" infrastructure. Prof. **Milica Radisic** is a leader in cardiovascular tissue engineering. She has pioneered "electrical field stimulation" to cultivate functional heart tissue in the lab, leading to new approaches to testing drugs. Prof. **Murray Thomson** is a researcher in alternative fuels, pollution control and combustion sensors. He has developed industrial sensors that allow reductions in energy consumption and emissions through better monitoring. Prof. **Honghi Tran**'s contributions to the pulp and paper industry include patented research advances that have saved the industry hundreds of millions of dollars. Adjunct professor **Sankar das Gupta** is CEO of Electrovaya, and developed the first lithium ion-powered electric car in North America and in Europe.

PHOTO: LEFT, U OF T ARCHIVES (WITH ILLUSTRATION BY ANDREA M. LISTRO); RIGHT: RALPH KOLEWE

UNIVERSITY OF TORONTO

BOUNDLESS

THEY PROTECTED US.

WE PROTECT THEIR MEMORY.

Soldiers' Tower was built in 1924, funded by donations from alumni of the University of Toronto. This Remembrance Day, our community will gather under a fully restored Soldiers' Tower, thanks to the generosity of our alumni and friends. Alumni and friends like you have helped raise more than $1.1M to return the Tower to its original glory. Thank you!

Preserving the Soldiers' Tower and the memory of the 1,185 alumni, students, staff and faculty who gave their lives in the two World Wars continues to be a sacred responsibility. With your help, we will ensure this monument to bravery and sacrifice continues to stand strong for many years and many generations to come.

Please make your gift to the Soldiers' Tower Fund today. We hope you will join us on Friday, November 11, 2016 at 10:15 am for our annual Service of Remembrance.

Photo: University of Toronto Archives – November 11, 1924

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THANK YOU

Leading Edge

"The fear of inevitable and imminent disruption is unfounded"

Joshua Gans, a Rotman School of Management prof, addresses a myth that keeps many CEOs awake at night

p. 21

Hungry for Hazardous Waste

How pollution-eating microbes could help clean up toxic sites

PROFESSOR ELIZABETH EDWARDS of chemical engineering and her team have developed a secret weapon in the war against pollution: a mix of micro-organisms that eat toxic chemicals for breakfast. Now, funding from Genome Canada will help Edwards and her industrial partners bring the unique microbial culture to market.

Everywhere tanks of oil or gasoline are stored underground, hazardous chemicals leak into soil and groundwater. "The owner of every gasoline station on the planet probably has some contamination issues," says Edwards, who holds the Canada Research Chair in Anaerobic Biotechnology.

To clean up the site, crews have to dig, wash or aerate the soil to encourage the growth of oxygen-loving micro-organisms that break down the pollutants – a labour-intensive, time-consuming and expensive remediation process. Edwards and her team have discovered another set of organisms that live without oxygen and could do the job without having to churn up and process all the soil.

The microbial cultures Edwards works with now have evolved from soil samples taken at contaminated oil refinery and gas station sites more than 15 years ago. Since then, Edwards and her team have been enriching the cultures by feeding the organisms oil-derived chemicals that are difficult to degrade and selecting the samples that are most effective at breaking them down.

"What we have is a culture that can chow down on these chemicals when there's no oxygen around," says Edwards. Adding this culture to a contaminated site, a process known as bio-augmentation, may speed up the degradation of pollutants with minimal disruption to the environment. ›

ILLUSTRATION: BRIAN STAUFFER

U of T's Green Roof Innovation Testing Laboratory has found that, during summer, green trellises can reduce a building's exterior surface by as much as three degrees Celsius

In addition to demonstrating the effectiveness of the process in the lab, the team has done extensive genomic sequencing to understand which individual species in the culture are responsible for each step in the chemical breakdown. "We think it's ready to be tested in the field, but to do that we have to scale it up," says Edwards. Her team is partnering with SiREM, an environmental remediation laboratory in Guelph, Ontario, that specializes in bio-augmentation. The lab has already commercialized another one of Edwards' microbial cultures, which is optimized to clean up chlorinated solvents such as those used in dry cleaning and other industrial applications. Adding more chemicals to the list of treatable ones could help increase SiREM's share of the global market for bio-remediation, which is estimated in the billions of dollars.

"This project is a great example of the way our researchers work across disciplines to address challenges in sustainability," says Prof. David Sinton, interim vice-dean, research, for the Faculty of Applied Science and Engineering. "Together with industrial partners, engineering researchers are bringing leading-edge solutions from the lab to the global marketplace."

Other partners include Mitacs, a Canadian non-profit that's funding a post-doctoral researcher on the project, and the Ontario Ministry of Research and Innovation, which will provide matching financial support.

If the pilot project is successful, the bio-augmentation culture could be used at contaminated sites around the world. "It's a brand new tool to deal with difficult remediation," says Edwards.

– TYLER IRVING

Investigating Media Bias

Visible minority political candidates get short shrift from newspapers, study finds

CANADIANS TAKE PRIDE IN THE COUNTRY'S REPUTATION for inclusivity and diversity, but new research from U of T Mississauga shows that when it comes to reporting on politics, there's room for improvement.

In her new book, Prof. Erin Tolley of political science examines how minority political candidates are treated by the mainstream press. *Framed: Media and the Coverage of Race in Canadian Politics* reveals that while overt racism rarely occurs in the pages of Canadian newspapers, assumptions about race and diversity often influence media coverage to the detriment of visible minority candidates.

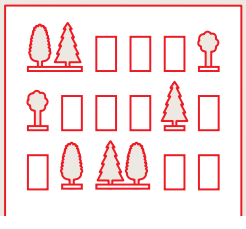
Tolley surveyed coverage of the 2008 federal election by 18 English-language daily newspapers, comparing articles about white candidates to articles about candidates from visible minority backgrounds. Tolley analyzed each story's main focus, the policy issues candidates were shown to be interested in and the extent to which each candidate was portrayed as a legitimate contender with a chance of winning.

She found that articles about minority candidates received less prominence and were less likely to be positive in tone, portray candidates as electorally viable or focus on issues that mattered most to the electorate. "Minority candidates were not included in conversations about key issues like the economy," she says. Tolley adds that these differences in coverage could not be explained by any factor other than race.

Tolley notes that some visible minority candidates are aware of these factors and work to counter them. One candidate said that when he speaks in the House of Commons, he posts the video online so people can see that he's articulate and speaks without an accent. Others work to demonstrate expertise in areas unrelated to immigration and diversity. **– BLAKE ELIGH**

LINGO

Vertical forest



Green roofs are one way to incorporate vegetation into a building's design, but they suffer from a major drawback: you can't see them from the street. So some architects, primarily in Europe and Asia, have started building towers with stronger balconies that support full-size trees and bushes, creating a kind of "vertical forest."

Like green roofs, vertical forests help keep the building – and the city around them – cooler in summer. They improve urban biodiversity and look nice. Architects tend to like them because they open up new design possibilities, says Prof. Liat Margolis, director of the Green Roof Innovation Testing Laboratory at the Daniels Faculty of Architecture, Landscape, and Design. The challenge, she notes, is that reinforcing the balconies boosts construction costs and caring for the vegetation adds to the maintenance bill. So an important question for cities considering them is whether the environmental and aesthetic benefits justify these extra costs, she says.

And while vertical forests work well in semi-arid or tropical climates, they may not withstand Canada's more extreme weather. "You'd have to be careful with plant and soil selection," she says.

– STAFF

PHOTOS: ISTOCK

Netflix launched its DVD-by-mail service in 1998. Blockbuster at its peak in 2004 had 9,000 stores; it filed for bankruptcy in 2010

THE BIG IDEA

The Risk of Innovating First

How should companies respond to technological disruption?

A GENERATION AGO, many corporate leaders were ignorant of – or at least complacent about – the risk that technological innovations could put them out of business. Now they're downright paranoid about it, says Joshua Gans, a professor at the Rotman School of Management. But should they be?

In 1996, Harvard Business School professor Clay Christensen proposed in his book *The Innovator's Dilemma* that even the best-managed firms can do all the right things and still get blindsided by disruption.

This alarmed established business leaders, but delighted startups who saw themselves as potential disruptors. The subsequent failures of companies such as Kodak, Polaroid and Blockbuster, which proved unable to adapt to advances in imaging and video distribution, seemed to prove Christensen right.

But fear is the wrong response, says Gans, who in his new book, *The Disruption Dilemma*, revisits Christensen's theories with the aim of helping managers respond to disruption more effectively. "Successful firms and their investors can calm down," he says. "This doesn't mean they can relax, but the fear of inevitable and imminent disruption is unfounded."

For a start, says Gans, disruption doesn't happen overnight. Even in cases where it does occur quickly, the evidence shows that companies have years – not weeks or months – to figure out how to respond. BlackBerry's revenues more than tripled in the four years after the launch of Apple's iPhone (but then collapsed over the next three years). "In most cases," says Gans, "the companies muddle through. They're big firms, and [unlike BlackBerry] not everything they do is being disrupted."

Second, it's easy to identify disruption in hindsight but not when it happens. And even when business leaders do see it at the time, it's difficult to know how to respond, since nine times out of 10, innovators fail. The lesson: Established firms should react gradually and cautiously.

Third important point: Be sure you're watching for the right thing. Christensen defined disruption as what happens when a competitor introduces a new low-cost, inferior product that initially attracts only the incumbent firms' worst customers, but then rapidly improves to attract greater market share. As a result, he famously dismissed Apple's iPhone as not disruptive because it was priced at the high end of the market.

What Christensen failed to realize, says Gans, was that the iPhone represented a different *kind* of disruption. It completely changed what a cellphone was, in both design (with its large touch screen) and function (apps that turned it into a pocket computer). This kind of "architectural" innovation is extremely difficult for incumbent firms to respond to and often requires a complete operational overhaul. The most effective competition to the iPhone came from a company that wasn't burdened with an existing handset business: Google, with its Android operating system.

So how do companies insure against iPhone-type disruption? Gans says they need to assimilate emerging innovations into their operation rather than setting up a separate business unit to deal with them, as Christensen recommended. Companies that navigate disruption successfully tend to be structured in tightly knit teams, cultivate close links to customers to anticipate their future needs and experiment across multiple generations of technology. Rotating managers among different areas of the company also helps those managers embrace innovation more easily.

As Gans points out, firms that successfully adapt to new technology are often not first adopters or market leaders. They're prepared to "be number two in the industry for a long time rather than number one for a short time."

– **SCOTT ANDERSON**

ILLUSTRATION: YAREK WASZUL

Which nations' citizens drink the most tea? Turkey is first at more than three kilograms per person annually, followed by Ireland, the U.K. and Russia

STARTUP

Brewed to a T

Using robotic technology, an engineering student lets tea drinkers create their perfect cuppa

A U OF T STARTUP that uses robotic technology to serve up customized cups of looseleaf tea has deployed machines in nine retail outlets, libraries and corporate offices across North America, and is on target to launch some 30 more by year-end, according to one of its co-founders.

Rehman Merali, a PhD student at the University of Toronto Institute for Aerospace Studies, co-founded Teabot three years ago with his high-school friend Brian Lee. Lee's mother owns a tea shop in Sudbury, Ontario, where the line is often out the door. "His poor mom couldn't make tea fast enough," says Merali. "One day, he said, 'Rehman, you're a robotics guy, can't you build a machine that will make a cup of tea faster?'"

As a graduate student, Merali works with Prof. Tim Barfoot, whose lab designs algorithms to help mobile robots move themselves using visual sensors.

At Lee's mother's store, Merali learned that the top 10 tea blends account for 80 per cent of her business – and are composed of only a few ingredients each. "We realized that if we could dispense the right amounts of these different ingredients, we could make personalized cups of tea," says Merali. "Now we had a product that didn't exist on the market: you can't go into an ordinary café and order 30 per cent peppermint and 40 per cent rooibos – or whatever you want."

Today, the Teabot holds 18 types of ingredients, up to three of which can be combined in any proportion for a given cup. Through a touchscreen interface or from a mobile phone app, the user can specify his or her personalized blend and desired water temperature, pay with a credit card and retrieve their brewed cup in 30 seconds. In Toronto, Teabots are located in U of T's Gerstein library, the MaRS atrium on College Street and at York University.

Merali says the company's biggest engineering challenge was designing a dispensing mechanism that could handle the unique properties of looseleaf tea. "It's very delicate, and there are different granularities and sizes. The difference between a rooibos and an oolong is like night and day," he says. "It would have been so much easier if we could grind it up like coffee, but customers are paying for looseleaf tea, so we had to deliver that experience."

In recent months, the company has focused on improving the Teabot machines, but it soon plans to allow customers to have packages of their favourite tea blends delivered to their door.

Teabot received support from several business accelerators that are part of the entrepreneurial ecosystem at U of T, including the Creative Destruction Lab and Start@UTIAS. – **TYLER IRVING**

Findings

Fast Food and Diabetes

Canadian adults under the age of 65 have a 79 per cent greater risk of developing diabetes if they live near a high number of fast-food restaurants and have few healthier dining options, according to researchers at U of T's Dalla Lana School of Public Health.

The study is the first in Canada to examine whether living within walking access to various types of restaurants in urban residential areas affects the risk among adults of developing diabetes. In their calculations, the researchers accounted for individual and neighbourhood socio-economic factors and neighbourhood walkability. "Our results show that having restaurant options that offer healthier alternatives to fast food may be important for mitigating people's risk of developing diabetes," says Jane Polsky, a PhD candidate and the study's lead author. – **NICOLE BODNAR**

Flying Off the Handle

A U of T researcher and a Harvard colleague say they have discovered one previously overlooked factor in air rage – and it's not flight delays, shrinking seats or a general decline in civility.

