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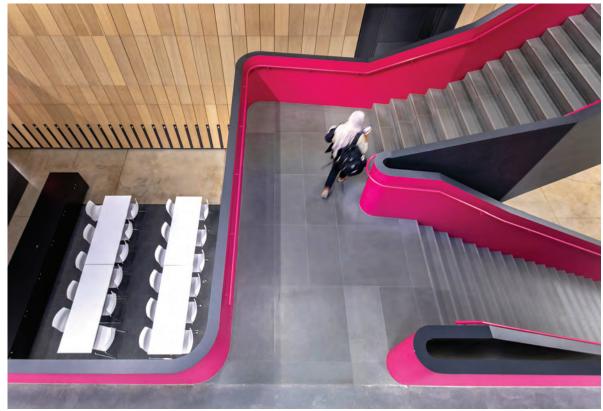
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A remarkable gift from the Rotman family created the Rotman Catalyst Fund, which is spurring innovation at Canada's top-ranked business school, p. 78

COVER ILLUSTRATION EXCLUSIVELY FOR U OF T MAG BY NIM BEN-REUVEN; PHOTOGRAPH BY NICK IWANYSHYN

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ON THE COVER



To convey a simple but sincere and heartfelt message of "thank you," we turned to Nim Ben-Reuven, a custom lettering artist in Brooklyn, New York, known for his elegant scripts.



THE LANDMARK PROJECT

THANK YOU FOR HELPING US REVITALIZE U OF T'S HISTORIC CORE

Excitement for the Landmark Project continues to grow in Toronto and around the world. Hundreds of donors are leaving their mark on the University's historic core with commemorative gardens, trees, benches and pavers.

The Landmark Project will reclaim the centre of St. George campus for pedestrians by moving surface parking on King's College Circle (KCC) and Hart House Circle underground, installing the largest urban geothermal field in Canada beneath KCC—saving us 15,000 metric tons of greenhouse gas emissions a year, the equivalent of taking more than 3,000 cars off the road—and introducing new plazas, pathways and green spaces. Altogether, the Landmark Project will create a campus experience more befitting a world-class University.

Join us in imagining our downtown campus as an even more inspiring showcase and point of pride for our community and city.

Carve your legacy in stone and create a special place in the historic heart of the University of Toronto for generations of students, graduates and visitors to gather and enjoy. With a gift of \$1,000, your name—or that of a loved one—will be engraved on an elegant 12" x 12" granite paver placed outside Convocation Hall.

Learn more about this historic initiative at: landmark.utoronto.ca

Support the Landmark Project at: donate.utoronto.ca/landmark or by calling 416-978-4928.



Actual Size 12" x 12"





I love this redesign

@LOUISEKINROSS

The New Look

I receive alumni magazines from Guelph, Queen's, York and U of T. I usually scan them for insights and as you say "a backstage pass to the university's brightest minds." But this issue of University of Toronto Magazine was something special. I was riveted by the feature stories. The magazine hadn't just assembled some profiles and facts. The editors had presented a mini-course on urban planning full of ideas that matter. Great work reimagining! WENDY HUGHES, BEd 1978 OISE, MEd 1997, TORONTO

Congratulations on your new format! When I graduated from U of T in 1960 I went straight to Boston where *Harvard Magazine* awaited me. I hid my *U of T Magazine* from sight because of its chest-pounding provinciality. In 1988, I joined the Columbia

faculty where *Columbia Magazine* had the same
dominating effect. Now, at
long last, *University of Toronto Magazine* has serious articles
that cry out to be read amidst a
minimum of in-house bumph.
I display it with pride to my
Ivy League colleagues to prove
that the University of Toronto
is truly in the fast lane.

JOHN TRUMAN, MD 1960, NORTH ANDOVER, MASSACHUSETTS



Moving Challenges

Prof. Ron Buliung wrote about how his research into urban mobility and his own perspective changed

A QUESTION

What are you most thankful for right now?



38% Family/friend

14%
The opportunity
to study at U of T

8% My health

4%

36%

U of T students, like most everyone, are grateful for the people they love. In the moment they were polled, many also expressed gratitude for being able to attend U of T. (We didn't put them up to this!) Some students were asked the question with a café nearby, which could explain the strong showing for "coffee." A few were thankful for something they didn't have (imminent exams or a student loan) while others expressed thanks for a particular aspect of their U of T experience, such as their professors, an exchange opportunity or the library. Among the answers receiving one vote each: "God," "the TTC came on time," "legal pot" and "my winter jacket."

This highly unscientific poll of 100 U of T students was conducted on two very cold days in February on St. George Campus. after he learned his young daughter Asha would require a wheelchair.

Prof. Ron Buliung's story resonated with me beyond words. Like Asha, I have spinal muscular atrophy type 2. The lack of accessibility in the city has been a huge and constant barrier in my life. I applaud Prof. Buliung for teaching his daughter from an early age the importance of advocating for herself and making her needs known to others. This is something I didn't fully learn until a few years ago. SARAH POLLICHIENI, MEd 2017, WOODBRIDGE, ONTARIO

I remember trying to get around the city in the snow with a stroller. It was so incredibly taxing, I'd frequently end up in tears. And all I could think about was, how do people in wheelchairs cope? This is such positive research. Looking forward to hearing the outcomes! **ALPHAJULIET** @ALPHAJULIETCOMM

Priced Out

Writer John Lorinc looked at ways we could plan cities better to solve the affordable housing crisis affecting Toronto and Vancouver.

Your article on affordable housing suggested the solution is to build more highrises, creating an ultra-dense city. What we need to do is address rampant speculation. Studies show that one-quarter of the price of a new home is caused by the flipping of land deeds that occurs before a house is even

Write to us

University of Toronto Magazine welcomes letters at uoft.magazine@utoronto.ca. All letters may be edited for clarity, civility and length.

@uoftmagazine built. Actions at all levels of government should include: public land assembly, a 100 per cent capital gains tax on such profiteering and a total ban on such speculation by foreigners. BOB STEVENSON, BA 1962 VICTORIA, OTTAWA



Toronto to Montreal in under an Hour?

The future is magnetic. Cool piece on developments in Hyperloop transportation. JEN LEE @JENERALZEE

Fighting Climate Change in Cities

Writer Joe Castaldo investigated how to make sustainability part of everyday living.

The article in your autumn issue about climate change is very timely. As the October 2018 report of the Intergovernmental Panel on Climate Change made clear, even those of us fortunate to live in Canada will face great difficulty dealing with this existential threat to human societies. Seventy per cent of our greenhouse gas emissions occur in cities, so they will be a key battleground for the remainder of this century and into the next. BARRY MITCHELL, BA 1968 NEW, MA 1969, PhD 1978, TORONTO

A Correction

Several readers wrote to point out that North America's oldest football trophy is not the Yates Cup, as we stated in "America's Game Might Have Kicked Off at U of T" (Autumn 2018), but the Mulock Cup first awarded in 1895, three years before the Yates.

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Editor and Manager Scott Anderson

Deputy Editor **Stacey Gibson**

Editorial and Advertising Assistant Sally Choi

Art Direction and Design Studio Wyse

Vice-President, U of T Communications **David Estok**

Co-Publishers

Barbara Dick

Assistant Vice-President, Alumni Relations

Erin Lemon

Executive Director, Communications and Public Engagement

Editorial and Advertising Inquiries 416-978-0838

uoft.magazine@utoronto.ca

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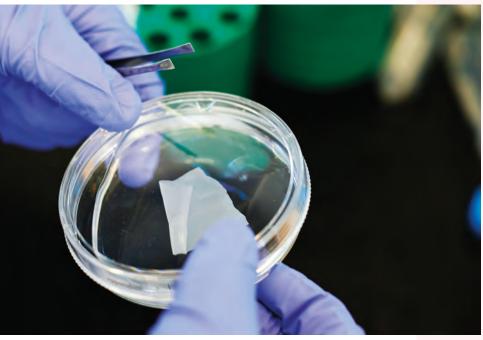
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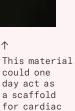




HEALING BROKEN HEARTS

Paul Santerre, a biomedical engineer at the Ted Rogers Centre for Heart Research, is working on a "cardiac patch" that one day could be used to repair damaged heart tissue. When journalist Alison Motluk (BA 1989 Trinity) visited Santerre's lab and saw the patch a small, gossamer sheet of polymer fabric — she thought of fairy wings. "When I asked him how it could possibly go inside a body, he plucked it out with tweezers and it flattened to almost nothing. It was like a magic trick," she says, "but better, because I knew it was real."

-Read more about Paul Santerre's cardiac tissue patch on page 12.



cells,

itself

helping the

heart heal



STEPH MARTYNIUK The first time Martyniuk, a Toronto photographer, met U of T Mississauga student Sabeen and her mentor Samra Zafar, a UTM alum, was when they showed up at the studio to be photographed. "It's daunting," says Martyniuk, who had read about each woman's difficult past beforehand (p. 32) and had prepared herself for a very serious shoot. "But from the first second on set, they were both so positive and fun. And that became the story I wanted to tell: their happiness, and the bond between them."



KATRINA ONSTAD Reporting on Prof. Chelsea Rochman's research into plastic pollution was, for Onstad, a bit like entering a subculture of enthusiasts, though with much higher stakes. "In the way of any record collector or comic book

fan. Chelsea's fascination with microplastics becomes infectious," says Onstad. "I began to see plastic pollution everywhere. I was disturbed by research on the prevalence in waterways of microfibres shed by clothing, especially fleece, and joked with my kids that the article (p. 74) should be called "Your Slanket is Killing the Planet." Onstad (MA 1999) is a journalist, novelist and screenwriter.



YASIN OSMAN What struck Osman about photographing U of T student Bahia Marks at a youth event she was involved with in St. James Town (p. 18) was how warm the members of the group were with each other. Having grown up in Regent Park, Osman savs he knows the value of a tightly knit community and sees parallels between what Marks is doing and his own mentorship program, #ShootforPeace, which he hopes will empower local youth.

Want to contribute? Send your ideas to scott.anderson@utoronto.ca.

HOW COULD THIS BE MORE BEAUTIFUL?

Travelling with like-minded people makes discovering new lands a richer experience. The University of Toronto Alumni Travel Program invites you to explore all corners of the world with U of T alumni who share your sense of adventure. Each tour is fascinating, enlightening and meticulously planned—down to every detail and flavour. What will turn your trip into a journey are the folks you meet along the way.







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ALL OF YOU

SEVEN YEARS AGO, WE announced a bold plan to raise an historic \$2 billion for the University of Toronto. We chose such an ambitious goal to help fulfil our academic aspirations, but also as a symbol of our determination to strengthen our place among the world's very best universities.

That the Boundless campaign soared past this goal, raising a total of \$2.641 billion, is a striking indication of the success of this institution and the immense support it has gained from its alumni and friends.

We couldn't have done any of this without you.

More than 100,000 of you supported Boundless. To me, this is the most remarkable number of the campaign. It points to the incredibly broad support we have inspired, and to a culture of giving within our community that bodes well for our future.

As you shared with us your ideas for the campaign, you challenged us to work collaboratively - to reach across disciplines within the university, and to transcend boundaries between the university and other institutions.

You encouraged us to think big.

It was exactly this kind of thinking that led to a record-breaking \$130-million gift from the Rogers family jointly to U of T, SickKids and the University Health Network to create the Ted Rogers Centre for



Heart Research. Through this pioneering initiative, scientists and clinicians from these three institutions are working together to improve the lives of people with heart disease.

There are numerous other examples of gifts that have brought together researchers from different areas of the university to solve an important challenge. These donations have helped us see problems in new ways; they've helped us innovate.

We're grateful, too, for your support of scholarships. The University of Toronto prides itself on research excellence in a large number of fields, but what sets us apart from our international peers is how well we combine research excellence with accessibility for students of all economic backgrounds. In order for us to sustain this dual identity, support for scholarships is absolutely critical.

Through your giving, you've also helped us physically transform our three campuses. If you haven't visited U of T Mississauga or U of T Scarborough in the past five years, go! See for yourself the spectacular new spaces for teaching, learning, research and innovation. On the St. George campus, you've helped us renew historic structures, such as the Daniels Build-

> ing and the Munk School of Global Affairs & Public Policy, and construct impressive new ones, such as the Jackman Law Building and the Myhal Centre for Engineering Innovation & Entrepreneurship. These are just a few examples of how your giving has enabled this university to do great things in pursuit of its academic mission and to contribute to the city around us.

> As alumni, you've also given generously of your time and talents. In record numbers, you've mentored students, spoken at events, hosted dinners for students, served on governance and advisory bodies, and helped us

recruit brilliant students from around the world.

For all of these reasons, and many more that you'll read about in the following pages, we're grateful.

Thank you for sharing in our aspirations, and for making the Boundless campaign such a tremendous success.

Muic Stelle Sincerely,

MERIC GERTLER



BECAUSE

THERE IS **NEW HOPE FOR HEART PATIENTS**

FOURTEEN YEARS AGO, AT age 75, my father had his first serious heart attack. During an event like that, heart tissue is starved of oxygen and can die. Tests showed my dad's heart had been badly compromised.

