



Carleton  
UNIVERSITY

WINTER 2020 | ISSUE NO. 1

# RAVEN

The New Carleton U

## WHY WE'RE HERE

CARLETON AND  
THE PROMISE  
OF CANADA

*Zahraa Al-Ahmad*

Master's student, refugee researcher

01 ELEVEN WAYS  
TO LOOK  
AT WATER

02 CHEMISTRY,  
PERCEPTION AND  
THE OPIOID CRISIS

03 TOOLS FOR  
TACKLING  
CLIMATE CHANGE

Before coming to Carleton as a graduate student, Akintunde Akinleye was a photographer with Reuters in his native Nigeria, helping people understand the country through powerful images such as this World Press Photo prize-winning shot of a man rinsing soot from his face after a deadly pipeline explosion on the outskirts of Lagos

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MESSAGE FROM  
THE PRESIDENT

Spreading  
Our Wings

Welcome to the first issue of *Raven*, a new showcase for the important and inspiring work we do at Carleton.

With nearly 32,000 students in a city that matters — our national capital, Ottawa — we are a large and impactful place. Traditionally, Carleton has also been a humble university, reluctant to tell our story and promote our work. As a consequence, perceptions of Carleton lag behind reality. This beautiful magazine is a step toward bridging that gap, a celebration of our sense of purpose and powerful momentum.

In the pages that follow, you will read about members of the Carleton community who are working to improve energy efficiency, share Indigenous stories, support refugees, advocate for health and wellness, safeguard our water and wildlife, alleviate the opioid crisis and much, much more. In many of these articles, students, professors and alumni are speaking directly to you in either first-person or as-told-to format. We wanted their voices to be front and centre in the inaugural issue of *Raven*. They make our university great, and this is their magazine.

In today's era of digital overload and fake news, launching a print publication is an act of countercultural resistance. It carries the insistence that these words and pictures are real, meaningful and lasting — that these stories *matter*. Reading this issue, I was struck by the sense of resilience, purpose and gratitude it conveys. We invite you, friends and kindred spirits — busy people with challenging lives and careers who are striving toward a better world — to join us on this collective journey.

**Benoit-Antoine Bacon**  
President and Vice-Chancellor

RAVEN

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**PRESIDENT:**  
Benoit-Antoine Bacon  
**DIRECTOR, UNIVERSITY COMMUNICATIONS:**  
Don Cumming  
**MANAGER, PUBLIC AFFAIRS:**  
Beth Gorham

**EDITOR:** Dan Rubinstein  
**ART DIRECTOR:** Mario Scaffardi  
**DIGITAL:** Chris Cline, Jesse Plunkett

**COPY EDITOR:** Ellen Tsapraillis

**CONTRIBUTORS:** Akintunde Akinleye, Meredith Boerchers, Tyrone Burke, Barbara Dumont-Hill, Sarah Everts, Lisa Gregoire, Brian Johnson, Adenieke Lewis-Gibbs, Martin Lipman, David Lochead, Kara Louttit, Joseph Mathieu, David McGuffin, Kagiso Lesego Molohe, Robert Proulx, Chris Roussakis, Michael Runtz, Janice Schroeder, Rémi Thériault, Fangliang Xu, Sarah Zutrauen

**ON THE COVER:**  
Political science master's student Zahraa Al-Ahmad, whose research is exploring the challenges faced by Syrian refugees in Lebanon, photographed by Rémi Thériault in Ottawa on Nov. 19, 2019. Thériault also took the photo of film studies master's student and novelist Kagiso Lesego Molohe that appears on the back cover.

**YOUR INPUT IS IMPORTANT**  
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Carleton University acknowledges the location of its campus on the traditional, unceded territories of the Algonquin nation.

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ICON

PHOTOGRAPHS BY  
**MICHAEL RUNTZ**

FOREVERMORE

In the inaugural issue of *Raven*, four members of the Carleton community share their perspectives on the clever, co-operative and deeply symbolic namesake bird of both this magazine and the university's varsity sports teams



Ravens are regularly seen (and heard) on the Carleton campus



# SHAPESHIFTING

BY BARBARA DUMONT-HILL

In 1997, my husband and I were sitting on a bench in Banff and this huge raven — the biggest I’ve ever seen — walked towards us. He had a limp and I could imagine that he was using a cane. He stood right in front of me, looked me in the eye and started to speak. He moved around and circled sometimes, but he went on and on for about 10 minutes. When birds give me a message, I tell them, “There was a time when our people understood the language of the birds, but I don’t understand you.” But he kept talking and finally he came up very close to my feet and then turned and hobbled away.

Around 10 years ago, going to a grocery store in Ottawa, my husband and I had just gotten out of our car and a raven landed in front of me. It was like he didn’t want me to walk past. He was a young raven, but it brought me back to the time in Banff when that old raven had a message for me. Back in 1997, I had a hard time having a conversation with anybody. I knew so little about who I was. But then my life started to change, and I believe that old raven began the shapeshifting. I inherited some of its spirit. When the young raven came to me, his message was that it was the beginning of me having a voice.

That’s what raven does. That’s the magic that it can instill. I had always been ashamed of who I was. Now I’m proud. And I think part of the transformation was raven taking me out of the darkness and bringing me into the light.

I speak to students all the time and tell them I never went to university, but they have the opportunity at Carleton to learn and create change. I don’t have special powers. I just listen to people and give them a hug if they want me to. Often, when I hug people, I can tell that they’re hurting, and I ask them to let me take their hurt, and we hug as long as they need to. Often, students need a raven to help begin the shapeshifting in their lives.

Our people used to listen to animals. Everything had a message and everything was important. Today, there are a lot of messages that we ignore. The animals are telling us, “When we have all disappeared, you too will disappear.” But we are not listening. And we don’t listen to one another or to the Earth, either. We need to be aware that everything has messages, and that we all have the ability to create change.

*Barbara Dumont-Hill is a knowledge keeper at Carleton’s Ojigkwanong Centre, a member of the university’s Indigenous Strategic Initiatives Committee and a grandmother from the Kitigan Zibi Anishinabeg First Nation.*

# PARAGON OF THE AIR

BY MICHAEL RUNTZ

When I was a young birder in the Ottawa Valley, common ravens were anything but common, and in fact were so rare that a winter sighting would create great excitement. A widespread poisoning program to eliminate wolves was reportedly one of the reasons for their rarity because they regularly scavenge large wolf-killed animals. Today, ravens have become what their name suggests and are regularly seen (and heard) on the Carleton campus. The sight of two of these huge crows-on-steroids landing on top of the Nesbitt Biology Building during a snowstorm on one of my weekly bird walks is a memory not soon forgotten.

ITS DEEP, SONOROUS  
PENETRATING VOICE DEMANDS  
IMMEDIATE ATTENTION AND  
RESPECT, EVEN THOUGH WE  
HAVE LITTLE OR NO IDEA  
WHAT IT SAYS.

Ravens are extremely intelligent birds that, because of their loud screams and squawks, allow me to find wolves. When I hear a cacophony of ravens, I know that wolves aren’t far away. Ravens follow wolf packs in anticipation of a kill, then feast on the leftovers, sometimes stealing beakfuls of meat from under a wolf’s nose. When a bald eagle appears at a carcass, the ravens fly up only to settle down again at the kill, remaining just out of reach of that bird’s massive bill. I once watched a raven tug on an eagle’s tail and when the eagle looked back at its antagonist, one of the raven’s companions stole a beakful of meat.