Katy DeCelles, a professor at the Rotman School of Management, says visible inequality between first-class and economy-class passengers is one thing associated with travellers from both groups who lose composure while flying.

Air rage incidents are nearly four times as likely when the plane has a first-class cabin, according to the study. The odds are greater when economy passengers pass through first class to get to their seats, reinforcing the inequality. The bad behaviour was higher for both classes of passengers. Other factors such as crowdedness, alcohol and flight delays can contribute to disruptive incidents, says DeCelles, but more research is needed.
– **KEN MCGUFFIN**

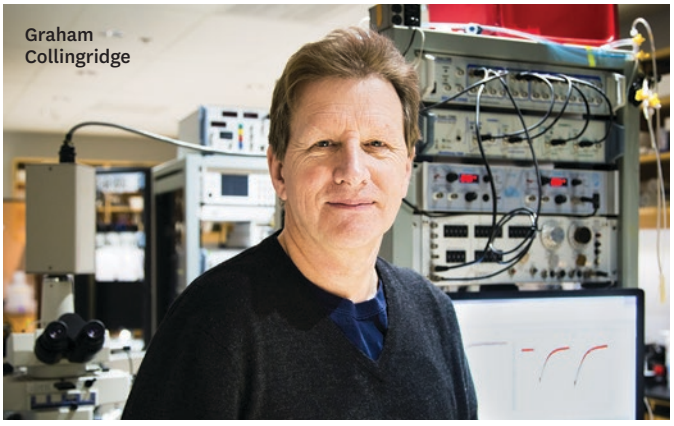
PHOTO:COURTESY OF TEABOT

An estimated 564,000 Canadians are living with Alzheimer's disease or other dementia, according to the Alzheimer Society of Canada

Q&A

When Memory Fails

Understanding how we learn and make memories could lead to better treatments for Alzheimer's disease



Graham Collingridge

Earlier this year, **Graham Collingridge**, chair of U of T's physiology department, shared the "Nobel of neuroscience" – the $1.5-million Brain Prize – with two other scientists. They received the award for their work on "long-term potentiation," a model for understanding how memories form. **Scott Anderson** spoke with Collingridge about his research and how it could lead to better treatments for Alzheimer's disease.

What is long-term potentiation and why it is important? The great Canadian psychologist Donald Hebb put forward the idea that when two neurons are active at the same time, the connections between them get stronger. Tim Bliss, one of the co-winners of the Brain Prize, discovered long-term potentiation (LTP), a process by which a brief period of intense neuronal activity leads to a long-lasting increase in the connections between the nerve cells. This is now regarded as the most important model for understanding learning and memory in mammalian brains.

What was your contribution? I was a post-doc working on glutamate, one of the major neurotransmitters in the brain. When glutamate is released from a nerve cell it binds to a protein called a receptor. One of these receptors is called N-methyl-D-aspartate (NMDA). After a series of experiments, I proposed that the NMDA receptor triggers the first part of the long-term potentiation process. A few years later, Richard Morris (the third co-winner of the Brain Prize) showed in experiments with rodents that blocking this receptor does indeed impede learning.

What do we know about long-term potentiation now that we didn't know when you started? Since I observed the role of the NMDA receptor, hundreds of labs have worked on this process. We know the NMDA receptor is just the initial trigger. We also know that the receptor that is actively involved in storing memories is called the AMPA receptor. Between the activation of the NMDA receptor and the AMPA receptor, there's a "molecular machine" that involves hundreds of proteins. We know the identity of some but not all of them. And we certainly don't fully understand the sequence of events.

What important questions are you working on now? I'm interested in translating my research to create better treatments. There's increasing evidence that errors in long-term potentiation are causally related to conditions such as autism and schizophrenia. It seems very likely that disregulation of LTP is involved in stress, addiction, anxiety and depression. We are also very interested in Alzheimer's disease, since typically the first thing that goes wrong in this dreadful disease is the ability to learn new information.

What are you investigating related to Alzheimer's? Long-term potentiation is an increase in the strength of synaptic connections in the brain. But the brain has a way of decreasing the strength of synaptic connections too; it's called "long-term depression" or LTD. This is important because you need a balance between potentiation and depression of synapses. You can't go through life making all your synapses stronger. We believe Alzheimer's disease is caused by a shift in the normal balance between LTD and LTP, such that you get a reduction in LTP and correspondingly too much LTD.

How could your research lead to new or better Alzheimer's medications? If we better understood the "molecular machine" involved in learning and memory, it would be easier to design more effective Alzheimer's drugs. But we don't have the time to wait until we know the complete system. If we can establish that a certain component is involved, then we can test the therapeutic potential of modulating its action. The challenge is that most of the LTP and LTD molecules are involved in other processes in the body as well. We aim to find molecules that are important *only* in long-term depression, since these could be the best therapeutic targets.

PHOTO: ERIN HOWE

Oxford Dictionaries selected "selfie" as its word of the year in 2013. The word first appeared in an Australian chat room in 2002

Know Thy Selfie

You may think the pictures you take of yourself and post to social media are pretty fantastic, but your peers probably don't think so, according to U of T psychologist Daniel Re, who recently looked at how people rate "selfies."

"This topic was more lighthearted than the things we usually observe," says Re, whose research team found that frequent selfie-takers liked their own selfies better than other people who were asked to rate those same pics.

In fact, according to the study, even selfie-takers who claimed they disliked the narcissism they associated with other people's pictures of themselves still rated their own selfies higher than anyone else rated them.

"That was a real surprise," Re says. "They seem to be aware that people don't like seeing a bunch of selfies of others, but when you ask people who hate selfies to rate their own, they rate them really high – almost as if they'd forgotten what they just said.

"People take so many of these pictures, they trick themselves into thinking they're doing a good job at it," says Re. "Ironically, by doing so, they may be making themselves look more narcissistic and less attractive." **– PETER MCMAHON**

The Cost of "Painless" Payment

Making purchases by card and smartphone instead of cash changes our perception of value

WHEN IT FEELS EASY TO PAY FOR SOMETHING we tend to value it less, according to a new U of T Scarborough study – and this has important implications for consumers, who are making an increasing number of purchases by card and smartphone. "While going cashless is convenient, that convenience may come at a price," says Avni Shah, a professor in U of T Scarborough's department of management and at the Rotman School of Management.

In an experiment, Shah and colleagues at Duke University and the University of North Carolina-Chapel Hill looked at the consequences of paying with cards over cash by focusing on how attached consumers felt toward what they bought.

Researchers asked participants to buy a coffee mug normally priced at $6.95 for the discounted price of $2 with either cash or credit. Two hours after the purchase, they were asked to sell back their mugs at a price of their choosing. Despite the fact that it was the same mug owned for the same amount of time, those who paid cash wanted nearly $3 more than those who paid with a card. "Those who paid with cash also reported feeling more emotionally attached to their mug," says Shah.

Why does paying with cash make you value something more than paying with a card? Shah calls this effect "pain of payment."

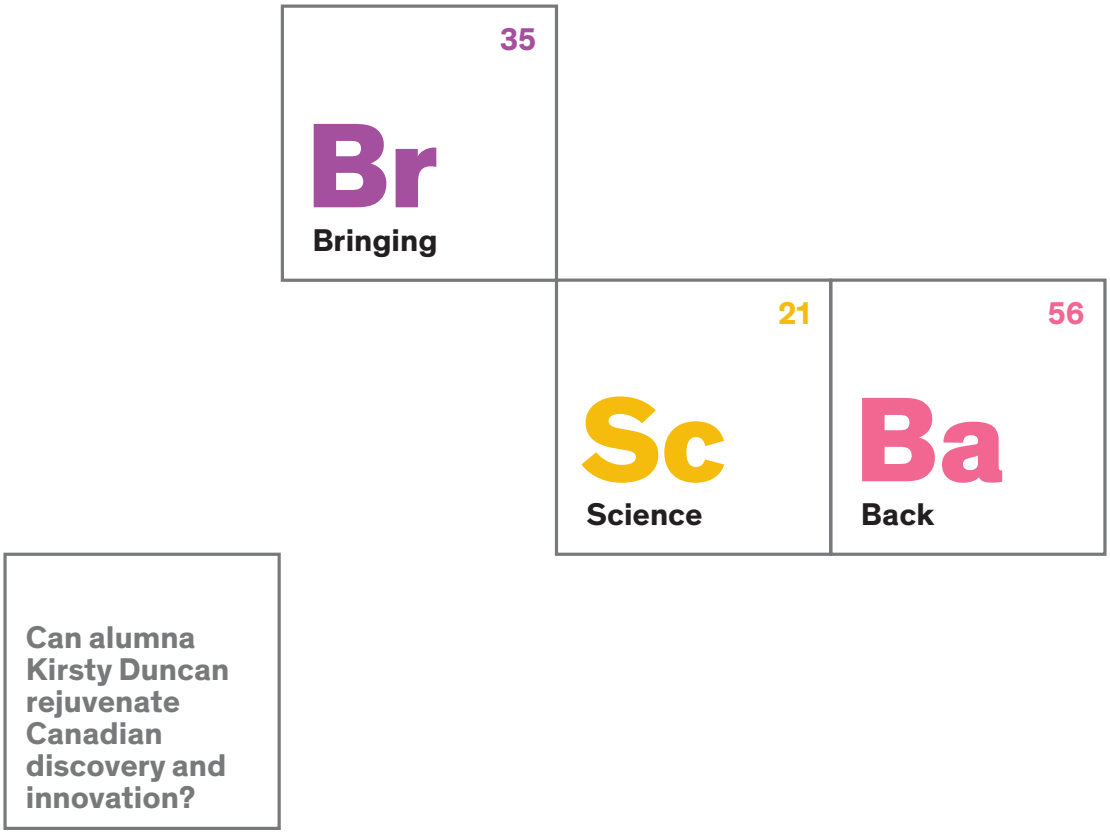
"Something tangible like cash will feel more painful to part with than paying by cheque, which will feel more painful than paying by card and so on," she says.

The phenomenon extends beyond cash and credit to include new forms of payment on smartphones such as Apple Pay. As North America moves toward a cashless economy, Shah says it's important to understand the implications of these new payment systems for consumers. With easy credit and high consumer debt levels, mobile payment systems that further reduce consumers' attachment to products could be a toxic combination, she notes. **– DON CAMPBELL**

PHOTOS: ISTOCK

Kirsty Duncan (BA 1986 UC), Canada's minister of science

By **Margaret Webb**
Photo by **Jessica Deeks**



Can alumna Kirsty Duncan rejuvenate Canadian discovery and innovation?

IT'S A SLOW MORNING IN JUNE AT THE HOUSE OF COMMONS, where a handful of MPs are trading speeches before the glitz and quips of afternoon question period. Kirsty Duncan (BA 1989 UC), Canada's new federal minister of science, is on House duty and that requires sticking close by, ready to duck back in should a surprise vote be called and the government need the support of its MPs. The languid pace seems a far cry from the adventurous research expedition that propelled Duncan, a medical geographer, into the public spotlight at age 27. That was the year she launched a mission to take a multinational team of experts to the Norwegian Arctic to exhume seven bodies buried in permafrost in the hopes of finding the cause of the 1918 flu pandemic that killed millions.

Duncan strides from a meeting in the members' lounge just outside the House, her eyes gleaming as if every moment offered an opportunity to seize. She takes an interview in the rotunda where most of the action seems to be today, albeit in the form of security guards and teachers corralling rambunctious children on school tours. Duncan is unfazed by the cacophony, having coached kids in gymnastics, trampoline, diving, weightlifting and – of all things – Scottish dancing. It's a fitting backdrop for two stories she tells me to explain why she left academia for politics and her biggest role yet: rejuvenating Canadian science after what many have called a lost decade.

The first story: In the early 1990s, when Duncan was a young professor at the University of Windsor, she asked students

in her meteorology class if they believed in climate change; only two put up their hands. By the end of that decade, in response to the same question, she recalls all hands shooting up *except* two. Yet in Ottawa politicians seemed not to share the concern. Duncan deduced that either our elected officials weren't getting the same facts about humans' impact on the environment that her students were – or weren't sufficiently compelled by the evidence to take action.

The second: When Duncan returned to U of T in 2003 to teach medical geography (the study of how location and climate affect health) at U of T Scarborough and corporate responsibility at the Rotman School of Management, a segment of her curriculum required students to do community service. Students could choose their group projects – caring for an acre of boreal forest, say, or holding a clothing drive for a homeless shelter – but what she wanted them to take away was this: "You learn the textbook, you learn the science, but you have to make a difference." With a continued lack of political action on climate change and federal support for science eroding, the professor considered taking her own lessons about community service to heart. "I loved my research, I loved teaching," says Duncan. "But I knew if I wanted to make a difference [on climate change] this was the time to do it."

So when former Liberal leader Stéphane Dion asked her to run in 2008 – part of a bid to get more women into politics and bolster his "green shift" agenda – she said yes. Though Duncan won her riding handily, the Liberals were reduced to third-party status in that election. Soon after, the rookie MP found herself sharing the backbench with another former teacher – the future prime minister, Justin Trudeau. During long sessions in Parliament, the two often talked science policy. Ted Hsu, the Liberals' former science and technology critic, credits Duncan with convincing the party to embrace key elements of the current government's science policy. That is: create a chief science officer and carry out a comprehensive review of federal support for fundamental science, with an overall mission to increase funding for researchers; ensure that federally funded scientists can make their findings available to Canadians (as Duncan touts, "open data, open science"); and also "to make sure that scientific evidence makes it to the cabinet table" as the basis for sound policy-making.