It wasn't clear what to do. Over his five weeks in hospital, the cardiologists swayed back and forth among options. Should he get a "redo" - a second bypass surgery, grafting new arteries to feed the heart, to follow up on the quadruple bypass he'd had 12 years earlier? Or angioplasty to widen the arteries, with stents to keep them propped open? Or was it safest just to treat him with drugs alone? In the end, he got angioplasty and multiple stents, followed by a diet of pharmaceuticals.

It obviously worked - he's still alive and kicking - but I remember wishing in the midst of the crisis that he had a stash of stem cells, to regenerate his heart from within. He didn't. But now Paul Santerre, a U of T biomedical engineering professor leading a research team at the Ted Rogers Centre for Heart Research, is at work on the next-best thing – an injectable polymer material studded with cardiac cells that can take up residence at the site of injury. He calls it the cardiac tissue patch.

Bypass and angioplasty and stents and medicines can all work fine, but they are workarounds. Being able to regenerate cardiac tissue, as Santerre is aiming to do, will allow the heart to function closer to the way it did before the injury.

One of the big challenges of crafting synthetic materials that will be put inside the human body is that our immune system is expert at sniffing out foreign substances - then attacking them, breaking them down and tossing them out. This is terrific if the foreign substance is a pathogen, such as measles or E. coli, but not so good when it's a medical device.

Santerre has spent years pondering this problem. He knows that the immune system's response to foreign objects is a lot like its response to a wound. The first thing that happens is inflammation, during which

> Prof. Paul Santerre leads a research team at the Ted Rogers Centre for Heart Research



All researchers pictured are using the appropriate level of safety gear for this lab



MAGAZINE.UTORONTO.CA 13





The Santerre Lab aims to create a cardiac patch

damaged (or foreign) cells are removed. This is the downfall of many a medical implant. After that, however, wound-healing begins - the laying down of new blood vessels and the groundwork for new tissue - and that rebuilding phase was something Santerre was keen to harness for heart regeneration.

He was particularly interested in creating a material that could act as a scaffold for cardiac muscle cells. These cardiac cells, which had been derived from stem cells, were extremely promising, but when they were injected into the heart on their own, they ended up disorganized. Out of millions of cells injected, fewer than 10 per cent typically survived.

Santerre's fine polymer is designed in such a way that it helps orient the cardiac cells, so that they fall into their required pattern. This orientation is very important for heart muscle function - it ensures that the receptors on the cells align correctly, so that the cells together can send the electrical pulses needed to keep the heart beating. "If they are oriented in every which way," says Santerre, "then the force doesn't really go anywhere."

The polymer is designed to chemically mimic a natural protein, so it doesn't arouse suspicion from the immune system. "What you do is you enable the local proteins to interact with this polymer as if it belongs there," says Santerre. His experiments show that white blood cells that would normally attack foreign substances like these don't pay much attention to his. Not only does this mean that the immune system is less likely to attack, it also means that the patch might be incorporated into the attempts at wound-healing that follow.

The idea of the patch, then, is to use the sheet of oriented cells in a damaged part of the heart, and coach the cells to develop into functioning heart muscle tissue.

The polymer, which looks like fine

white gossamer, is so thin it could be folded and drawn up into the heart through a catheter. Chopped into tiny pieces, it could be injected straight into the heart with a needle. The polymer is also designed to degrade well, says Santerre. After it helps regenerate healthy tissue, it has no purpose in the body. Eventually, water will break the material down into carbon dioxide and a naturally digestible product, which can be excreted.

The patch won't be ready in time for someone of my dad's generation. It's still a few years away from being tried out in a mouse. Santerre says he and his colleagues will spend the next year or so perfecting the sheet of cardiac cells. Then they have to see if the cells can retain their appearance and behaviour in the lab. "If they hold on to these things in my petri dish, they're going to be able to hold on to them in their appropriate ecosystem," says Santerre. Be still my beating heart. - Alison Motluk

In 2014, the Rogers family donated \$130 million to U of T, the Hospital for Sick Children and the University Health Network to create the Ted Rogers Centre for Heart Research. Scientists and clinicians at the centre, such as Paul Santerre, are working to reduce hospitalizations due to heart failure and improve the lives of people living with heart disease.



BECAUSE

IF WE REPEATED "THANK YOU" FOR **EVERY DOLLAR** RAISED DURING THE BOUNDLESS CAMPAIGN, WE WOULDN'T FINISH UNTIL THE **YEAR 2102**



Prof. Mary L'Abbé conducts research into the nutritional quality of packaged and restaurant foods. One of her interests is food marketing to children – work funded by U of T's Joannah and Brian Lawson Centre for Child Nutrition. She talks to deputy editor Stacey Gibson about the disturbing consequences of marketing unhealthy fare to kids.

Tell us about your research into food marketing to children.

For one study, we looked at the amount of sodium, sugar and saturated fat in more than 20,000 food and beverage products. We found that only 16 per cent met Health Canada's proposed thresholds for marketing to kids. Our research has also shown that foods that are most heavily marketed to children

are often the less healthy option.

We want more of the onus to be put on the *system* rather than the individual to find the healthiest food. A parent goes into a grocery store with two children in tow and, with limited time, tries to pick out the healthiest foods while being bombarded by advertisements. It's a hard job, and we want to help minimize the struggle.

Why is it so important to get a handle on this type of marketing?

Children are the most vulnerable in our society. The food habits that children learn early in life are the habits they tend to follow for the rest of their lives.

Compared to a generation ago, a lot more children today are obese. Because of poor eating habits, we're also seeing more cases of high blood pressure and elevated blood lipids and glucose levels in adolescents and young adults. These are risk factors for diseases such as stroke, heart disease and diabetes – which don't usually appear until middle age. I think that's a real wake-up call.

We need to start *preventing* disease in childhood rather than *treating* disease in adults. To do this, we need to start healthy eating habits in the home so that our children grow up to be healthy adults, as opposed to treating them with all kinds of drugs as adults to keep their blood cholesterol, glucose and hypertension levels normal. Restricting companies from marketing unhealthy foods to children is a start.

Your research has helped support the Child Health Protection Act, which is awaiting final approval in the Senate. Why is this bill important?

The bill proposes to prevent companies from marketing foods that exceed the Health Canada thresholds for high levels of sodium or sugar or saturated fat to children under the age of 13.

This works two ways. It reduces the amount of marketing that children and parents are exposed to, and it also works as an incentive to the food industry to reformulate foods. We saw that happen with trans fats: virtually every company has reformulated their foods to get below the regulations.

Are there certain kinds of foods that are marketed to children more aggressively than others?

Breakfast cereal is one of them. There'll



be half a dozen things on the box clearly setting them up to appeal to children games on the back, cartoon characters, the colour of the cereal, the colour of the boxes. Yogurt and cookies are two other examples.

How can parents help ensure their kids choose healthy foods?

Children are dependent on the adults in their environment to help shape their eating habits. School food policies, parent councils at school and eating well in the home really do help children. We hope by the time they're making their own choices, they've learned how to eat healthily.

Joannah and Brian Lawson donated \$10 million to create the Centre for Child Nutrition at U of T's Faculty of Medicine. Established in 2017, the centre connects researchers, health practitioners and patients to improve the nutrition of children and reduce childhood obesity, malnutrition and chronic disease.



BECAUSE

Bomb Ponds (2009),

by Cambodian photographer

Vandy Rattana

Landmine craters could be turned into something useful









As a result of a threedecade civil war, Cambodia is one of the most heavily mined countries on Earth: there are more active explosives buried beneath the ground than people living above it. Removing the mines is dangerous and expensive, and more than 1.900 square kilometres of land could still be contaminated.

A few years ago, before starting work on her master's thesis in landscape architecture. Shaine Wong (MLA 2017) saw pictures of people in Cambodia using craters from exploded landmines as fish ponds. This inspired her to think about ways to make removing the mines more practical - more like an opportunity than a cost. "The mines might leave craters but we could use them," she says.

And so, in the treacherous landscape of postwar Cambodia, Wong found her thesis topic. At one landmine

site, she proposed using bomb craters as rainwater reservoirs. At another, she suggested creating a canal that farmers could use to irrigate their crops and then transport them to market.

Wong's ideas received positive feedback from a member of the Cambodian Mine Action and Victim Assistance Authority. "Landscape architecture is about so much more than making things look pretty," she says. "When you look around, you start to see hidden opportunities in every challenge."

While working on her thesis, Wong received the John E. (Jack) Irving Prize from the Daniels Faculty of Architecture, Landscape, and Design, worth \$2,500 (since raised to \$5,000). Wong says the award came at an opportune time. "It let me know that I wasn't the only one who believed in what I was doing," she says. -Brent Ledger

LLUSTRATIONS BY ELENA XAUSA

BECAUSE

YOUNG PEOPLE **ARE SPARKING CHANGE IN THEIR COMMUNITIES**

WHEN BAHIA MARKS WAS 10 YEARS OLD AND living in Cape Town, South Africa, her mother, who worked in public health, sometimes took her on visits into the local communities. Even at that age, Marks - now a master's student at the Daniels Faculty of Architecture, Landscape, and Design - noticed a relationship between what people looked like and where they lived. "I wondered why some people, who were often white, lived in areas of extreme wealth and others did not."

These questions lingered with Marks, and as an undergraduate in the U.S. she became interested in "participatory design." She began thinking about how neighbourhood residents might contribute to the design of their own communities.

Now, Marks is exploring this topic - both in her master's work at U of T and as a volunteer with the Junior Youth Spiritual Empowerment Program in St. James Town, where Marks meets weekly with a group of 11- to 15-year-olds.

Together, the group - one of several junior youth groups that meet across Toronto - considers what their neighbourhood needs. Then they act. "Our group decided they wanted to create a space where children can watch movies together," says Marks. While this may be a small change, she hopes the skills the youth learn will stay with them. "It's like a muscle we're building together," she says.

Bahia Marks is a John and Myrna Daniels Scholar. The scholarship for master's students in architecture was created with a donation from the Daniels in 2008 and expanded with an additional \$6-million gift last year.









On March 22, Bahia Marks joined members of the Junior Youth Spiritual Empowerment Program for a film screening in Toronto's St. James Town





CENTRE: Bahia Marks and Jadgeo Gabrial, 16, walk through St. James Town to a screening of a short film made by and about youth. LEFT: Marks and Maya Wong prepare for the screening. ABOVE: Marks and Gabrial sit together. TOP: Youth discuss the film.



BECAUSE



You believe in better protections for Canadian investors



Are your investments safe? Not as safe as you might think, says Prof. Anita Anand, who holds the J.R. Kimber Chair in Investor Protection and Corporate Governance at U of T's Faculty of Law. The chair was created in 2016 through a gift from Chancellor Emeritus Hal Jackman (LLB 1956) to foster research into investors' rights. Anand is calling for three major changes to boost safeguards for the 50 per cent of Canadians who own stocks:

1—Give investors a legal right to compensation for any money they lose due to fraud or due to breaches of security regulations. Securities law allows for penalties against companies found guilty of fraud or securities violations, but there is no guarantee those fines will be paid to investors who lose money. Most of the time, investors get nothing back. This is especially bad for low-income or retired individuals, says Anand, because they are most vulnerable to financial ruin and the least able to pursue their own remedies.

2—Regulate the relationship between investment adviser and client more tightly. Right now, investment advisers and financial planners have no statutory obligation to act in good faith and in the best interests of their clients. They are not required to obtain a license or professional designation, and they may give themselves job titles without telling clients what they mean. As a result, investors may have a false sense of their advisers' credentials.

3—Apply stricter rules to companies that have more than one class of shareholder. Some companies have dual-class share structures. With one class, they are able to raise capital from the public and with the other, they can allot themselves extraordinary voting rights so they maintain control of the corporation. Although outside shareholders provide equity to the firm, they do not have any say in governance, including executive compensation. "This is unfair," says Anand.



JAMESTO

Students are banking on a brighter future for refugees



Reach Project students Elizabeth Assefa, Marin MacLeod and Natalie Boychuk visited Jordan to research a refugee program

Marin MacLeod (MPH 2017) can pinpoint the moment the proverbial penny dropped: In April 2017, she and four fellow students travelled to Amman, Jordan, to research a cashassistance program led by the UN Refugee Agency.

"I had a moment where I realized that 'business as usual' is just not good enough," says MacLeod. "If we want to reach the most vulnerable, we need to challenge the status quo."

For one year, students in the Reach Project - offered through the Munk School of Global Affairs & Public Policy examine development programs that are helping marginalized communities. Then, the students spend up to 10 days interviewing people who work on these programs.

In Amman, MacLeod witnessed how the cash-assistance program

worked. In the past, UN agencies have provided help to refugees in the form of goods or services, with limited ability to tailor support to match a family's needs. Under the new program, UN agents conduct home visits with refugee families. Those deemed eligible for aid receive cash payments through an ATM. The system allows the recipients to make decisions about what they need and the agency to track assistance and prevent fraud, using biometric data a member of the family has provided.

One of the most valuable lessons, says MacLeod, was learning that although, from afar, the program seems to involve just one UN agency, in fact many organizations contribute to its success. "In the field, you begin to see the complexity of reaching refugees in a conflict zone," she says.

