

MM

Rise of The Machines

UTM is building a robotics stronghold that is at the vanguard of research, led by world-class scientists searching for ways to help humanity

Pg. 12





The Photographer
Lisa Kramer is a Professor of Finance at U of T Mississauga's Department of Management and an accomplished wildlife photographer.

VIEWFINDER

Bird of prey

A red-tailed hawk (*Buteo jamaicensis*) was spotted at the University of Toronto Mississauga this winter. “I am pretty sure he is silently judging whether students really spent their time reading during Reading Week,” writes Lisa Kramer, who snapped this photo. Located on 225 acres of protected greenbelt along the Credit River and near the 150-acre Riverwood Conservancy, UTM is home to over 450 species of animals and plants. Perhaps most famous for the white-tailed deer often spotted grazing in the wooded areas and on the fields, UTM’s natural setting also attracts many other visitors to campus. Wildlife such as squirrels, groundhogs, opossums, raccoons, rabbits, and birds of prey are commonly seen on campus.

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Editor's Note



Patricia
Loneragan

EDITOR



From a single academic building housing 155 students to dozens of facilities where thousands come to study each year, the University of Toronto Mississauga has grown and matured since its humble beginnings as Erindale College. At the same time, our ways of communicating have also evolved.

Over the years we have found new ways to stay in touch. There was the Erindalia, a quarterly newsletter for alumni, the photocopied ERINEWS newsletter, and others like it. The first alumni magazine appeared in print in 2006, which relaunched in 2016 in its current iteration, M Magazine.

Today, we have even more platforms available. Those who follow us online may have noticed we've boosted our efforts to better communicate with you through our various channels, whether it's our news page, Twitter, Facebook or Instagram.

As our campus continues to evolve (which you can see on page 24), so too do the ways we communicate. That includes this magazine.

I am delighted to share that University of Toronto Magazine, which already serves hundreds of thousands of alumni and friends of the university, will be changing to more fully reflect the tri-campus nature of our institution. That means, going forward, you will receive one unified magazine that serves all three campuses.

The university has a tri-campus structure, bound together by a shared identity and interconnected programs. It is only fitting that our magazine reflects that shared identity. The newly integrated University of Toronto Magazine will highlight the stories that are unique to UTM alongside those from St. George and Scarborough.

By consolidating content into a single university-wide magazine, the stories of UTM faculty, students, staff and alumni will reach an audience almost 10 times greater than they do now. We will be able to showcase the unique strengths of this campus to a broader audience, gaining even greater recognition for the accomplishments of our UTM community.

Moving to a single, tri-campus magazine will also allow the university to reduce its environmental footprint and realize significant savings in printing and distribution costs.

As we move toward sharing the rich history and identity of UTM and the broader U of T network, know that our commitment to inclusion, academic excellence, bringing our community together and communicating with you remains strong.

While this is the last issue of M Magazine, the stories of UTM – your stories – will continue. We look forward to keeping in touch through University of Toronto Magazine and the many platforms we use today and may use in the future. Thank you for being part of our story and for continuing this journey with us.

Thanks for reading,

Patricia Lonergan
Editor

True Community Spirit

This past academic term at U of T Mississauga has been unlike anything I've ever experienced. The word “unprecedented” has been used countless times, but it bears repeating because responding to the novel coronavirus pandemic has truly been challenging for everyone.

The rapid spread of COVID-19 forced us, as a society, to make changes I never imagined we'd have to make. We had to figure out new ways to work, learn, play and relax as we started to self-isolate. Working from home became the default option for many.

The university, too, had to make changes, involving difficult but necessary actions based on recommendations from public health authorities. Ensuring the health, well-being and safety of our campus community is always our number one priority.

In March, we suspended in-person classes and exams, and restricted access to our campus buildings. Most of our residence students returned home early; those who couldn't leave were accommodated in living quarters with sufficient physical distancing space. To finish the spring term and exam period, our faculty explored and delivered new ways of teaching and testing while our staff kept our operations – through in-person and remote work – humming along.

As I write this in early April, the country is still in the midst of self-isolating, wherever possible. However, amidst such a dire situation, UTM is rallying to support one another and the broader community. Our faculty and librarians continue to innovate with new teaching methods for our spring and summer sessions. Our researchers, through expert commentary online and in media, are helping us to make sense of the pandemic: offering tips to keep children occupied, explaining health and safety risks for delivery workers, suggesting ways to support small businesses, and helping us manage our anxiety.

Our staff are finding new ways to virtually connect with students: offering fitness challenges, mental health supports, Career Centre workshops, programs on building resiliency, and chats with peer leaders. Essential staff are coming to campus daily to keep our residences open, our campus secure and our lights on.

And our students, of course, are rising to the challenge. Third-year theatre and drama student Muhaddisah Batool joined a worldwide cast on YouTube, performing Shakespeare's *Taming of the Shrew*; undergraduate student Habon Ali, a member of the Prime Minister's Youth Advisory Council, spoke to Justin Trudeau about the concerns that young people are facing these days, and fourth-year residence student/don Juliette Melchor Rodriguez is helping other residence students adapt to the significant academic and social changes ahead.



I am also proud, but far from surprised, to see our alumni using their talents and resourcefulness to find ways to help their communities. Conner Tidd (MScSM 2017) and Kevin Jakiela (MScSM 2017), through their hydroponics business, have provided free seeds and lesson plans to build mini indoor greenhouses, giving families a fun activity to do without needing to leave the house. This is but one of the many examples of our alumni stepping up to make a difference.

Amidst all this great uncertainty, our community is showing tremendous compassion, creativity and thoughtfulness. Various departments across campus joined together to donate thousands of critical supplies of masks, gloves and gowns to hospitals. Some individuals used their own resources – personal 3D printers – to produce face shields for frontline health-care workers. And our Academic Machine Shop produced sneeze barriers for on-campus facilities.

Members of the UTM community are sharing their knowledge, skills and even medical supplies with the world and one another, reminding us that we're all in this together. I have no doubt our spirit of helpfulness and cooperation will continue as we move past this pandemic. Shared adversity has a way of highlighting the strength of community. I am heartened to see the UTM family's determination and commitment to working collectively toward a better tomorrow.

A handwritten signature in black ink that reads "Ian Orchard". The signature is fluid and cursive, written in a professional style.

Ian Orchard
**Acting Vice-President & Principal
University of Toronto Mississauga**

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BUILDING THE FUTURE

How our campus evolved into an academic hotspot and community engine, and what's on the horizon

Acknowledgment of Traditional Land

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years it has been the traditional land of the Huron-Wendat, the Seneca and, most recently, the Mississaugas of the Credit River. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

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Campus News



1

BUILDING A LEGACY

New scholarship honours Iranian plane crash victims

U of T matches donations three-to-one up to \$250,000

The University of Toronto has launched a new endowed fund, the Iranian Student Memorial Scholarship Fund, to honour the memory of those who died in the tragic crash of Ukraine International Airlines flight PS752 in Tehran, Iran.

Eight members of the U of T community were on the plane, including U of T Mississauga biology student Zeynab Asadi Lari.

The new scholarship fund will provide needs-based scholarships to international students from Iran as well as students from any background pursuing Iranian studies at U of T.

“With the creation of this scholarship we hope to honour the memory of those we have lost by helping students from Iran pursue their studies at U of T and by supporting students of all backgrounds who are interested in exploring Iranian studies,” says U of T President Meric Gertler.

U of T has pledged to match donations three-to-one up to \$250,000.

Moved by the tragedy, in February the producer and cast from the hit musical *Come From Away*, playing at Toronto’s Royal Alexandra Theatre, raised \$16,186 for the scholarship fund, which will be matched through the three-to-one matching program.

The scholarship will be available to undergraduate and graduate students.

TOP PHOTO: DREW LESIUCZOK



2

GLOBAL EXCELLENCE

Award-winning design *Maanjiwe nendamowinan earns international nod*

U of T Mississauga's newest building has been recognized with an international award for design.

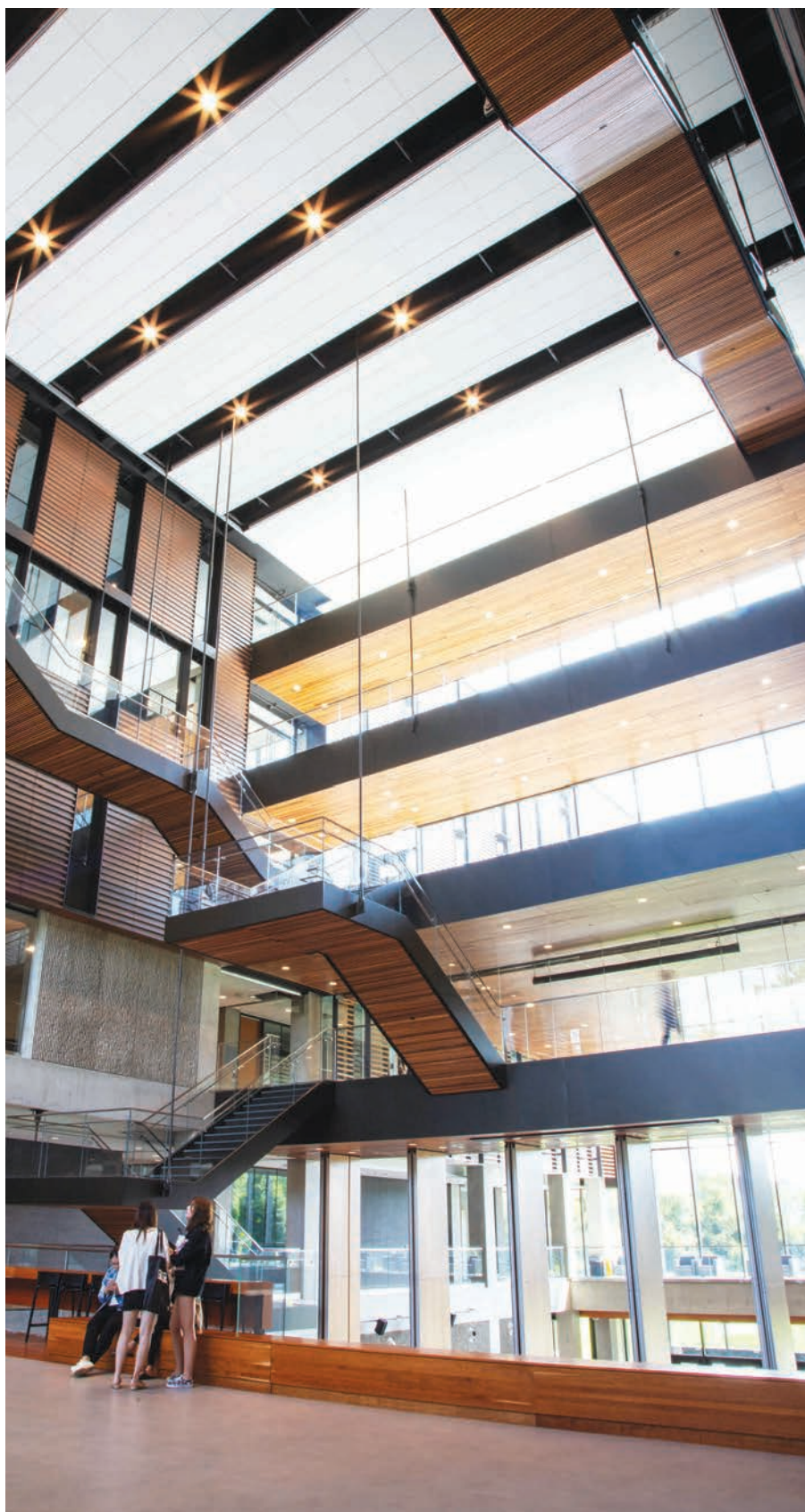
The International Interior Design Association (IIDA) announced that the Perkins and Will-designed project won a 2019 IIDA Global Excellence award in the education category. The annual juried design competition recognizes originality and creativity in interior design and architecture projects across 15 categories.