Raven groups are fascinating to watch at a carcass, as biologist Berndt Heinrich details in his terrific book, *Ravens in Winter*. If a territorial pair finds a dead

deer or moose, they remain silent while they feast. If juveniles locate one, however, they scream vociferously, attracting more young ravens to the carcass. The resulting “conspiracy” sets up dominance hierarchies and pair bonds, with much posturing and courtship behaviour — a dead animal turned singles bar.

Ravens are also beautiful to watch in the air. They perform mesmerizing acrobatics, flipping upside down and diving at breakneck speeds. They soar and play with and seem to taunt hawks. And their vocalizations are diverse, ranging from bell-like dongs to raucous screams. “The raven is the paragon of the air,” writes Heinrich, and “its deep, sonorous penetrating voice demands immediate attention and respect, even though we have little or no idea what it says.”

*Michael Runtz is a biology professor at Carleton and a world-renowned naturalist who has published 12 books featuring his writing and photography, most recently Algonquin Wild: A Naturalist’s Journey Through the Seasons, in 2018.*



# CULTURAL CONVERGENCE

BY BRIAN JOHNSON

Arguably no literary bird has enjoyed greater fame or longevity than the “ominous bird of yore” that graces Edgar Allan Poe’s popular 19th century poem “The Raven.” To the poem’s bereaved speaker, the feathered midnight visitor who croaks “Nevermore!” in response to his every question is a frustratingly enigmatic messenger from “Night’s Plutonian shore.” Is the bird a gift from God sent to help the speaker momentarily forget his grief? Or is it a “devil,” “a tempter,” “a thing of evil”? Or perhaps it is a “prophet,” able to reassure the morose speaker that he will be reunited with his beloved in the afterlife? “Nevermore!” “Nevermore!” “Nevermore!” comes the teasing, maddening, unvarying reply.

Poe’s campy Gothic depiction of the raven as ominous messenger draws on a long history of the bird’s representation in Europe, the Middle East and South Asia. Dating back to antiquity, and finding continuous renewal across a broad range of contexts — the Bible, Norse mythology, the Qu’ran and Shakespeare, to name only a few — the convention of depicting the raven as a sinister creature has roots in the bird’s objective features: its black colouration, its carrion diet, its battlefield ubiquity and its uncanny ability to mimic human speech. All of these qualities have contributed to its status as a figure of evil, death or ill-omen, as a prophetic mediator between the living and the dead, or some combination thereof. In Poe’s poem, the ultimately unknowable raven (its animal speech might, after all, not mean anything) becomes a site for the speaker’s projections and “fancies,” all drawn from the storehouses of diverse cultural traditions.

In other ways, however, the playfulness of Poe’s raven points towards another set of cultural traditions wherein the raven’s role as mediator between human and supernatural realms makes it not a pretext for Gothic chills but a mischievous, shapeshifting bearer of sacred knowledge and communal memory. Raven’s celebrated role as both trickster and Creator in the stories and spiritual practices of the Indigenous peoples of the Pacific Northwest, for instance, inspires Haisla and Heiltsuk author Eden Robinson’s generically hybrid trickster novels, *Son of a Trickster* and *Trickster Drift*, which feature the spiritual and supernatural

coming-of-age of Indigenous teen Jared whose parentage is part *wee’git* (Raven), part witch. Meanwhile, many works of contemporary urban fantasy, like Neil Gaiman’s *American Gods* and Susanna Clarke’s *Jonathan Strange & Mr Norrell*, notably feature ravens that nostalgically conjure the pagan ambiance and “magic” of pre-Christian Europe. As the foregrounding of the raven’s deep roots in multiple traditions by its most recent literary appearances suggests, Poe’s “bird of yore” was neither strictly “ominous” nor strictly “Poe’s” to begin with. In literature today, it is now, more than ever, a figure in which the threads of numerous cultural traditions converge, clash and sometimes mingle.

Brian Johnson is a professor in Carleton’s Department of English Language and Literature with an interest in comics studies, Canadian literature, psychoanalysis and genre.

# SOMETHING LARGER THAN YOURSELF

BY SARAH ZUTRAUEN

Everyone always says your last game of your final season is the shortest game you’ll ever play. You can see your varsity career ticking away on the scoreboard. It’s bittersweet that my Ravens soccer years are over. After five years of hard work, I will proudly move on as an alumna. Being a varsity athlete enhanced my university experience. It was challenging to balance school and sport because we spent so many hours on the field and in the gym, but this forced me to develop time-management skills. Playing sports has taught me many other things, including perseverance, resilience and collaboration, which can be used in many environments.

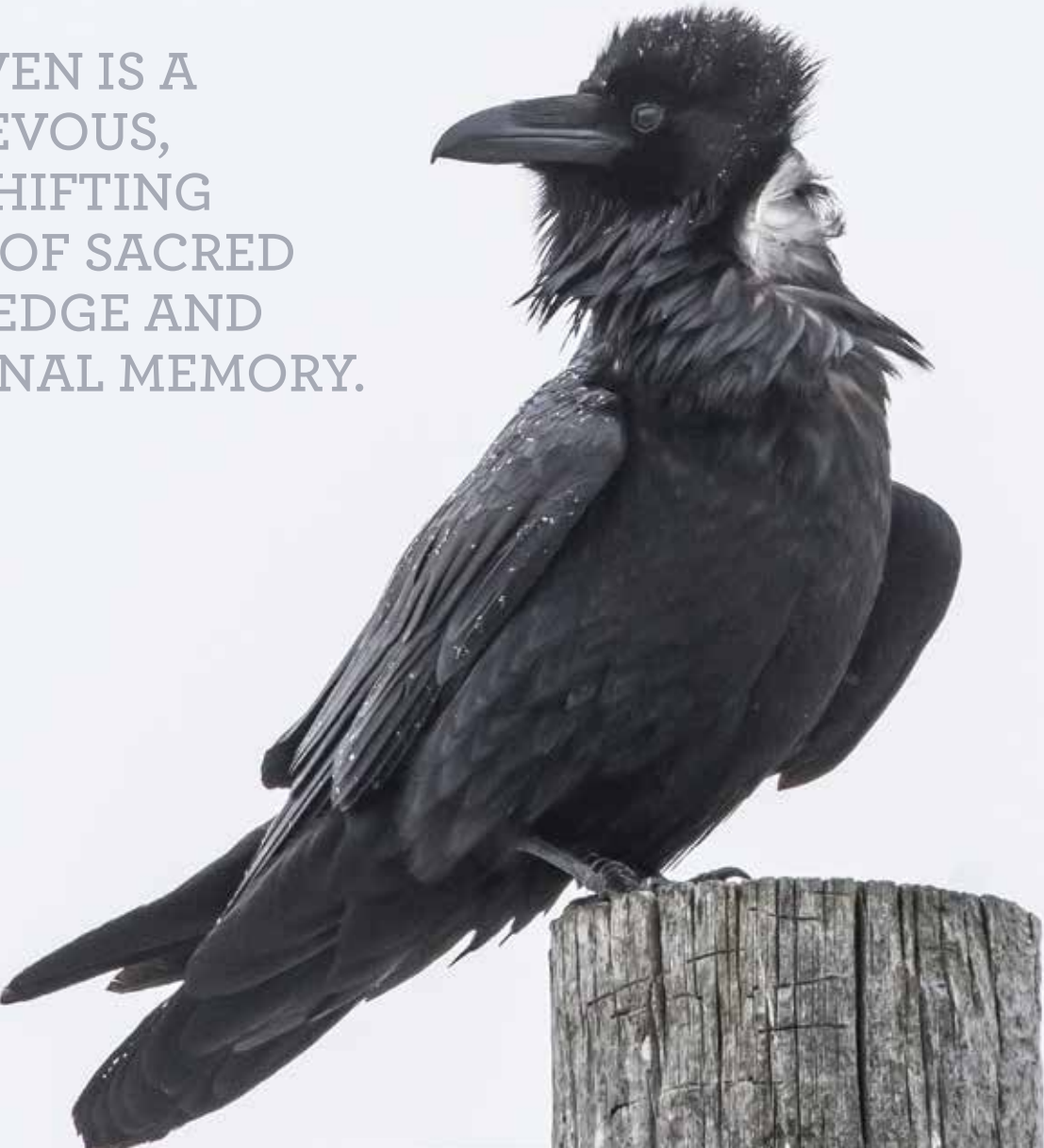
I’m currently studying toward a master’s degree in Health: Science, Technology and Policy. I hope to work in the public health sector. I’ve always been interested in healthy living and can see myself helping prevent illnesses, injuries or chronic diseases. The courses offered in my Health Sciences undergraduate degree were interdisciplinary, ranging from biochemistry to epidemiology, and I gravitated to the latter.