The Reach Project is made possible by a partnership between the Mastercard Center for Inclusive Growth and the Munk School of Global Affairs & Public Policy, which was established with a landmark gift from the late Peter Munk (BASc 1952) and Melanie Munk.

BECAUSE

KIDS ARE **SUPERHEROES**

MANMEET MAGGU AND RAHUL Udasi were studying engineering at the University of Waterloo when Maggu received troubling news from family in India: His young nephew Praneit had cerebral palsy, a condition that can severely limit movement and balance.

Before long, Maggu had an idea: What if he and Udasi could develop wearable robotics to help Praneit walk independently? As they began postgraduate degrees at U of T - Maggu an MBA, and Udasi a master's in engineering – they decided to launch a startup. Their company, Trexo Robotics, would create a robotic device (in concept, a bit like the suit in *Iron Man*) that helps children with physical challenges walk.

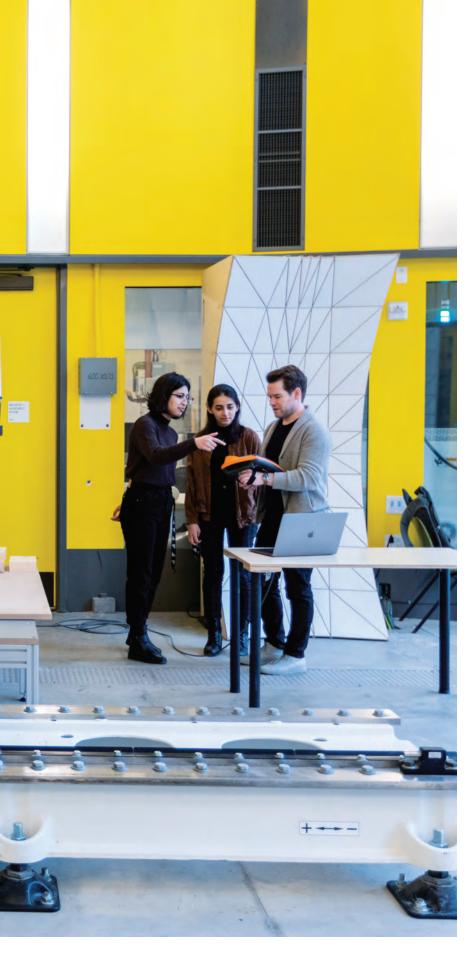
In 2016, Maggu and Udasi packed up a prototype of their wearable robotic system and flew to India to visit Maggu's brother, his wife and Praneit, who tried it out in the family's living room. "Watching Praneit take his first steps using our device was an incredibly proud moment for us," says Maggu.

To create the prototype, Maggu and Udasi had drawn on resources and expertise from four U of T business incubators - including the Entrepreneurship Hatchery at the Faculty of Applied Science and Engineering. (As part of a \$3-million gift from Gerald got a new home in the Myhal Centre.) Trexo is one of the Hatchery's success stories.

The company launched a pilot study last August with the Cincinnati Children's Hospital Medical Center, one of the largest children's rehabilitation programs in the U.S. "This is the kind of impact we want to have in life," says Maggu. - Chris Sorenson





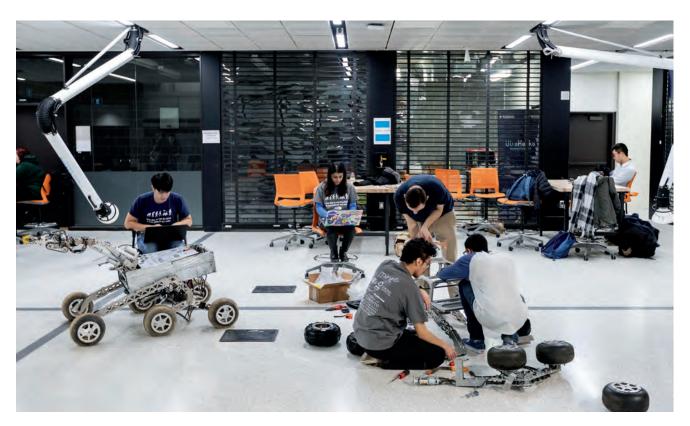


BECAUSE

TOMORROW'S CAMPUS HAS ARRIVED

The Boundless campaign raised \$600 million for new and updated facilities that will provide students on all three campuses with better and more accessible places to learn. These new spaces will also help U of T researchers make the next big discoveries. Take a behind-the-scenes peek inside several of the largest projects supported by the campaign.

Technology has changed the practice of architecture. The new digital fabrication laboratory, or "fab lab," at the expanded Daniels Faculty of Architecture, Landscape, and Design at One Spadina Crescent includes this robotic arm to help researchers test new design ideas. John H. Daniels (BArch 1950) and Myrna Daniels provided crucial support for the new building.

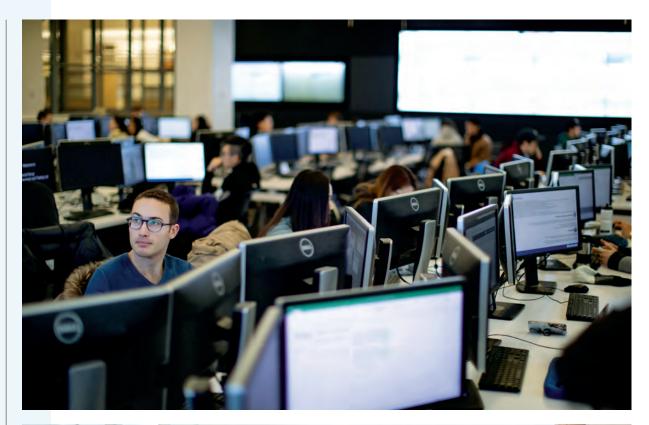




TOP: The Engineering Society Arena in the new Myhal Centre for Engineering Innovation & Entrepreneurship gives students the space and equipment to design and build projects for classes and clubs - and for their own startups. The building is named in honour of two of the Faculty of Applied Science and Engineering's most dedicated supporters - George Myhal (BASc 1978) and Rayla Myhal. **BOTTOM:** Students and researchers are using the robotics lab at the Myhal Centre to build self-driving vehicles, drones and AI-driven robots to assist in the treatment and care of patients.

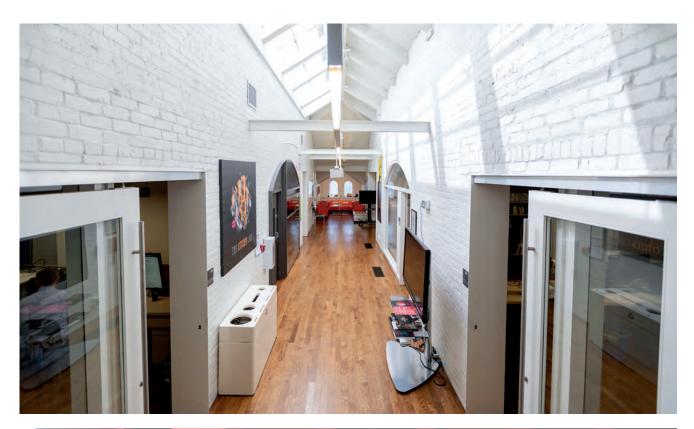


TOP: The Goldring Centre for High Performance Sport has given a big boost to U of T athletics and research in exercise science. It's also giving all students the chance to get physically active and enhance their workout routine, with equipment that ranges from VersaClimbers for cardiovascular training to the Bod Pod (shown) for measuring body composition. **BOTTOM:** The Goldring Centre received \$29 million in support from the Boundless campaign, and includes the Kimel Family Field House, which seats up to 2,000 fans for Varsity Blues volleyball and basketball games.



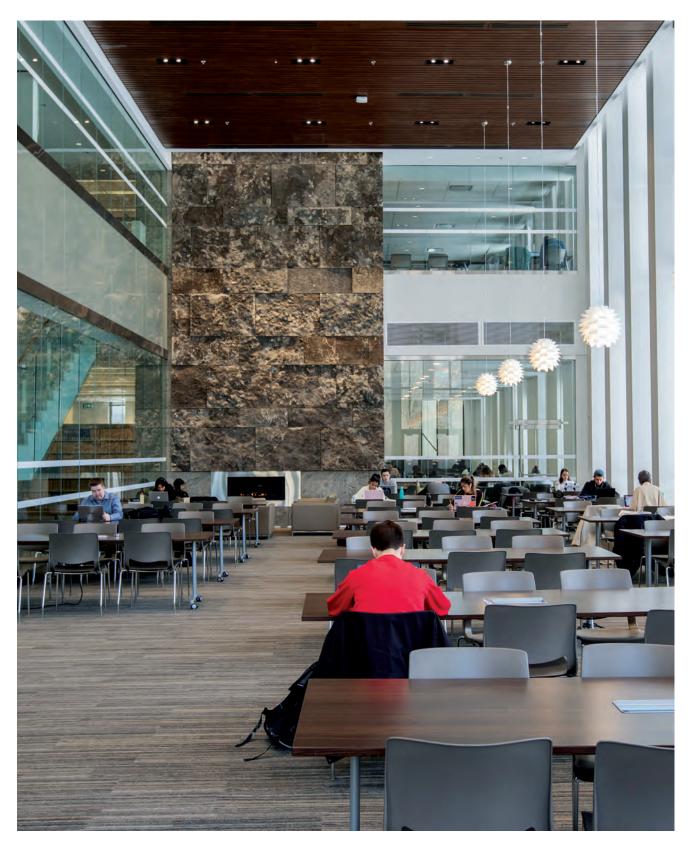


TOP: Each year, the BMO Financial Group Finance Research and Trading Lab at the Rotman School of Management hosts a three-day simulated market challenge involving dozens of universities. (This year, U of T placed sixth out of 52.) The Rotman School's south building, which opened in 2012, was supported by the Rotman family, Marcel Desautels and many others. BOTTOM: U of T Mississauga's Terrence Donnelly Health Sciences Complex is home to Canada's only graduate biomedical communications program. The complex was supported by gifts of \$12 million from Terrence Donnelly and \$10 million from the FDC Foundation.





TOP: The Citizen Lab at the Munk School of Global Affairs & Public Policy works at the intersection of digital media, global security and human rights. It has prevented hacking attempts against the Dalai Lama and made front page news for exposing targeted surveillance of journalists and human rights groups. The school's (and lab's) expansion into a heritage building on Bloor Street was made possible through an extraordinary gift from the late Peter Munk (BASc 1952) and Melanie Munk. BOTTOM: With its open spaces, U of T Scarborough's newest building, Highland Hall, explicitly aims to bring students together. The project was supported by a gift of \$1 million from Mark Krembil (BA 1988 UTSC) through the Krembil Family Foundation.



In Torys Hall, the beautiful main reading room of the renovated Bora Laskin Law Library, students can pore over cases together at the long tables or read solo in armchairs next to the fireplace. The library is attached to the new Jackman Law Building, which opened in 2016 and won a Canadian Architect Magazine Award of Excellence for design. Hal Jackman (BA 1953 VIC, LLB 1956) donated \$11 million to support the new building. Some 600 other alumni and friends also contributed to the project.



12

BECAUSE

Without you, there would be no Con Hall

Early in the 20th century, the newly formed U of T Alumni Association began seeking \$25,000 from graduates to build a new auditorium to replace the one that had been destroyed in the University College fire a decade earlier.

As donations rolled in, plans expanded and the association raised more than double its goal. Modelled on the Sorbonne Theatre in Paris, Convocation Hall opened in time for the graduation ceremony of 1906.

Since then, countless U of T students have taken classes in Con Hall, while many others have seen 20th century legends on its stage everyone from musician Bob Marley to former U.S. vice-president Al Gore.

To mark Con Hall's 100th anniversary, the alumni association once again raised funds, \$500,000 this time, to restore the iconic building.

BECAUSE

EXCITING CHANGES ARE COMING



← A New Hub for Innovation Gerald Schwartz and Heather Reisman have made a remarkable \$100-million gift to establish the Schwartz Reisman Innovation Centre on the St. George campus. The centre will anchor U of T's cluster of world-leading AI scientists and biomedical experts and the country's largest hub of studentand faculty-led startups.

Academic Wood Tower → A 14-storey academic tower to be built above the Goldring Centre for High Performance Sport will be the tallest mass timber and concrete hybrid building in North America. The tower will house the Rotman Executive Programs, and parts of the Munk School of Global Affairs & Public Policy and the Faculty of Kinesiology & Physical Education.



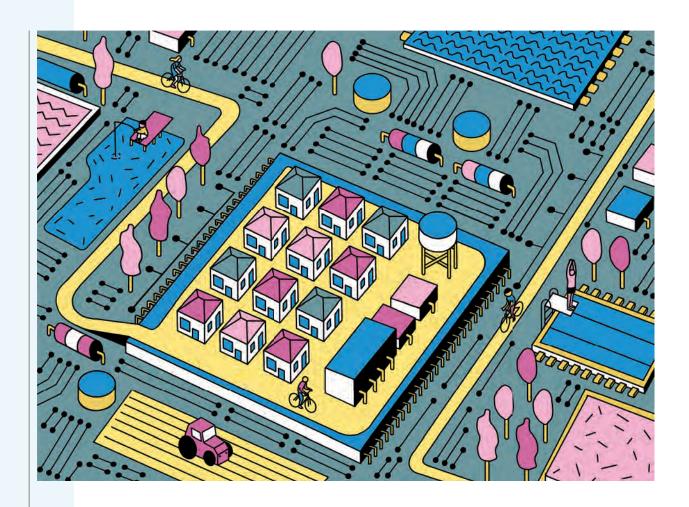
← Revitalizing the Central Campus The Landmark Project will revitalize the historic core of the St. George campus. Surface parking will be removed, and a necklace of paths will be established around a car-free King's College Circle. The University of Toronto Alumni Association, with the university, pledged \$2 million to the project.