"Our team was tasked with creating spaces that are 'always active, never empty.' The driving theme behind the design is the convergence of an array of students and academic disciplines. Connecting students and faculty to each other, and to their spectacular natural setting became the project's critical design challenge," Toronto-based Perkins and Will wrote on social media.

Maanjiwe nendamowinan marks the fifth project designed by Perkins and Will for the UTM campus. The 210,000-square-foot building features an airy, six-storey atrium and event space, 40,000 square feet of new classroom space and more than 500 new study spaces, as well as office space for humanities and social sciences departments.

In keeping with UTM's commitment to sustainability, the building also achieved LEED Silver designation through environmental innovations such as rainwater recycling, energy-efficient mechanical systems and green roof spaces.

The university officially opened Maanjiwe nendamowinan in November 2019.



TOP PHOTO: SUPPLIED



3

ENVIRONMENT

REPAIR AND REUSE

Sustainability week

Volunteer expert fixers were on hand at the 2020 Repair Café to mend clothing and restore small appliances and electronics during U of T Mississauga’s first Sustainability Week.

The week kicked off in early March with Meatless Monday, followed by Trashless Tuesday, Wellness Wednesday, Tech Thursday and Future Friday. The week-long initiative was themed around understanding the impact people have on the world, with each day intended to explore that impact from a different angle.

UTM Sustainability Week included a series of student-led and organized events designed to educate and encourage sustainable behaviour on- and off-campus. Activities included learning how to properly sort waste, a reusable mug giveaway, a clean-tech exhibit, a radio-controlled car demonstration, an e-waste collection, numerous round table discussions and, of course, the Repair Café.



4

NATIONAL RECOGNITION

BIOLOGY PROFESSOR NAMED TO ORDER OF CANADA

Josef Svoboda overcame great personal hardship to pursue research in the Arctic

Nine years in jails and labour camps did nothing to deter University of Toronto Mississauga’s Biology Professor Emeritus Josef Svoboda’s resolve. Once free, he moved to Canada, built a successful academic career, and has now been named to the Order of Canada.

Svoboda was recently appointed on Dec. 27, 2019 for “his pioneering research on tundra ecosystems and for his lifelong mentorship of scientists studying the Arctic.”

He was recognized for his research and work in Toronto, Ontario and out of Baker Lake, Nunavut. Svoboda and the 21 graduate students he has mentored throughout his career have travelled across the Canadian Arctic, along Hudson Bay and Ellesmere Island, conducting research on Arctic plant ecology.

He was surprised when he learned he was receiving the appointment. “You don’t expect something like that,” he said. “I’m an old man, long-retired, but suddenly somebody remembered my name.”

Svoboda came to Canada at the age of 40 after spending nine years in prison camps in then-communist Czechoslovakia, as a result of his political opinions when he was a student. In a new country, he was determined to finish his education, despite his age, or despite what others told him.

He finished his bachelor of science at Western University, earned his PhD at the University of Alberta and started with the University of Toronto as a visiting assistant professor in 1973. He retired after a long career in 1994.

Svoboda’s research unveiled a treasure trove of plant knowledge in the Arctic as a result of his painstaking measurements of plant communities scattered across the north. He’s published more than 60 scientific papers, has written an autobiographical book *Wine from Raisins*, and the Josef Svoboda Czech Arctic Research Station in Svalbard, Norway, was named in his honour in 2016.

His advice to his students, many of whom have gone on to successful careers, is to never give up, and take things seriously.

“This is what makes you a mature professional,” he said. “At the time it was said you have to be as good as the professor, maybe even better.”

5

TRUTH AND RECONCILIATION

UTM APPOINTS NEW INDIGENOUS INITIATIVES DIRECTOR

Tee Duke brings extensive experience, expertise to new role

In the photo, Tee Duke stands in an alley in Toronto’s downtown core. She holds a fan of feathers against her chest, partly covering the beaded regalia she wears to honour the jingle dress dance, which traces its origins back to her childhood home in Treaty 3 Territory near Kenora, Ontario.

For Duke, who now lives in Treaty 19 Territory in north Mississauga, the image represents all that she holds dear as an Anishinaabekwe woman, a city dweller, a dancer and an educator—experiences she now brings to her new role as assistant director, Indigenous Initiatives at University of Toronto Mississauga’s Indigenous Centre.

“I’m excited to harness and strengthen the relationship between Indigenous and non-Indigenous communities,” says Duke.

Duke will develop and implement Indigenous initiatives at UTM, enhance Indigenous community relationships with both on-campus and off-campus communities, and manage the Indigenous Centre. She will also work closely with her counterparts at the St. George and Scarborough campuses to implement tri-campus initiatives identified in U of T’s response to the findings of the Truth and Reconciliation Commission.

Duke brings considerable expertise to her new position, with previous roles at Seneca College, York University and the Ontario Federation of Indigenous Friendship Centres where she worked as an educator covering urban Indigenous culture, safety and residential school history.

She is focused on helping Indigenous students, staff and faculty



find a place of pride on campus, and to develop a network of support. “We need to find out what our Indigenous community looks like, but also how we can build stronger ties with our allies,” she says.

Above all, Duke wants the UTM community to find a personal connection with the Truth and Reconciliation Commission and U of T’s response to the report.

“I want people to think about the role they have to play. It’s not just the responsibility of Indigenous members of campus—it’s everyone’s responsibility to meet those goals,” she says. “My work will ensure that there is a space and place where staff, faculty, students and community members can come together and create a vision to go forward.”



6

FIRST IN CANADA

ETHICALLY SOURCED CAMPUS FOOD

UTM receives silver designation from Fair Trade Canada

U of T Mississauga has become the first campus in Canada to receive a silver designation from Fair Trade Canada, proving that the campus continues to be a change leader in the food service sector.

UTM, which launched the country’s first-ever certified gluten-free food station, achieved bronze designation in 2016 from Fair Trade Canada. The initiative proved so successful that UTM’s Hospitality & Retail Services team pursued the next level of designation.

All tea and coffee offered at non-branded campus food stations are certified fair trade, including an expanded menu of loose leaf and bag teas. Sugar offered at the stations is now exclusively supplied by fair trade certified producers, as is the cinnamon and cocoa used in the UTM kitchens. UTM also offers five types of fair trade chocolate.

To celebrate the new silver designation, UTM hosted a Fair Trade Marketplace in January where the UTM community had an opportunity to sample fair trade treats from certified fair trade vendors.

The Fair Trade Canada program supports small-scale farm organizations that meet specific social, economic and environmental standards that help ensure better prices and working conditions for farmers and workers in the program.



PHOTOS: DREW LESUCZOK

UTM in the Moment

SOCIAL MEDIA

At UTM, something amazing is happening around every corner. Here are a few of the moments that caught our eye:

Follow UTM on:

Twitter @UTM

Facebook facebook.com/UTMississauga

Instagram @uoftmississauga



Talking about the importance of mental health. Spread the word and create pawstive change. #letstalkaboutit #bellletstalk @utmresidence #cavachonpuppy @winniethepuppers



It's a great day for a skate! The U of T Mississauga students are kicking their weekend off at their on-campus Glisce Rink #syntheticice #iceskatingrink #letsgoskating @topshothockey



I went to the little book sale on campus, scored a couple paperbacks. That is all. @sleepymarginalia



While they're sometimes too timid to come out, the deer here at UTM practically pose for the camera when you find them! Shot on Nikon D3500 @flying.chicken.photos



Mamba mentality #nsrjgg #basketball #uoft @nsrjgg



Clouds over the Student Centre @earthydianaweidaivis

Snapshot

SEARCHING FOR FALSE POSITIVES

Forensic science undergraduate puts a new roadside drug testing device through its paces

For decades police have had a roadside device to test potential drunk drivers, but until recently there have been no such devices for suspected drugged drivers. With the legalization of cannabis, the federal government, in the interest of public safety, approved such a device.

The Drager Drugtest 5000 is the first oral fluid drug screener approved for use by Canadian law enforcement. Since its debut in 2018, there have been questions raised about the device's reliability, with some suggesting it will give a positive reading even if someone hasn't recently used drugs.

Adrienne Chiang, a forensic chemistry specialist who will graduate later this spring, is testing the device to determine if someone who hasn't used marijuana can still test positive for THC, the main psychoactive compound in marijuana.

The issue, she says, are suggestions that potential contamination from other substances produce a false positive reading. There are those who claim their positive test is a result of an innocuous substance that doesn't cause impairment.

It's reminiscent of the questions about the reliability of breathalyzers, where "people think they can get away with a drug test" and blame the positive result on mouthwash, says Chiang, who hails from Malaysia and opted to study forensic chemistry because she has an interest in toxicology and chemical analysis. She was drawn to the program at UTM because it includes an internship, which is how she got involved in this study.