Thirty years ago, it was 20 per cent women [working in science, technology and engineering] and today it's 22 per cent. That's totally unacceptable in 2016

Duncan says she has also tasked her department with an initiative of her own – to improve the opportunities for women in science, technology and engineering. "Thirty years ago, it was 20 per cent women [working in these disciplines]," says Duncan, "and today it's 22 per cent. That's totally unacceptable in 2016." According to Statistics Canada, women who work in these fields are paid eight per cent less than men. And a recent survey of more than 500 female scientists by Professor Joan C. Williams at the University of California, Hastings College of the Law, found that women face persistent gender bias, sexism and significant levels of sexual harassment in the workplace. The study concluded that this drives out qualified employees before they can reach leadership ranks and keeps talented women from entering the fields.

Duncan's own experiences serve as a glaring example of the challenges women in science can face. In her book *Hunting the 1918 Flu* (University of Toronto Press, 2003), she shares meticulous records of what she has called "the dark side of science" – turf wars between senior scientists from different countries trying to take credit for a group mission she founded; reneging on promises to share samples; using research funding to claim seniority and control data; and, in media interviews, making searing personal attacks on her that likely would not have stuck had she looked more like most of the other members of the expedition team – older and male.

It's clear the experience still stings and has made her wary of revealing personal details. Duncan says she prefers to let her book speak for itself, but notes that this was her takeaway: "I learned how to pull together a diverse group of people, who happened to be the world's experts [in nine disciplines, including virology, neuropathology and geology]. I learned how to gain the trust of the community [in Norway, where the exhumations were conducted]. I learned how to fundraise. And I learned there are real challenges in male-dominated worlds." She adds that she was inspired to write the book to make things better for the next generation of women researchers and is making this "a real push" as she travels across the country speaking to universities, research institutions, funding agencies and especially young women. She recalls a conversation with one who wanted to go into the coast guard but thought it was impossible for a woman. Duncan urged her to stick with her dream, as the minister clearly did. "I said impossible is an attitude. Impossible can be accomplished."

One can trace Duncan's ambition to her childhood home in western Toronto, near the riding she now represents, Etobicoke North. She was only the second in her family to go to university – after her mother, who graduated from U of T and became a phys-ed teacher. Her father, a supervisor of care taking for the Toronto District School Board, played amateur

On Being a Woman in Science

Early in her career, Kirsty Duncan taught meteorology, climate change and medical geography. She became interested in influenza and sleeping sickness, and eventually led a research expedition to the Norwegian arctic in search of the origins of the 1918 flu pandemic. In 2003, she published a book about the experience, *Hunting the 1918 Flu,* focusing partly on her experience of being a young woman in science.

In 1992, I knew nothing about influenza or sleeping sickness: strike one. I was young and had virtually no track record: strike two. I am a woman: strike three. Although I did not know it, I was to find that there are barriers for women in science, particularly for relatively young women. Nevertheless, I felt driven to solve the unanswered puzzles. This is the story of the voyage that followed.

The quest began with my searching for all available information on influenza and sleeping sickness. Medline – a computer search tool for the health sciences – listed thousands of articles on influenza but only a few on encephalitis lethargica, as that disease largely disappeared by the late 1920s, except for a few suspected, isolated cases. I spent weeks at the computer reading abstract after abstract – sometimes hundreds in one day – and then searched the stacked library shelves at the University of Toronto for each important article. This was the beginning of my six-month crash course in virology. I diligently read each article, book, monograph, and commissioned report listed on Medline, afraid to miss any scrap of potentially valuable information. I made detailed notes on the etiology, epidemiology, clinical features, diagnosis, treatment, prevention, and control of influenza and encephalitis lethargica. I memorized the dates and details of the outbreaks, the epidemics, and the influenza pandemics of the last five centuries, and I studied the language of a new science. When I completed my review of the current literature, I descended into the lower levels of U of T's Gerstein Medical Library to examine fading articles and books from the early decades of the 20th century. It was difficult poring over case histories. But after six months of intensive research, I felt ready to approach the experts. I required pathological samples of lung and brain tissue from 1918 and from the 1920s. I phoned leading virologists to ask if tissues existed from victims of either Spanish influenza or encephalitis lethargica. I then asked leading neuropathologists for samples from victims of sleeping sickness. The experts all informed me that no samples existed; nevertheless, archival samples would surface later.

Six months of reading, and I was stuck. I decided to search for bodies, rather than for archival samples.

After two years of searching, I still had nothing. I needed a break. And the break did come – from Scotland. My dear friend Dr. Andrew Kerr called from the University of Edinburgh's geography department. Andy told me about his recent trip across a glacier in Spitsbergen; he also mentioned rifles, flares, dried foods, and rigorous disposal methods for human waste. I listened with interest. And then he mentioned permafrost. Permafrost! I became excited. I knew that flu had hit Norway. In fact, more than 7,300 people had died there of Spanish flu, and more than 370,000 were registered as having had the disease. I realized that if people had travelled from Norway to Svalbard, they might have carried influenza with them. And if flu had raged, sleeping sickness perhaps followed. I wrote immediately to the Norse Polar Institute in Longyearbyen, Svalbard, and briefly described my research interests. While I waited for a response to my letter, I immersed myself in the history and geography of Svalbard and its wonderful people. Seven of its dead were to become the focus of my life and of our project.

baseball – pitching until he was 75 and "playing against 35-year-olds," Duncan says proudly. "In our family, you had to be good at school, but you had to be better at sports." Duncan excelled at gymnastics, practising three hours after school each day and eventually competing at U of T. Teammate Barb Brophey, now a senior athletic instructor with the Faculty of Kinesiology and Physical Education, believes gymnasts are among the strongest athletes, physically and mentally, as they must launch their bodies into the air and trust that training and skill will land them safely. "As you get older, especially, you have to have the mental toughness to say, 'I know I can do this' and to enjoy the challenge of it. My memory of Kirsty is she had an amazing work ethic and was a buzz of positive energy – extremely supportive of her teammates."

After an injury derailed her gymnastics career, Duncan channeled her abundant vitality into distance running and completed eight Boston marathons. Her first and enduring love, however, is dance. Her close-knit family often spent summer weekends at Scottish festivals where Duncan participated in highland dancing. She grew up wanting a career in painting and dance – reflective, perhaps, of her uncommon depth of feeling. After our interview, she rushed me through a tour of her favourite architectural details in the House of Commons and then to the daily page-turning ceremony commemorating Canada's fallen soldiers. At the end, tears welled up in her eyes.

Duncan enthuses that a first-year geography course at U of T "took us around the world in one lecture" and from that point

on she "was hooked" on science and the thrill of discovery. She graduated from U of T with a BA in anthropology and geography. At the University of Edinburgh, she completed a combined master's and PhD in geography, with a focus on climate change.

Now, Duncan presents herself as a tireless champion and advocate of science, after what she calls the previous government's "war on science." She points out that during Stephen Harper's three terms Canada fell from third to eighth place in higher education research and development, and from 18th to 26th in business research and development. Scientists marched on Parliament Hill in 2012 and 2013 to protest cuts to research that could put the environment at risk and what they saw as the muzzling of federal researchers. "I come from a place where I understand the challenges [for scientists]," she says. "I'm able to ask, how do we do this better for you?"

Duncan's initial task on that front was working on the Liberals' first budget, which injected an additional $95 million into Canada's three research funding agencies, $20 million into two additional Canada Excellence Research Chairs in fields related to clean and sustainable energy, and $2 billion over the next three years in science-related infrastructure at post-secondary institutions (see "An Historic Investment in Canadian Science and Innovation," p. 11).

Vivek Goel, U of T's vice-president of research and innovation, hails the $95 million as "the first major investment of unrestricted money in a decade," which allows granting councils to decide where to make investments rather than tying research funds to government priorities in job creation or to industry partners. "We're delighted with the focus on the science agenda and the fact that for the first time we have a full cabinet minister responsible solely for looking at science and science funding."

Next on Duncan's agenda was establishing the terms of the chief science officer, which fills the void of the national science advisor role scrapped by the Conservative government in 2008. She says the broad terms of the position will be to provide scientific advice to MPs, engage and listen to the scientific community, be an ambassador and champion of science, make sure federally funded scientists can speak freely "now and in the future," and ensure that scientific evidence informs decision-making. It's all about making federally funded science open and available to Canadians, she says.

Indeed, the Trudeau government considers science so important that it has given two ministers responsibility for the subject – Duncan and Navdeep Singh Bains, who is minister of innovation, science and economic development. While Bains's ministry will harness science to drive innovation, Duncan says her ministry will focus on boosting discovery science, to make sure that basic research is available to be harnessed.

To that aim, Duncan has struck an independent panel of nine experts to review federal funding of fundamental science. The panel is notable for its heavy hitters – two former U of T presidents in Robert Birgeneau and David Naylor, and Nobel Prize physicist Art McDonald – and for its gender balance and representation of younger researchers. Duncan is particularly concerned about getting support to young researchers so they can get "up and running" earlier in their careers. And she would like to see "the pendulum swing back to discovery" from the past decade's focus on applied science. Duncan says the four women on the panel – including two university vice-presidents of research and a university president – will help "change the conversation," and perhaps address the rather dismal statistics that Duncan cited in her responses to the Standing Committee on the Status of Women in 2015. While women now make up 52 per cent of university students in Canada, they don't progress through the professorial ranks at nearly the same rate as men. According to the latest Statistics Canada figures, there were roughly an equal number of male and female assistant professors but nearly twice as many men at the associate professor level and more than triple the number of men at the rank of full professor.

Duncan has promised to bring change on that front but can't announce anything formal yet. In the meantime, she champions bright young female academics when she can, such as Sandhya and Swapna Mylabathula. The identical twin sisters, both doing doctorates in concussion research at U of T and huge hockey fans, enjoyed a boost of support from Duncan before she was even minister of science. Together they worked on a policy that Duncan put forward in a private member's bill in 2015. It called for a national strategy on concussions and a centre of excellence for concussion research. The bill received its first reading in the House and the two sisters look forward to how their work might move concussion policy forward when parliament reconvenes after the summer. Duncan, ever the teacher and coach, helped the young researchers prepare for their first presentation – for a national conference on concussions.

Now both are excited to see where Duncan takes science in Canada. "It's inspiring to have a minister of science who is a woman," says Swapna. "She's a role model for us – and for all women in science."

Duncan is particularly concerned about getting support to young researchers so they can get "up and running" earlier in their careers

Margaret Webb (BA 1985 UC) is the author of *Older Faster Stronger: What Women Runners Can Teach Us All about Living Younger, Longer* (Rodale Books, 2014).

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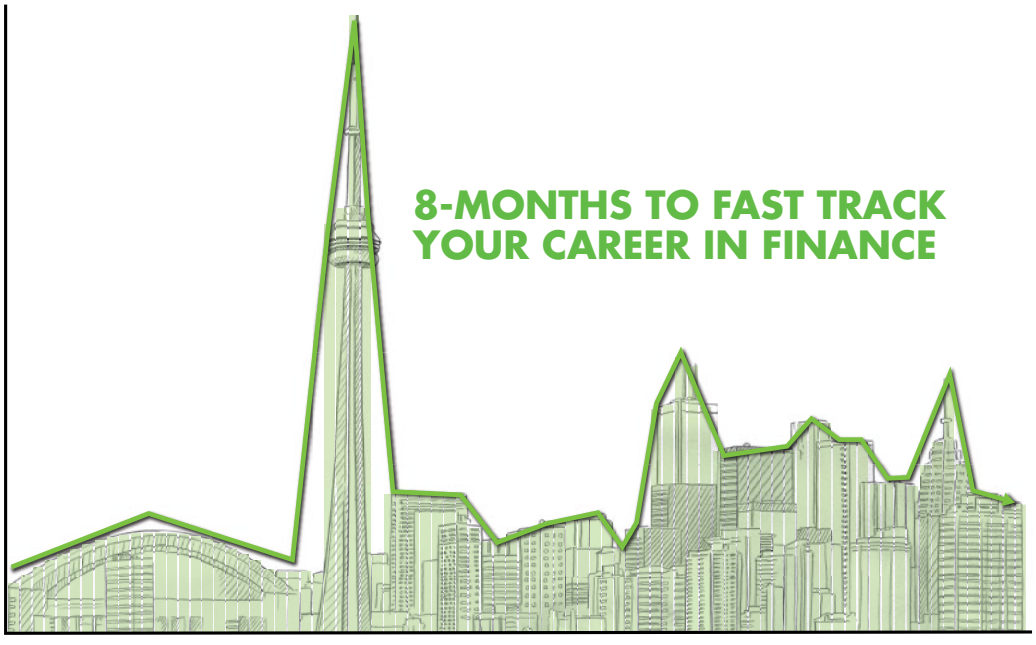