A Centre for Cities and Culture → A nine-storey building at 90 Queen's Park Crescent will bring together academic and public spaces to create a hub at U of T for cities and culture. The structure will be home to the School of Cities. Near and Middle Eastern Civilizations and other departments. Among the building's showpieces will be a recital hall that will provide audiences with a stunning south-facing view of the Toronto skyline.



REASONS —

WE'RE — GRATEFUL



BECAUSE

AI WILL HELP US **FIND NEW WAYS** TO PREVENT **DISEASE**

CHRONIC DISEASES SUCH AS Type 2 diabetes take a massive toll on Canadians, both on our health and on our health-care system. Since obesity and inactivity are major risk factors for diabetes, the most common intervention so far has been for doctors to counsel their high-risk patients to lose weight and exercise more. That's good, but is that the most effective approach as diabetes rates continue to soar? Drawing on machine learning for her research, Laura Rosella, an epidemiologist and professor at U of T's Dalla Lana School of Public Health, suggests that broader community-based actions could prevent more cases and save more money than targeting individual patients.

When Rosella took the risk-prediction algorithm that she and her team developed - the Diabetes Population Risk Tool - and applied it to Statistics Canada's health information on the population, a clear picture jumped out at her. Beyond obesity, influential risk factors to predict who would get diabetes include lack of access to physical activities, social isolation, food insecurity, low socioeconomic status and chronic stress. The data suggested that making investments to address

these factors could prevent disease.

Public health departments had suspected as much, but this was the first time they had the evidence to support it. Rosella's algorithm would now enable them to clarify which populations to target for prevention efforts, and to calculate the health and economic benefits in their own municipalities from various investments, such as improving neighbourhood walkability. This opens up a whole new way of looking at health care, says Rosella, who holds a Canada Research Chair in Population Health Analytics. "It's not a tweak. It's going to actually change the way we think about disease and care."

Rosella's research caught the attention of the Region of Peel, west of Toronto. With its large South Asian community, a group that has a genetically higher risk of diabetes, and its car-dependent suburban neighbourhoods that may discourage walking, the prevalence of diabetes in Peel is 26 per cent higher than the provincial average. Rosella's algorithm showed that at the current rates of the disease, the projected health costs over 10 years would be \$689 million. "That was really compelling," says Julie Stratton, an epidemiologist with Peel Public Health. "This tool allows us to provide the information showing why it's really important to make investments now."

These investments might include anything that encourages people to be more physically active, such as safe walking routes, bike paths and more public transit for commuting to work (which increases the amount that people walk). With the vision of building healthy communities, Peel's official plan now requires that new development applications undergo a health assessment, which supports pedestrian- and transit-friendly neighbourhoods.

Other municipalities are becoming interested in Rosella's research, too, especially since it enables them to attach dollar figures to various health risks. In the Greater Toronto and Hamilton Area, the analytics found that diabetes-related medical costs attributable to inactivity alone exceed half a billion dollars every year. Ottawa Public Health used the algorithm to calculate that a long-term plan to improve public transit and build more bike paths would prevent some 4,000 cases of Type 2 diabetes over 10 years.

HEALTHY PEOPLE WHO WERE MOST DISSATISFIED WITH LIFE HAD TRIPLE THE RATE OF **DEVELOPING** A CHRONIC DISEASE **COMPARED TO THOSE** WHO WERE MOST SATISFIED WITH LIFE

Building on her initial success, Rosella has since spearheaded the development of other predictive algorithms, such as the High-Resource User Port. A mere five per cent of Ontario's population consumes about half of the province's healthcare budget, so Rosella set out to predict which groups would likely become future high users of the health-care system. She and her team followed health-care use of 60,000 people over five years.

To their surprise, they found that in addition to the expected predictors of age, chronic conditions and smoking, an equally strong predictor of becoming a high user was people's own feelings about their well-being. "This reinforces the need to listen to patients and ask them how they feel about their health," Rosella says.

Rosella followed up the initial study with one using a more global measure of people's self-rated life satisfaction and tracked them for several years. She found that healthy people who were most dissatisfied with life had triple the rate of developing a chronic disease such as diabetes, heart disease or chronic obstructive pulmonary disease, compared to those who were most satisfied with life. "I've been studying risk factors for chronic diseases for 15 years, and this was one of the biggest effects I've ever seen," she says. The relationship between life dissatisfaction and becoming a high-cost health-care user persisted even after adjusting for income, activity levels, mood disorders such as depression, and lifestyle behaviours.

There's no pill for life dissatisfaction, unhappiness or loneliness, Rosella says. But instead of thinking about a patient only in terms of high blood pressure, anemia or borderline diabetes, she suggests that equally important considerations include whether one lives alone, has sufficient income or has a safe place to walk. "We need to think of patients as people, and all the complexities that surround them." She adds that there may be a growing role for social prescriptions, such as a doctor's note allowing free admission to a museum or art gallery. She points out that last year the U.K. government appointed a minister of loneliness.

Rosella, who in 2018 was named one of Canada's Top 40 Under 40, is a faculty affiliate at Toronto's Vector Institute for Artificial Intelligence. In 2018 she received a Connaught Global Challenge Award to launch a global network that will use predictive analytics to address world population health challenges. Says Rosella: "AI has huge potential to be beneficial both for population health and the sustainability of the health-care system." - Marcia Kaye

Paul and Alessandra Dalla Lana donated \$20 million last year to U of T's Dalla Lana School of Public Health to support research such as Prof. Laura Rosella's. This recent gift comes almost a decade after their first \$20-million gift to establish the school.



THE 19,214 ALUMNI AND FRIENDS WHO SERVED AS VOLUNTEERS DURING THE CAMPAIGN COULD FILL TORONTO'S SCOTIABANK ARENA





MENTORS HELP STUDENTS FIND THEIR INNER **STRENGTH**

SABEEN* HAD SURVIVED two abusive marriages. She had entered the first - an arranged marriage - in Lahore, Pakistan, at the age of 21. After almost 10 difficult years, she boarded a plane with her children to start again in Canada. At 35, she then tried marriage a second time. This husband quickly turned emotionally abusive. To Sabeen, living with him felt like "living with the devil," and she began fearing for the safety of her children. In a matter of months, she found the strength, yet again, to leave.

Sabeen had wanted to attend the University of Toronto Mississauga for a long time, hoping to attain a degree in criminology and sociolegal studies to pursue a career in family law. But there were so many roadblocks to attending university, including paperwork: she didn't have her transcripts from the university she had attended in Pakistan. She was dealing with the emotional and financial toll of a divorce in progress, and of being a single working mom. But she thought a lot about applying, anyhow.

One day, her mom sent her a link

to a Toronto Life article, with a oneline message: "If she can do it, you can do it." It was a memoir by U of T alum Samra Zafar, who had been forced into an arranged marriage at the age of 17. Like Sabeen, she had survived emotional and physical abuse. She, too, had two children very young. She, too, had found the strength to leave her marriage. Unlike Sabeen, Samra was much further ahead in her academic journey - and her journey of healing. She had not only earned a bachelor of science in financial economics from UTM in 2013, but had followed it up with a master's in economics in 2014. She was now pursuing a successful career in commercial banking.

After she read the article, an astounded Sabeen looked up Samra on Facebook and messaged her. She wrote, "I feel like this is a sign from God that I have to pursue this and submit an application to UTM." Samra messaged her right back, and advised her to email her story to the office of the registrar. So Sabeen wrote to them, laying out her entire life story. "I felt, 'I need someone to open one window for me so I can just jump through and save my life."

On a summer day in 2017, she was visiting her parents who were then living in Abu Dhabi. She sat down and checked her email. There was a letter of acceptance from UTM. "I did it," she thought. "I got in." That night, she messaged Samra. "I thought I heard Samra scream through Messenger. She was so happy for me."

Since then, Samra has been her mentor, an unofficial position that sees them meet up or talk once a month. The first time they met, at a Starbucks, they talked away the hours over coffee that went cold. "I thought, 'She is so powerful and confident' and her smile," says Sabeen. "When people go through pain, it's hard to smile. So for her to be able to smile like that, where her eyes and her entire face sparkle, you can tell she's come a long way and she's proud of herself." Adds Sabeen: "My smile's kind of getting there now. Going to UTM is my healing process. Doing something for myself is a whole new beginning."

Alum Samra Zafar (left) is a mentor to Sabeen. a UTM student

Their conversations range from academics, to juggling single parenthood with classes, to career goals, to dealing with fears about future relationships. "It's very holistic," says Samra. "It's not just about school; it's about life." And because mentoring shapeshifts with each step that the mentee takes, the conversations change, too: When Sabeen started school, she had questions about the credit system. Now, she mulls over whether she should pursue grad school right away or enter the job market.

They also talk about lighthearted things - from the keto diet to dating: "She has a great sense of humour," says Samra. "There was a time when I went through a breakup and I said, 'Oh my God, I have the worst luck with men." They both just looked at each other. "Babe, I'm with you," said Sabeen. "We're both magnets." In that moment, they burst out laughing.

"MENTORING IS VERY DIFferent from teaching or coaching or even helping, because it's not about what you can do for them. It's about how you can empower them to do it for themselves," says Samra, who has mentored more than 30 women - at U of T and otherwise - and also founded Brave Beginnings, a nonprofit to support abuse survivors. "My own mentors have never told me what to do. They've been my sounding board. They've given me ideas. They've played devil's advocate. They've given me a reality check sometimes. They've connected me with people. At the end of the day, I'm empowered to make informed decisions for myself, which is so liberating. I can actually craft and create the life that I want for myself, and I don't want to do it alone and I'm not meant to do it alone. That's the power of mentoring."

When Samra left her husband in her second year at UTM in 2011 and moved into campus housing, she was struggling under the weight of court cases surrounding the divorce and domestic abuse; her own challenges of healing and coping; working multiple jobs; raising her girls; and going to school.

It was her UTM mentors and friends who lifted her up: Students would look after her children when she was at the lawyer's office. Professors would spend hours motivating her and encouraging her to go on.

One mentor who had a profound effect on her was John Rothschild (BA 1971 UC), then CEO of Prime Restaurants. He is still an integral part of her life, providing emotional support and encouragement, and helping her navigate fears and hard decisions. "People would hold my hand in the worst circumstances. It just warmed my heart so much, and that is what made all the difference," she says. "I realized that resilience is not just an individual concept. It's a collective

"KNOW THAT THE STRENGTH LIES INSIDE OF YOU, NOT AROUND YOU.

THE PEOPLE AROUND YOU WILL HELP YOU REALIZE THAT STRENGTH, AND THAT'S WHAT MENTORING IS ABOUT"

concept. When people are connected to each other, and when people are comfortable in offering and asking for help, that's what builds resilience."

Like Samra, Sabeen certainly knows what it's like to navigate her way through extreme stressors while attending university and raising children. She tries to schedule her classes so she can be there when her 10-yearold son and 13-year-old daughter get home from school; then she makes dinner and helps them with homework. When night hits, it is time for her to do her own assignments. Making friends with other students has been difficult given the difference in age and life experience - and Samra helps her with that. "Only she can

understand the pain that I feel, the misery of being undermined so much," says Sabeen. "She went to hell, she came back. And she's OK. Unless you've been to hell and back, you don't know what it feels like and you don't know if it's going to be OK."

SAMRA WAS ACCEPTED into UTM in 2004, but her husband wouldn't pay the tuition fee and she couldn't get OSAP because of his salary and assets. She started to babysit and tutor, and saved enough money on the sly for tuition. On a proud day in June 2013, at the age of 31, she walked across the dais in Convocation Hall, graduating as UTM's top economics student. Samra is now an alumni governor at U of T and her bestselling memoir, A Good Wife, was recently published by HarperCollins.

A few weeks ago, Samra had a vivid dream that she was back living with her ex-husband and his parents. She was in the basement, and tried to open the door to get out. She was trapped. She woke in a sweat and looked around. She was home in her condo, safe. Her kids came by. "Are you OK, Mommy?" They all hugged.

After Samra has had a nightmare or flashback, or has experienced anxiety, she imagines embracing her young self. "That 17-year-old girl who was forced into marriage or the 23-year-old who was told she couldn't go to school, I just imagine hugging her and telling her it's OK. You're a part of me and I love you, and just saying the things she should have heard at the time."

Now, as a mentor, Samra is able to support other women who may need an embrace - whether it's a physical one, or more of a helping hand. She tells them: "The only thing that can heal you is you. Know that the strength lies inside of you, not around you. The people around you will help you realize that strength, and that's what mentoring is about, but ultimately it's in there. Once you know that you have that power, then you're unstoppable." -Stacey Gibson

*Sabeen's last name has been withheld at her request.