Chiang says mouthwash, poppyseed cakes and chewing gum are the main items blamed for false positives, with poppyseed cakes topping the list.

Adrienne Chiang

CLASS OF 2020



"There have been articles out of Vancouver that poppyseed cakes give a positive response because this device detects up to eight classes of drugs, including opiates," she says, adding the devices calibrated for Canada mainly detect cocaine and THC.

Like a pregnancy kit, the Drager Drugtest 5000 relies on amino acids to provide a positive or negative result. Police can test for the presence of cocaine or THC by collecting saliva at the roadside with a one-time-use cartridge that fits into a portable device for analysis. The question for Chiang is whether common substances can trick the system.

"I am looking at stuff people usually have in their car that they use to try to get away when they're stopped," Chiang says. "It's easy to get away with mouthwash for breathalyzers. Chewing gum is one of the most common ones, because there have been chewing gums that have tested positive on the breathalyzer before because of the sugar content."

So far, participants in Chiang's study who have eaten poppyseed cakes, chewed gum or gargled with mouthwash have not received a positive test result.

"I think this device is reliable," Chiang says.

That's an important finding for the undergraduate student, who plans to pursue a masters in chemistry. She says lawyers and police can reference her study in court if questions about the reliability of the device come up.

"People keep challenging it," Chiang says, noting drivers who think they have some scientific knowledge will fight back, arguing "don't take me down just because it's a positive test. I've taken poppyseeds."

With the legalization of marijuana, it's important the public, law enforcement and the forensic community understand the roadside device is reliable, Chiang indicates, noting it hasn't been the subject of a lot of research.

"I think this could really help the forensic world."

—Patricia Lonergan

ADVENTURES IN URBAN ECOLOGY

UTM alumna's book teaches kids about the messy business of scientific discovery

Cylita Guy knows all too well that the pursuit of urban ecology comes with its share of unglamorous obstacles, from smelly river muck to nosey passersby – and now she's hoping to paint a more complete picture of the scientific process for the public.

She recalls, as an example, one cool night in Toronto's High Park while she was doing research on city bats for her PhD in ecology and evolutionary biology at the University of Toronto Mississauga. Her field partner nearly fell off a roof trying to reach a bat colony and the work was constantly interrupted by curious onlookers, including a police officer with an apparent fear of the winged mammals.

Guy draws on that experience, and those of seven urban ecologists at U of T and other universities, in her first book – a children's book – about the problems that arise during the process of doing science and about the diverse work of urban ecologists.

Adventures of Your Friendly Neighbourhood Urban Ecologists features scientists at different stages of their careers and highlights the work of female ecologists and people of colour.

She says she wants to introduce young readers to the relatively young field of urban ecology and address what she sees as a gap in children's literature about science – namely a tendency to gloss over how scientists actually obtain data and make their discoveries.

"I felt like a lot of kids' science books present... 'the cool people who found those cool animal facts,'" she says.

"I think one of the problems is that people think that science is static. We think these are the way things operate, but sometimes we find the complete opposite – and sometimes we generate new questions that we still need to go out and answer."

Her research in High Park, which was published in the *Journal of Urban Ecology*,

will be the focus of the first chapter of her book, which is due to be published next year by Annick Press (the independent Canadian publisher approached Guy after seeing her work featured in another book, *Fieldwork Fail: The Messy Side of Science*).

The chapter describes how scientists can change their minds about a research question after gathering new evidence.

Like other ecologists, Guy assumed the park in Toronto's West end was a good habitat for big brown bats (*Eptesicus fuscus*), but her fieldwork suggested otherwise. The bats they found in the park were runtier than specimens in Hamilton, Ont.; males outnumbered females two-to-one; and beetles, bats' favourite snack, were in short supply.

There was also the eventful night in High Park when she and field partner Krista Patriquin, a Postdoctoral fellow at UTM's Ratcliffe Lab, encountered the aforementioned complications. The pair were trapping bats from a colony hanging from the eaves of a house when Patriquin slipped and nearly tumbled to the ground. Later, while examining the bats, the pair were interrupted by a group of curious teenagers.

"I was super stressed because I was like 'Oh my god. What is going to happen?'" Guy recalls. "But they were probably the most engaged group of people we have ever encountered."

Later the same evening, a police officer showed up and asked the researchers what they were doing in the park after midnight. As Guy explained, she noticed the officer's eyes widen.

"Ma'am, did you know your shirt is moving?"

"Oh yeah, of course," Guy answered. "I have 25 bats down there."

Because of the cold, the bats had entered what Guy describes as a "mini-hibernation state," also known as torpor. Guy was following a procedure to warm them up before releasing them back into the wild.

In the book, Guy builds on that anecdote with vignettes about urban ecologists across North America, including U of T PhD candidates Charlotte de Keyzer, who looks at how plants and pollinators respond to climate change, and PhD student Rachel Giles, who studies road run-off and other contaminants in waterways and how they affect invertebrates like crayfish and larvae.

Guy says she chose the U of T researchers to show the broad range of research questions that urban ecologists seek to answer.

—Geoffrey Vendeville



PHOTO: SUPPLIED BY CYLITA GUY

WALK IN THE PARK

Postdoctoral fellow wants to bring Indigenous communities into Canadian parks

As we walk the path of reconciliation, how can parks foster better relationships with Indigenous communities? That's the question Chance Finegan hopes to answer with a study launching this summer.

Finegan is a post-doctoral fellow with U of T Mississauga's Department of Geography and the Centre for Urban Environments. Through interviews with park management and Indigenous community leaders, Finegan hopes to learn more about the relationship between Canadian park agencies and contemporary urban Indigenous communities. His research will focus on four municipal, provincial and federal parks located in urban centres across the country.

"Parks are places where the state controls the land, down to where you can sleep and eat," says Finegan. In the past, park interpretation programs often overlooked Indigenous heritage entirely, or defaulted to basic acknowledgment of the historic use of the land. "I'm interested in understanding how protected natural areas or parks can ethically engage with Indigenous peoples and their traditional lands and heritage," he says.

Reconciliation efforts offer new opportunities to engage with Indigenous communities, but Finegan says there's an information gap in training for parks management personnel. In a previous study, Finegan surveyed nearly 400 training programs for parks and land resource management programs and found a dearth of information about working with Indigenous communities.

"Incorporating Indigenous heritage and perspectives on settlement and the land is really powerful, but there isn't a lot of study of good relationships or best practices to follow," he says.

Finegan hopes to learn more about hunting and fishing rights, access to traditional medicinal plants, like tobacco, and the opportunity for Indigenous users to conduct tourism businesses or host cultural events within parks spaces.



Chance Finegan

POSTDOCTORAL FELLOW

He is particularly interested in how urban Indigenous communities interact with park spaces. "More Indigenous people live off reserve than on, and that leaves a lot of people out of the conversation," he says. In urban areas, the Indigenous community includes people from diverse geographic and traditional communities. There isn't a unified audience or authority to work with, which creates a different dynamic for park authorities attempting to serve and include those groups.

The researcher also hopes his findings will inform training for long-term and

seasonal park employees. He is committed to ensuring his work is accessible to Indigenous community members through open access journals and conferences. The end goal is to foster better relationships between park administrators and Indigenous park users.

"We need practitioners to be listening to communities," he says. "As academics, we can use that platform to amplify voices in spaces where they might otherwise not be heard.

"We all have a stake in this relationship."

—Blake Eligh

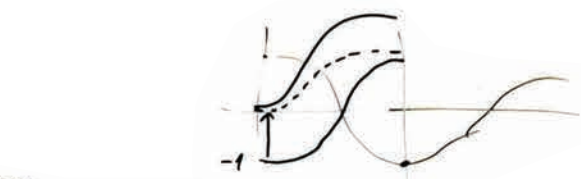


Rise of the machines

From complex surgeries to underwater exploration, UTM's new robotics program is building a research powerhouse

By Andrew Snook  Illustration by Wenting Li



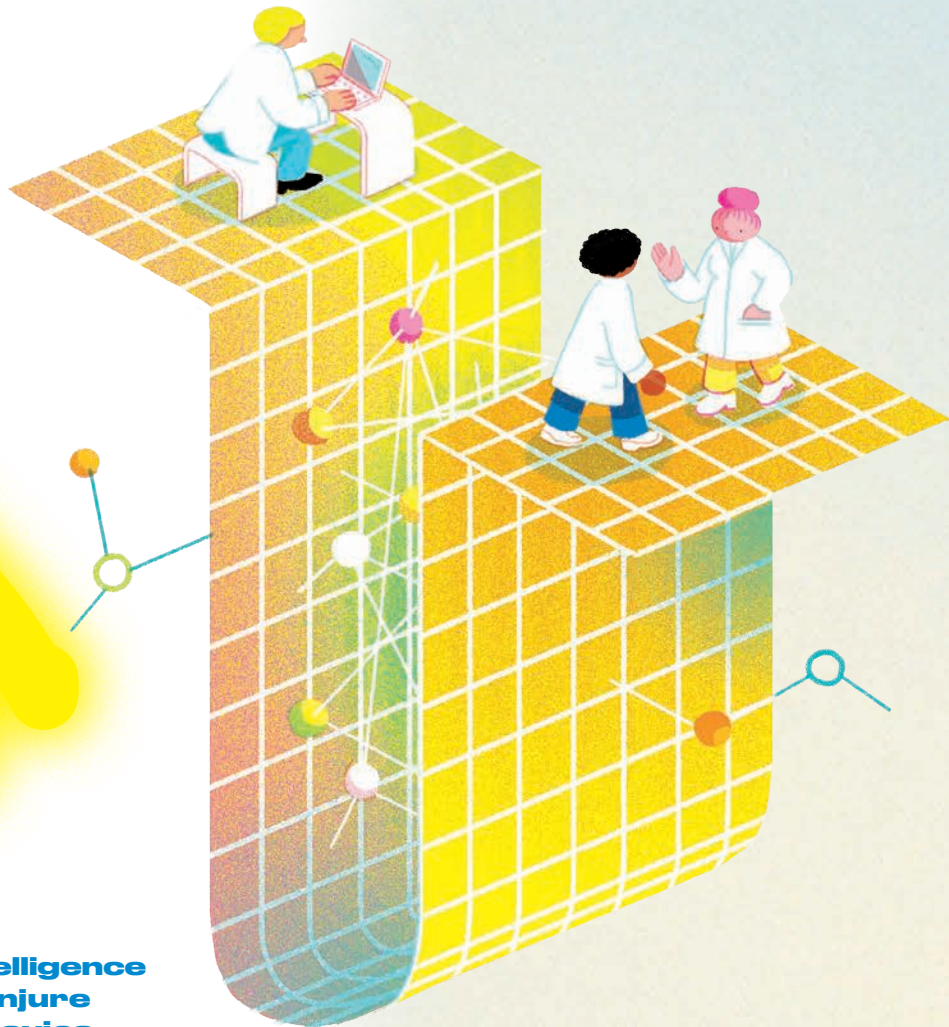


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N



News of advances in artificial intelligence and robotics can sometimes conjure images of over-the-top action movies,