Having an opportunity to wear the Ravens uniform was special. You’re representing something larger than yourself. As captain, I always tried to motivate and encourage others to be their best and helped teammates whenever needed. First, you must earn their trust, so they know you have their backs. To any new athletes joining the Ravens, the number-one thing I’d say is that there will be ups and downs, but

both the wins and losses will provide opportunities to learn and grow. Although I am embarking on my next chapter, I will forever be a Raven at heart. ■

Sarah Zutrauen, an Academic All-Canadian, played for the Carleton Ravens women’s soccer team for the last five seasons and was captain for the last two.

THE RAVEN IS A MISCHIEVOUS, SHAPESHIFTING BEARER OF SACRED KNOWLEDGE AND COMMUNAL MEMORY.





# Building Blocks

TACKLING CLIMATE CHANGE  
THROUGH ENERGY EFFICIENCY

BY TYRONE BURKE  
PHOTOGRAPHS BY  
MARTIN LIPMAN

Engineering professor Cynthia Cruickshank inspects an instrument that measures solar radiation, part of a weather station that helps her understand the exact conditions buildings are exposed to

Making our homes and workplaces more energy efficient is a crucial front in the fight against climate change. Roughly one-third of the world's energy is consumed by buildings, and in Canada, where residential and commercial buildings account for more than 20 per cent of greenhouse gas emissions, most of that energy is used for heating. Reducing that demand is one of the cheapest and most effective ways to cut carbon emissions. But before we optimize a building's energy systems with renewables such as solar and geothermal power, we need to ensure it has a good building envelope: its roof, sub-floor, windows, exterior doors and walls — basically everything between the climate-controlled indoors and the uncontrolled climate beyond. "You can have the best energy system," says Cynthia Cruickshank, a Mechanical and Aerospace Engineering professor at Carleton, "but if you have a bad building envelope, you won't be able to keep the heat in."

Cruickshank leads the Carleton University Centre for Advanced Building Envelope Research (CU-CABER), a six-year, \$5.1-million project, supported by the Natural Resources Canada (NRCan) Energy Innovation Program and the Ontario Research Fund, in partnership with NRCan, Algonquin College, the National Research Council and Alaska's Cold Climate Housing Research Center. "Governments around the world are looking for ways to reduce energy use and greenhouse gas emissions from their housing and building stocks," says Cruickshank. "This problem is most acute in older buildings — the largest segment of the market — which have less insulation and require more heating fuel. Older buildings are also the hardest to renovate."

To address these challenges, Cruickshank and her team will draw upon advances in super-thin insulation materials, prefabricated construction and panelized retrofits to develop building envelopes that are thinner and cheaper, and new methods for renovating existing buildings with less cost and disruption. Here are some of the tools she is using:

## Guarded hot box

"The guarded hot box is essentially a box within a box," says Cruickshank, cracking open a featureless three-metre cube to reveal an internal chamber that's wired with sensors, a heater and refrigeration equipment. One side of the cube is heated, the other cooled. A 1.2-metre

by 1.5-metre wall sample is placed between the two. Sensors measure temperature, relative humidity and heat flux — the transfer of energy between the hot and cold sides. Using this data, Cruickshank can calculate a wall's R-value (its ability to resist the transfer of heat). Cruickshank and her students built the guarded hot box in her lab on campus, but when the new CU-CABER lab opens in 2022 at NRCan's research complex in Bells Corners, just west of Ottawa, it will have a larger guarded hot box capable of testing three-by-six-metre samples. The new instrument will be able to test walls across a larger temperature range, control the humidity and simulate the use of solar and wind power.

## Pressurized spray rack

Beyond the thermal qualities assessed inside the guarded hot box, the air and water tightness of new wall assemblies is of critical importance. To ensure that new building envelope designs and components satisfy air and moisture tightness requirements, and to find out how resilient they are, a pressurized spray rack capable of testing the same sized wall samples will be used. This piece of equipment will simulate rainfall on building components, and because it will be pressurized beyond standard atmospheric pressure, it will be used to determine whether construction methods and materials can withstand decades of outdoor exposure.

## Humidity chambers and guarded hot plate

Building envelopes get wet, and moisture impacts performance. Cruickshank learns how different materials will respond to moisture using humidity chambers and a guarded hot plate. The glass-doored, two-metre tall humidity chambers have the look of an industrial refrigerator, but instead of cooling air, they regulate its heat and moisture levels. Cruickshank uses them to infuse materials with moisture, then measures the impact this has on performance with a guarded hot plate. Similar to the guarded hot box, this tabletop machine exposes one side of a material to heat and the other to cold. Sensors measure its thermal resistance, and by comparing the results with dry materials tests, it's possible to model the impact of wet weather on insulation value.



Cruickshank stands inside a guarded hot box, which she and her students use to determine the ability of a wall to resist the transfer of heat



Temperature baths

The results of Cruickshank’s experiments are used in mathematical modelling. If temperature readings are inaccurate, the results will be too. To ensure that sensors record exact measurements, she uses high-precision temperature baths. Sensors are calibrated by immersing them in these countertop machines that provide stable temperatures ranging from -35°C to 120°C. Accurate measurements are especially important when modelling a material’s performance over an extended period. “By exposing the materials to different conditions, we’re essentially accelerating the aging process,” Cruickshank says. “We might be able to simulate five years, and then can curve how the effectiveness of a panel reduces over time.”

Weather station

At Cruickshank’s new lab in Bells Corners, she’ll be able to insert samples directly into its exterior walls. Envelope materials will be exposed to the elements and equipped with sensors that measure their performance. To understand the exact conditions that materials are exposed to, the lab will have an on-site weather station. This will record precipitation, humidity, temperature and solar radiation, and it will enable precise modelling of weather conditions. ■

‘You can have the best energy system, but if you have a bad building envelope, you won’t be able to keep the heat in.’



See Her, Be Her

In addition to energy efficiency, Cynthia Cruickshank is passionate about encouraging women to enter science, technology, engineering and math (STEM) fields. “Women can bring a different point of view to a problem,” she says. “It’s about working together and having the strongest team — one that includes both genders.” Here are her suggestions for supporting the next generation of women in STEM:

I Start young

Take girls to STEM-focused activities, such as camps and women-in-STEM events, in their formative years. Head off the discouraging experiences they may have in high school, and show them pathways to STEM careers.

II Raise awareness

Teach girls about women’s achievements in STEM, what they could achieve themselves, and what engineers and other STEM professionals actually do. “Girls should know that engineers solve problems,” says Cruickshank, “and help people.”

III Encourage them

Although many guidance counsellors and parents already promote STEM to girls, it may take more than a couple events throughout the school year to show them that a career in STEM is possible. Three-quarters of students say that their parents have the biggest influence on their career direction.