PHOTOGRAPHS BY (DENTISTRY) NOREEN AHMED

17

BECAUSE

Dentistry students are doing life-changing work



A lingering toothache brought Sadia Sharif to the Faculty of Dentistry's clinic in 2016. There, a student dentist told the single mother of three that she needed a root canal - and that she had several cavities that needed filling.

U of T charges about half the market rate, so Sharif, 33, paid for immediate work to relieve her pain. But she couldn't afford the root canal.

The student suggested Access to Care, a donorsupported fund at the faculty that covers treatment for 50 to 80 patients a year. It will soon help more people thanks to \$500,000 from George Christodoulou (DDS 1985, MBA 2007) and \$250,000 from Lynn Tomkins and Dan Kmiecik (both DDS 1981). "We help patients who are most in need to get dentistry that will significantly improve their quality of life and help them get back into the workforce," says James Posluns, director of patient clinics.

Sharif eventually got her root canal - and a new crown. "I still cannot forget that student," says Sharif. "I pray that she has a bright future." —Diane Peters



Kavithaa Kandasamy

BECAUSE

HISTORY WON'T BE TOLD BY A SINGLE VOICE

Fourth-year student Kavithaa Kandasamy recently took a Tamil Studies class at U of T Scarborough. Here, she describes what it meant to her.

"This year, I enrolled in 'The Making of Tamil Worlds,' which was taught by Prof. Ponni Arasu. Her methods of teaching history are powerful, using large themes such as migration to connect stories and people throughout time.

Although my parents are from Sri Lanka, I was born and raised in Scarborough. I have never been to Sri Lanka, and I identify more as a Canadian. My parents have rarely spoken about the hardships that Tamils endured during the civil war in Sri Lanka. By probing deeper into the issues in class, I am able to understand the realities that Tamils have faced, and continue to face, to this day.

Growing up, the extent of my knowledge about the war came from dinnertable conversations between my dad and my uncle, which left me with more questions than answers. Prof. Arasu used scholarship and research to create a timeline that broke down the enormous complexity of why this war happened. Remaining objective is very difficult when something hits so close to home, yet her academic approach enabled me to think critically about the underpinnings of the civil war and find the answers I was seeking.

I sincerely hope that there will be more Tamil studies classes, especially at a place like UTSC, which is so multicultural. I am proud to attend a school that teaches many different types of history - and acknowledges that my history is important to be taught."-As told to Stacey Gibson

Recent gifts to expand Tamil studies at UTSC include \$2 million from Ravi Gukathasan (BSc 1982 UTSC, PhD 1987), \$348,000 from Prof. Brenda Beck of anthropology, and a \$3-million fundraising commitment led by Tamil Chair Inc. and the Canadian Tamil Congress.

19

BECAUSE

YOU FOUND SUCH CREATIVE WAYS TO GIVE



A BOUNDLESS WEDDING

When Dr. Angela Jerath (MSc 2018) and Jason Wong (BA 1994 UC) married in 2015, they opted out of a traditional gift registry. Instead, they asked guests to contribute to a Faculty of Medicine scholarship honouring Jerath's grandmother and mother. "They instilled in me the belief that I could do anything I set my mind to," says Jerath, who's now a staff anesthesiologist at Sunnybrook Health Sciences Centre in Toronto. More than 50 wedding guests contributed to the award, raising \$25,000.



THE TWINS TAKE OUT THE TRASH

On a winter day in 2018, Yee-Fan Sun was walking along Toronto's Bloor Street, when she spotted a \$100 bill on the icy sidewalk. Sun took it home and asked her 11-year-old twin daughters, Oona and Beatrix, what she should do with it. After some thought, the young nature lovers chose to donate it to U of T professor Chelsea Rochman's Trash Team, whose members work to reduce garbage and educate the public about waste. They'd heard about the team from their father, Asher Cutter, a U of T prof.



DREAM MAKER

Don Smith (BA 1968 Trinity, PhD 1975) grew up in Oakville, Ontario, where, he admits, he "knew nothing" about First Nations in Canada. Then, as a PhD student in Canadian history, he came across papers of the Ojibwe leader Sacred Feathers, which sparked a life-long interest in the stories of Indigenous peoples. In 1990, he created a scholarship for undergraduates in Indigenous Studies, which he bolsters each year with further donations and with royalties from two of his books – Sacred Feathers and Mississauga Portraits.



THE GUIDE THAT KEEPS GIVING

Every year, U of T students in the Faculty of Medicine revise and update Toronto Notes - a study guide for medical licensing exams, sold across Canada and internationally. They dedicate 80 per cent of the profits to student initiatives at the faculty, such as travel bursaries and wellness support. Proceeds from the study guide, now in its 35th edition, contributed almost \$3.7 million to the Boundless campaign.



ALL I WANT FOR CHRISTMAS...

Each holiday season, Sylvia Vanhaverbeke (MDiv 1993) buys gifts for her nine grandchildren. A few years ago, to encourage them to think about philanthropy, she began asking them each to choose a charity to which she would donate \$100. Last year, her eldest, Quinn Cryderman (MASc 2015), selected the U of T Research Fund for Excellence - because, he says, he believes research will help find solutions to society's problems.



BECAUSE

One gift, made 60 years ago, has helped hundreds of aspiring engineers



On the second floor of the Galbraith Building on the St. George campus hangs a stately portrait of John Edgar McAllister (BASc 1895), a man whose generosity has helped hundreds of engineering students attend U of T.

McAllister enrolled in firstyear engineering at U of T in the late 1880s and received one of the few scholarships available at the time. He excelled at civil engineering but lacked wealth and connections, making it difficult to launch his career. (During his first assignment, in British Columbia, he and his wife lived in a tent for a year.) He eventually built a successful consulting business.

When he died in 1959, McAllister left instructions to establish a charitable foundation. His wish? To provide aspiring engineers with financial support so they could focus on their education, and not on how to pay for tuition. Over six decades, the foundation has provided U of T's Faculty of Applied Science and Engineering with more than \$7 million in student aid. -Emily Meyertholen

BECAUSE 104,059 OF YOU SUPPORTED THE **BOUNDLESS** CAMPAIGN. THAT'S ALMOST AS MANY PEOPLE AS LIVE IN ST. JOHN'S



TOGETHER WE ARE DOING MORE TO HELP **INDIGENOUS PARENTS**

WHEN NATASHA* WAS PREGnant last fall, she had the usual worries of an expectant parent, plus one most never have to endure: that her newborn would be taken from her. "I was so scared about my baby being apprehended," says the 30-year-old Ojibwe woman, who had no permanent home at the time and whose three older children were in foster care. Today, thanks to her participation in an Indigenous-led research project involving U of T professors, Natasha and her baby girl are living in a two-bedroom apartment in Toronto's Regent Park neighbourhood.

"I was living with my mom temporarily when I joined the study," she says. "I'd ended a nine-year abusive relationship that had caused my kids to be put in care, and I had nowhere else to go." Researchers at the Baby Bundle Project matched Natasha with a wellness worker from Seventh Generation Midwives Toronto. The two worked together to identify her urgent needs, which included housing and money to buy medication, and created a plan to prevent her baby from being apprehended. "She made me a very high priority because time was running out," says Natasha. "I took possession of my place one day after my daughter was born."

Researchers created the Baby Bundle model to deliver culturally sensitive, holistic support to Indigenous women during pregnancy, birth and the six months after birth. Wellness workers arrange for the services that clients have identified as priorities, which may include Indigenous midwifery, counselling and addictions treatment. The reality is that many Indigenous women and families want, and need, more support than better resourced non-Indigenous families do, says Sara Wolfe (MBA 2017), an Indigenous midwife and founding partner of Seventh Generation.

"The impact of colonization and intergenerational trauma is very real. Whether it's mental-health challenges and substance abuse or family

Sara Wolfe (MBA 2017) is an Indigenous midwife involved with the Baby Bundle Project instability growing up, some Indigenous women haven't been equipped with the basic skills needed to care for infants. Or poverty prevents them from providing the necessities. We know that almost nine out of 10 Indigenous people in Toronto are living in poverty. How do these moms access the simple things like medicine and clothing for their infants, or find support from family and friends who are also living in poverty, let alone secure adequate housing?"

The aims of the project are to reduce the number of Indigenous babies who are put into foster care and to close the gap in maternal and child health between Indigenous and non-Indigenous families. In Canada, almost eight per cent of children under the age of 14 are Indigenous, yet they represent more than half of those in foster care, according to 2016 census data. Former federal Indigenous Services Minister Jane Philpott (MPH 2012) has called this situation a humanitarian crisis.

Patricia O'Campo and Dr. Janet Smylie, both professors at U of T's Dalla Lana School of Public Health, are leading the Baby Bundle project with a team of Indigenous researchers and community partners. Fifty pregnant Indigenous women will receive the Baby Bundle care model over approximately two years. Six months after participants give birth, the researchers will assess outcomes such as the mother's and baby's health and whether there's been any involvement with a Children's Aid Society. "We know there's profiling going on in the health-care and child-welfare systems," says O'Campo. "The Baby Bundle Project alone won't solve this problem, but I'm doing this research because I have hope that it will help get that number down."

The move to provide better care for Indigenous mothers and their infants has its roots in more than a decade of research collaboration between Seventh Generation Midwives Toronto and Well Living House, a research centre at St. Michael's Hospital that helps Indigenous families. Wolfe, who is Ojibwe, has been a midwife since 2002 and a nurse since 1997. While she was a nurse, she met Smylie, then a family doctor who practised obstetrics. "In

the beginning, we gathered oral histories and teachings from the grannies and Elders to learn traditional stories and to learn about how we knew what makes a baby well," says Wolfe. "Today, many of those teachings form a basis for the Baby Bundle Project."

Some of the project participants are aware of those teachings and want to incorporate them into their care plan, while others are not aware, says Wolfe. "We share the teachings to empower women to reclaim them." She cites the example of smudging, which involves burning sacred herbs, during labour. "This practice is meant to make mothers feel good about what they're doing for their babies, which instils confidence and helps with bonding."

Indigenous women hear about their deficits too often, says Wolfe, so the project emphasizes the existing strengths in the Indigenous community. "We get told that we're unhealthy, uneducated, unemployed and bad parents all the time. What I love about this study is that we're bringing together all the amazing Indigenous teachings, social networks and services to create better bundles of knowledge, supports and wisdom for our mothers and children."

Natasha's baby is a few months old now and she is hoping to be reunited with her other children sometime this year, but she still calls her wellness worker when she needs help, advice or a sympathetic ear. "All we're doing is meeting women where they are and partnering with them to navigate a network of services," says Wolfe. "This isn't rocket science. If we support people who need extra layers of support, we'll build stronger families." -By Megan Easton

*Natasha's last name has been withheld at her request.

The Baby Bundle Project is supported by a \$2.6-million grant from Merck for Mothers to U of T's Dalla Lana School of Public Health and to Well Living House. The Waakebiness-Bryce Institute for Indigenous Health, which was created in 2014 with a \$10-million gift from Dr. Michael and Amira Dan, is a partner in the Baby Bundle Project.

23

Tiny satellites will connect vehicles in space



Kepler Communications, a startup with roots at U of T, is building a global telecommunications network using satellites so small that each one would fit in a gym bag.

These tiny satellites require a fraction of the power of conventional devices, and can be launched for \$250,000, compared to as much as \$500 million for a typical satellite.

So far, the company has sent two into orbit, but aims to launch 140, to allow clients to send and receive data from fixed locations or moving vessels anywhere in the world. Kepler sees an opportunity to help companies track assets such as railcars and shipping containers.

The company got its start in 2015 through Start@UTIAS, a Faculty of Applied Science and Engineering incubator created with the help of a \$1-million gift from Francis Shen (MASc 1983).

The initial support was critical for Kepler to develop its core intellectual property, which includes the specialized radio equipment the satellites rely on, says Jeffrey Osborne, vice-president for strategy and business development.

While the company's current focus is using satellites to cheaply connect things here on Earth, Osborne says the long-term vision is to enable connections between spacebased vehicles. -Dan Falk



24

BECAUSE

YOU'RE SUPPORTING COUNSELLORS WHERE STUDENTS NEED THEM

Since 2014, the Rossy Foundation has donated \$3 million toward student mental health, helping the university expand care across the three campuses. There are now counsellors in more than 20 faculties, programs and colleges. Here, Saretta Herman (MSW 2011), a wellness counsellor in the Faculty of Medicine, talks about the advantages of being "on location."

"For a lot of students, transitions can be tough – moving from high school to university, or from living at home to a room in residence. We see a lot of students worried about their academic workload. We also hear about struggles with life events, such as a breakup or serious illness in the family.

By being where students take classes, we make it easier for them to access help right when they need it. It also gives us knowledge of the culture of the programs or college, and the unique stressors students there may be facing.

We don't have long wait times because we focus on early intervention. Our aim is to catch students when they're just starting to feel overwhelmed or experience anxiety or depression. I always tell students who think they might need us to come in before things get worse. A few sessions can arm them with valuable coping skills. And if their needs are more complex, we can help them get the right support through the Health and Wellness Centre."

-As told to Megan Easton



READING IS NOT BELIEVING

University of Toronto Libraries teaches vital media literacy skills

In the age of social media, fake news has become a powerful tool for subverting democracy. University of Toronto Libraries is teaching students and other community members to detect it.