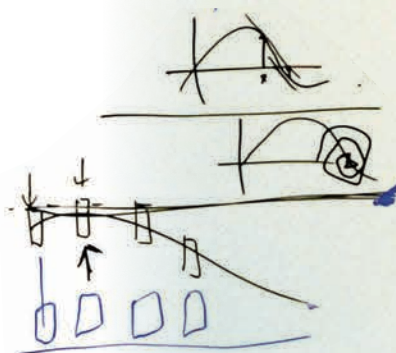
where the war for humanity is being waged against a heartless army of machines. But when it comes to the latest cutting-edge research in robotics, this could not be further from the truth. The University of Toronto Mississauga’s new robotics cluster program is looking to lead the charge in generating world-class research that will help surgeons, researchers and businesses.

To help the program thrive, it has been infused with a significant investment that will be put towards a new building, labs and other resources. The university has hired three professors to build the robotics cluster program from the ground up: **Jessica Burgner-Kahrs**, director of UTM’s Continuum Robotics Laboratory and associate professor in the Department of Mathematical and Computational Sciences, and assistant professors **Animesh Garg** and **Florian Shkurti**. The three professors come together with complementary skills and research interests that will form the foundation of UTM’s robotics program.

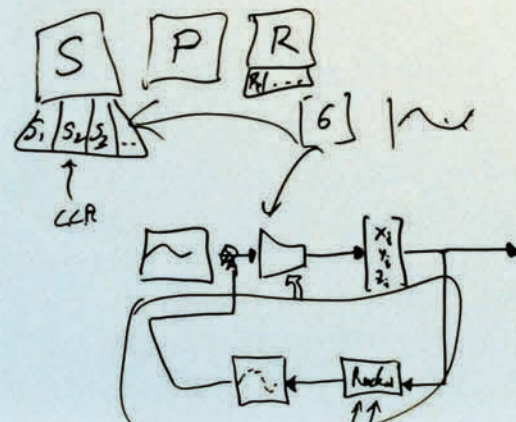
“This is a new initiative between computer science and UTM overall,” says Garg. “The big picture is to build a stronghold of robotics. As a part of this effort, UTM has created new faculty positions, out of which, three have been hired and there will be between five to seven new people for a total of up to 10 people over the next five to seven years.

“It will be one of the biggest robotics programs in this space. They have brought in upwards of \$30 million in building spaces, creating resources to make this a robotics hub.”

“It’s fair to say we’re the most well-funded robotics program in Canada,” Shkurti adds. “I think the support we’ve been receiving so far is just extraordinary – in terms of research priorities, research teaching, administrative priorities and buildings getting built.”



*Gecko-Layer-Jumping
(Electro-adhesion)*



**“I’m stretching
in between
computer
science and
engineering,
trying to bring
those closer
together, so
that we all work
together on
the common
goal of making
robotics help
humanity.”**

$t^*?$
 $t^* = 0.5T_{10}$
 $n=3$
 $C_{a,n}$
 $T_{10} = \frac{3}{2} \frac{V_{max}}{a_{max}}$

**LEADERS
OF TODAY**



**JESSICA
BURGNER-KAHR**
Director UTM Continuum
Robotics Lab

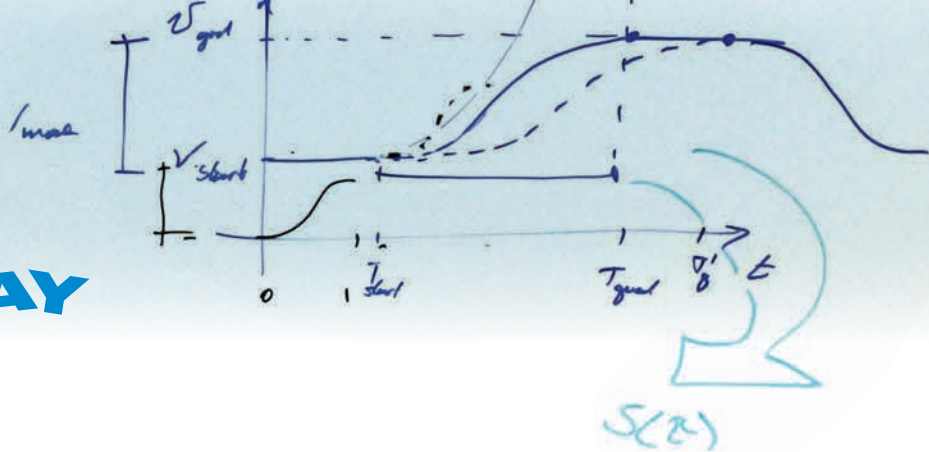


ANIMESH GARG
Assistant Professor
Department of Mathematical and
Computational Sciences



FLORIAN SHKURTI
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LEADING THE WAY



Burgner-Kahrs has travelled a long and impressive journey to get to her new role as director of UTM's Continuum Robotics Laboratory.

Prior to joining UTM, Burgner-Kahrs taught at Leibniz University Hannover in Germany, and previously with Vanderbilt University in Nashville, Tenn. She joined Vanderbilt shortly after earning her PhD in computer science from Karlsruhe Institute of Technology (KIT) in Germany in 2010.

An expert in continuum robotics, her research focus is on the design, modelling, planning and control of robots for applications in hard-to-reach places. She builds and programs extremely small, continuum robots to assist surgeons with non-invasive surgeries, as well as more industrial applications, like the non-destructive inspection of goods.

The surgical applications are close to Burgner-Kahrs' heart. Growing up in a family deeply immersed in the medical industry, she wanted to become a surgeon to help heal people. But after the tragic loss of her uncle due to a brain tumour (and a miscalculation in his treatment), Burgner-Kahrs reconsidered her career path.

"He got radiation therapy and there was an error in the calculation, so the radiation therapy ended up treating just next to the tumour," she explains.

"But that was, to me, eye opening; because I was like, 'Wow, if I ended up working in medicine, an error I make could cause someone's death.' That got me thinking at 17, maybe I should do something else.

"I was always very excited about computers. I got my first computer when I was 14. I learned how to program and I just loved it; so then I figured I'd take computer science with the purpose of helping surgeons and medical personnel do their jobs better."

Burgner-Kahrs enrolled at the Karlsruhe Institute of Technology (KIT) and became a student researcher early in her undergrad, researching the surgical applications for robots.

"I was working with these big robots with these big industrial robot arms in a surgical setting – because that's how it started. We just use what we have and try to fit it into an operating room and try and use it in surgery," she says. "I was putting a laser on such a big robot to cut human bone using laser energy, which was somewhat crazy."

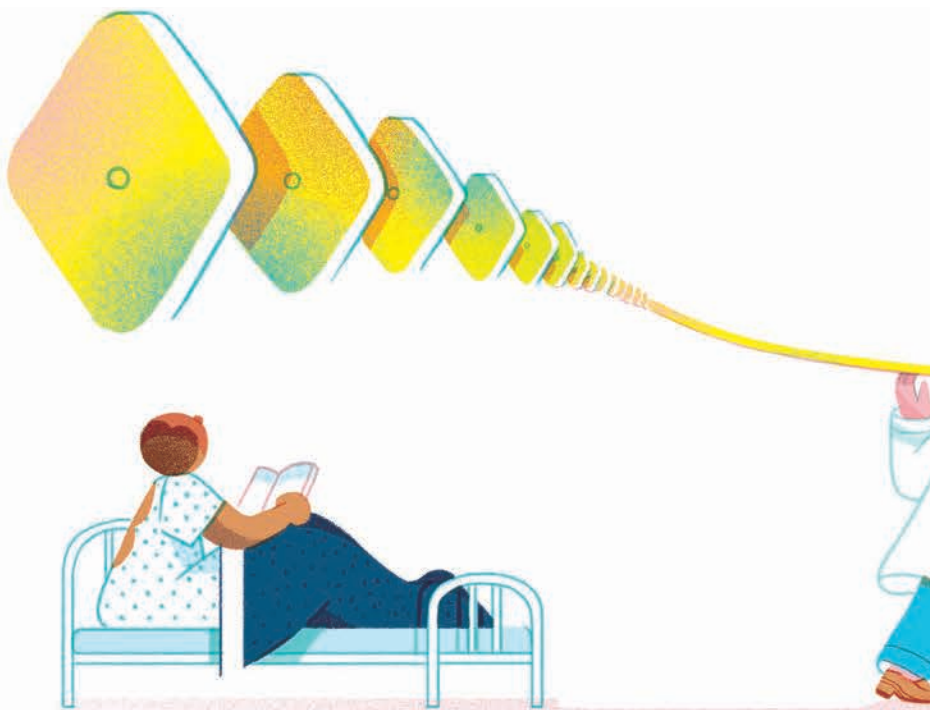
As much as she enjoyed her research, Burgner-Kahrs didn't want to see such large robots working on humans in operating rooms, for fear they could harm the patients. With about a year left before completing her PhD, Burgner-Kahrs sat in on a lecture on continuum robotics research in Vanderbilt University, and it opened her eyes to new possibilities.