IV Be a mentor

Female students need support on their journeys toward becoming engineers and support after they’ve joined the workforce. They need champions — people who will help open doors and break down barriers.

V Make women visible

“If I can see her, I can be her,” says Cruickshank, who has a two-year-old daughter. Girls need to have role models and see examples of what they can be in the future. “I would like to live in a world where being a woman in STEM does not make you ambitious or bold — it makes you normal.”



'I can hardly imagine waking up every morning to read a newspaper or news articles in my language. That is a remarkable step.'

## AMPLIFYING

BY LISA GREGOIRE  
PHOTOGRAPH BY  
FANGLIANG XU

Shelby Lisk, a reporter based at Carleton through a new partnership with TVO to create an Indigenous Hub on campus, started her job three weeks before last fall's federal election. Naturally, her first story for the provincial media organization was about why Indigenous people don't vote. Sort of.

Lisk wrote about the Haudenosaunee Confederacy, a political system that predated Canada by about 700 years and ensured peace between five nations — Mohawk, Onondaga, Seneca, Cayuga and Oneida — and later a sixth, the Tuscarora. But as with many aspects of Indigenous culture, the Canadian government ignored the confederacy and imposed a colonial system of elected band councils. "I thought if people could understand that we have our own system, that we see ourselves as a sovereign nation, that we have our own governance that worked for us for a thousand years," says Lisk, "then maybe instead of just saying, 'Indigenous people don't vote,' they might understand why."

Lisk, a Turtle Clan member of the Mohawks of the Bay of Quinte First Nation, grew up in Belleville, Ont., and didn't speak Mohawk. Neither did her mother, who was raised in Toronto. In fact, many of Lisk's relatives severed their roots, spoke English and hid their identities. That ends with Lisk.

was growing up," Lisk wrote in an opinion piece for TVO. "I can hardly imagine waking up every morning to read a newspaper or news articles in my language. That is a remarkable step."

Lisk, 27, a poet, photographer and artist, didn't grow up wanting to be a journalist. But once she realized it was about storytelling, she saw journalism as a means to uncover her own story and amplify other untold stories. With dual roots — her father is non-Indigenous — Lisk feels like a bridge between two worlds and hopes to accomplish a pair of sometimes competing goals: educate settlers about Indigenous newsmakers and culture, and create more representations of Indigenous people in contemporary media. But Indigenous reporters have added challenges. She's aware of her own biases, struggles with concepts of impartiality and feels the pressure, real or imagined, to make her community proud.

That Lisk is young and still figuring out journalism concepts and ethics is actually beneficial to the journalism school, says its director, Susan Harada, because through her, students can glimpse the complex reality of reporting from an Indigenous perspective. "Students aren't expecting cut-and-dried answers," says Harada. "It's OK for Shelby to puzzle through things out loud with students."

## UNTOLD STORIES

PARTNERSHIP WITH TVO BRINGS INDIGENOUS JOURNALISM TO CAMPUS

With a tattoo on her left arm which asks *skennen'kó:wa ken?* — a Mohawk greeting which means *do you have the great peace?* — and a vow to learn Mohawk, Lisk is trying to re-stitch the frayed fabric of her life and, by extension, her community. She plans to spend her one-year contract at TVO writing stories about Indigenous people and issues in Ontario thanks to a \$2-million donation from Goldie Feldman and the Barry and Laurie Green Family Charitable Trust to fund four regional TVO hubs, plus the Indigenous hub at Carleton. The donations also pay to translate her articles into Indigenous languages, and the partnership with the university, part of the evolution of journalism education, will cultivate connections between Lisk and students, faculty and the broader Carleton community.

"I became a journalist because I didn't see positive representations of Indigenous people in media while I

"We take the Truth and Reconciliation Commission Calls to Action very seriously," continues Harada, focusing specifically on No. 86, which calls upon journalism programs to incorporate Indigenous history and context. "Having Shelby here, as a journalist-in-residence, is a really important visible sign to our students that there are perspectives they need to consider and we have someone here in our midst who can help us do that."

It's a lot of weight on young shoulders. Sometimes Lisk wonders whether she can live up to everyone's expectations, including her own. But she knows the journey itself has worth. "I remember moments in my life where someone has said to me, 'I didn't think anybody else felt this way until I read your work,'" she says. "I never want another young person to grow up not knowing or being ashamed of who they are. Storytelling can make people feel like they are not alone." ■



# Location, Location, Location

ENSURING DRIVERLESS CARS  
KNOW EXACTLY WHERE THEY ARE

BY TYRONE BURKE

PHOTOGRAPHS BY  
MARTIN LIPMAN

Mohamed Atia commutes to work and runs errands in a Toyota Yaris, but when he duct tapes a set of sensors to the vehicle, attaches an antenna to the roof and connects the equipment to a small custom-built computer on the front passenger seat, the nondescript silver hatchback is transformed into a window to the future of transportation — minus the duct tape, of course.

Atia, a Systems and Computer Engineering professor at Carleton, drives around the city looking for places where Global Positioning System (GPS) and Global Navigation Satellite Systems (GNSS) signals are blocked by buildings, tunnels and other infrastructure. This telecommunications hiccup is not a big problem for human drivers: it could temporarily interfere with their ability to check Google Maps, or even — gasp! — force them to pull over and ask for directions. But the lack of GPS and GNSS is a critical gap to overcome for a world in which driverless cars will need to safely navigate amongst pedestrians, cyclists, stationary objects and other vehicles. “Self-driving cars need to be able to precisely perceive their environments and determine their positioning and orientation,” says Atia, a sensor fusion expert who brings together data from multiple sources to identify a vehicle’s location in real time.

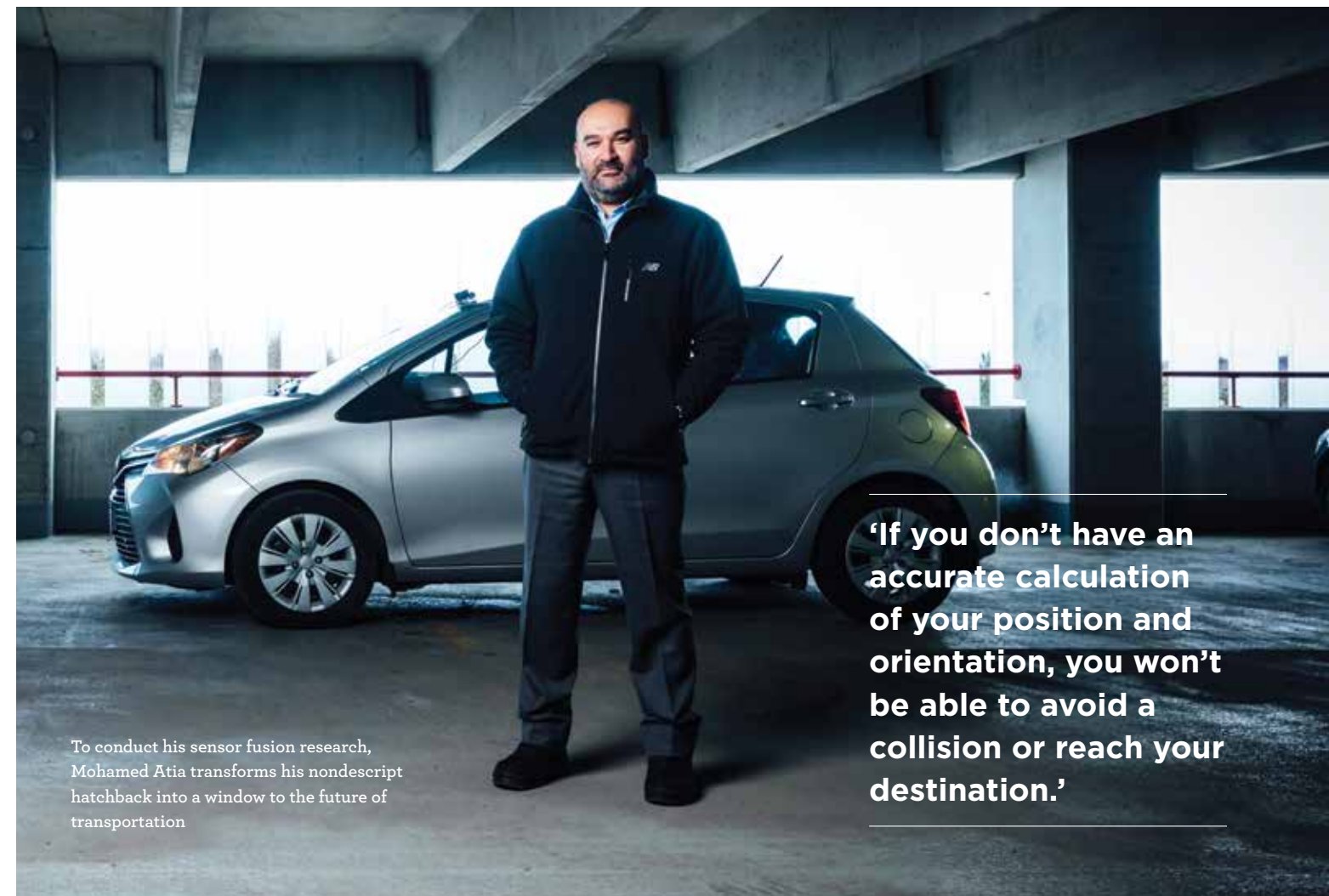
In his lab on the fourth floor of Carleton’s Minto Centre for Advanced Studies in Engineering, Atia — part of a large contingent of researchers at the university who are working on the development of connected and autonomous vehicles — places a small satellite receiver on the windowsill to demonstrate the risks of relying on single type of technology for navigation. Although there should be at least four