It's one of the many ways Libraries supports learning, teaching and research at the University of Toronto.

To support the Library, please contact Megan Campbell at 416-978-7644 or visit www.library.utoronto.ca/support



YOU CAN LEARN MORE THAN YOU THINK FROM A BEER LABEL

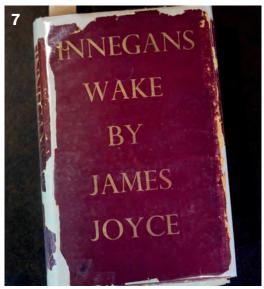
There are millions of books on the shelves at U of T's libraries. But dig through the vaults, and you'll discover a huge variety of other items: posters, sound recordings, films - even beer labels. *U of T's libraries actively acquire many of these things, but they also* receive them as gifts-in-kind. These donations are hugely important, says librarian Loryl Macdonald, because they serve as the raw material for scholars to produce original and innovative research.

- 1—Among more than 600 boxes of writer Margaret Atwood's papers is juvenilia such as Sewing: Darning and Buttons created when the author was eight or nine years old.
- 2—The 200 personal letters of James Wolfe, the British general who triumphed at the Battle of the Plains of Abraham in 1759, include the first he ever wrote - to his mother as he was preparing to depart for war and the last, penned just before his death.
- 3-More than 3,000 beer bottle labels tell the story of brewing in Canada, from the triple-X strong ales of the late 1800s to the craft malts of the 1990s.
- 4-Svetlana Alliluyeva, Josef Stalin's daughter, wrote hundreds of letters to her best friend Mary Burkett. Of her father she once wrote: "Even today, Russians are incapable of grief and atonement for Stalin's crimes."
- 5—David Onley, the lieutenantgovernor of Ontario from 2007 to 2014, is a strong advocate for people with disabilities. In this photo, from his personal archives

- at U of T Scarborough, he receives a red carpet welcome at the Queen's Plate in Toronto.
- 6—Scholars or fans of Anne Murray can trace the musical career of Canada's songbird through a collection that includes all her recordings, from demo tracks to final releases, as well as concert set lists.
- 7-In his personal collection of 6,000 books, renowned U of T prof Marshall McLuhan had four copies of Finnegans Wake, including this heavily annotated first edition.
- 8—Poet Allen Ginsberg's photo collection, spanning 1944 to 1997, provides a behind-thescenes look at the artists and writers known as the Beats, with candid shots of his friends before they became famous, like this one of Jack Kerouac (left) and Lucien Carr.
- 9-In the 1960s, research by Ursula Franklin, a U of T physicist and engineer, helped end atmospheric nuclear weapons testing. This poster, from 150 boxes of her papers, is for a talk she gave at the University of Saskatchewan.





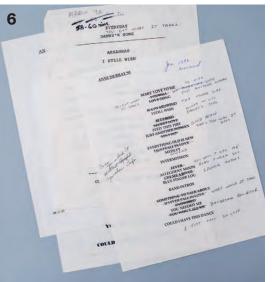


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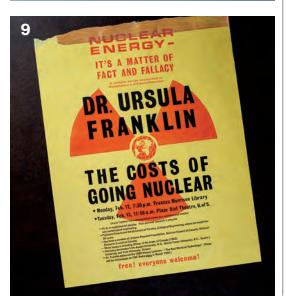












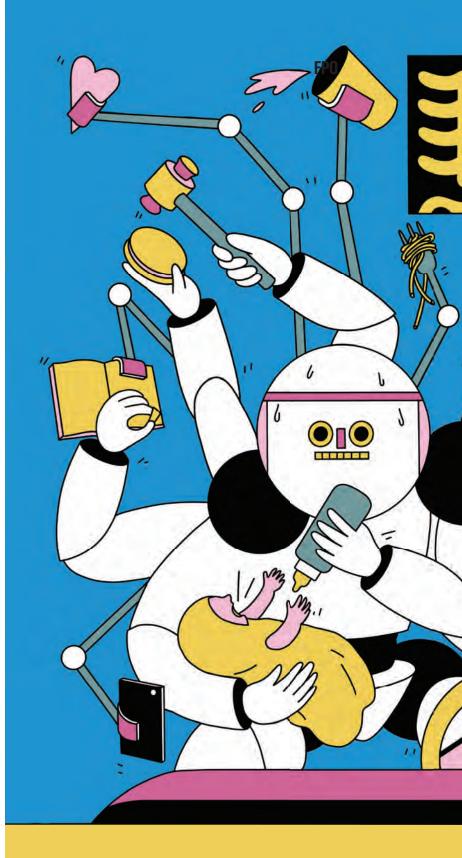


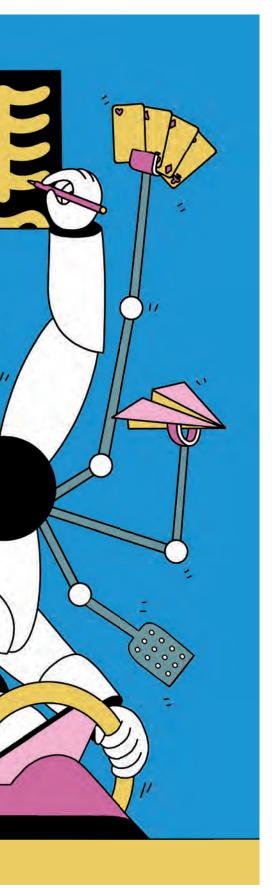


Like us, you wonder how the universe began

In 1921, Clarence Chant, the head of U of T's department of astronomy, was having trouble finding anyone to support his dream of building an observatory near Toronto. But after a public lecture about a possible civilization-destroying comet, he met amateur astronomer David Dunlap. The two became friends and when Dunlap died in 1924, Chant asked his widow, Jessie, whether she would finance an observatory as a memorial. She agreed, donating the funds for the construction of the David Dunlap Observatory near Richmond Hill, Ontario. When it opened in 1935, the observatory's 74-inch telescope was the second-largest in the world. Some of Canada's best known astronomers worked at the facility and, in 1972, U of T astrophysicist Tom Bolton used observations he had made there to prove the existence of black holes.

Decades later, lights from a vastly larger Toronto had rendered the observatory ineffective. In 2007, the university and the Dunlap family agreed to sell the facility, with the proceeds forming an endowment fund that established the Dunlap Institute for Astronomy and Astrophysics - which now conducts research into fundamental questions about the universe.







WE'RE BEGINNING TO UNDERSTAND WHAT AI CAN AND CAN'T DO

ARTIFICIAL INTELLIGENCE (AI) continues to make deep inroads into all aspects of society - from reading X-rays to driving cars. But is our ability to assess the limits of AI keeping up? Are there areas where we should not deploy AI to assist us?

These are the kinds of questions that interest Brian Cantwell Smith, the new Reid Hoffman Chair in Artificial Intelligence and the Human at U of T's Faculty of Information, whose goal will be to shed light on how AI is affecting humanity. The chair was created in 2018 through a \$2.45-million gift from Reid Hoffman, co-founder and former chairman of LinkedIn.

Smith spoke with us recently about where AI is headed. Hoffman annotated the interview with his own perspective.

Is it fair to say that it's not just the public who have misconceptions about AI, but scientists and experts as well?

I think all of us need a deeper appreciation of the stuff and substance of human thinking and intelligence. I want to bring attention to the gravity and the stakes of the development of AI and to the incredible accomplishment humans have wrought, over millennia, in developing our ability to be intelligent in the ways that we are.

I'm not thinking of something so specific as putting a man on the moon, but,

> for example, what it means to be a fair and honest judge in a court of law, or to inspire children through education to stand witness to what matters in the world, or to convey the message through great literature that life is

worthwhile to the extent that one commits to something larger than oneself.

These accomplishments remain a long, long way in front of anything the technical branches of AI have even taken stock of and envisioned, let alone accomplished.

People seem alarmed when they talk about AI. Is this justified?

I think there are two parts to the general alarm people are feeling. One is that AI is going to be bad - it's going to enslave us, it's going to divert all our resources, we're going to lose control. This is a latenight horror movie kind of worry.

The other is that AI's going to best us in all sorts of ways, take all of our jobs

PHOTOGRAPH BY (HOFFMAN) DAVID YELLEN; RENDERING BY (SCHWARTZ REISMAN INNOVATION CENTRE) WEISS/MANFREDI

and replace everything that's special about us. This doesn't require AI to be evil or bad, but it is still a threat in that it challenges our uniqueness. I don't think that second worry is entirely empty.

Could you elaborate on this second worry - that AI will become better than us at many tasks?

My overall concern has to do with whether we are up to understanding, realistically and without alarm, what these systems are genuinely capable of, on the one hand, and what they are not authentically capable of, on the other - even if they can superficially simulate it. I am concerned about whether we will be able to determine those things – and orchestrate our lives, our governments, our societies and our ethics in ways that accommodate these developments appropriately.

This leads to a bunch of specific worries. One is that we will overestimate the capacity of AI, outsourcing to machines tasks that actually require much deeper human judgment than machines are capable of. Another is that we will tragically reduce our understanding of what a task is or requires (such as teaching children or providing medical guidance) to something that machines can do. Rather than

asking whether machines can meet an appropriate bar, we will lower the bar, redefining the task to be something they can do. A third and related worry, which troubles me a lot, is that people will start acting like machines. I feel as if we can already see this happening. Students, for example, often ask how many references they need to get an A on a paper. Faculty going up for tenure are worried about how many citations they've received. We can't quantify importance. If we reduce human intelligence to counts - to a measure of how many questions you get right - we're lost.



We need to steer and shape AI in intelligently inclusive ways. The more deeply and actively we think about the future we're trying to create, the better shot we have at creating a future that benefits us all.

What do you think is missing from discussions about AI?

We're seeing extreme views in both directions – doomsayers and triumphalists. Either it's all going to be terrible or it's all going to be wonderful. Very rarely do such wholesale proclamations prove to be the deepest and most enduring views.

I'm particularly concerned that many of the people who have the of Toronto. deepest understanding of what matters about people and the human condition have only a shallow understanding of artificial intelligence and its power. And vice versa: Those who have a deep understanding of the technology often have a shallow understanding of the human condition. What we need is a deep comprehension of both. It's as if we are at (0,1) and (1,0) on a graph, when we need to be at (1,1).

Ideally, how would you like the discussion to proceed?

We need to set aside the whole "people versus machines" dialectic, and figure out what skills particular tasks require and what combinations of

New technology should augment humans in ways that play to the unique strengths of each.

people and machines can best provide those skills. Calculate pi to a million decimals? Clearly a machine. Teach ethics to schoolchil-

dren? Obviously a person. Read an X-ray? Tricky. It may soon be that the best strategy will be for an AI to do the initial classification and pattern recognition on the image, but for a seasoned physician to

interpret its consequences for a lived life and recommend a compassionate treatment strategy. As machines start to be able to do certain things better, we should include more of them appropriately in the mix.

Let's leave to the machines what they can do best, set those things behind us and raise the standard on the parts that require people - the parts that require humanity, depth, justice and generosity. —Ann Brocklehurst

We must not forget that we can evolve as humans, too. We should pursue not just ever-morecapable technology, but advance our human spirit and ethics as well.

This is precisely

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BECAUSE

THE FUTURE TRULY IS BOUNDLESS

LAST FALL, I HOSTED A CELEBRATION to mark the 10th anniversary of the Dunlap Institute for Astronomy and Astrophysics. Several scholars from the institute spoke at the event, and each remarked that the opportunity and freedom to pursue curiosity-driven research is what drew them to U of T.

In a single decade, the Dunlap Institute has cemented its position as one of the world's great centres for research in astronomy and astrophysics. Yet it would not exist were it not for a visionary gift from the Dunlap family. The institute is a great example of how inspired giving can have a profound impact in a field in a short period of time.

The Boundless campaign has enabled the University of Toronto to attract some of the brightest minds in the world. But for us to continue to compete globally for the best students and scholars, philanthropy will be essential.

To build on the success of Boundless, we're aiming our sights even higher.

U of T has the capacity to address questions that span the sciences, humanities, social sciences and the professions. For example, we are able to investigate the fundamental science behind burgeoning fields such as regenerative medicine, artificial intelligence and gene-editing therapy, to examine their implications from ethical, legal, social and philosophical perspectives, and to create valuable new companies based on these technologies.

As we look to the near future, we are already setting ambitious goals. Thanks to an historic gift from Gerald Schwartz and Heather Reisman, we're establishing the Schwartz Reisman Innovation Centre, which will create the country's largest university-based hub for innovation. The centre will house our research pioneers in machine learning, data analytics, genomics and personalized medicine. Situated close to several of the country's top hospitals and the MaRs Discovery District, the building will be a symbol of U of T's leading role in Canada's knowledge economy.

The \$100-million investment will also support the launch of the Schwartz Reisman Institute for Technology and Society, whose mission will be to explore the ethical and societal implications of AI and other emerging technologies.