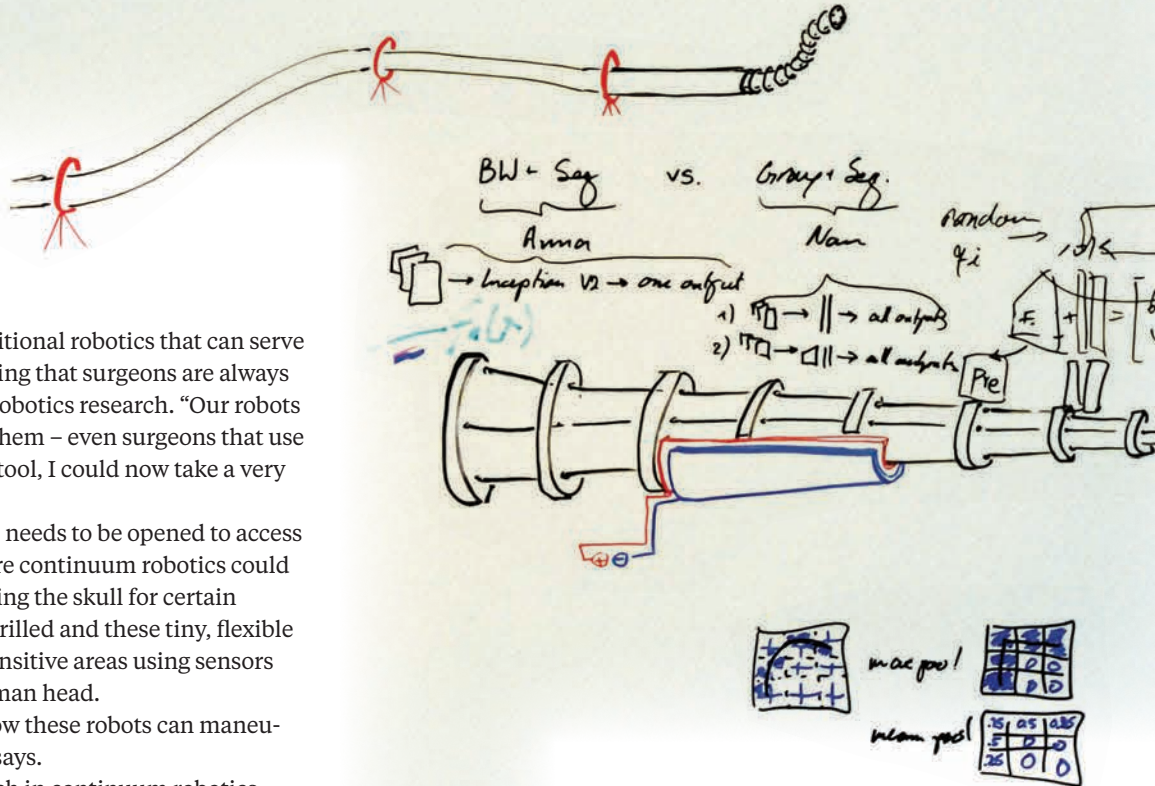
"I saw these tiny little robots and I was like, I want to work on this, this makes so much more sense to me," she recalls.

Burgner-Kahrs immersed herself in the mechanics of continuum robotics, where the mechanical structure is fundamentally different from conventional robots. Inspired by biological elephant trunks, tentacles, tongues and worms, these robots sport a joint-less body that is continuous.

"I learned how to build these robots. I learned about mechanical models, and I got so excited about these small robots that not many people were working on," she says.

She's not the only person excited about the potential for these tiny machines. Doctors currently working with more traditional robots for surgical applications see the potential that continuum robotics holds for parts of the human anatomy that are difficult to treat without invasive measures.





“There’s really no technology in traditional robotics that can serve this problem,” Burgner-Kahrs says, noting that surgeons are always excited when they see her continuum robotics research. “Our robots come in and whenever a surgeon sees them – even surgeons that use this robot – are like, ‘Wow, if I had that tool, I could now take a very different route.’”

Surgical applications where the skull needs to be opened to access hard-to-reach areas of the brain is where continuum robotics could prove to be invaluable. Instead of opening the skull for certain neurosurgeries, a small hole could be drilled and these tiny, flexible robots could be maneuvered around sensitive areas using sensors and cameras to reach deep inside a human head.

“I get all these ideas by just seeing how these robots can maneuver, which is exciting,” Burgner-Kahrs says.

Burgner-Kahrs continued her research in continuum robotics while teaching mechanical engineering in Germany until the opportunity came to run the robotics cluster program at UTM, where her research will likely garner as much attention for its non-destructive inspection applications as it will for its surgical applications.

These tiny robots can be used in industry as well as in medicine. For example, jet engines on an airplane need regular inspections to see if any impacts from birds or stones have affected the blades, which could lead to a mechanical failure. Burgner-Kahrs explains that a technician uses a flexible scope with a camera, going into small boreholes, to inspect the individual turbines. She says the process could be automated so a person doesn’t have to stand below trying to manipulate and maneuver the camera.

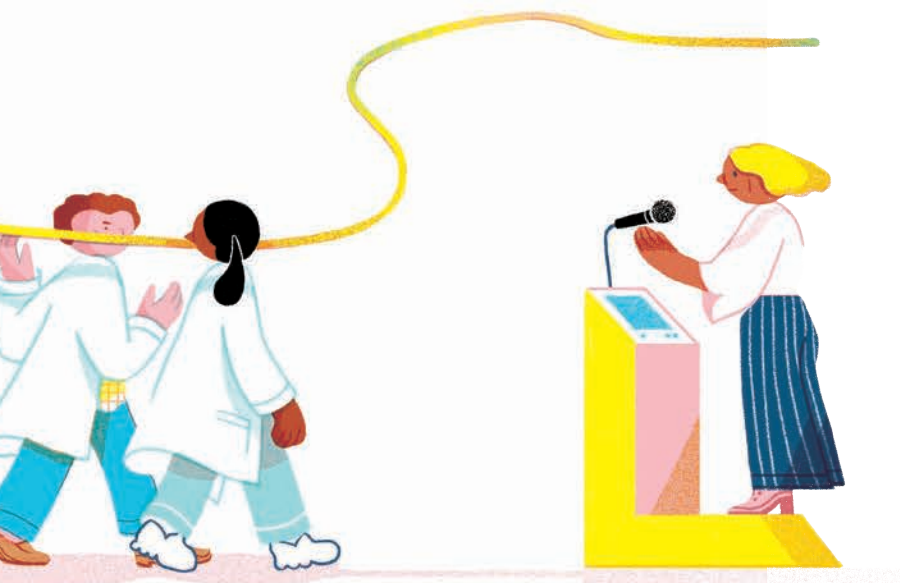
Since obtaining her PhD, Burgner-Kahrs has won the Heinz Maier-Leibnitz Prize (2015); the Lower Saxony Science Award in the Young Researcher category; Young Researcher of the Year 2015 in Germany; and the 2016 Engineering Science Prize awarded by the Berlin-Brandenburg Academy of Sciences.

She was also named one of the Top 40 Under 40 recipients in the Science and Society category in 2015, 2016, and 2017 by business magazine, *Capital*, and was nominated as “Young Global Leader” by the World Economic Forum.

But the awards and accolades that Burgner-Kahrs brings to her new role at UTM aren’t nearly as valuable as her uniquely balanced research experience and wealth of knowledge in both computer science and mechanical engineering.

Building UTM’s robotics cluster is an opportunity for Burgner-Kahrs to bring the two fields together.

“The University of Toronto has all these great roboticists in engineering that I’d love to collaborate with at the Robotics Institute that we just set up last year,” she says. “I’m stretching in between computer science and engineering, trying to bring those closer together, so that we all work together on the common goal of making robotics help humanity.”



“Having robots that can service retail is important. It lets us service people in remote areas much easier, and deliveries are easier. Robots don’t actually eliminate these workers, but remove dull, dirty, dangerous jobs.”



TEACHING ROBOTS TO PROBLEM-SOLVE

One of the biggest challenges when it comes to programming robots is teaching them to solve problems without human intervention. Enter Florian Shkurti's, who focuses on creating methods for enabling robots to learn how to perform reliably in outdoor environments and alongside humans.

Using machine learning, one branch of Shkurti's research is focused on helping marine biologists, oceanographers and ecologists.

"People are starting to use robotics to collect data for specific experiments," he says. "Where I think robotics can make a huge difference is to enable people who don't know how to code, to help them with specific types of data their robots need to collect."

Building predictive models of the physical environment is a key piece of Shkurti's research and will be important for computer science students looking to enter the world of robotics. It is a vital part of programming robots in a safe manner. Think of, for example, a self-driving car.

"In robotics, we worry a lot about the model mismatching in the real world. If you try and optimize for the wrong thing, that will cause accidents. And we tend to think pretty carefully, and modeling them well for these types of situations is where we can provide a type of certainty. Our main job as roboticists is building good models that are safe to deploy in the real world."

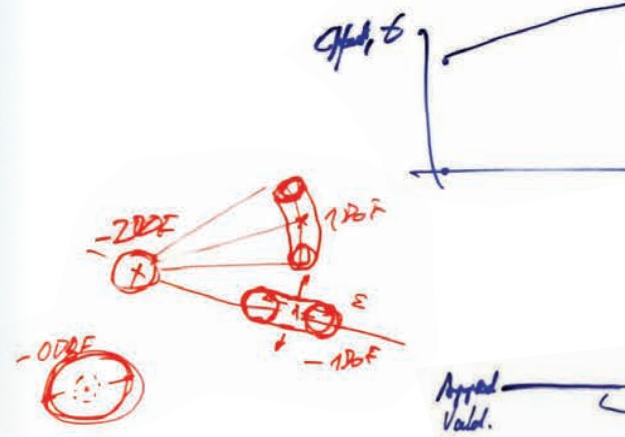
Shkurti views UTM's robotics cluster as an opportunity to build an entirely new program from scratch that will offer a balanced education to robotics students.

"We want to grow it from the bottom up," Shkurti says. "We want our undergrads to have a robotics culture – the ability to tinker with both hardware and software. Go deep and see how things work. Take them apart and explain how they work and why they break. We want to instill that culture early on, so when people graduate, they have strong fundamentals."

Shkurti's colleague, Animesh Garg, develops algorithmic methods to program robots to efficiently learn long-term sequential tasks through generalizable autonomy.

Whether the application lies in a commercial kitchen, on a factory floor or in a surgical ward, the idea is the same: robots doing the heavy lifting so humans can focus on more important tasks. But this is easier said than done. Getting robots to do what appears to be the simplest of tasks can be tricky.