satellites within range, due to urban interference, the screen connected to his receiver shows only one dot in the sky overhead. “Self-driving cars need to know where they are at all times,” says Atia. “This gives them ‘path control’ and determines how they behave in the next instant. If you don’t have an accurate calculation of your position and orientation, you won’t be able to avoid a collision or reach your destination.”

To come up with this calculation, Atia and three of his grad students have developed an algorithm that crunches data from multiple sensors, providing more reliable information than any one of those sensors could on its own to determine how far a vehicle has travelled from its last-known position. The accelerometers and gyroscopes that are part of a car’s inertial measurement unit calculate a vehicle’s speed and trajectory, and the algorithm references that data against known GNSS data such as road geometry and topography that’s used in today’s on-board GPS systems. “Vehicles already have high-performance computing platforms,” says Atia. “Scientists and engineers are working to optimize these platforms.”

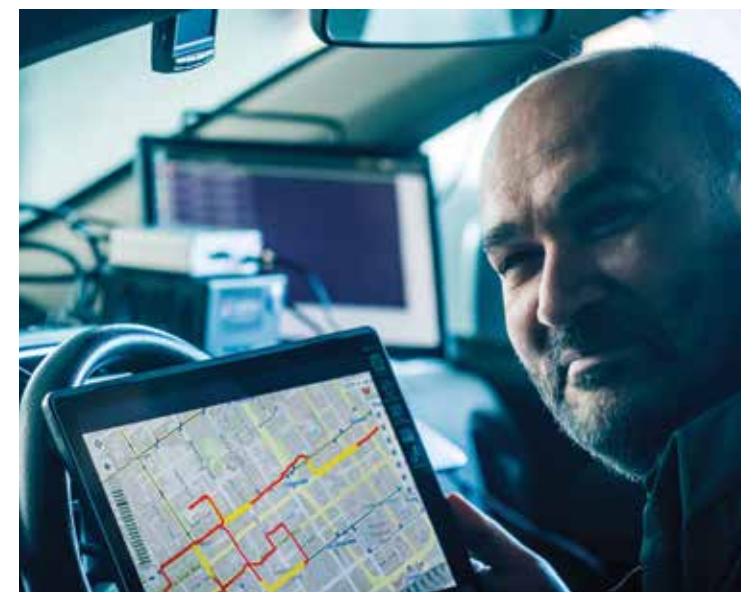
To collect the data needed to fine-tune the algorithm, Atia drives around Ottawa in his hatchback. In the future, the on-board computers in connected and autonomous vehicles will be loaded with geographical information that includes local road features such as traffic lights, speed limits and speed bumps. But if the vehicle doesn’t precisely know where it is, all that information will be useless, so engineers like Atia have to find a way to fill in the blanks.

Much of their work in the years ahead will take place at Ottawa’s L5 connected and autonomous vehicle testing facility, an 1,866-acre site with 16 kilometres of paved roads and a control centre on a former research farm in the city’s west end. The facility opened last year and will provide Carleton researchers and their private-sector and government partners with an ideal proving ground for the development and demonstration of technologies that cannot be tested on city streets. “L5 offers world-class testing grounds for the safe implementation of our algorithms,” says Atia, who has already used the facility’s advanced navigation infrastructure as a ground-truth comparison for his algorithms. “With buildings that create GNSS blind corners and fully-functioning traffic lights, our algorithms can be tested on roads in Ottawa’s unpredictable four-season climate.” In the meantime, he’ll be driving his car around the city, moving closer to a safe future, one kilometre at a time. ■



To conduct his sensor fusion research, Mohamed Atia transforms his nondescript hatchback into a window to the future of transportation

**‘If you don’t have an accurate calculation of your position and orientation, you won’t be able to avoid a collision or reach your destination.’**





# FROM AWAY

BY LISA GREGOIRE  
PHOTOGRAPHS BY  
RÉMI THÉRIAULT

Like the rest of the country, Carleton is home to a diverse population of students and professors, many of whom have moved to Canada from abroad and made this university a key stop on their journeys. They enrich our public service, business practices and international relations, bring vitality to our arts — and, as refugee researcher **Zahraa Al-Ahmad** shows, strive to give back in profound ways

Last July, Zahraa Al-Ahmad was in Beirut, Lebanon, ready to begin a research project focusing on the educational and employment barriers faced by Syrian refugees in that small country pinched between Syria and Israel on the Mediterranean Sea. But after several weeks abroad, she was still facing her own barriers — logistical and bureaucratic delays that prevented her and a Lebanese colleague from conducting interviews with refugees. So she sat, spinning her wheels, frustrated and worried that she was squandering a precious opportunity to better understand, and possibly even improve, the experience of several hundred thousand Syrians in Lebanon.





If you think those wheels spun for long, you don't know this woman.

Al-Ahmad, a Syrian-born political science graduate student at Carleton, is one of the first student researchers with the Local Engagement Refugee Research Network (LERRN), a seven-year Canadian initiative which helps partner universities in Lebanon, Jordan, Tanzania and Kenya conduct homegrown research projects that are relevant and meaningful to them. Al-Ahmad is, by her own admission, a shy and introverted 23-year-old who makes a mean lasagna and prefers board games with friends to late-night parties. But here's what others notice: intelligence, confidence, resourcefulness and quiet tenacity, all of which come in handy when trying to work in a foreign country — especially a complicated place like Lebanon.

Syria and Lebanon have a contentious history. Lebanon's 15-year civil war, which started in 1976, led to significant Syrian intervention that lasted until 2006. After that, Lebanon tried hard to rebuild from chaos within a region dogged by perennial conflict. Then, in 2011, Syria deteriorated into civil war itself, sending its citizens fleeing, many into Lebanon.