With your support, we believe we can make further headway on many of the fundamental questions facing humanity. It's an exciting journey to be on – and we hope you'll stay with us as it unfolds. The future truly is Boundless. -Meric Gertler



BOUNDLESS

Your visionary generosity helps us reimagine our world

Boundless: The Campaign for the University of Toronto engaged thousands of donors to support our highest priorities and aspirations. This global community of alumni and friends has played a fundamental role in U of T's pursuit of excellence and innovation. In classrooms, labs and libraries across our three campuses, we see how our community's generosity enables us to push the limits of knowledge, explore game-changing ideas and discover new possibilities for improving our world.

Over 100,000 alumni and friends supported vital initiatives that are changing students' lives and contributing to the health and vibrancy of our society. Having achieved an historic total of \$2.641 billion, the campaign has elevated the capacity of U of T and our community to address the world's most pressing problems.

On the following pages, we celebrate benefactors who made gifts to the Boundless campaign of \$25,000 or more and those who became members of the King's College Circle Heritage Society during the campaign.

Please visit boundless.utoronto.ca/donors to view an extensive listing of donors who have contributed to the campaign.

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Dr. Vicky Nguyen (PhD 2010, MD 2014) and her parents left Vietnam to come to Canada in 1991 to reunite with family. Now, with assistance from her uncle Phu Hoang, her family supports the Faculty of Medicine's Summer Mentorship Program, which offers Indigenous, Black and economically disadvantaged high school students mentoring opportunities at U of T.

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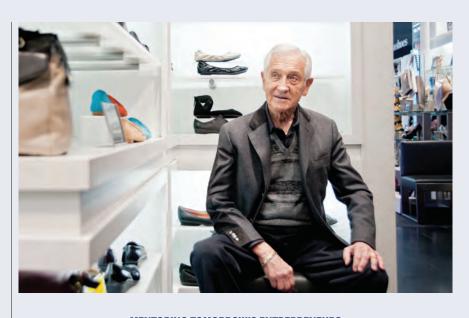
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Pauline Mazumdar and her late husband, Dipak, created legacies at U of T. In 2006, the couple created a chair in the History of Medicine in her name. This past year, they updated their wills and included a bequest intention to establish a chair in Bengal Studies.

Β.

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- The Annual General Meeting
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Keynote Address

Do Sentient Als Have Rights?

Al has already stoked fears about surveillance and mass unemployment. Yet the possibility of creating Als that think and feel—sentient Als—raises difficult questions. How should we treat them? Do they have legal rights? Do we also pose a threat to them? In his talk, Prof. Kingwell explores the looming ethics and politics of sentient Als.

Mark Kingwell is a professor of philosophy at the University of Toronto and contributing editor of *Harper's Magazine*. Winner of two National Magazine Awards, he is also the author of several national bestsellers, including *Better Living* and *The World We Want*. His most recent book, *Wish I Were Here*, addresses boredom and technology in the 21st century.



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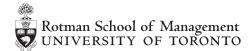
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Shining a Light

Depression is a major cause of disability — yet we know so little about what causes it. The new Labatt Family Network is targeting the biology that underlies the illness



K

erstin Camenietzki had experienced ordinary ups and downs in mood, but never anything she called depression. It was at age 79 that she had her first serious tangle with the condition, and it hit her hard.

Camenietzki thinks the trigger was the death of her dog, Nellie. She had gotten the terrier as a puppy, shortly after retiring from a long career as a librarian. Her husband had continued to work, so the dog became a constant companion. "I was alone with her during the daytime," says Camenietzki. "We'd take long walks in the ravine. We'd sit on the same sofa. She was like another human being." But at age 12, Nellie was diagnosed with cancer and died.

At first Camenietzki was sad but stable. But during a trip overseas a month later, a debilitating depression struck. "It was very sudden and startling," Camenietzki recalls. Over the next days and weeks, she completely lost her appetite. She couldn't eat, couldn't cook, couldn't bear even the smell of food. She stopped sleeping. Her mood sank lower and lower. Although she didn't want to end her life, Camenietzki started to understand why

people did. "I have never experienced anything like it," she says.

As many as one in six older adults show clinically significant symptoms of depression. For some, it is a lifelong condition that continues into their golden years; for others, such as Camenietzki, it doesn't start until late in life. Dr. Kathleen Bingham, who recently completed her PhD in medical science and a research fellowship in U of T's department of psychiatry, says in many ways the elderly are more vulnerable to depression. It can be set off by medical conditions such as stroke, Parkinson's and dementia - all of which become more common as we age.

Bingham is particularly interested in depression in older people. She works at Toronto General Hospital, where she splits her time between patients and research on geriatric depression. During her medical rotations, she was struck by how little was known about depression's underlying causes and how much of the treatment involves some degree of trial and error. This was largely the case with Camenietzki, who found her way to Bingham's care about a year into her illness. And, like many people with depression, Camenietzki suffered a "treatment-resistant" variety, meaning she had to try several medications before Bingham finally hit on a combination of two medications that worked.

B ingham's investigation into late-life depression is precisely the kind of work that will benefit from a new research network funded by a \$20-million gift to U of T's Faculty of Medicine from the Labatt family. The donation is specifically targeted to understanding the biology that underlies depression, and will support two chairs in depression biology: one focused on late-life adults (in collaboration with the Centre for Addiction and Mental Health) and one focused on children (in collaboration with the Hospital for Sick Children). It

will also support a professorship in depression biology and provide funds for research.

U of T's department of psychiatry trains a quarter of all psychiatric residents in the country, and the university is at the centre of the third-largest biomedical cluster in North America. There's a critical mass here, says Dr. Alastair Flint, a professor of geriatric psychiatry and the newly appointed director of the network, which will give special attention to mentoring scientists in the early stages of their careers - people like Bingham. Flint says this "pipeline approach" will help ensure that young researchers will be able to pursue promising avenues from the start, and will have a greater chance of being able to continue that work, and be supported in depression research, throughout their careers.

B ingham is interested in all types of late-life depression, but she has a special interest in psychotic depression, which, in addition to symptoms such as low mood, loss of appetite, insomnia and lack of interest in



ANTI-**DEPRESSANT** USF **GLOBALLY**

Number of people per 1,000 who take antidepressants, 2013



life, also involves psychosis. This could mean delusions, such as believing that someone has stolen all your money or that you have a fatal disease when you don't. You might hear voices or have other hallucinations. Studies estimate that up to 34 per cent of older adults hospitalized for depression have psychotic depression, says Bingham.

Most of these people are successfully treated with a combination of an antidepressant and an anti-psychotic or electroconvulsive therapy. But a substantial minority don't respond to either, and those who do can quickly relapse after treatment is stopped, says Bingham. And if physicians knew what was happening in the brain to bring on this and other types of depression, they would be in a much better position to treat it in a more targeted way, she says.

Bingham herself is intrigued by the connection between depression and cognition. "We know that people with late-life depression and psychotic depression can have a lot of cognitive difficulties," she says. The brain's "white matter" is known to play a role in cognition.



And white-matter abnormalities have been observed in patients with late-life depression. Bingham would like to investigate this relationship further, and to be able to glimpse inside the brains of depressed patients. Knowing if there are white-matter differences between healthy people and depressed people - even depressed people who have their condition under control - might give clues to other treatment options.

Advances in computational MRI techniques now make it possible to investigate white-matter structure in detail - and a related technique called magnetic resonance spectroscopy enables a look at the chemical composition of white matter. "That is what I'm interested in looking at," she says. "Being able to look at the actual white matter in more detail will help us understand what's really going on."

ur understanding of the biology of depression stands in stark contrast to our knowledge of the biology of cancer, infectious disease or cardiac problems, says Flint, where researchers have a very good understanding of what's going on, so they can develop targeted treatments. The hope is that the Labatt Family Network can help fill this gap. "The treatments that we currently have for depression were not derived from a biological understanding of the illness," he says. "Our hope is that a better understanding of the biology will lead to more precise and effective treatments, with less trial and error."

Depression is the leading cause of disability on the planet, says Flint, yet we know so little about what causes it. "There are multiple risk factors for depression," he says, "but we have limited understanding of how these factors affect the biology of the brain to cause depression: that is the challenge." - Alison Motluk



Stephanie Zhou's family struggled financially. It has made her a better doctor. she says

Stephanie Zhou (MSc/MD 2018) recently published an article in the Journal of the American Medical Association that went viral: Zhou, who had received the support of bursaries, wrote about how her socioeconomic background made her feel isolated in medical school but later helped her empathize with many of her patients. Below are some excerpts from "Underprivilege as Privilege."

My family was supported by a homeless shelter before we moved into subsidized housing. Food came from the food bank or soup kitchens. Clothing was second-hand from the church donation bins. To me, these were all part of a normal life, but in the context of privilege, these aspects suddenly became salient as a mark of "underprivilege." Placed at a school attended by mostly middle-class students, this underprivileged experience became part of my identity, and to be different was incredibly isolating.

It wasn't until I left medical school that these sentiments began to change. I saw patients who did not take their medications because they were too expensive. I saw myself and the experiences of my family in the

lives of these patients, and I realized that I did fit into medicine - I fit in with my patients.

To come from this background grants a different, more subtle form of privilege beyond that of wealth and social networks. I call it an "empathic privilege" that allows one to be more cognizant of the social determinants of health that patients often leave unspoken when seeking medical care.

I encourage medical students and practising physicians to be open about their stories, to humanize the identity of medicine so that it doesn't seem so lofty to those at a lower starting line – to show that a lived experience in poverty is valued by medical schools as much as, if not more than, having volunteered at a homeless shelter.

Sea of Troubles

Prof. Chelsea Rochman explores how the tiniest bits of plastic are polluting our waterways

hen Chelsea Rochman was six years old and a little anxious in the aftermath of her parents' divorce, she was taken to a child psychologist. The doctor asked: If you could have three wishes, what would they be? One is forgotten, but, 30 years later, Rochman can clearly recall the other two wishes: the ability to see better (she's had glasses since she was nine months old), and an end to all the trash in the world.

Today Rochman is a professor of ecology and evolutionary biology at the University of Toronto researching microplastics, particles of plastic often barely visible to the naked eye (wish one). More specifically, she's interested in how they pollute lakes, rivers and oceans (wish two), affecting ecosystems and - ponder this the next time you eat fish - the food chain. The research on microplastics taking place in the Rochman Lab at U of T is rippling out of academia, informing policy change including a recent multicountry ban on microbeads those non-biodegradable exfoliators that made many of us suspicious of our face wash.

An unusual, zigzagging personal path has taken Rochman from aspiring Hollywood actress to speaking at a United Nations meeting about the need to reduce plastic use. At 37, she's become a frontline ambassador for a critical environmental issue that almost no one wanted to talk about a decade ago.

S tanding in a sun-drenched lab off Spadina Crescent this past January, Rochman holds up a bagel-sized Petri dish dotted with tiny specimens of coloured plastic, some smaller than the pin on a thumbtack. "They're pretty, huh? I kind of want to take a picture and blow it up," she says in her super-fast voice, vowels loping in a singsong way.

Several students in lab coats murmur agreement. One sits in front of a microscope using tiny pincers to examine a microfibre found in the stomach of a Lake Ontario fish. Another tells Rochman she's identified a pre-production pellet from a chemical company that was likely





Plastic samples collected from San Francisco Bay, California

destined to become a bottle until it rolled down the drain and into a harbour.

Since the 1950s, when plastic was heralded as the miracle material of the postwar era, humans have created more than seven billion tonnes of it and only nine per cent has ever been recycled. The rest has been incinerated, landfilled or has broken into fragments that end up in our soil, air and water.

The smallest pieces, at less than five millimetres, are called "microplastics," and Rochman started thinking about them as a marine ecology undergrad at UC San Diego. During a visit to a largely uninhabited research facility on an island off Australia's coast in 2006, she noticed metres of trash strewn across the beach. The turtles in the rehabilitation centre were, she says, "pooping plastic." She had some questions, and Google led her to the Great Pacific Garbage Patch, an 80,000-tonne mass of debris floating between Hawaii and California, largely made up of microplastics created by sun and waves eroding bigger plastics. More questions: What about the chemicals in the plastics? How exactly do they make their way to fish and wildlife like those pooping turtles? Rochman decided to do her graduate work at UC Davis studying how plastic pollution affects ecosystems and food webs.

For one UC Davis study, Rochman went to the supermarket and bought some fish. It turned out that one in four contained microplastics, a number that now seems low: every fish in the Great Lakes has plastic in it, she says. A newly published Rochman Lab study found more than 100 synthetic microfibres in the stomach



"CONTAMINANTS ARE EVERYWHERE BUT WE DON'T REALLY KNOW YET THE ANSWER TO THE QUESTION, 'HOW BAD IS BAD?'"

of a single fish. Many of the 23 to 36 trillion microfibres that annually end up in Lake Ontario watersheds come from our own clothes, released during laundering. But the study shows that a large percentage of those fibres could be prevented from entering the environment by adding a simple commercial filter, available at hardware stores, to a washing machine.

This is good news because microplastics can harm the growth, feeding and reproductive cycles of fish. Less known is exactly what concentration of plastic in the environment is dangerous for humans – a largely unstudied area. "I'm not working on it vet, but we do work on human exposure to microplastics via seafood and drinking water," savs Rochman.

"Contaminants are everywhere but we don't really know yet the answer to the questions, 'How bad is bad? What's a tolerable amount?' We have to figure out how to stop it from reaching a tipping point for human health."