"You can program a robot to open a water bottle, but what happens if the water bottle changes? Or if it's in a different room? What if it's something similar that needs to be screwed off?" Garg asks, adding that programming flexible autonomy is the answer. "Basically, the big picture idea is that we want to be able to learn how to perceive the environment, understand common grounds, then perform these actions without completely learning from scratch. This is an algorithmic ability that we need our robotic systems to have."



His research is currently focused on two applications: surgical robotics – to help surgeons perform complex surgeries – and high impact retail robotics.

"Think of your favourite convenience store around the corner. Think, what if that convenience store was a big vending machine? You can just go in, grab your stuff and go," he says. "Having robots that can service retail is important. It lets us service people in remote areas much easier, and deliveries are easier. Robots don't actually eliminate these workers, but remove dull, dirty, dangerous jobs."

Garg sees great opportunities for UTM's robotics program to partner with industry in Ontario to build a state-of-the-art robotics hub.

"I believe we are at an inflection point where we want to work very closely with companies, especially in Ontario – Google, Walmart, Amazon, for example – to build a consortium of technologies," he says. "By bringing on this new talent – as far as faculty and students go – to UTM in five years, we can build this into a powerhouse of robotics. It will be beneficial both for the community and students. It builds a brand of being able to do cutting-edge stuff that isn't happening anywhere else in North America." ■





UTM child labs forge lasting community connections

Unlocking the mysteries of language development, one game at a time

By John Stewart
Photos by Drew Lesiuczok



Kendra Empey just can't wait when the call comes from "Monsters University."

She may be six-years-old now, but the Grade 1 student's been experiencing university labs since she turned 18 months.

Her favourite study at U of T Mississauga's Child Language and Speech Studies Lab (CLASS) is one she's done for several years in the language development lab directed by associate professor Elizabeth Johnson.

"I taught the monsters (on the computer screen) how to pronounce words," says Kendra proudly.

Kendra's mom Anna explains, "They recorded her voice over several visits saying words with me to the monsters." Spontaneously, mother and daughter happily rhyme off examples: dog, passport, airplane, leash, toothbrush.

"Every time there's a call from UTM, I tell her, 'You got a call back from Monsters University.' She immediately wants to know what she's doing and when she can go."

The Empeys' visits are part of an ongoing study where children's and mother's voices are recorded, then used in multiple research projects.



Elizabeth
Johnson



Johnson was drawn to UTM in 2007 because of the long-standing reputation of the child studies research program, one of the first established in Canada in 1973.

It's a decision she doesn't regret.

"This is the place to do human developmental work because the university and the leadership team really support it."

The research wouldn't flourish, however, without the enthusiasm of mothers like Anna and children like Kendra.

The partnership with the community is a critical element to the success of the psychology department's four developmental science labs, (two in the CCT building and two in Deerfield Hall) which study everything from child development to seniors dealing with hearing loss to interaction with robots.

That partnership has already become multi-generational.

Anna, a 2005 UTM history major, brought her daughter because she enjoyed her own experience so much as a child.

Kendra's grandmother, Helen Andrenacci taught kindergarten for 20 of her 31 years at the Toronto Catholic School Board. One doctoral student who visited Helen's classroom studied twins who were learning two languages at home.

That sparked Helen's pedagogical interest in language and she enrolled her daughter in the lab. Anna returned regularly until she "aged out."

The "monsters" lab has informed several research projects, including a paper Johnson coauthored that brought children and moms back to the lab to listen to previous recordings of their voices. The study found children had difficulty identifying themselves.

Other questions the research broaches: how well can adults recognize children's voices? When do children begin to sound like their parents? When do boys and girls begin speaking differently? What factors predict language skill development?

"My goal is to understand the mysteries of child language acquisition, which is in my mind one of the most remarkable feats achieved by mankind," says Johnson, noting babies begin comprehending simple words like baby and dog as early as six to nine months.

Her work's been able to show that five-month-olds already distinguish between English spoken in North America and Britain.

Other researchers had shown toddlers speak differently to their babysitter than to their preschool teacher. "In my lab we're finding that same pattern of language development across a variety of learning environments, including children exposed just to Canadian English, to multiple versions of English and to more than one language."

While getting her PhD at Johns Hopkins in psychology and brain sciences, the Canada Research Chair worked with birds and babies before concentrating solely on infants.

"Initially, I didn't want to work with babies," she confides. "How scientific can it be? They don't look like they're doing anything. In fact, it's really challenging."

She must find up to 100 four-month-old volunteers per study. The younger they are, the trickier it is to design experiments and collect data. Children can be in the lab 45 minutes for a two-minute test.

The key is making it fun.

"It can be frustrating if they're having a bad day," says Johnson, who is also a mother of two. "You need a different skill set. You have to think from a baby's perspective and be creative and patient."





Johnson's on a mission to help the UTM community, and the broader one, appreciate the critical function of campus labs.

By demarcating language development milestones, the lab provides building blocks for a variety of other improvements in children's lives, such as better screening to identify those who are delayed in reaching milestones, optimizing early childhood education, teaching ESL more effectively and improving speech therapy.

"Our labs specialize in whole lifespan development and working with the community," Johnson says.

It helps that UTM is surrounded by a city with one of the most linguistically and culturally diverse populations in the world.

Keeping parents and children coming back is a critical factor in that link. The labs work hard at maintaining the connection.

Free designated parking spots, Saturday hours, Jr. Scientist T-shirts and onesies, mini-graduations with child-sized caps and gowns, Teddy bears, brightly-painted reception rooms where monkeys cavort across splashy wall murals – not to mention a life-sized stuffed monkey to cuddle with – all add to the allure.

Another lab baby of yesteryear, who currently brings her daughter back to the program, only faintly remembers the experiments but clearly remembers one indelible memento.

"I got a T-shirt that said 'Class of 2000,'" says Beth Hughes, 44, who took part from 18 months until she was six or seven. "I wore that T-shirt until I was five. That was a big memory. When I was a kid I loved the experience."

Hughes' late mother Margaret ensured her daughters had a chance she was denied. "My Mom wasn't able to go to college or university, so she had us contributing" at the lab.

When Hughes took her own maternity leave her participation was "a way to get out of the house, where you're really isolated, while making a contribution to science."

Parental newsletters explaining the purpose and results of labs reinforce her belief in their value. "When I see the impact, it makes me feel so proud to be part of the program."

Johnson wants more alumni, staff and residents exposed to the opportunity.

The research questions she ponders are endless: How do children learn language so rapidly? How are languages so similar, yet so different? Why is human language so much more powerful and creative than other animals? Where does language come from?

"In a way, studying language is my way of studying what makes us human," Johnson says. "I see language acquisition as one of the greatest mysteries of the world." ■



Tina Malti

Transforming research into quick solutions

When you make a breakthrough that could change people's lives, you want it applied tomorrow.

One of the frustrations of researchers who spend extraordinary time and effort learning how to do something better is not seeing the knowledge practically applied in the real world until much later, if ever.

For Tina Malti, UTM psychology professor and founding director of the Laboratory for Social-Emotional Development, the delay between research and policy implementation is especially irksome because she often deals with children and adolescents in mental health crisis.

Malti's lab, which she's been running for 10 years, studies children's emotional and social development. Her work studying empathy in the young - including testing interventions that nurture kindness and reduce effects of exposure to family violence - has drawn widespread press, and praise, beyond Canada's borders.

"There's a huge gap between what we know as researchers and how mental health services are delivered," says Malti, a registered clinical psychologist cross-appointed to U of T's psychiatry department.

On June 1, UTM will take a large step to remedying that gap with the official launch of The Centre for Child Development, Mental Health and Policy, which Malti will lead.

The aim of the centre is nothing less than, "to become a global leader in multiple-disciplinary child development that looks at children in a holistic sense, combining education, medicine, sociology, biology and public health."

The involvement of multiple disciplines can help close the research/policy gap.

Hospitals, Peel Children's Centre and other front-line services, with whom the lab already works, will be directly involved.

"Service deliverers need to collaborate with researchers to create the next generation of services," says Malti. "We're going to improve outcomes by creating tight links to cutting-edge research knowledge."

The centre will develop and test that knowledge and, ideally, help shape government policy in Peel, Ontario and Canada.

It will provide specialized training in a unique environment for service providers and 40 students.

The community is also a critical collaborator.

"Many people just don't know what's already available," says Malti, who is also president-elect of the International Society for the Study of Behavioural Development.

The centre will hold information nights and develop advisory groups, "so we can learn from the community."

Malti's academic interests may have been spurred by having a "very kind" father herself. "I think I research empathy and kindness because it's such a positive in children's lives."

Often it takes just one caring individual to make a difference.

The professor learned that in Boston while studying high risk youth without parental support. When her research team asked, "What made the most difference to you in the past year?" the answer surprised her.

"They overwhelmingly said it was the fact that you were here for me for an hour, twice-a-week, to listen. They just needed a reliable figure in their lives.

I felt as if I'd adopted 100 kids."



How our campus evolved into an academic hotspot and community engine, and what's on the horizon

By Sharon Aschaeik

When it comes to the University of Toronto Mississauga's development, the numbers alone point to a campus on the rise. In 1967, UTM began as a U of T college with a single academic building that accommodated 155 students. Today, the campus houses 29 buildings, and has 15,500 students. UTM has become a leading post-secondary player in Canada and worldwide for those seeking to be part of a high-calibre academic environment with a strong community spirit and serene natural setting.

On the immediate horizon is a new Science Building that will house 31 laboratories, 16 of which will be for the Centre for Medicinal Chemistry. Other building occupants will include the forensic sciences program and a high-performance computing data centre, and the building will complement UTM's plans for accelerated faculty hiring and graduate student recruitment.

The campus has grown at a steady clip over more than 50 years, with UTM principals pursuing expansion carefully to respect the surrounding nature and neighbourhoods. This emphasis on controlled growth has translated into buildings that house multiple academic programs.

"There is lots of interdisciplinary work happening at UTM," says Professor Ian Orchard, acting vice-president and principal. "When you have fewer silos, you have more collisions between disciplines, and people begin to appreciate other disciplines more. This has made UTM a campus of choice to study and work."

UTM has evolved into a robust academic institution that today encompasses 17 academic units offering 155 programs in 95 areas of study. The virtuous cycle of growth, with rising undergraduate enrolment spurring UTM development, was amplified in 2003, when the campus faced a surge in applications from a double cohort of high school graduates following the end of Grade 13.