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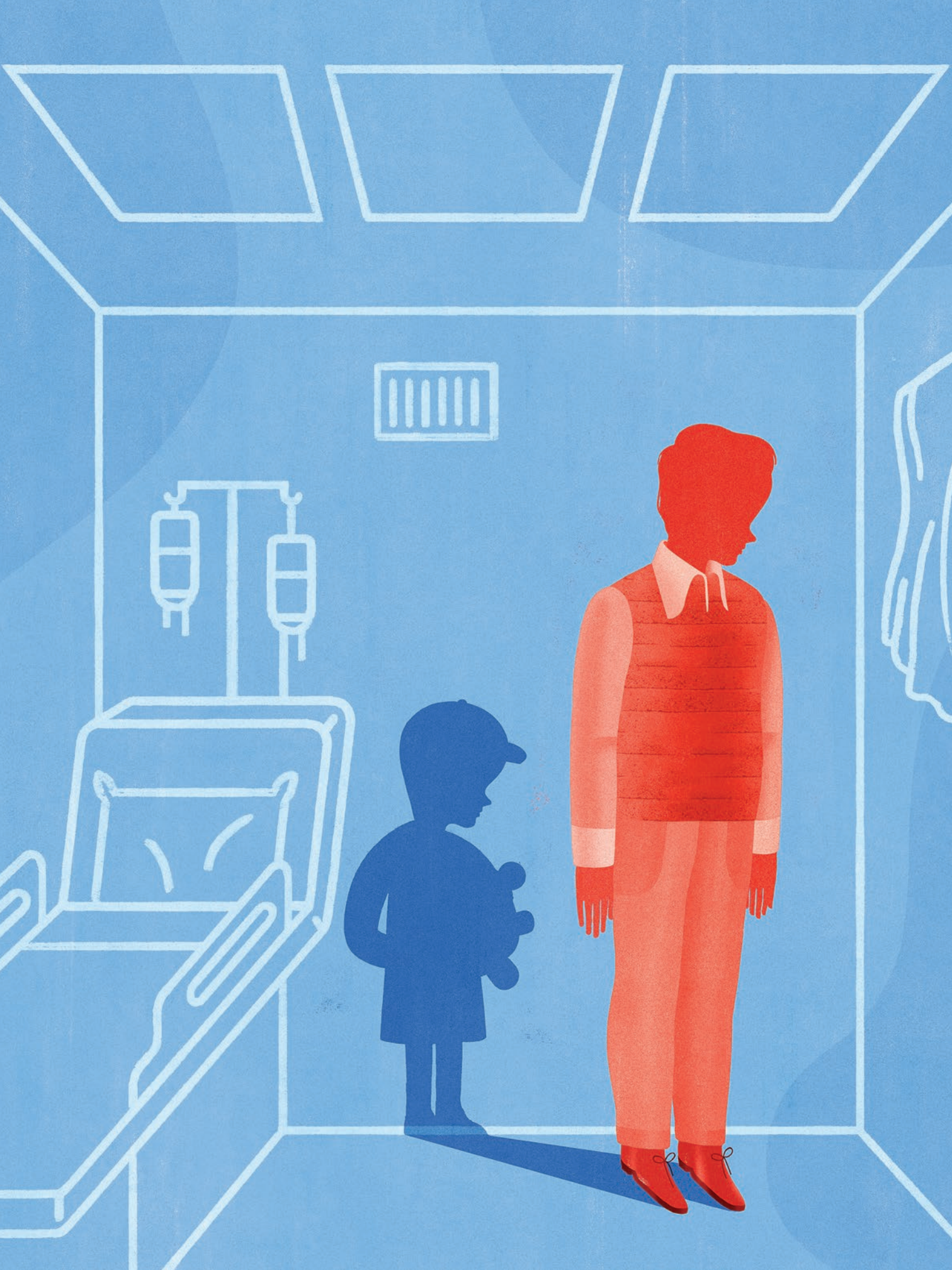


Prof. Esme Fuller-Thomson has spent much of her career uncovering the devastating effects of child abuse on health. Now she wants to ensure all survivors get the help they need.

BY
JOHN BARBER

ILLUSTRATION BY
GRACIA LAM

The Hidden Epidemic

THERE IS A POWERFUL STORY – almost a nightmare – embedded in the science of public health, explains Professor Esme Fuller-Thomson, who holds the Sandra Rotman Chair in Social Work at U of T's Factor-Inwentash Faculty of Social Work.

"You're by a stream, and bodies keep drifting by," she says, quoting a classic public health parable. "You rush in to try to rescue them." You do what you can, she adds, to save lives.

"But nobody's questioning who's throwing the bodies in upstream."

Fuller-Thomson is an exception. Seeking not just the immediate causes of human illness, but the causes of those causes, her research has helped pioneer a new frontier in the emerging science of social epidemiology, revealing startling and often disturbing insights into the deep determinants of many common diseases.

Fuller-Thomson, who is also the director of the Institute for Life Course and Aging, has published 28 articles examining the link between childhood maltreatment and many

adult health problems, including cancer and heart disease. Her conclusion is simple: Child abuse is harming lives to an extent never previously imagined. Even abuse survivors who develop none of the debilitating habits that often grow in response to childhood trauma still run a significantly higher risk of these diseases than adults who suffered no such trauma in childhood.

Combined with emerging scientific insight into the biological processes that can turn past trauma into future illness, Fuller-Thomson's research holds profound consequences for social policy – both in the broadest sense of public education and the urgent need to ensure that all young victims of abuse receive treatment to help dispel the ominous shadows that darken their future lives.

A third-generation social worker whose grandmother trained in the east end of London in 1919, Fuller-Thomson began her career far downstream from the terrain she now explores, working at a free women's health clinic in a blue-collar neighbourhood of Montreal in the 1980s.

"As a social worker, you almost never get clients who want to see you," says Fuller-Thomson, now a busy mother of four children, prolific researcher, teacher and member of no fewer than six book clubs. "But this clinic had a long waitlist and anyone who wanted to talk about any issue could come in and see a social worker."

And come they did, seeking advice to deal with a vast and daunting array of conditions typical of hard lives lived at the bottom of the heap. "Many, many of them had serious health issues – morbid obesity, heart disease, diabetes," Fuller-Thomson recalls. "I could just see there was this huge cumulative disadvantage of physical health, mental health and early adversity."

Prof. Esme Fuller-Thomson

At the time, discussion of what researchers now call "the social determinants of health" was just beginning, prompted by the famous Whitehall Study of British civil servants in the late 1960s and 1970s, which showed that low social status drastically shortened lives. Fuller-Thomson discovered that reality – and her vocation – head-on in Montreal.

One striking fact stood out amid the multi-faceted hardships she helped to mitigate as a neophyte social worker: Although the people who visited the clinic were dealing with a wide variety of problems, many – about 60 per cent of them, she estimates – were incest survivors. "That was when people were just beginning to talk about incest for the first time," Fuller-Thomson says. "It was considered too shameful to discuss it before. I don't think I knew what the word meant till I was 20."

That early experience gave her a crucial insight into a reality still clouded by taboos, one continually reinforced by her subsequent research: that all forms of child abuse – sexual, physical and emotional – remain rampant in our society. "The prevalence of child abuse is much higher than people think," she says. "If you're walking around with polio, people see that. But these are internal scars."

Victims "protect themselves," she adds. "If you look around any room, the chances are fairly high that there are both sexual and physical abuse survivors there. They're among your friends, your colleagues, the people in the coffee shop, but you wouldn't have any sense of that. There are child-abuse survivors in every income level, of every ethnicity, in every age group and in every region of the country."

The evidence is not only hidden, it's sometimes dismissed once uncovered. Even today, Canada remains one of the only developed countries that permits the corporal punishment of children. Section 43 of the Criminal Code, dating from the Victorian era, is often used successfully to acquit caregivers and others facing criminal charges in documented cases of abuse. The burden of shame among survivors is made heavier by such permissions, explicit or otherwise.

Fuller-Thomson's early experience in Montreal did little, however, to suggest just how formative early abuse had been in the disordered lives of the clients she tried to help. "It was just too messy," she recalls. "I didn't see any pattern there except that people who've had a hard childhood often have a fairly hard adulthood, too."

The young social worker's understanding of the issue changed in 1998 with the publication of a landmark study led by Dr. Vincent J. Felitti of the Kaiser Permanente Health Maintenance Organization. Felitti and his colleagues surveyed 17,421 patients covered by Kaiser for signs of what they called "adverse childhood experiences," including a history of physical and sexual abuse, domestic violence, or parents

PHOTO: MALLIKA MAKKAR/*THE VARSITY*

who were mentally ill, addicted or incarcerated. They then correlated those experiences with their patients' known health histories.

The results were startling: Those who had experienced childhood trauma were markedly less healthy as adults than those who had not – and the more types of adverse experiences they'd had, the worse their health. Those with four or more types were almost two-and-a-half times more likely to have contracted a sexually transmitted disease, almost four times more likely to have developed chronic obstructive pulmonary disease and 12 times more likely to have attempted suicide.

Studying this emerging research while on sabbatical with her family in France a decade ago, Fuller-Thomson was intrigued. The Felitti study provided an incomplete but seminal answer to the question that had driven her career since Montreal: Who gets to be healthy, and why? She decided to dig in and find out. "I was fascinated by the hypothesis, but I wasn't completely convinced until I could jump in and look for myself," she says. "I thought the pathway that would really explain these associations is that children who had horrible childhoods would self-medicate. They try to make themselves feel better by smoking, by overeating, by excessive drinking – and it's those things that are going to put them at risk."

Fuller-Thomson threw herself into the research, using two surveys of American and Canadian populations large enough to support the statistical winnowing necessary to better separate cause from coincidence – about 25,000 people altogether. She started with heart disease, one of the leading causes of premature death in North America, and found a strong association between child abuse and heart disease later in life – just as Felitti had before her. The association remained, even after she took into account the differences in the respondents' age and sex.

"Then I said, 'Wait a second, when I put in your smoking and your drinking, inactivity and obesity, I bet that direct association is going to go away.' In other words, it's going to be totally accounted for by the fact that those kids who were abused developed unhealthy behaviours."

But she was wrong. "It didn't change very much at all when I controlled for those variables," she says. "The direct connection wasn't attenuated."

Even if they developed none of the bad behaviours known to hasten heart disease, adult survivors of child abuse were still 45 per cent more likely to suffer from heart disease than non-abused peers.

Using the same large datasets, Fuller-Thomson turned her attention to other physical diseases, and the same pattern emerged. Most disturbingly, she discovered that abuse survivors were 49 per cent more likely than others to contract cancer. And when she controlled for more than a dozen lifestyle factors known to promote cancer – smoking, drinking, inactivity, obesity – the number hardly budged, dropping by just a few percentage points. "I put in 15 other risk factors for cancer, but that direct association was incredibly robust," Fuller-Thomson says.

To clarify what this means, she posits two middle-aged men: both non-smokers, moderate drinkers, non-obese and reasonably fit. If the only difference between them was that one had suffered physical or sexual abuse as a child, that man would be 45 per cent more likely than his peer to contract cancer.

This finding had a profound effect on Fuller-Thomson. "I had not at all thought there would be an association with

Is Child Abuse Linked to Cancer?

Prof. Esme Fuller-Thomson has published 28 papers linking childhood trauma to adult health problems, including cancer and heart disease – the top two leading causes of death in Canada. She found that abuse survivors had significantly higher odds of contracting the majority of physical and mental health conditions she studied (many of which are listed below), even after she adjusted the results for health behaviours, income, education and mental health conditions. Individuals who are physical abuse survivors, for example, had 1.45 times the odds of developing cancer in comparison to their peers who are not abuse survivors.

DISEASE OR CONDITION	TIMES MORE LIKELY THAT ABUSE SURVIVORS WILL DEVELOP IT
Migraine headaches	1.36
Thyroid disorders (women only)	1.40
Cancer	**1.45**
Heart disease	1.45
Osteoarthritis	1.56
Fibromyalgia (women only)	1.65
Peptic ulcer	1.68
Chronic fatigue syndrome	2.11
Alcoholism	2.13
Attempted suicide	2.25
Drug addictions	2.26
Ulcerative colitis	2.28
Multiple chemical sensitivity (women only)	2.82
Suicidal ideation (men only)	3.57
Suicidal ideation (women only)	4.48

The results were startling: those who had experienced childhood trauma were markedly less healthy as adults than those who had not – and the more types of adverse experiences they'd had, the worse their health.

cancer," she says, describing her decision to investigate the potential link as "totally exploratory."

Stress is thought to affect the speed at which cancer develops, she says, but not to cause it. "From what we know, the fact you have cancer or don't have cancer shouldn't be associated with stress. But our findings were perplexing, suggesting that those who had been abused during their childhood had higher odds of contracting cancer, regardless of whether they followed a healthy lifestyle."

In subsequent studies, Fuller-Thomson discovered that adult survivors of childhood abuse also face greater risk of migraines, osteoarthritis, ulcerative colitis and a host of other physical disorders. In almost every case, the experience of childhood abuse was strongly associated with increased risk – even after taking into account the effects of behaviours known to imperil physical health.

Other results were equally intriguing. Previous research had shown a clear relationship between child abuse and irritable bowel syndrome, but when Fuller-Thomson controlled for depression she found that the association disappeared: People who had been abused yet didn't succumb to depression had no greater risk of developing the syndrome.

The closely related disease of ulcerative colitis was another matter: Fuller-Thomson showed a robust link between it and early abuse, both physical and sexual. And yet early abuse had no effect on a person's likelihood to develop another similar physical problem: Crohn's disease.

Such distinctions strongly suggest that abuse may trigger a very specific set of physiological changes. Only recently, however, has the potential identity of these changes begun to emerge.

As a social scientist, Fuller-Thomson came to a point in her research that would have been familiar to Dr. John Snow, her Victorian predecessor. His famous map marking London cholera deaths identified contaminated water as the culprit, and simultaneously overthrew a long-prevailing theory that cholera and other diseases were transmitted by "miasma" – in the air. Although Snow proved conclusively that cholera was water-borne, decades passed before scientists finally accepted germ theory to explain the transmission of infectious diseases.

By what possible mechanism could childhood abuse be transmitted directly into adult disease? "That left me a bit befuddled," Fuller-Thomson admits.

Having eliminated all the usual answers, she turned to the work of Dr. Clyde Hertzman at the University of British Columbia, at the time a world-leading researcher on the social determinants of health. Focusing on the long-term effects of child poverty, Hertzman had coined the term "biological embedding" to explain how bodies "remember" and revisit trauma throughout their lives. "What he was saying is that early experiences get under the skin, and they change the way we react to stress for the rest of our lives," Fuller-Thomson says.

The explanation makes sense intuitively, she adds. "When you're a child and you're in a totally abusive environment, you have to be hyper-vigilant. Is Dad going to come home drunk? Do I have to watch out? The idea of being very alert all the time – having a quick fight or flight response – is hugely protective if you're in that type of environment."

But that conditioning extracts a price. "What it means is that your body will react to any subsequent adversity as though it's a five-alarm fire. And eventually that wears things out and makes you more vulnerable.