Census data are imprecise but it's estimated that about one in three people in Lebanon is a refugee, predominantly Syrian and Palestinian. Lebanon's estimated population of 6.1 million people includes roughly 1.5 million Syrians and 500,000 Palestinians, which means that Lebanon is home to the highest per capita refugee population in the world. Many educated Lebanese can't find jobs and resent newcomers. With no official refugee camps, Syrians face a precarious legal status and fickle restrictions on where they can live and which jobs they can do.

Despite project setbacks, Al-Ahmad was still hoping to find out why Syrian refugees weren't going to school or getting jobs. So after conferring with LERRN project director James Milner, a political science professor at Carleton, Al-Ahmad switched gears halfway through her six-week trip, made a list of relevant non-governmental agencies (NGOs) and put her first language — Arabic — to use.

She tracked down busy NGO staffers, charmed her way into last-minute interviews and took Ubers across the city to streets with no addresses and only vague instructions: *it's across from the market; text me when you arrive and I'll come find you.* The work was stressful and tiring but also relevant and fulfilling. And it was better than spinning her wheels. "There was a learning curve, but honestly, it was a great experience and I'm so thankful for it," Al-Ahmad says over tea on the Carleton campus. "It was a lot of work and a lot

of pressure, but I wanted to get the most I could out of my trip." Before flying home, she presented her findings to the LERRN team in Lebanon, including suggestions regarding structure, logistics and limitations to help streamline future research in the region — paying it forward for her colleagues there and back home in Canada.

That's the kind of flexibility and professionalism LERRN needs in its student participants, says Milner, who praises Al-Ahmad for her grace under pressure. "These trans-national research partnerships, working across context and capacities, they're wonderful when they go well, but they're really tested when we encounter these kinds of challenges," he says. "That's where the trust and dialogue that we create help us problem solve and find ways toward positive outcomes. I felt so fortunate that Zahraa was there because of her ability to do those things."

Al-Ahmad's ability to overcome challenges and accomplish something worthwhile is second nature for a girl who grew up in a new Canadian family. She moved to Toronto from the thriving port city of Latakia, Syria, with her parents and two older brothers in 2005 when she was eight. They lived briefly in North York then moved to Etobicoke, watching English TV to learn the language but speaking Arabic to one another. Her father is a civil engineer and her mother, an early childhood educator. Both returned to school in Canada to get re-certified, working day and night at their studies and placements. It was a challenging few years during which her brothers stepped up to help take care of her.

Canada offered myriad opportunities but it was not Syria. Winters were cold and clothing was thick and heavy and, as a child, Al-Ahmad felt like a total outsider. She missed the olive groves of home, the Mediterranean beaches and her many cousins, aunts and uncles, but she saw in her parents a recipe for success: hard work, love and persistence.

The Al-Ahmads were not refugees and their move was supposed to last only until the children had finished school and university. Then their country fell apart and Canada became home. Syria's civil war, which has killed more than 100,000 civilians and displaced millions of others, has spared coastal Latakia. But the country remains in tatters and more than 25,000 government-sponsored Syrian refugees have come to Canada and thousands of others through private and group sponsorships.

Zahraa loved talking politics in her family's Etobicoke home, but like many loyal children of immigrant parents, she wanted to be a doctor. To that end, she started attending Toronto's York University as a science undergrad and, for fun, took an arts elective. Then she discovered that one

'There is an untapped strength at Carleton: the backgrounds and the life journeys that students bring with them. Everyone in the Carleton community has come from a journey and the more we embrace that journey, the more we'll be able to realize the real social purpose of the university — to engage in real-world problems, not just in an efficient way, but in a very respectful way.'

could actually get a degree in a different kind of science: the political kind. She switched majors and earned a bachelor's degree in political science in 2018.

Thinking that the nation's capital was a good place to continue studying politics, Al-Ahmad applied to do a master's degree at Carleton. One of her courses was in the global politics of migration with Milner. Most refugees live in the global south, Milner says, but most refugee research is controlled by the developed world, where there is money and influence. LERRN is trying to change that dynamic by offering expertise, funding and capacity. Refugee host countries direct the projects while Canadian researchers act as partners and amplifiers.

When it was time to recruit LERRN's first cohort of student researchers, Milner thought that Al-Ahmad, with her background, political interests and language skills, would be an ideal fit. He was right. Carleton touts diversity as an asset and that's not just words, he says. "There is an



untapped strength at Carleton: the backgrounds and the life journeys that students bring with them," says Milner. "Everyone in the Carleton community has come from a journey and the more we embrace that journey, the more we'll be able to realize the real social purpose of the university — to engage in real-world problems, not just in an efficient way, but in a very respectful way."

Al-Ahmad expects to earn her master's in April 2020 and then it's on to a PhD. At this point she's considering a focus on security studies. So, her plans of being a doctor might still pan out, just not a medical one. And her parents support that. "I think they knew that no matter what I was studying, I would work *hard*," she says. "I'm not somebody who stands as life goes by. I want to help Syria and Syrians because they're such a big part of my identity as a proud Syrian-Canadian. That's why this work is so important to me." ■



‘Change climate, change culture, change history.  
Nobody knew me.’



# CHANCELLOR YAPRAK BALTACIOĞLU'S FRESH START

AS TOLD TO DAVID MCGUFFIN

*Yaprak Baltacioğlu's journey toward becoming Carleton's chancellor in 2019 contains many valuable lessons. Originally from Turkey, Baltacioğlu, in a 29-year career in Canada's civil service, rose to become the highest-ranking immigrant in the federal government. She spent 15 of those years as a deputy minister at Treasury Board and the Agriculture department, among other appointments, championing efforts that advanced mental health, employee wellness and workplace diversity. The advice she gives new Canadians is to carefully study where the opportunities are. "There's a huge commitment to diversity in the federal public service, making sure we represent Canada," she says. "The numbers for women and minorities are much higher than in the private sector." A master's degree graduate from Carleton's School of Public Policy and Administration, Baltacioğlu was born into a prominent family, the only child of one of Turkey's top civil rights lawyers and an artist mother. "It was a tough marriage," she recalls. "They just couldn't ever get together." In a way, this prepared her for the roles she played as a senior public servant: "I have capacity to mediate almost all conflict. I was very well trained in trying to make sure nobody fights."*

My mother was a wonderful artist. She loved animals. She loved people. She was generous. I didn't know she had depression. In 1980, she killed herself. It's going to be 40 years and ... when I talk about it, it still chokes me up. That was the year I moved. She died in February and we came to Canada in August, which was amazingly good for me. A fresh start is the

best thing to do. Just change. Change climate, change culture, change history. Nobody knew me. Nobody knew about me. It was pretty public in Turkey when my mother died.

As an immigrant, if you don't have Canadian work experience, if you don't have Canadian credentials, and if you don't have any contacts, finding a job in any professional area is hard. So I applied to Carleton. That was the beginning. First it gave me the education and the credentials. It gave me the contacts through my professors and classmates who ended up becoming accomplished in public policy. And it also gave me the confidence that I was actually capable.

Coming to Carleton helped me find my first job in the civil service in 1989. I looked for interesting places to work and good people to work for. In the mid-1990s, I became chief of staff to the Deputy Minister of Agriculture just as deep budget cuts were being implemented. Huge subsidy programs like the Western Grain Transportation Act were repealed, and I got to see how a big organization changes shape. Our minister was Ralph Goodale, the MP from Saskatchewan, and those cuts were hard for a western leader to make. I watched everything he did and how he handled challenges, from weighing options to communications to basic survival. That was the best training you can get.