UTM accelerated its development, with a continued commitment to sustainability. Since 2006, all large academic and research buildings have been built to LEED silver minimum standards; the campus currently has two LEED golds.

"UTM takes a very sustainable approach to development because we want to be in harmony with the surroundings. Maintaining the natural look and feel of our campus, the flora and

fauna—it's key," says Tammy Cook, executive director of Facilities Management & Planning.

Sustainability has been a priority in step with innovation and modernization, as UTM ensures its new spaces are visually striking and highly functional. This has led to numerous buildings with designs that are both architecturally forward-thinking and award-winning, while also supporting best practices in teaching, learning and research.

UTM's newest addition, Maanjiwe nendamowinan, is not only functional, sustainable and attractive, it also reflects a fourth priority: reconciliation with local Indigenous communities. The name of the building, which means "gathering of minds" in Anishinaabemowin, was provided by the Mississaugas of the Credit First Nation.

Just as the campus values and facilitates interconnected education, it did not develop in a silo. UTM and Mississauga grew up together, partnering on multiple initiatives to benefit their overlapping constituents. UTM's connections with the broader region extends to community agencies, businesses, emergency services and even Sheridan College, with which UTM has shared programs. Each year, UTM contributes more than \$1.3 billion to the local economy.

"We work closely on many important initiatives with the city," says Saher Fazilat, chief administrative officer. "From health, culture and community safety to academic research and volunteer touchpoints, we share an unrivalled partnership with the City of Mississauga."

In the third decade of the 21st century, UTM is adjusting its approach to development. Undergraduate enrolment will remain at a steady state for the next several years while graduate studies will expand. More spaces are needed to conduct advanced research in the sciences, social sciences, and humanities, and to accommodate students wanting to live on campus.

UTM is pursuing \$274.5 million in capital construction projects, with an emphasis on a balanced approach to growth through smarter planning and more effective use of resources.

"Our supply of buildable land is limited," says Fazilat. "So, we're building responsibly with sustainability as a guiding principle. We want to ensure we offer our community innovative teaching and research facilities where they can succeed and excel." **M**



▲
1885

**Lislehurst
—
Principal's
Residence**

Purchased by U of T in the mid-1960s to create the new Erindale College campus

1880

1890



▲
1890

**Crime Scene
House**

U of T acquired the cottage in 1963

1900

1910

1920

1930

1940

1950

1960

1970

1980



1967

North Building

Erindale College officially opened, under Principal D. Carlton Williams, with one "preliminary" building, two tennis courts and 155 students. Expected to be temporary, the building was used until 2016 when it was demolished to make way for a new building.



1971

**South Building
—
William G. Davis Building**

The South Building was renamed the William G. Davis Building in 2012 for the former Ontario premier, who, as provincial education minister in 1970, turned the sod for the groundbreaking of the same building.

1973

Schreiberwood Residence

Erindale College pioneered a new style of university residence with its first townhouse community of 250 beds in four- and six-person configurations.



1922

Alumni House

Purchased by U of T in 2005

1967

Paleomagnetism Laboratory

Decommissioned April 2019

1967

Geomorphology Lab

1968

Central Utilities Plant



1968

Erindale Studio Theatre



1974

**Erindale Academic Plaza
—
Crossroads Building**

Initially intended as a retail space, the building housed classrooms and offices for faculty and student groups. It was located where the Student Centre now stands.

1976

McLuhan Court Residence

1983

Putnam Place Residence

1986

Leacock Lane Residence

1989

MaGrath Valley Residence



▲
1992

Kaneff Centre

1998

**Roy Ivor Hall
Residence**

1990

1999

Student Centre

UTM students
contributed a
landmark \$1 million to
the centre's campaign



2000



▲
2003

**Communication,
Culture and
Technology
Building**

2003

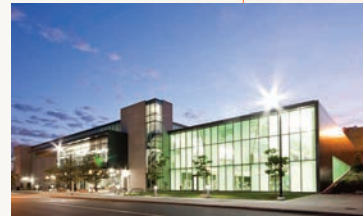
**Erindale Hall
Residence**



▲
2006

**Oscar Peterson
Hall**

Built on the site of the
old Colman House, this
residence building is now
a focal point for students
living on campus



▲
2007

**Recreation,
Athletics and
Wellness Centre**

2007

**Hazel McCallion
Academic
Learning Centre
—
UTM library**



2008

**Early Learning
Child Care Centre**

2008

**Parking Lot 8
deck**

2010

Academic Annex

Replaced Thomas Cottage

2011

Instructional Centre

2011

Grounds Building

Where the Geomorphology Lab once stood

2013

Deerfield Hall

The name Deerfield Hall reflects UTM's natural setting and its reputation for growing sustainably.



Coming Soon

New Science Building

Construction expected to start in 2020

2015

Research Greenhouse

2016

Parking Lot 4 Deck

2010

2011

Terrence Donnelly Health Sciences Complex

Houses the Mississauga Academy of Medicine



2014

Innovation Complex

Expansion of the Kaneff Centre



2018

Maanjiwe Nendamowinan

Referred to as the New North Building until it was renamed "gathering of minds" in Anishinaabemowin, MN replaced the North Building.



Spark

EXAMINING TREATMENT OPTIONS FOR DEADLY DISEASE

Biology professor gets funding boost to develop new ways to test rare muscle disorder



University of Toronto Mississauga (UTM) biology professor Bryan Stewart is teaming up with a colleague to tackle a fatal pediatric disease.

Stewart and U of T Assistant Professor Penney Gilbert are growing tiny muscles in an effort to help those with Duchenne Muscular Dystrophy. Their project recently got a \$459,000 boost via a Canadian Institutes of Health Research grant.

Until now, their research has been unfunded and, as Stewart explains, they've been "scraping together bits and pieces to get it going."

Duchenne Muscular Dystrophy, or DMD, is a genetic disease that usually affects boys. The progressive neurological disorder weakens muscles in the entire body. Over time, children with DMD will develop problems walking and eventually the muscles used for breathing and the heart will give out, Stewart explains, adding those with DMD don't typically live past their early 30s.

"It's a very bad disease because everyone dies," he says. "There's no cure."

DMD tends to affect boys because it is what's known as an X-linked gene, which means the mutation that causes the disease is carried on the X chromosome, Stewart explains. Males only have one X chromosome, which they receive from their mother. If that chromosome carries the gene mutation, "it's the only X chromosome the son has so he has the disease," Stewart continues. Females, meanwhile, have two X chromosomes and would need to carry the mutation on both to have DMD. While females are carriers, it's rare for them to have the disease.

"The underlying causes of DMD are very well known," Stewart says. "(But) there's really no good treatments."

Describing himself as a "new entry into the DMD field," Stewart explains his background is in neurobiology, studying physiology, neurons, muscles and how they work.

"My whole research program is how the neurons function and they develop," he says. "Until this point, all my research has been on fruit flies. There are good reasons for that. Practical reasons. Scientific

reasons. And that's the system I chose to work with a long time ago."

His collaborator, Gilbert, specializes in muscle and stem cell biology. Her research program is designed around understanding tissue engineering and using muscle stem cells to grow muscles.

"We have this complementary expertise," Stewart says, noting they met about five years ago and discovered their research interests were aligned, deciding "let's give it a shot."

According to Stewart, until now, there hasn't been an effective way to study the basic biology of DMD, in part because it's a human disease and you "can't just go and do experiments on people."

Stewart and Gilbert are creating a way to study that basic biology and test treatment options. Using techniques developed by Gilbert's lab, and with the help of PhD student Christine Nguyen, they are using stem cells to grow tissue that looks and behaves like a muscle.

"It's basically a miniature muscle," Stewart says. "By studying the tissue in a 3D culture system, I think it's a much better mimic or model of a real muscle. And now that we've done that, we're at this state where we can ask questions."

The goal of the project is to determine the effects of the mutation on the neuromuscular structure and how the basic physiology of the system is understood.

"We feel there is sufficient lack of evidence there," Stewart says. "Once we have that and characterize that system, we can test existing therapeutics to improve the function."

Taking off-the-shelf compounds already approved for other cases, Stewart and Gilbert are looking to find treatments that could alleviate any of the problems that are detected in Duchenne's tissue.

Stewart cautions that their goal is not to come up with a prescriptive therapy or drug regimen, but is instead intended to fill in information about how DMD works, which could lead to an overall strategy to treat the disease.

"There's a lot of literature about what they think is going on in the cells, so we can test all this now," Stewart says. "We think there's a sufficient gap in our knowledge that it's worthwhile to check these things." —**Patricia Lonergan**

HOT, UNPREDICTABLE AND DEADLY

From the edge of volcanoes to the front of the lecture hall, UTM volcanologist brings real world learning to the classroom

Something unexpected is happening at U of T Mississauga.

The ground has started to rumble with increasing frequency, shaking buildings, rattling desks and leading to mounting concern and confusion.

Is the unsuspecting campus perched atop a concealed volcano?

That's a question students in a new fourth-year volcanology class slated to start next year may have to contend with as part of a mock scenario. While a volcano secretly hiding beneath UTM is geologically impossible, says UTM Assistant Professor Paul Ashwell, the emergency exercise will give students a taste of what it's like to work behind the scenes during a potential volcanic crisis.

That means determining what's happening geologically, communicating information to the public, battling misinformation and deciding when and where to evacuate people. Some of the decisions will have to be made with little available data, just like the real world, says Ashwell, a volcanologist with the Department of Chemical and Physical Sciences.

He should know. Ashwell's research has focused on better understanding nature's hot, deadly and unpredictable volcanoes in an effort to help others plan and prepare for eruptions.

While completing his PhD, he studied lava domes, which are created by thicker lava that can't flow away from the vents. He explains the lava builds up, sometimes creating spires that tower hundreds of feet. These unstable domes act like a cork, and any collapse can lead to an explosive release of trapped gases.

"It happens almost instantaneously," Ashwell says. "The gas expands rapidly and the only place it can expand is up the mountain, and it does so explosively."

The unpredictable nature of lava domes necessitates the creation of no-go zones around volcanoes that develop them, forcing people to abandon their homes for years, if not decades.

A better understanding of lava domes could give people affected by them much-needed information to plan for the future.