"If you're in a home environment where that's the most scary place to be, you can never let your guard down," Fuller-Thomson adds. "It totally makes sense that you might get sick, because there's never a place you can go and not be vigilant about your personal safety."

The effort to understand how chronic anxiety in childhood might result in physical disease decades later led Fuller-Thomson to examine research in the emerging field of epigenetics, which examines how external factors, especially stress, can produce heritable changes in gene expression without changing genes themselves.

Fuller-Thomson points to the research of Dr. Michael Meaney at McGill University, who examined the role of mothering in rats. Meaney's work showed not only that rat pups raised by nurturing mothers grew up to be much calmer adults than rat pups raised by less nurturing mothers, but also that their mothers' attention produced physical changes in the pups' brains. Licking – the rodent equivalent of cuddling – triggers an epigenetic "switch" that activates a dormant gene that helps decrease the concentration of stress hormones in the body.

"We're bringing in pieces of evidence from everywhere we can possibly find them, and until further notice that's

the best possible hypothesis," Fuller-Thomson says. "My interpretation is that early adversity may change the way childhood abuse survivors react to the stress of future adversity, and this is what may be putting them at risk of these health outcomes." In effect, early trauma may rewire the brain, opening circuits that help survival in the short term but ultimately harm the body they are designed to protect.

The role of epigenetics in disease is as novel and controversial today as germ theory was in John Snow's London – but local authorities didn't wait years for confirmation from Louis Pasteur before disabling the notorious Broad Street pump that was the source of the contaminated water. Similarly, Fuller-Thomson is concentrating today not on the basic science but rather on the policy implications of a hidden public health crisis. Her personal goal is to help ensure that all victims of child abuse receive therapy to help them slay the hidden traumas that threaten to darken their future.

Currently, Children's Aid Societies focus mostly on protecting children from further harm, according to Fuller-Thomson. "So either they remove the child, or they remove the perpetrator, or they do something to keep the child safe," she says. "And if the child looks like she is functioning – she is making it to school most days, she is not slicing her wrists – that's it. They've done their job to make that child safe from immediate harm, and they go on to the next urgent case. I think this response is inadequate. We have to offer abuse survivors more."

The good news is that effective treatment is available for the asking. "I'm open to all kinds of therapies, but the evidence is very, very strong for cognitive behavioural therapy [CBT]," Fuller-Thomson says.

Trauma-focused CBT is a relatively short, intensive program that has proven effective for children suffering from the hidden but long-living effects of trauma. Taking place over 12 or 16 weeks, the therapy focuses on correcting the subliminally dysfunctional thoughts that often flow from trauma – especially the propensity of victims to blame themselves for it. "It's a very simple technique but very powerful for anxiety, depression and post-traumatic stress disorder," Fuller-Thomson says.

> Early trauma may rewire the brain, opening circuits that help survival in the short term but ultimately harm the body they are designed to protect.

"Most children take on some blame for physical or sexual abuse," she adds. "They may be told by the abuser they're being punished for bad behaviour, that they deserve this bad treatment. Trauma-focused CBT helps the children grab those thoughts and assess their validity based on other experiences in life."

The therapy aims to disrupt the intensifying cycles of fear, shame and guilt that so burden young victims of abuse, substituting a more realistic, positive narrative. "At a minimum, we want to give them the skills to know that they don't deserve abuse," Fuller-Thomson says. "It gives them the skills to be resilient."

In light of what she has learned about the dangers of abuse, the researcher has now turned activist, determined to reform what she considers to be an inadequate institutional response to the hidden plague of child abuse. "I even have a date – it's going to be May 14, 2025," she says, to mark the 10th anniversary of a talk she gave on the subject. "I want to make sure that, by then, every child in Canada with substantiated abuse gets therapy, whether or not they're showing symptoms."

Meanwhile the quest to uncover the social determinants of health continues to beckon. After uncovering the potential source of such grievous harms, Fuller-Thomson has turned her attention to "protective" behaviours and relationships, seeking to understand why some people thrive and others falter. The "burning question" she first confronted as a novice social worker decades ago has lost none of its heat.

"Who gets to be healthy and who doesn't?" she asks, summarizing what has become her life's work. Her research so far proposes startling new answers and suggests promising social reforms that could improve the quality of life and well-being of abuse survivors. Marriage and companionship are hugely important in developing what she calls "complete mental health."

Unconditional love, religion or spirituality and mentorship – "any little bubble of cushioning in a tough world" can help, she says. This summer she received funding to look at how survivors of physical and sexual abuse have achieved and maintained complete mental health. "There are so many people doing well," she says. "Not a majority, but a substantial minority are thriving."

With every new study, the search for answers moves steadily upstream, quietly challenging our deepest-seated demons – and helping to rescue their victims one by one.

John Barber is a freelance writer in Toronto.

Tiff Macklem helped steer the Bank of Canada through the financial crisis, making it the envy of its global peers. Now, he aims to place the Rotman School among the world's best, drawing on a $30-million gift from U of T's biggest benefactor

By John Lorinc
Photography by Sandy Nicholson

SCALING UP

NOT LONG AFTER THE WRENCHING BREXIT VOTE in the United Kingdom in June, Tiff Macklem, dean of the Rotman School of Management, found himself sharing a meal with some MBA students working on Bay Street for the summer. They recounted the frisson of being on trading floors and watching as global markets convulsed wildly in the wake of the vote and the ensuing political fallout across Britain and Europe.

Macklem listened attentively. "You got a little gift," he told them, knowingly. "I bet you learned a lot in those few days."

As he often does with students, Macklem, who is 55 and holds a PhD in economics, offered up his analysis of the 2008-09 financial crisis, and the importance of reflecting closely on the market conditions, system failures and "cognitive biases" that led to the meltdown. In a hyper-connected

world, he says, "there are things [individuals] can do to prepare." Business school educators, he adds, should "engage students to think about why they're doing what they're doing."

It's hardly surprising to find faculty members in a leading business school such as Rotman with insights about a financial shock considered to be the worst since the 1929 market crash that triggered the Great Depression.

But very few have Macklem's direct experience of a severe crisis. As a senior official in both the Department of Finance and the Bank of Canada, Macklem spent those fraught months working intimately with top government officials and a tight circle of international central bankers to prevent the global financial system from collapsing altogether.

"The stress was crushing," he recounts. "We worked every moment we could. [I knew] there would never be a time in my career when, if we could do a good job, we could have a bigger impact on the well-being of Canadians." As he reflects now when discussing that episode with young people, "You learn so much when you're in those situations. You see how things really work when they start *not* to work."

In the two years he has spent as Rotman's dean, Macklem hasn't faced any crises. But the job has not been without the sort of challenges that pose true tests of leadership. Macklem's first task: succeeding Roger Martin, the charismatic and long-serving dean widely credited with putting the Rotman School, and especially its MBA program, on the map. Then, just six months after taking the job, Macklem was confronted with the death of benefactor and champion Joseph L. Rotman, the merchant banker who not only provided the school with extensive philanthropic support, but also served as a crucial sounding board, challenging the dean to constantly push the school to the next level (see facing page).

"When Joe died, it really knocked me back," admits Macklem, a trim man with a quietly self-possessed manner and the gravitas of someone who's seen the inner workings of government up close. "I was shaken, and I am not easily shaken."

If former dean Roger Martin was the hard-driving entrepreneur who grew his startup into a national leader, Macklem has stepped in as the executive whose task is to transform the Rotman School into a recognized worldwide brand

Yet in the wake of that terrible news – Rotman died suddenly in January 2015 at the age of 80 – Macklem has pressed forward with an ambitious strategy to consolidate the growth and brand awareness generated during Martin's tenure. A business analogy seems fitting: if Martin was the hard-driving entrepreneur who grew his startup into a national leader, Macklem has stepped in as the executive whose task is to transform the Rotman School into a recognized worldwide brand. (The school ranked first in Canada and 60th overall on the 2016 *Financial Times* index of international management faculties.)

Macklem's "Vision 2020" plan, released last fall, positions Rotman to become a globally renowned management school. He aims to accomplish this by increasing the impact of the school's faculty as international thought leaders, better engaging alumni around the world, bolstering the student experience and further integrating Rotman with the university at large. The seed funding to launch this transformation comes from an historic $30-million bequest from Joseph Rotman's estate (announced last spring by his family) and a further $15-million contribution from the university, which together comprise the Rotman Catalyst Fund.

This $45-million fund will be used to encourage innovative projects with the potential to transform management education and research. The first 17 projects have been vetted, and grants worth more than $3 million were approved over the summer. Among the successful proposals: investments to encourage entrepreneurship related to machine learning, boost online instruction, and scale up activities in both behavioural economics and pension and risk management to make the school a world leader in these subjects. "The gift is very true to Joe's vision," observes Macklem. "The structure ensures that the money flows to bold new initiatives."

"In many ways," adds Daniel Debow (MBA/JD 2000), who has launched several successful startups and is a founding partner of the school's Creative Destruction Lab (a business incubator), "the Rotman Catalyst Fund is Joe's bet on Tiff."

When the future central banking star was in high school in Montreal in the 1970s, he recalls becoming attuned to the divisive tensions of an economy that seemed addicted to inflation. "Everybody was very angry about it." Unions were competing for ever-higher wage settlements, pensions were eroding and the price of everything just kept climbing higher. As he began studying what he calls "the seductive logic of economics" at Queen's University, Macklem found himself wondering what causes inflation: "Why," he asked, "couldn't we get a handle on it? I saw economics and finance as a powerful lens to address this big public policy question."

Joseph Rotman Was One of U of T's Greatest Champions

The business visionary offered not just donations but ideas and leadership

As befits a public-minded investor, Joseph Rotman sometimes used the phrase "venture philanthropy" to describe his approach to giving. A prominent investment banker, Rotman parlayed a small oil-trading business launched in the early 1960s into Clairvest, a major private equity firm in Toronto. He became a driving force among Canadian universities, and health and cultural institutions, offering not just donations but ideas and leadership. Quoted in a *Financial Post* obituary, Rotman recalled, "My dad once said to me, 'Joe, writing the cheque is the easiest part.'"

Rotman completed a master's of commerce degree at the University of Toronto in 1960. His first donation to what was then U of T's Faculty of Management Studies was $50. In 1993, he and his wife, Sandra, made a gift of $3 million through the Rotman Family Foundation toward the construction of a new state-of-the-art building for the school. In all, the Rotmans have given more than $72 million to U of T, making them the university's largest donors. The Rotman School of Management, which is named in Joseph's honour, has become one of the most innovative business schools in the world.

Known as a benefactor who did his research and asked probing questions, Rotman was a donor to, or served as a board member of, numerous cultural organizations, including the Art Gallery of Ontario and the Toronto Symphony Orchestra. He also co-founded MaRS, a hub for innovation in Toronto. At the time of his death, in January 2015, Rotman was in his second term as chair of the Canada Council for the Arts, and was serving as chancellor for the University of Western Ontario, where he earned his undergraduate degree.

"The University of Toronto, and indeed all of Canada, has lost one of its greatest champions," said U of T president Meric Gertler following the news of Rotman's death. "Joseph Rotman believed that each of us has a responsibility to help build civil society. He had great faith in young Canadians, in their eagerness and ability to lead the way in that cause. And he was supremely confident in Canada's ability to compete and to contribute on the global stage."
– JOHN LORINC, WITH FILES FROM STAFF

He finished his BA in 1983 with many questions lingering, and embarked on a master's degree in economics at the University of Western Ontario. The prospect of pursuing a PhD and then a career in academia began to loom larger, but then the Bank of Canada came calling. Macklem spent a year in Ottawa with the bank's research group – he was hired by another young star named Stephen Poloz – and then returned to Western to finish his graduate work. By 1991, he was back in the nation's capital, working under one of Canada's pioneering inflation-busters, John Crow. Instead of focusing on overnight interest rates and the dollar, the bank at the time had begun inflation targeting – a new idea in the rarefied world of monetary policy.

"It was a very exciting time," says Macklem. No one had a strong theoretical handle on how to best set monetary policy in order to keep inflation close to two per cent. Macklem's research team worked hard to build one. "The senior management of the bank was hungry for our research and analysis."

Macklem took on increasingly high-profile assignments within the bank, readying him for a shot at the top job, a federal appointment. But when former Bank of Canada governor Mark Carney decamped for the Bank of England, in 2013, the Conservative government named Poloz instead. "It was no secret I wanted to be the Bank of Canada governor," says Macklem. In the aftermath, as he began to reflect on what to do next, headhunters came knocking, including one asking if he'd be interested in the dean's position at Rotman.

"The idea of a senior academic role appealed to me," says Macklem. He drew up lists of pros and cons. "But, at the end of the day, you have to go with your gut. It just felt right."

In the spring of 2015, Marni and Roland Wieshofer, who work in finance and entertainment in Los Angeles, had an idea for showcasing the Rotman School during the Toronto International Film Festival. Both Canadians with MBAs from U of T (pre-Rotman), the Wieshofers came up with a playful theme: "Tiff@Rotman" – a swank reception for filmgoing Rotman alumni, with the dean hosting, followed by a special screening. Three hundred people showed up, and "we hope to increase that to 500 this year," says Marni.

Since moving from Ottawa to Toronto, Macklem has found himself thrust into the sorts of settings and roles that don't typically come with a senior policy-making position, including red-carpet affairs and other events that require a certain knack for showmanship and schmoozing. "It's been a different role," he says. "But talking about the amazing things our students and faculty are doing is not that hard."