Despite all the support I had from colleagues throughout my career, I didn't talk about my mother's suicide because of the stigma. Then, five years ago, I heard that some of my employees who had children with mental health issues were not telling anybody and were trying to take time off to care for their families, and I started thinking, "God, we're in the 2000s and we're *still* not talking about it?" So I gave a speech about my mother to 600 executives. It's personal, but it was important that I spoke out because I was a senior person in the federal government. The stigma is not going to go away unless we talk about mental health.

It's important that Carleton and other universities are so focused on these issues today. Carleton has made a major difference to me; if I hadn't gone to school here, I don't know what my life would have been. Which is why, when the university asked me to become chancellor, I immediately said yes. You don't always get to pay back. I'm lucky that I can. ■



# SECURITY SCHOLAR STEPHEN SAIDEMAN THINKS BEYOND TOMORROW

AS TOLD TO DAVID MCGUFFIN



*Last summer, Stephen Saideman, a professor at Carleton's Norman Paterson School of International Affairs, received a \$2.5-million partnership grant from the Social Sciences and Humanities Research Council for the Canadian Defence and Security Network. Launched in spring 2019, the network brings together more than 30 partners, including government agencies and civil society groups, to address the security challenges facing Canada and figure out how best to address these threats. "We need to reduce barriers between the academic world, the policy world and the public," says Saideman, its director, "and there's support for that in Canada." A dual Canadian-American citizen originally from Philadelphia, Saideman came to Carleton in 2012 from McGill, where he had started teaching a year after the terrorist attacks of Sept. 11, 2001. That day, he was working as a Council on Foreign Relations Fellow with the Joint Chiefs of Staff in the Pentagon, focused on rebuilding the Balkans and other post-Cold War international fine-tuning. That focus would change completely for Saideman — and the world — by day's end.*

I was in the Pentagon when the towers in New York got hit. An Air Force colonel came in and told us to turn on our TV. We saw the second plane hit, and it was pretty clear that this wasn't an accident. Right after that I had a meeting with the State Department about Bosnia. At that point, we could still see planes taking off and landing at National Airport, which is next to the Pentagon. Then, while we were driving on the bridge between Arlington, Virginia, and downtown Washington, D.C., I heard a noise. I turned around and saw smoke behind me — that was when the plane hit the Pentagon. I got on my cellphone, called my wife and said, "Don't worry about me." She said, "Why should I worry about you? You're not in New York." So I told her what happened.

We went back to the Pentagon. It's an enormous building and the plane had hit the opposite side, so we were able to get back in. But the building was on fire. That day, the United States changed from a place that was trying to be involved in the world in ways that weren't particularly risky to a country at war.

It was really strange to watch America go to war while teaching in Montreal. There were two distinct

wars: the Afghanistan war, which felt like it was pushed upon the U.S., and the Iraq war, which was a war of choice — a war that was ill-considered both in terms of how it started and how it was implemented. I worked in the Pentagon when it was being run by Donald Rumsfeld, the Secretary of Defence, and was pretty skeptical about the ability of his people to do the right thing. It was embarrassing as an American to be living in Canada at a time when the United States was doing something so, so wrong.

I liked the idea of moving to a place like Norman Paterson School of International Affairs, where the main job is to train the next generation of people who will work in government. I felt that I'd have more opportunities at Carleton to teach people who would be going into the policy world. As a scholar of international relations, it's exciting to be in the national capital. I've had the chance to have lots of conversations with colonels and generals, with people up and down the ranks of Global Affairs, which has helped us build the new Canadian Defence and Security Network. Canada's place in the world is shifting and the government is consumed by the day-to-day, but we academics have longer time horizons and can help think beyond tomorrow.

I think what makes Canada special compared to many other countries is how we welcome immigrants. That allows us to have more creativity and more innovation — and better food — than other countries. It allows us to be less chained to narrow perspectives, which means we do things better on a whole than other places because we have a broader imagination. ■

‘It was embarrassing as an American to be living in Canada at a time when the U.S. was doing something so, so wrong.’



# BUSINESS DEAN DANA BROWN'S CONSCIENTIOUS CAPITALISM

AS TOLD TO DAVID MCGUFFIN

*Dana Brown, the new dean of Carleton's Sprott School of Business, has spent much of her career navigating uncertainty. That's where she's most comfortable. "I don't need to have the answer," she says, "and I think it's good to experiment, to try things and see whether they work." Born and raised in the U.S. and a longtime resident of the U.K., Brown arrived in Ottawa last summer with her husband and three children and an impressive track record: director of the University of Oxford's MBA program; dean of Business and Law at De Montfort University in Leicester, England; a professorship at the EMLYON Business School in France and a visiting lecturer at the American University in Cairo. But her trajectory in academia and business hasn't followed a traditional route. She earned a master's in Eastern European Studies at Oxford and a PhD in Political Science at MIT in Boston, and was one of the first few dozen employees hired by Jeff Bezos at Amazon, none of whom had a background in business or retail.*

At Amazon, we were a bunch of young people who knew very little about business, trying to figure out how to make this new thing work, and I think that was part of Jeff's strategy. He wanted to build something different and he didn't want preconceived ideas about how things were done or what was possible.

I think my fascination with change in business goes back even earlier, however, to when I was an undergraduate political science student at Rutgers in New Jersey and spent a year abroad in Moscow. My time there coincided with the collapse of the Soviet

Union and the end of communist-era economic planning. It was like a Wild West market in Russia. Nobody knew who was calling the shots. Price reforms and subsidies had been in place but were stopping. Rents and heating costs were spiking, and people were losing their economic foundations. People were on the streets selling everything they owned, even their toothbrushes.

Later, I got a job in Moscow with an American construction firm that was building a development in the centre of the city. They had hired Russian construction workers and brought in materials from Europe. My job was to manage the inventory because workers were constantly taking toilet seats home. There were no toilet seats left — Russians typically didn't have access to such things — and workers were walking off the site with everything. My job was to basically manage this process, and people were not happy when I told them they couldn't leave with toilet seats.

My experience in Russia and Eastern Europe really made me think about how to conscientiously build a capitalism that works for people. That led to my first job as a professor at Oxford. I was asked to come to the business school by the dean, who wanted to find a way of teaching future businesspeople to think differently about economic development and investment — to think about an approach that wasn't just about exploitation of the environment and low-cost labour and taking advantage of weak regulations. The status quo is basically a stripping of assets, which is where we are today, in my view.

I was interested in Carleton because I like to go places where there's an opportunity to really build something. Carleton is in this mode and is thinking about its footprint and impact. That attracted me to this new role. When the job offer came, I had a teenager and we were established in England. It's where our kids had grown up, and we had Europe at our fingertips. The idea of moving to Canada was a bit scary for everybody. But Brexit kind of pulled the rug out from under us. If you're raising a family and thinking about future opportunities, Canada is a good place to be. I want to know what's going on in the world, to have an impact and be engaged in meaningful work. But I don't want my kids to be worried all the time. So Canada and Carleton made sense. ■



‘It was like a Wild West market in Russia ... people were not happy when I told them they couldn't leave with toilet seats.’



# HOME

## A NOVELIST FINALLY FINDS THE RIGHT WORDS

BY KAGISO LESEGO MOLOPE

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*Kagiso Lesego Molepe is a master's student in Film Studies at Carleton and the author of four novels, including This Book Betrays My Brother, which won the 2019 Ottawa Book Award for English fiction.*

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The first time I discovered that I could travel without my body moving was during a government-imposed state of emergency in my quiet South African township in the late 1980s. Night was falling and so were bullets, outside and all around us. We were forbidden from leaving our homes and I was in my small bedroom with my two younger sisters and three visiting friends who could not leave because they had stayed out past curfew. We were listening to bootleg tapes of rap music that was so defiant I knew it had to be illegal.