Microplastics are a terrestrial concern, too. A fridge-like HEPA filter whirrs in a corner of Rochman's lab in an attempt to keep the room free of dust and particles from clothes and carpets. "I don't think seafood is our biggest source of plastic. I think it's drinking water and dust falling on our food," Rochman says, gesturing at a sunbeam in a window, catching specks. "See that? Microplastics."

or a native of Tucson, Arizona, dust makes a m preoccupation than marine life. But Rochman's parents were hippie-ish, and she spent much of her childhood outdoors, hiking and swimming. On Earth Day in high school, she ditched class to gather bags of trash in the desert. Rachel Carson's seminal

environmentalist book Silent Spring inspired Rochman. "I was fascinated with natural disasters. Now I study anthropogenic disasters," she says.

Rochman initially majored in atmospheric sciences at the University of Arizona, but the program was cancelled during her second year. She'd always acted, so she made a dizzying pivot to performing arts major. After two years, she packed up her car and drove to Hollywood where she did the la-la land thing: waitressing, taking classes and auditioning. Extra work on The West Wing and Curb Your Enthusiasm brought a non-speaking role as a bridesmaid in *American Pie 3*, the teen sex comedy franchise that was by then a case study in diminishing returns. "A terrible movie. Ten days on set and it turned me off the whole industry. It was icky and my brain was bored."

Rochman reinvented again, ending up at UC San Diego as a biology major and working at the aquarium down the hill. There, she discovered a love of teaching, revelling in field excursions like driving a tank of sharks to a school and taking children snorkelling and kayaking.

That affection for students has been on display since arriving at U of T three years ago. When we met, 25 lab students had been at her house the night before for a taco party in honour of a seminar speaker. Rochman started the U of T Trash Team in 2017, taking students on garbage-picking excursions off campus for research and to spread waste literacy. Last summer, the team unearthed 31 kilograms of trash at the mouth of the Don River in less than two hours. Now Rochman is working with Ports Toronto to find technology to prevent litter from entering Lake Ontario and to educate the public about waste.

Kennedy Bucci, a second-year PhD student who came to U of T specifically to work with Rochman, helped catalogue the heaps

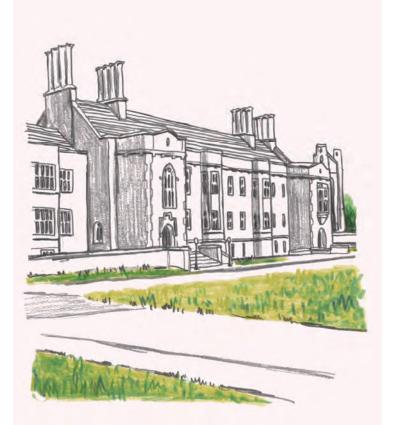
of straws and bottles that hot day. "I've learned from Chelsea that if we do science in our bubble, there's not much point," she says. "She really believes that what matters is when you bring research to the public and policy-makers."

To that end, Rochman consulted on the G7 Ocean Plastics Charter, an international agreement to halt marine dumping, spearheaded by Canada. She's also a science adviser to the non-profit Ocean Conservancy, and frequently finds herself at the table with representatives from Dow and Coca-Cola, trying to explain why reducing production is as important as recycling plastic waste. "It's still frustrating, but at least they're listening. They know microplastics are real." This is a change from the denial phase of a few years ago, when Rochman was regularly mocked on industry blogs.

For a long time, the community of microplastic scientists was, well, micro, but lately, Rochman has noticed a boom in research and academic postings. The interest is nascent, not unlike climate change study a generation ago, and it's an uphill battle: plastic production is expected to increase by about 40 per cent over the next decade. But Rochman's voice is now part of a louder chorus advocating for practical responses: proper recycling; less usage; and policy change around production, including taxation.

"I have all these optimistic students around me so I don't get too jaded," she says. "They're hopeful, so I have hope, too." And surely hope is at least as powerful as a wish. -Katrina Onstad

Chelsea Rochman's outreach program, the U of T Trash Team, is supported by more than \$25,000 in donations from the American Chemistry Council, the Canadian Plastics Industry Association, the Ocean Conservancy and the Alliance for the Great Lakes.



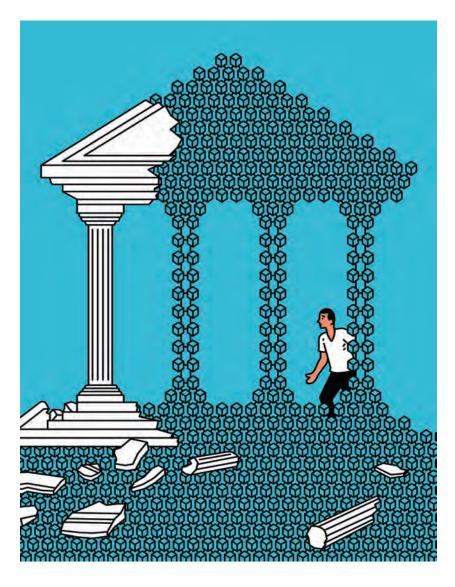
Hart House once had a flying trapeze. A century later, that spirit lives on

Charles Vincent Massey (BA 1910 UC) was chairing two student clubs and working for three U of T newspapers in 1910 when he saw an opportunity to forge links across faculty and college rivalries. He imagined a U of T community unified through what he called "high endeavour" - learning plus enthusiastic embrace of the arts, public debate and fitness.

An heir of businessman Hart Massey, he initiated a generous gift from his grandfather's estate and drew up plans for a student centre featuring a diverse range of amenities. Rooms for chess and fencing. A medical clinic. A swimming pool featuring a flying trapeze for the popular sport of "fancy diving." Shovels hit the ground, and Hart House

officially opened on November 11, 1919. But rooms were the least of what Hart House became. "The bricks and mortar are but the bones; the community must provide the spirit," said Massey.

When Hart House opened, however, it was almost completely off-limits to women; Massey believed in the segregation of sexes. The doors didn't swing fully open to women until 1972 – but now, Hart House is devoted to an open-door policy and diversity of voices. Says Hart House Warden John F. Monahan: "The students who are most engaged here should be representative of all the students of the university, and helping them to embrace and navigate differences is our highest calling."-Janet Rowe



fter spending the first portion of his career in banking in Latin America, Stephan Krajcer came to a stark conclusion about the future of his industry. "Financial instruments," he says, "should be born digital."

Krajcer is the founder of Cuore Platform, which last year joined the Creative Destruction Lab, the accelerator program at U of T's Rotman School of Management. Krajcer's vision is to develop "smart contract" technology that will allow traditional banking transactions, such as mortgages, which typically require signatures on printed copies, to be completed entirely without paper. As Krajcer explains, his eight-person team is deconstructing the steps and figuring out how to digitize each one of them, especially for routine and universal transactions such as promissory notes.

Cuore's nascent service is part of a poorly understood but potentially game-changing technology known as "blockchain." Developed a decade ago to facilitate the trading of cryptocurrencies such as Bitcoin, blockchain's premise is that much of the delay and cost can be edited out of financial transactions by recording them on "distributed"

ledgers." These ledgers are a bit like shared spreadsheets on a Google drive, except that they record transactions in a way that is transparent, secure, constantly updated and unalterable. Encryption ensures that entries are tamper-proof.

Andreas Park, a finance professor at U of T Mississauga, says blockchain allows for people to exchange assets directly, without a bank or other broker. Take the case of a typical wire transfer to a relative in another country - a transaction that costs up to 10 per cent of the initial amount and may involve a delay of days. With blockchain, such transactions could become practically instantaneous, completely verifiable at both ends and far less expensive. As Park observes, blockchain raises difficult but important questions about the value of the institutional go-between.

Park believes blockchain also holds out an important opportunity for research and education - and the sort of disruptive entrepreneurial activity Cuore and hundreds of other startups are undertaking. To advance students' understanding of the technology, U of T has launched workshops on blockchain through Rotman's Financial Innovation Hub in Advanced Analytics, established last year with \$1 million from TD Bank Group and seed funding from the Rotman Catalyst Fund. The Catalyst Fund was created in 2016 by a \$30-million bequest from donor Joseph Rotman's estate.

U of T has also created an interdisciplinary research project, UTLedgerHub, which Park oversees with Andreas Veneris, a computer and electrical engineering professor, and Fan Long, a professor of computer science. UTLedger-Hub is examining potential applications of blockchain in finance and economics. The goal of these efforts, says Park, is to enable U of T both to teach blockchain to students and to innovate with the technology through collaborations with industry.

\ \ / hen Park began offering a course on blockchain to UTM undergraduates in 2017, the student response was immediate. "You could feel the excitement in the room," he says. Many were familiar with blockchain because of the hype around Bitcoin. Each time Park taught the course, he asked for a show of hands to see how many had bought this digital currency. Early on, none had. But by last year, when extensive trading in Bitcoin had caused its price to soar, about a third owned some form of cryptocurrency. "They had a better understanding of what I'm talking about."

The students who have flocked to Park's classes are also aware of the fast-growing career opportunities to develop and sell software related to this technology. Veneris says Toronto, already a research and business hub for artificial intelligence and financial technology, is also considered a global centre for blockchain development. Park adds that it's good for local employers to be able to hire young people with these emerging skills. "There's a huge opportunity at the moment."

One of the challenges for researchers and entrepreneurs alike is in developing practical uses for the



TOP 10 CITIES IN THE WORLD **FOR BLOCK-**CHAIN **JOBS**

1-New York

2-San Francisco

3-London

4-Singapore

5-Boston

6-Chicago

7-Toronto

8-Palo Alto

9-Austin

10-Sydney

technology. They must essentially reinvent the long-established and complicated practices that have grown up around financial transactions such as mortgages and stock trades. Despite the fact that we can do our banking on smartphones, the back end of these activities remains paper-bound and heavily regulated. No one, Park says, would build a bank from scratch and make it such a slow-moving bureaucracy. Yet allowing transactions to be executed automatically and recorded on a blockchain is a complicated process.

One of the difficulties involves translating necessary regulation such as anti-money-laundering rules or know-your-client practices into computer code. While some blockchain enthusiasts espouse a kind of computer anarchism, Veneris says the technology will "need to be regulated to some extent." A few countries, such as China and Vietnam, have introduced regulations for the use of blockchain, to avoid a loss of control for their centralized regimes. Others, like the Irish government, have gone in the other direction, sponsoring blockchain hackathons. "Nobody," Veneris observes, "has a clear direction of where this is going."

Beyond all the blockchain hype and jargon, and the endless complexities of the banking world, the basic idea behind this emergent technology is almost philosophical in nature. Veneris sums it up in the form of a question: "How do you trust?" This question resides at the core of both blockchain technology and a global financial network that has developed byzantine ways to ensure that all parties in a deal get what they bargained for (and which has room for improvement, notes Park).

Blockchain's promise is that trust is literally programmed into a new generation of financial systems. As Veneris says, "We're one step closer to having machines do the trust for us." -John Lorinc



Judith Schurek fled the Hungarian Revolution and finished her studies at U of T. Now she helps other international students



Judith Schurek was one year away from earning her mechanical engineering degree when she and her fiancé fled the 1956 Hungarian Revolution. They took refuge in Vienna, where Schurek (BASc 1958) heard about Canadian scholarships that could cover her final year - but that she would have to come to Canada to apply. This clinched their decision about where to go next, and in the winter of 1957 the newlyweds arrived in Toronto. Schurek became one of the first women to earn a mechanical engineering degree at U of T and went on to a successful career as an engineer and entrepreneur. Last year, Schurek, 85, gave more than \$1 million to establish two Lester B. Pearson International Scholarships - one named for her, and one named in memory of her husband, Robert - which each cover four years of study for exceptional international students.

What was it like coming to U of T after emigrating?

It was a big change, but many people at the university made it easier. When I first arrived, I had to take an English exam to qualify for the scholarship. A volunteer from the University Women's Club tutored me and helped me pass.

What was it like to be a woman studying engineering at U of T in the 1950s?

I was the only woman in a class of 98 guys, but my classmates and professors were kind and helpful. The only time I remember being treated differently was during the Iron Ring Ceremony [during which graduating engineers commit to acting honourably in their profession], when the professor came to the

part of the engineering oath that refers to "brothers." He stopped for a moment, looked at me, thought, then called me "sister," continued on and gave me the ring. I'm still wearing it. I always say that it's my most valuable piece of jewelry.

Career Bell Canada for 38 years, mostly

as an engineer

In retirement Schurek did environmental compliance auditing for corporations

Coming to Canada When the Schureks arrived in Toronto in 1957. the Canadian government gave them \$5 each

First recipients of Schurek's Pearson Scholarships Katharina Vrolijk, a Swiss

national, studies architecture. Katie Kwang, from Singapore, is taking psychology

Why create a Pearson Scholarship?

I like the fact that the scholarships help young people who have the ambition to go to university - like me back then. I know how difficult it can be to leave your home and family to establish yourself at university in a new country. You need all the help you can get.

Why is it important to have international students at U of T?

The greater variety of students there is, the more versatile and open the university is. They bring different experiences and perspectives that enrich the whole environment. -Megan Easton



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