Macklem is now spending almost a third of his time travelling around the world, meeting with far-flung Rotman alumni to solicit their views on how the school can engage them better – not just for philanthropic purposes but also to situate

Rotman on the radars of international firms, and create new career and mentoring opportunities for grads. The dean also recently appointed Kevin Lobo (MBA 1995), who runs Michigan-based Stryker Corp., a $10-billion-a-year medical devices firm, to head a global advancement board. Its members, comprising alumni, friends, and business and community leaders from around the world, will provide Macklem with input on how Rotman can raise its international profile.

Debow sees this process as the crucial second phase of Rotman's evolution. "The question is, how do we get it to the next level?" he says. "The only way for Rotman to transcend Canada is when the best people from all over the world want to be here."

While Macklem has a mandate to situate Rotman more definitively on the global stage, he's also told his management team to fortify the undergraduate experience for commerce students. In the past year or so, the school has worked closely with the Faculty of Arts and Science to establish more community-building activities for these students, give them greater access to facilities and faculty members, and improve career placement services. While Rotman now ranks as the top MBA school in Canada, Susan Christoffersen, a professor of finance and a vice-dean with responsibility for undergraduate programs, says that Macklem's intensified focus on commerce is all about making it clearly the best commerce program in Canada. "Right now, we're among the top programs but we need to do more. He is committed to this." She notes that the school is also creating new graduate programs in financial risk management, professional accounting and management analytics as a way of broadening its offerings.

The final element of Macklem's strategic focus is to fill out the school's significant research capabilities, which have become increasingly prominent in the world of management scholarship. Between 2007 and 2016, Rotman rocketed up the *Financial Times*' business school rankings in the research category, moving from 23rd to third in the world, now behind only the Harvard School of Business and the Wharton School at the University of Pennsylvania. (That standing, as Christoffersen notes, comes with both reputational rewards but also risks, as it means that Rotman's researchers have increasingly become targets for recruiters from rival universities.)

Kenneth Corts, a Rotman professor of business economics who is the Marcel Desautels Chair in Entrepreneurship and the vice-dean of faculty and research, says the school is looking to recruit academics in fields such as behavioural economics, design thinking and pension management. He comments that strength in these disciplines will help position Rotman to deliver thought leadership in innovation, entrepreneurship and governance, which are among Macklem's goals.

Macklem points out that his last role at the Bank of Canada was chief operating officer, so he spent a lot of his time recruiting talent to an organization packed with PhDs. The difference, as he likes to joke, is that the researchers who worked for him at the bank had to "answer my questions." Rotman's professors, he notes, "don't actually have to answer the dean's questions. The dean's influence is more of soft power."

The old joke about central bankers, which Macklem knows, is that their task is to take away the punch bowl just as the party is getting started – a pithy reference to their policy duty to dial back monetary stimulus when a slumping economy has finally begun to find its legs. The line is also a reference to a mantra that has informed the work of a generation of economists such as Macklem and Mark Carney – that systemic financial and monetary stability, in the form of interest rate targets and robust regulation, is critical to global economic growth.

But in his current role, and especially as the titular custodian of the $45-million Rotman Catalyst Fund, Macklem also finds himself in the somewhat unfamiliar position of seeking out, and then underwriting, a certain sort of risk that could transform the Rotman School into a global brand.

Macklem insists there's no temperamental tension between his former mindset and his current one, partly because of the lessons he learned during the crucible of the autumn of 2008, when he and his colleagues had to make the toughest decisions in a crisis situation without a clear sense of where they were going. In fact, it's not a stretch to suggest that Joseph Rotman's historic bequest, in the form of the Rotman Catalyst Fund, offers Macklem another institutional platform for making very demanding decisions with potentially game-changing outcomes. "We're going to make bets, but we'll make informed bets," he says. "And true to Joe Rotman, we are going to aim high – very high."

"We're going to make bets, but we'll make informed bets," says Macklem. "And true to Joe Rotman, we are going to aim high – very high"

Journalist and author John Lorinc (BSc 1987 UC) writes about politics and urban issues for *The Globe and Mail*, *The Walrus* and *Spacing* magazine.

“Take Your Best Shot!” Photo Contest Winners

Once again, there were dozens of superb entries from around the world and very few easy decisions. But somehow our panel of judges whittled them down to 12 finalists and decided on these four winners, who each received $500. Runners-up received a U of T gift. “People’s Choice” winners were selected in online voting. Thanks to all who entered!

SEE MORE ONLINE!
View all the winners, runners-up and honourable mentions at: **magazine.utoronto.ca/2016-photo-contest-winners**

Places/Things

Winner: “Fishing at Li River” by Theodore Lo (PhD 1973)

While travelling in Yangshuo, China, in 2013, Ted Lo and his wife rented a bamboo raft to take pictures of the sunrise over the Li River. On their way back to Xingping Ancient Town, the couple came across a fisherman casting his net into the water – making for a picturesque scene against the backdrop of karst mountains.

Runner-up: “Misty Fjord” by Maria Clauss (BSc 1989 UC)

People’s Choice: “Balloon Sunrise” by Alexandre Marchand-Austin (BSc 2006 UTSC, MSc 2015)

People

Winner: “Milk Cartons on Side of Train” by Arjun Yadav (BA 2016 UTM)

A *National Geographic* feature on Indian railways inspired Arjun Yadav to take this photo when he came across a scene of milk cartons being loaded and unloaded at the Charbagh Railway Station in Lucknow, India, last January. The scene is a familiar one for local denizens: with little room inside the carriage, dairy farmers resort to hanging large metal containers on window grilles lining the outside of the train to transport milk to nearby towns.

Runner-up: “Curiosity” by Ahmed Alkoka, a fourth-year student in biology and psychology at U of T Mississauga

People’s Choice: “Milk Cartons on Side of Train” by Arjun Yadav (BA 2016 UTM)

Fun fact: Forty-six per cent of the entries in the Boundless category featured water, mountains or both

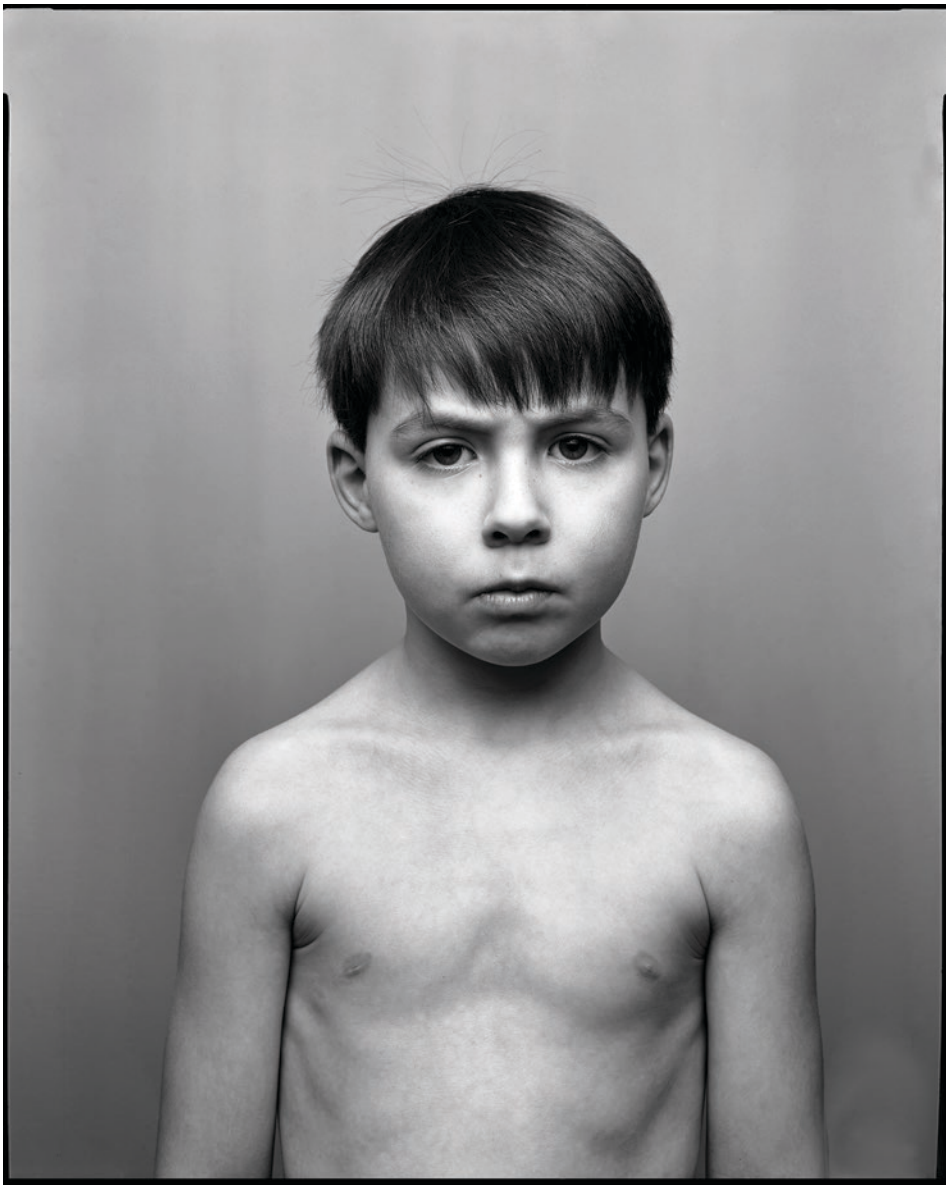
Boundless

Winner: "Novice Sunrise" by Dean Hay (BSc 1995 UTSC)

As the head coach of Nipissing University's rowing team, Dean Hay has witnessed many a dawn from the vantage of a cold, tin boat, while out on the water training his rowers every morning between late August and October. At times, he finds visual magic in the interplay of the sun striking the water and the strong, majestic line cut by the rowers – in this case last fall's novice women's eight on Trout Lake, North Bay. "Mother Nature provided the ingredients, and I merely took advantage," he says.

Runner-up: "Nighttime Fun" by Laura Mison (BSc 2015 UTM)

People's Choice: "Novice Sunrise" by Dean Hay (BSc 1995 UTSC)



Instagram

Winner: Joyce Crago (LLB 1993)

This portrait is one of a series Joyce Crago took of children in 2015. Crago, who is an aspiring photographer, says the series is meant to “confront the persistent myth that childhood is happy and carefree.” She notes that children experience the same negative and difficult emotions as adults – but with little to no perspective or experience to be able to process them or put them into context. See more of her work at joycecrago.com.

Runner-up: “Bestival Toronto at Dusk” by Denise Ing (BA 2000 UC)

People’s Choice: There is no People’s Choice winner in this category

The Judges

Scott Baker is a graphic designer for the Division of University Advancement at the University of Toronto. He studied design at OCAD University and is an amateur photographer.

Johnny Guatto is a videographer and photographer working in University of Toronto Communications. He is currently planning his next photo project in Cuba and is in pre-production for his second short film, titled *Xibalba*.

Gilbert Li is principal of The Office of Gilbert Li, a graphic design studio he founded in 2004. The studio’s much-lauded work covers all forms of print and editorial projects for a clientele of leading public institutions, cultural groups and non-profit organizations. He is *U of T Magazine*’s art director.

All About Alumni

"We don't think critically enough – not only about science but everything else, like politics. Many people seem to sleep-walk through life"
Ontario Science Centre's David Sugarman
p. 53


Margaret Froh

"The Stars Are Aligning for Our Nation"

Margaret Froh is the first woman to lead the Métis Nation of Ontario

BARELY SIX WEEKS AFTER BEING ELECTED PRESIDENT of the Métis Nation of Ontario, Margaret Froh (LLB 1996) found herself on a canoe trip on the Ottawa River with Prime Minister Justin Trudeau. Invited along with other Indigenous leaders to celebrate National Aboriginal Day on June 21, Froh says the event reinforced her optimism about improving the lives of Métis people during her term of office.

"I think the fact that we had such a prominent role in marking the day is a signal of the government's real movement to work on a nation-to-nation basis with us," says Froh, a Métis lawyer and educator. She is the first female president of the association, which was founded in 1993 to represent Métis people in Ontario.

Trudeau's call for a renewed relationship with the Métis Nation of Ontario and other Indigenous representative bodies could bring progress on housing, health, education and child welfare, says Froh. "There's never been a federal government that's been prepared to have this kind of dialogue."

Froh's other policy priorities over the next four years include promoting Métis land claims and self-government, and increasing political engagement among Métis youth. She says several political developments over the past two years will bolster her efforts, including Ontario legislation that recognizes the Métis Nation of Ontario's governance structure, and the Truth and Reconciliation Commission's report on the Indigenous experience in residential schools. ›

PHOTO: CHRIS THOMAIDIS

Linda Schuyler gave Drake his first big break: on *Degrassi: The Next Generation*, he played a basketball player who became paralyzed after he was shot

Pop-up Bike Lanes and Other Bright Ideas

How Robin Mazumder is helping to build better cities

Robin Mazumder

IT WAS A MILD, BREEZY SATURDAY afternoon in September of 2014 when several cyclists gathered in downtown Edmonton. But their bike ride along 102 Avenue was less about pleasure and more about using pedal power for public protest.

The group created a pop-up bike lane, with 10 blocks sectioned off with pylons and flowerpots, for 90 minutes. The point of the city-sanctioned event? Edmonton needs safer roads for cyclists. "Bike lanes give people who can't afford cars more options to get around, promote health and help Edmonton become a globally competitive city," says Robin Mazumder (MSc OT 2011), the event's organizer.

Up until recently, Mazumder lived in Edmonton, working primarily as an occupational therapist. He dived into city-building and, in 2014, was named to the Top 40 under 40 by *Avenue* magazine.

One of Mazumder's first projects arose when he experienced symptoms of seasonal affective disorder during his first winter in the city. He learned that a light therapy lamp would cost about $300 – so he started #lightbrightyeg (YEG is Edmonton International Airport's code) to bring three lamps to the Stanley A. Milner Library. They offer therapeutic benefits in a social space and fight mental health stigma, he says.