Working toward filling the knowledge gaps, Ashwell studied one of New Zealand's ancient volcanoes, Tarawera. An eruption about 130 years ago cut through the lava dome, exposing the interior and allowing Ashwell to get in and examine the structure. He found that, during a collapse, the middle of the dome was exposed, and the area depressurized enough to puff up like popcorn and fill in the dome, hiding the collapse scars. That's noteworthy, Ashwell indicates, because it could lead some to think that there are no collapse scars so there is no risk of collapse, but in fact they have to look at the dome carefully.



Ashwell says he feels his research just scratched the surface. "At the moment, we have complete uncertainty."

Now, he is taking his experience and the uncertainty inherent in volcanology into the classroom, where students will not only learn about volcanoes, but also respond to a simulated crisis with the goal of protecting vulnerable populations.

It is just one of the real-world experiences being brought to the classroom as Ashwell expands UTM's fieldwork program. He has also developed a second-year course that will take students into the field in Ontario, and has introduced a fourth-year class where students will visit the Rockies to practice their geological skills.

"(Fieldwork) cemented my love of geology," Ashwell says. "You're doing something. You're putting the stuff you learned in the lecture into practice." —**Patricia Lonergan**

Spark



DIGGING FOR KNOWLEDGE

UTM archeologist studies how we shaped the technologies that also shaped us

Digging into the past – oftentimes quite literally – U of T Mississauga archeologist Liye Xie pieces together how ancient technological adaptations have underwritten almost all aspects of human life.

“We make technology, but technology also makes us,” Xie explains. “We’re technological species.”

Indeed, technology is all around us, having become integrated into our daily lives. When we think of technology, we often think of today’s digital tools, yet technology encompasses so much more. It’s the pencil we write with, the rake we use to clear our lawn or the spoon we use to eat.

Going deeper in time, technology can be something as simple as controlled fire.

“Technology to me, because of the time period I’m dealing with, is the sum of knowledge, techniques and skills that people employ to overcome challenges to reach a specific goal in the material world,” Xie says.

She developed an interest in ancient technology almost by accident. In graduate school she was at a dig in China expecting to see a lot of fascinating artifacts because the area was likely the site of the first legendary dynasty in China. Instead, what she found was mostly broken tools used by everyday individuals.

Seeing these day-to-day items, Xie started asking questions. What were the tools used for, who produced them, who lived here, who dealt with the daily work for elites? It prompted her to study ancient technologies to better understand the people who used them and their relationships.

“What I’m most excited about is pre-industrial urban construction technologies,” says Xie, who is currently focused on large Neolithic earthworks in the Lower Yangzi Basin and Middle Yellow River Valley.

The single most important construction technology in Chinese history is rammed earth, Xie says, which involves compacting a damp soil mixture into a frame. This technique was used to build modest dwellings, palaces, tombs, temples, and even parts of the Great Wall of China.

The underlying social connections associated with bringing people together to work at these ancient construction sites is what most interests Xie.



“Once you bring people together to do something together, you can reshape the relationship between subjects and between subjects and leaders,” Xie says. “Technology is applied to resolve a physical need to build some stuff, but in the meantime, what technology we use and how we use it can reshape human relationships and human’s relation to the environment.”

In the later Shang Dynasty, leaders moved their capitals, necessitating the construction of new political centres. Xie theorizes this allowed late Shang rulers to reshape society. Moving people away from where they lived, even determining who got to move, and putting them together to work, could have been a way to reform the political structure.

“It’s a hypothesis,” Xie stresses, adding there must have been some benefit to overcome the costs of moving a political centre.

Before diving into her study of ancient urban construction, Xie examined shovels made from the shoulder of wild water buffalos by a community in the lower Yangzi, going so far as to replicate them using bones from a cow to get a sense of how and why they were made. She says she discovered the shovels were made using bones from older water buffalos, which were thicker and sturdier. That significantly narrowed the material available.

Xie concluded they used older water buffalos because it was part of their social identity and they didn’t question it, which ultimately constrained their choices.

Understanding the underlying social and political relationship with technologies from the past helps provide insight into today’s world, where we still use tools to resolve daily challenges.

“Our plans and understanding of the world are always structured by the technologies we have,” Xie says, noting we are born into a world where the technology we create can reshape our relationship with others and with the material world. —**Patricia Lonergan**

Class Notes



Danielle Gonsalves

Co-Founder & Social Media Manager



Rashaad Ishmail

Co-Founder and Web Developer

Sharing student stories

Driven by a desire to create a platform for young people to find inspiration and motivation through individual experiences, UTM's Danielle Gonsalves and her friend Rashaad Ishmail (Wilfrid Laurier University) co-founded eyesofourlives.ca, a blog focused on student life.

The duo, who first met in Grade 10, originally covered typical characteristics of student life, including how to choose a major, stress management techniques and memorization tips. The two soon realized they wanted to expand their content to encompass all aspects of what it means to be a student and help parents become more active in their child's academic life.

"In doing so, Eyes of our Lives has become a more accurate representation of our lives as balancing both leisure and hard work," says Gonsalves, who is pursuing a bachelor of arts with a double major in English and criminology, law and society.

The blog includes sections on holidays, tourism, student life and sports, the latter being Ishmail's passion. All content is told from a student perspective. With their individual academic and personal goals, the two share what they have learned and what drives them as individuals, with a goal of fostering that same ambition and eagerness to learn in others.

The blog has been live since mid-December. The co-founders intend to incorporate more university-based content and hope to share their experiences of studying abroad when they embark on a planned exchange program to Paris, France in a few years.

Ishmail, who studies business administration, says he hopes visitors to the blog will be inspired by their stories.

Challenging norms through art

Anishinaabe artist and curator

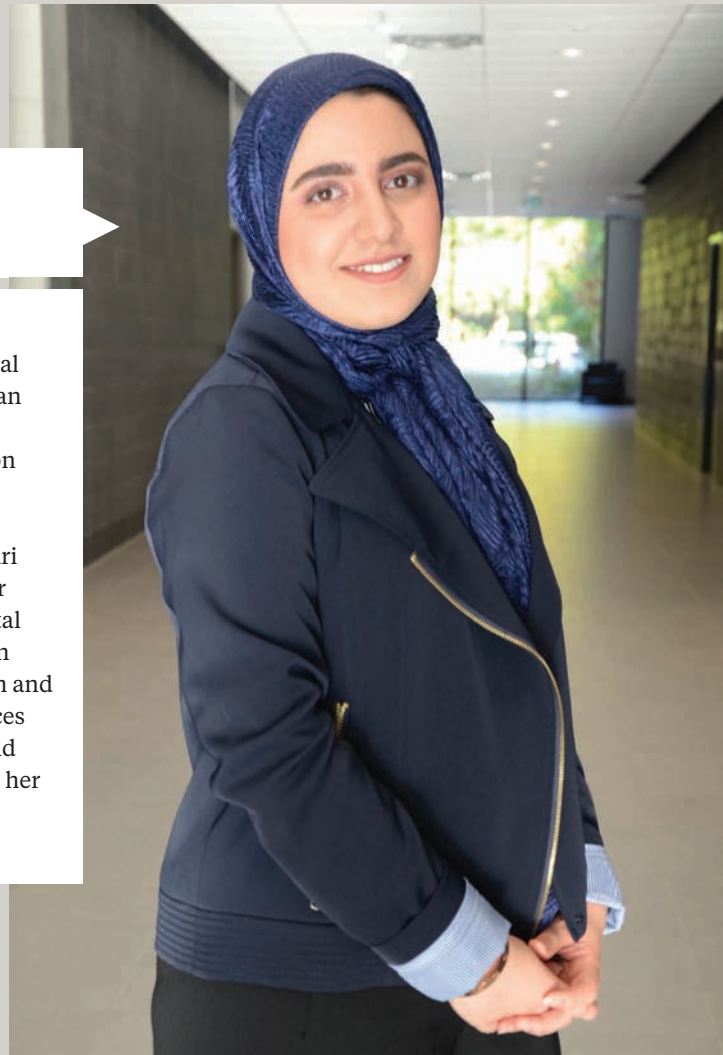
Cathie Jamieson (BA 2014) uses art to focus on narratives of identity and intergenerational connectivity. She studied art and art history at the University of Toronto Mississauga in a joint program with Sheridan College. Since graduating, she's been elected band councillor of the Mississaugas of the Credit First Nation reserve near Hagersville, Ont. and has created several exhibits including one at the Art Gallery of Ontario. Most recently, she had an exhibit in New York state at the Hartwick College Yager Museum of Art and Culture entitled *dadibaajimo: Two Mississauga Artists Share Stories*. Jamieson's work focuses on balancing the natural law of the environment and human law and challenging structural norms.



IN MEMORIAM 1998-2020

Creative, hardworking student

University of Toronto Mississauga fourth-year biology student Zeynab Asadi Lari was among those on the Ukrainian International Airlines flight that crashed in Iran on Jan. 8, 2020. Remembered as an accomplished young leader and mentor, Asadi Lari was enrolled in biology for health studies with minors in biomedical communication and sociology. She was also the founder and president of the UTM branch of STEM Fellowship, a student-run non-profit organization that strives to engage future STEM leaders and innovators. Asadi Lari is described as a creative, hardworking and committed young leader who was a fierce advocate for mental health. She served as the mental health network coordinator for the Youth Mental Health Association and was a youth member at Young Canadians Roundtable on Health and an executive board member at the Iran University of Medical Sciences Medical Student Association. She previously interned with the World Health Organization. Asadi Lari was travelling back to Toronto with her brother, Mohammad, a student at U of T's Faculty of Medicine.



Creating a space for everyone

U of T Mississauga alumnus and lawyer Hani Al-Dajane (BBA 2014) believes the world is diverse, but the narratives aren't. It's why he started Yalla! Let's Talk, a platform designed to tackle issues faced by people identifying with Arab culture. It's a welcoming and open space for everyone, and participants can engage online or physically in conferences, symposiums and café talks. Al-Dajane runs his own law firm in Toronto after graduating from UTM with a BBA in 2014, earning his Master's in industrial relations at the St. George campus, and his law degree at the University of Ottawa. He describes his platform as "TEDx with a cultural twist."

Vault

Art on campus. “Zero Centre,” a steel structure seen in the background, was designed by artist Leonhard Oesterle for the Erindale outdoor art exhibit in 1968. The artwork remained on loan to the college and sat outside the North Building along the 5-minute walk until 2001. Over the years, students have referred to the structure by many names, including the CIBC logo, the Green Goliath and the Erindale Enigma.

1968



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