Mazumder is now pursuing a PhD in cognitive neuroscience at the University of Waterloo, where he is exploring how urban design affects mental health. His occupational therapy education at U of T helped shape his approach to promoting vibrant, safe, inclusive communities, says Mazumder. "I gained a holistic understanding of health. Our environment affects how we feel and function." – **SHARON ASCHAIEK**

To Feel Good, Throw a Snowball

Here are a few ways city-builder Robin Mazumder worked to improve quality of life for Edmontonians:

- **#HumanScaleYeg:** In 2014, he organized a free public screening of *The Human Scale*, a documentary about modern city life.
- **#yegsnowfight:** Mazumder helped create Edmonton's largest annual snowball fight, which attracts several hundred participants.
- **Mayor's Task Force for the Elimination of Poverty in Edmonton:** As part of a group of citizens, businesses and organizations, he collaborated on a 10-year poverty-fighting plan.
- **REACH Edmonton Council for Safe Communities:** Mazumder was a board member of this non-profit, which tackles social issues such as sexual exploitation, youth crime and mental illness.
- **Make Something Edmonton:** He was a board member of this city-funded group, which supports community-building projects such as art festivals, street libraries and social-enterprise challenges.

Growing up in the Qu'Appelle Valley in Saskatchewan, Froh says her family was surrounded by Métis people, but lacked a strong sense of their Indigenous identity. "My parents took a 'We're Canadian' view. Being Métis was not something that was celebrated. And that's not a unique story for Métis people."

After attending the University of Prince Edward Island, Froh was inspired to apply to law school after helping an Ojibway-Potawatomi friend, Mary Pitawanakwat, with a human rights complaint against the federal government. "I saw the law as being a different and powerful language," she says, "and if I could learn it, I could use it for our people."

At U of T's Faculty of Law, Froh found a supportive group of Indigenous students who eased her fears about fitting in. "I had some anxious moments. I was worried that I wouldn't see myself reflected. But I made instant connections with people, and some of them are still my best friends."

She helped launch the Kawaskimhon National Aboriginal Law Moot for Canadian law students, which incorporates principles of Indigenous law. A few years after graduating, she returned to the faculty as an adjunct professor for a course she helped design. Taught in the format of a traditional talking circle, it featured Indigenous guest speakers.

Froh has devoted much of her career to supporting strong and healthy Indigenous communities. Among other roles, she served as legal counsel for the Chippewas of Rama First Nation and was president of the Indigenous Bar Association.

"The stars are aligning for our nation," says Froh. "This is an extraordinary time in the history of the Métis people, and an amazing time to be serving in this role." – **MEGAN EASTON**

PHOTO: CURTIS COMEAU

OVERHEARD

“What impressed me even more than hearing about your academic pursuits is your innate sense of service. . . . You understand that the needs of others are as important as your own. A wise man once said, ‘Be kind. For everyone you meet is fighting a hard battle.’ That was Plato over 2,000 years ago.”

Linda Schuyler (BA 1974 Innis), honorary degree recipient and *Degrassi* co-creator, speaking to Innis grads at Convocation Hall, June 14

PHOTO: COURTESY DHX MEDIA LTD.

Of the 36.9 million people worldwide living with HIV-AIDS, 25.8 million live in sub-Saharan Africa, according to the WHO

Heather Johnston

Battling a Health Emergency

Heather Johnston helps combat AIDS in Malawi as president of Dignitas

"A LONG EMERGENCY." This is how Heather Johnston describes why Dignitas International was set up in 2004. "[Our co-founders] saw how AIDS was decimating Southern Africa in the 1990s and 2000s, and they, like everyone in the field, could see what a crisis it was – and how there were no quick fixes."

Johnston (BA 1992 VIC) is the new president and CEO of the Toronto-based organization and the co-founders in question are James Orbinski (MA 1998) and James Fraser (BA 1996, MA 2001).

The fifth generation of her family to attend U of T, Johnston is no newcomer to aid work in Africa. Four weeks before she turned 30, she left a solid desk job at a Toronto-based charity to move to Mali in 1999. "It was grassroots stuff, trying to help address the concerns of groups of Malian people who are blind and deaf." Johnston later "shifted to a job working on reproductive health rights – of real interest to me, since both my sons were born in Mali during my 13 years there." (The eldest is adopted; the youngest's father, Ibrahim Ag Idbaltanat, has won international awards for leading the campaign to curtail slavery in Mali.)

After Mali, Johnston worked on aid and development projects in Ghana, Uganda, Ethiopia, Haiti, Bolivia and Canada. Taking the job at Dignitas has shifted her attention to Malawi, a small, landlocked nation of 16 million in Africa's southeast. "AIDS was an important public health issue in Mali, but the HIV-prevalence rates never reached the levels they did in Southern Africa," she says.

Dignitas has, since its founding, administered 1.7 million HIV tests and connected more than 244,000 people with life-saving treatment in Malawi. "We're rolling out a program [with the country's Ministry of Health] to help eliminate transmission of HIV from mothers to children," she says.

Under Johnston, Dignitas has lately been pursuing three goals set by the United Nations, called, informally, 90-90-90: "You want 90 per cent of people living with HIV to know their status, 90 per cent of diagnosed people to receive sustained retroviral treatment and 90 per cent of people on treatment to have viral suppression." At her fingertips, she has current numbers for one region of Malawi – 79, 77 and 84 per cent, respectively. "That whole region was about to lose an entire generation of people. What the Jameses saw was like a health tsunami or earthquake. It's much better than it was, but the emergency, it's not over." – **ALEC SCOTT**

A Tale of Two Rodeo Stars

"I'm into cults recently – I just read an incredible book on Charles Manson," says writer Brendan Bowles (BA VIC 2009, MA 2011) when asked about topics that stoke his imagination. Small-town spectacles and subcultures are recurrent thematic interests – including in "Wyatt Thurst," his story that won the 2016 RBC Bronwen Wallace Award for Emerging Writers. The prize is for writers under age 35 who are unpublished in book form.

"Wyatt Thurst" focuses on the intertwining lives of two Canadian rodeo stars. Bowles traces the story's origins to a Texas rodeo he visited with his girlfriend. "It was gaudy and beautiful at the same time," he says. "I thought about the nature of friendship and how competition affects that bond, and I wanted to explore bull riding from a Canadian perspective."

In fourth year, Bowles took former U of T professor Jeff Parker's seminar class in creative writing, and calls it "the best, most rewarding class at university." He also earned a creative writing MA at U of T. Currently completing his MFA at the University of Massachusetts Amherst, Bowles is at work on a book-length collection of short stories and a novel. "Wyatt Thurst" can be downloaded for free at iTunes.com/BronwenWallace. – **AMY STUPAVSKY**

PHOTO: TOP, COURTESY OF DIGNITAS INTERNATIONAL; BOTTOM, COURTESY OF BRENDAN BOWLES

The world's largest Lego sculpture is a full-sized recreation of the *Star Wars* X-Wing Fighter, which comprises more than 5.3 million Lego blocks

MY DEFINING MOMENT AT U OF T

Anything's Possible When Someone Believes in You

A tough-but-fair professor allowed this alumna to thrive in engineering

By Jeewika Ranaweera (PhD 1999, MASc 1995) as told to Sharon Aschaiek

WHEN I STARTED MY MASTER'S DEGREE in electrical and computer engineering at U of T, I was a part-time student, because I couldn't afford to attend full time. That changed when I met Prof. Andre Salama. He and I really clicked, partly because he had done some work at the same university in Cuba where I had just completed a bachelor's degree in computer science, so he knew where I was coming from. He was doing research on an area of interest to me – flash EEPROM cells, then a relatively new type of computer memory storage – and he offered me a research assistantship. That extra income was a big relief: I could stop worrying about my finances and pursue my studies full time. The position included my own cubicle, computer and access to the research labs, so I had more opportunities to learn and explore.

Prof. Salama (who is now a professor emeritus) was my adviser for my master's thesis and, later, for my PhD dissertation. English wasn't my first language (I'm originally from Sri Lanka), and he helped me improve my writing. He was tough – sometimes I had to rewrite my work several times. But it helped me develop strong writing skills, which has benefited my career. As a hardware engineer at Oracle, I prepare many reports and presentations – everyone always remarks on how well written they are. I received the same feedback about *My Three Journeys*, an ebook I recently wrote about my engineering experiences. What I learned from Prof. Salama and his way of teaching helped make these achievements possible. He recognized my talent, and always encouraged me to do my best.

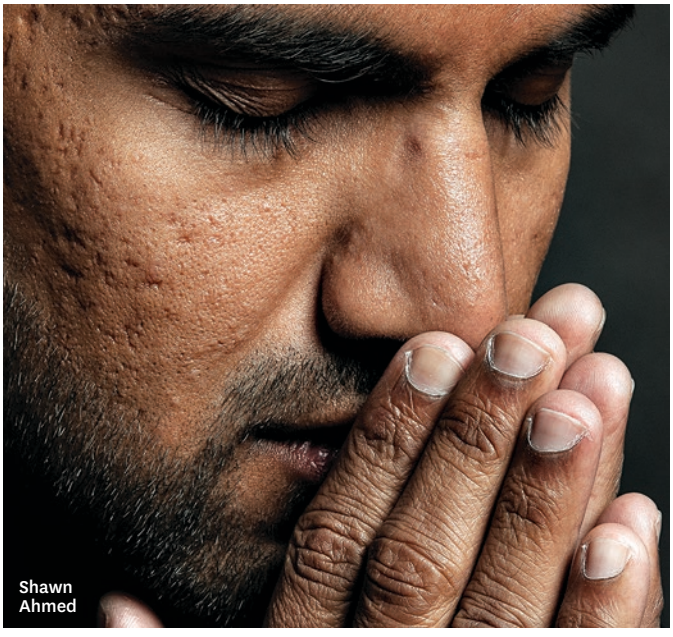
Build It and They Will Come

Graeme Dymond made every kid's dream a reality by building a life-sized house out of toy bricks – the largest structure of its kind in Canada, he says.

Last year, Dymond (BA 2006 VIC) – also known as Brick Man Graeme – was approached by Habitat for Humanity to design this 200-square-foot-plus structure for their Brick to Brick campaign. The house, made of almost 37,000 Mega Bloks, was displayed at the Interior Design Show in Toronto in January. "People were deciding on luxuries like granite or marble countertops," says Dymond. "But this was a reminder that there are people out there deciding between having food on the table or heat."

Many assume that Dymond – who was a master model builder at the Legoland Discovery Centre in Toronto before becoming a freelance brick artist – has an engineering or architecture background. But like his creations, this anthropology grad proves that anything is possible if you're imaginative. Dymond has designed everything from a giant frog used to promote an event at High Park to two spaceships – each slightly smaller than a fridge – honouring *Star Trek*'s 50th anniversary for a toy convention. "Toy bricks are like words," says Dymond, referencing his training in linguistics and semiotics, "and when you put them together, the final product becomes the story." – **NADIA SIU VAN**

PHOTO: TOP, COURTESY OF JEEWIKA RANAWEERA; BOTTOM, COURTESY OF HABITAT FOR HUMANITY CANADA



Shawn Ahmed

FIRST PERSON

As an Openly Gay Muslim, I'm Terrified of the Muslim Community

We must choose love over hate

ON JUNE 12, A MUSLIM MAN named Omar Mateen shot and killed 49 people and injured 53 others in an LGBTQ nightclub in Orlando, Florida. From Toronto, there was not much I could do except condemn the shooter. But what was meant to be a simple gesture on social media made me a target for hate from hundreds of Muslims around the world. Such is the life of an openly gay Muslim.

"I'm sad you weren't in the club in Orlando," one man wrote in a tweet, adding at the end, "Have a nice day" with a smiley. "Please get hit by a bus," another said. "I'll be among those to stone you to death," one Muslim tweeted. "Please prepare for hell," warned another politely.

As an openly gay Muslim, I am terrified of the Muslim community. As a Muslim, I know that acts of terror do not reflect Islam. With more than 1.6 billion Muslims on this planet, I know the vast majority of them are non-violent and peaceful just like me. As a gay man, I find no comfort in this fact because I know firsthand that hatred of LGBTQ people runs rampant within the Muslim community. Muslims cannot claim that Islam is the Religion of Peace if it is the Religion of Homophobia.

We cannot be both because to be the Religion of Homophobia means people die. Not only at the hands of Muslims such as Omar Mateen who shoot people in cold blood. Muslims also kill people with the homophobia in their hearts and on their lips because that homophobia leads LGBTQ Muslims to hate themselves. This self-hate leads many to take their own lives. This is a truth that is all too familiar to me and nearly cost me my life.

Growing up, I found it was easy to deny that I was gay. My immigrant parents did their best to raise their children in line with their traditional Bangladeshi Muslim values. Pork, alcohol, even heterosexual dating were all forbidden. In high school, I dismissed my lack of interest in girls as me being a good and obedient son. Moving out for the first time, to attend the University of Toronto, I tried to bring those traditional Muslim values with me to the dorm. This included the homophobia I learned from the Muslim community.

Moving onto campus was like entering the belly of the beast. Throughout the hallways were rainbow-coloured "positive space" stickers. I was disgusted. How could there be so many queers? Did they have no shame? Why did they have to be so open? What I did not know then, and what many Muslims still do not understand, is that being an LGBTQ person and being openly proud forces you to empathize. In the Muslim community, few people are brave enough to come out so most Muslims see LGBTQ issues as a distant "Western" problem. It's easy to hate in the abstract.

By being brought face-to-face with open and proud LGBTQ people, I had to choose between hate and love. I chose love. I chose love even when I did not love myself enough to accept that I was gay. I chose love because Allah has 99 names and bigotry, hate and homophobia are not among them – but love is. Many Muslims are proud of their racial and religious identity even though openly embracing this identity can lead us to be targets of racism and Islamophobia. What many Muslims don't understand is that this same pride lives in the hearts of LGBTQ people even though we face homophobia, transphobia and biphobia.

Omar Mateen's act of terrorism shows us that being openly gay and proud can still cost us our lives. As a proud and openly gay Muslim, I know that I am a target within the Muslim community. Maybe one day it will cost me my life. But by being open and proud of who I am, Muslims are forced to choose. They must choose between loving me or hating me. If they choose love, they will see that both the gay community and the Muslim community have shared truths. Both believe that life is precious and both want to live in a world with tolerance.

And so I choose love. Because love wins.

Shawn Ahmed (BA 2005 Trinity) is an activist who promotes poverty alleviation, interfaith dialogue and LGBTQ rights. He has been honoured by the World Economic Forum. You can find Ahmed at twitter.com/uncultured.

PHOTO: CHRISTOPHER MORRISON

The Ontario Science Centre was designed by U of T alum Raymond Moriyama (BArch 1954)

60 SECONDS WITH

David Sugarman

Ontario Science Centre guy gets a charge out of explaining the natural world

David Sugarman

SINCE 1969, the Ontario Science Centre has brought the mysteries of the natural world to life for more than 50 million visitors. One of the world's first interactive museums, it inspires countless children to choose careers in science. **David Sugarman** (BSc 1983, BEd 1986) has spent 30 years at the centre as a senior researcher, and is one of the people responsible for program development and public education. Here, he peers through the microscope with **Cynthia Macdonald**.

Who doesn't love the science centre? Touching the Van de Graaff generator and feeling your hair stand on end is a rite of passage for any Toronto kid. We'd never dare get rid of the Van de Graaff because it's so iconic. At one point we even had a Van de Graaff in the science circus that went around the province.

Since you've been there, the world has seen incredible changes in technology, climate and neuroscience: I guess your exhibits have to change, just as the world does. That's true. In the mid-90s, we had an area called "The Information Highway." Relatively few people had access to the web then, so we had computers set up for them to play the latest games. You can imagine how popular that was.

Do you think we are scientifically literate as a society? Not nearly enough. And I find there's a huge disparity between that literacy and the amount of information that's available. We don't think critically enough – not only about science but everything else, like politics. Many people seem to sleepwalk through life.

Around the turn of the millennium I read a book called *The End of Science*, which claimed that everything had been discovered already: Science was over. It's preposterous, of course! The tools we have now – take the Hubble telescope, for example – only reveal how much we still *don't* know. Science is like a door that leads onto other doors. As soon as you say you've found it all out, you're closing those doors.

Famous scientists such as Nobel laureates John Polanyi and the late Marie Curie don't strike me as "mad." They're very distinguished – so where does the image of scientists as "mad" come from? Scientists are intensely focused on their work – work that is often quite esoteric, and that can make them seem like odd ducks, I suppose. But that focus is understandable, because the world is so magical. Think about what's going on underground – there are untold numbers of organisms in the ground beneath your feet. Outside, birds are singing: if they don't get their songs right, they don't get a mate. And the whole idea of life, that we're part of an unbroken chain that goes back in time to the first bits of protoplasm – I mean, that's just mind-blowing!

Milestones

Lena Koke

If you are at a Walmart in the Greater Toronto Area, you might see a sign for Axess Law – a company that provides affordable legal services in high-traffic areas. Axess co-founder and president **Lena Koke** (JD/MBA 2008) was recently named a Rising Star to Watch in the *PROFIT/Chatelaine* W100 ranking of Canada's top female entrepreneurs. (Co-founder **Mark Morris** earned a BA in 1998 and an MBA in 2006 from U of T.) **Kim Shannon** (MBA 1993), president of Sionna Investment Managers, a value investing firm, placed 33rd in the W100 ranking. **Ann Kaplan** (MBA 2005), president of iFinance Canada, which provides loans for medical procedures, placed 46th.

Five U of T alumni were recently inducted as fellows of the Canadian Academy of Engineering, which honours the country's most accomplished engineers. **William Breukelman** (BASc 1955) is chair of Business Arts. The companies he has led have advanced the fields of imaging, analytical geochemistry and geophysics. **Elizabeth Croft** (PhD 1995) is associate dean, Faculty of Applied Science, UBC, and a robotics researcher. **Samantha Espley** (BASc 1988) is general manager of mines, geology and technical services for Vale's Ontario operations. **John Gruzleski** (PhD 1968) has made major advances in the study of strontium. He is a former dean of engineering at McGill. **George Kipouros** (MASc 1977, PhD 1982), dean of engineering at the University of Saskatchewan, has made significant contributions to metals processing.

PHOTO: TOP, COURTESY OF MORIYAMA & TESHIMA ARCHITECTS; LEFT, COURTESY OF ONTARIO SCIENCE CENTRE; RIGHT, COURTESY OF AXESS LAW

IN MEMORIAM

Carl Mitchell's Outstanding Service

Former president of the U of T Alumni Association has left a lasting impact

IN HIS TOO-SHORT TIME ON EARTH, Carl Mitchell (BSc 1984 St. Michael's College) exemplified the concept of giving back. The 55-year-old Mitchell, who died in June after a 14-month battle with abdominal cancer, was a successful tech pioneer and business executive whose extraordinary generosity to U of T – in the form of time, leadership, money and ideas – has left a lasting impact on the school he so loved.

"Carl Mitchell won the admiration and affection of everyone who had the pleasure of knowing him," says U of T president Meric Gertler. "He also earned the gratitude of the entire U of T community for his exemplary leadership in service to our alumni and to our shared academic mission. We will remember his wisdom, integrity and decency."

Mitchell started off as a general science student in 1979, but soon gravitated to the burgeoning field of computers. "Programming was a lot more intuitive than, say, chemistry," he recalled in a 2004 interview with this magazine. "I could work out a program in my head on my way over to the lab."

Several years after graduation, Mitchell (by then a software manager) went into business with three others. Their company, V3 Semiconductor, developed rapid data-transfer technology for clients such as NASA. After V3 was sold in 2001, Mitchell earned an MBA and worked as a business consultant.

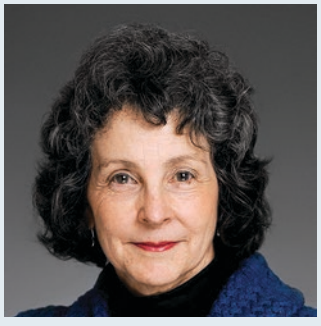
By this time, of course, computers had long moved out of the punch-card era. When Mitchell learned about U of T's plans for a new information technology facility, he decided to become the first donor. His largesse led to the establishment of a full computer lab at the Bahen Centre.

So began Mitchell's extraordinary period of alumni service at U of T. Among other things, he served on computer science's award selection committees, as well as its industry advisory board. In 2009, he was elected president of the U of T Alumni Association (UTAA). "He believed that board members need to show their engagement, not just talk about getting others engaged," says Matthew Chapman, who succeeded him as president. To this end, Mitchell encouraged members to perform acts of service, such as tree planting.

Born in Jamaica, but a Toronto resident for most of his life, Mitchell was married to Margaret Shaw (BA 1986 Victoria) and has a daughter and son. Says Barbara Dick, assistant vice-president of alumni relations: "Carl walked and spoke softly, but everyone who had the pleasure and honour of working with him came away with a clear sense of his innate kindness, principles and intelligence." – **CYNTHIA MACDONALD**

IN MEMORIAM

Paula Goering



A little kindness goes a long way, but Paula Goering – who dedicated her life to improving the lives of others, before passing away of cancer in May – went beyond the call of duty.

After obtaining her PhD from U of T's Institute of Medical Science in 1985, Goering became a psychiatry professor at the university, where she was known to lead daunting large-scale projects. Her life's work culminated in a five-city study that showed the "Housing First" model – where people grappling with homelessness and mental illness are provided with a place to live, along with preventive care – to be an effective long-term approach. "Paula was always bold and fearless in her commitment to helping those in need," says Donald Wasylenki, former chair of psychiatry at U of T.

Throughout her career in mental-health-services research, Goering extended kindness to everyone, from befriending the people she worked with (many of whom struggled with mental illness) to organizing celebrations. "She'd bake a chocolate angel food cake – my favourite kind – for my birthday every year," says Wasylenki. "She believed in making a difference in the world, no matter how small."

Farah Mawani, a PhD candidate in public health sciences, had assumed that Goering would step down as her co-adviser. "She said, 'No, I want to see you through to the end,'" Mawani recalls. "I was not able to complete my PhD in time, but I will carry her kindness, generosity and belief in me forever."
– **NADIA SIU VAN**

PHOTO: TOP, DAVE CHAN; BOTTOM, COURTESY OF U OF T PSYCHIATRY

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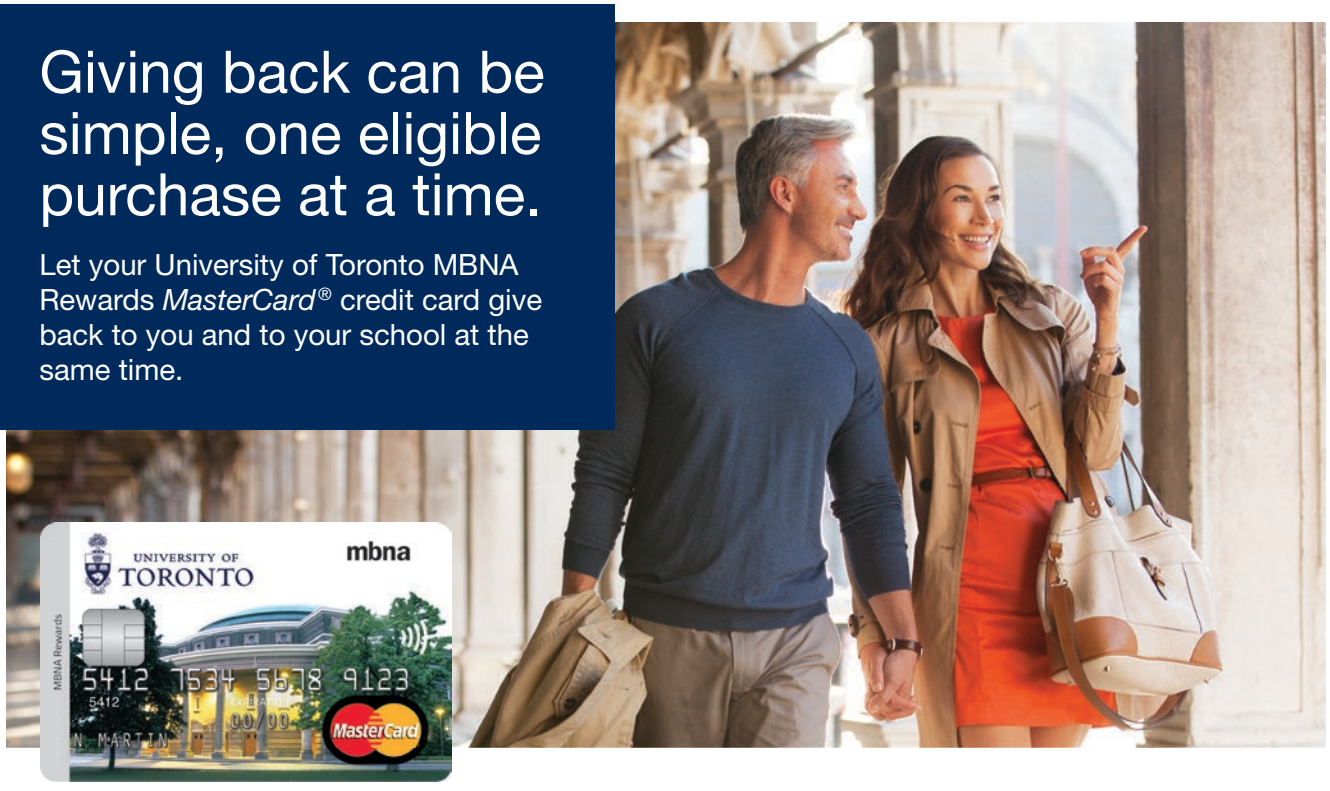

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Workers unload a 2.5-tonne bell destined for the carillon in U of T's Soldiers' Tower

FOR WHOM THE BELL TOLLS

Sept. 14, 1927

The Soldiers' Tower carillon creates a unique U of T soundscape

On a warm September day, U of T workers unpacked a 2.5-tonne bronze bell, tuned to a low C note. They hoisted the behemoth to the top of Soldiers' Tower, hanging it from steel girders among 22 other different-sized bells to assemble the university's original carillon.

The project to commemorate the fallen of the First World War had quickly struck a chord with U of T alumni. Fundraising began in January 1927, when Board of Governors Chair H. Maurice Cody donated $125 to fund the smallest bell. More donations poured in, with many grads contributing $5 apiece – the Victoria College Alumni Association collectively donated $5,800 for the pictured bell, the second-largest.

The Gillett and Johnson foundry in England had shipped all 23 bells in August, and the dedication concert took place on October 6. Parliament Hill's official carillonneur, Percival Price (BMus 1928), played the hymn "Old Hundred" to live and radio audiences on the carillon's clavier, then rang the largest bell 100 times to acknowledge U of T's centenary. (In 1952, 19 more bells were added to honour the fallen from the Second World War. Another revamp of the carillon took place in 1976.)

Ever since, students have been fascinated by the music that wafts from the tower top. "The carillon's purpose is to contribute to the soundscape of the community," says Roy Lee (JD 2004), the current carillonneur. "Our performances throughout the year are how we fulfil the wishes of the original donors: that the carillon be 'for all time an audible and daily reminder' of the sacrifices of the university community during the Great War." **– JANET ROWE**

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