I want to say it was the rhythm of the song coming from the small tape player that moved me, but really, it was the lyrics, the way they transported me from the confines of that room to another land. In my mind I travelled to and lived, briefly, in a place that felt like freedom. I knew then that I wouldn't spend my adult years in the country where I was born.

People always ask: *Where is home?* It's such a heavy question. Whenever I'm asked, I fumble my way through an answer and come away thinking that I sound terribly inarticulate. But the truth is that it has taken me a couple decades to come to what feels like the right response.

I am a professional storyteller, a novelist. I believe it is my ability to travel to other worlds that has held me together through the very long process of settling in Canada and becoming comfortable with a language so far removed from my mother tongue. From the very beginning of arriving here in 1997, I sought solace in writing. I found these words in a collection of stories I wrote in my first few months in this country:

*You can put all your life together for free at this place they call a community centre: there are posters offering everything from pottery classes to anonymous meetings for alcoholics to cleaning jobs. Twenty dollars to clean someone's house. So much more money than I have. Seems simple enough. I think it can be done. I'm feeling that now-elusive thing called hope that seems to duck in and out of me once every few weeks, teasing me with brief glimpses of something new and better.*

Cold, a confusing language and a baffling new culture were what I was living, yet even then I was travelling to a brighter future. It helped that, right after gaining permanent resident status, I got a job working with refugees in newcomer centres. In their eyes I saw hope and resilience amid the challenge and pain of adapting to somewhere new. I also saw this hope and resilience — an insistence on belonging — in the stories I heard when I later worked for the United Nations Association in Canada and travelled around the country to teach young people about the Charter of Rights of Freedoms and learn about their concerns.

Immigration is an act of hope. It requires the ability to go somewhere better before something better comes along. Today, when I am asked, "Where is home?" I think it is where people are willing to offer the promise of change. At Carleton, I've been able and allowed to carve out space for myself within the university community, on my own terms. Today, when I travel to distant worlds, it is not with the anguish I felt that evening as a child in that room in South Africa. It is with pleasure, because for the first time, I feel anchored. When you immigrate, you are always searching. Then you discover that feeling welcome and safe is home. ■



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Immigration is an act of hope. It requires the ability to go somewhere better before something better comes along.

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WORDS AND PHOTOGRAPHS BY  
**AKINTUNDE AKINLEYE**  
AS TOLD TO DAN RUBINSTEIN

# SHIFTING PERSPECTIVES

A PHOTOGRAPHER TURNED PhD STUDENT LOOKS AT THE WORLD THROUGH A NEW LENS





In an image that Akinleye has titled “A Billion Reasons,” a woman walks through a commercial district in Lagos, Nigeria, in September 2012. Previous spread: a rainy day in Lagos in September 2014.

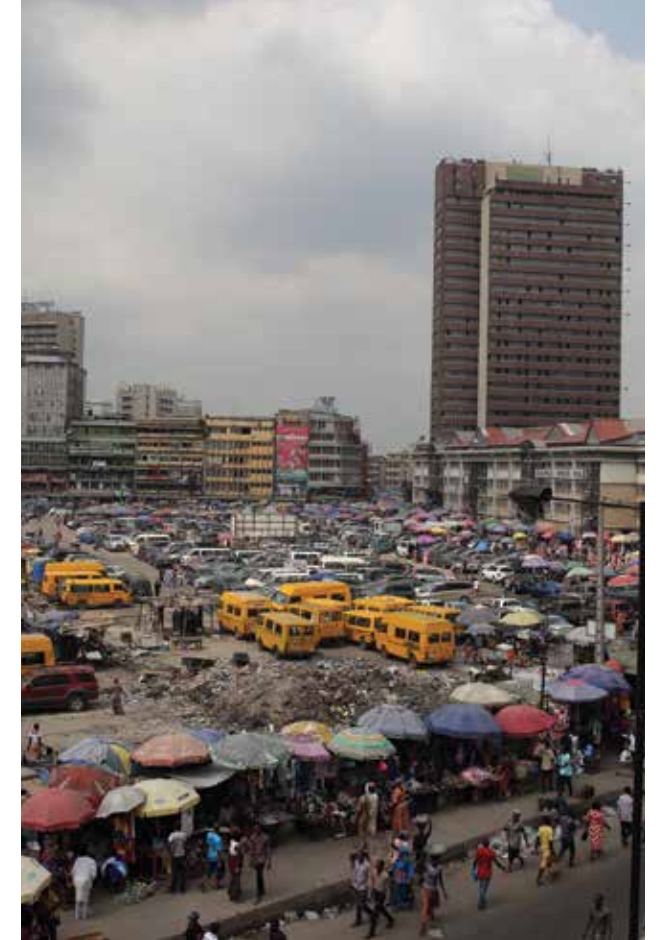
## IT WAS HIS MOTHER'S IDEA. AKINTUNDE AKINLEYE DIDN'T PLAN TO BECOME A PHOTOGRAPHER.

*pictures — an important consideration for a student from a middle-class family in a country going through a tumultuous period of “structural adjustment.” That experience led to nearly 20 years of work as a photojournalist, during which he travelled throughout Nigeria and other African nations, documenting the continent’s conflicts, religious rituals and everyday moments, getting beat up and shot at, and winning the prestigious World Press Photo prize in 2007 for an image of a man rinsing soot from his face after a deadly pipeline explosion. His images, including pictures documenting the human and environmental impact of oil production in the Niger Delta, have been published around the world and have been featured in several international exhibitions — “images that shock but also possess a formal beauty,” writes gallery director Oliver Enwonwu, with “an honesty of purpose clearly evident.” But despite that success, and a well-paying job with Reuters, Akinleye had always dreamed of becoming a teacher. In January 2017, he took a leave of absence and enrolled in a film studies master’s program at Carleton, a trial run in a new country. Now he’s pursuing a PhD in anthropology at the university, studying the voodoo religion in Benin. Both his time in Canada and the act of trading his camera for a regimen of reading and writing have had a dramatic impact on how Akinleye sees the world.*

*Growing up in Lagos, Nigeria, when he wasn’t at school, he played football on the streets with friends. At age 11, to provide direction and discipline, his mother got him a camera and an apprenticeship at a nearby studio. Later, at university, he realized he could make money by selling*



A girl sells bottles of fuel out of a covered canoe in February 2016 in Lagos lagoon’s Makoko community, where nearly 100,000 people live in houses on stilts



The bustling market near the marina in Lagos’ central business district in December 2016

Photography touches all aspects of life. Ethnicity. Politics. Class. Religion. Everything. It’s the same in Nigeria or Canada or any other country. My background as an undergraduate social studies student helped me begin to understand the planet and all the people around me. Later, when I roamed around Nigeria with my camera, I saw in real life some of the theories I had studied in the classroom. Photography is a tool that you can use to capture societies as they change — to make a visual discourse about crime or poverty or infrastructure dilapidation. My mission as a photojournalist was to put history into perspective, so that distortion could be reduced to its barest minimum. My photography is a kind of agitation with aesthetics. Everything is woven around activism. There is a sort of agitation behind every single picture I try to create.

Journalism allows you to travel; life is never boring. But after so many years of doing it, I was starting to forget my initial goal to become a teacher. I wanted a new challenge. I needed a new landscape. Leaving home has given me a fresh perspective. Taking a break from photography has also been good for me. Now I want to look at things not journalistically but through a longer time scale, which is one of the things that drew me to anthropology. Anthropologists go somewhere and embody an environment; you embody that knowledge. Then you go back home and reflect and write about it. You’re not just observing people. You’re interacting with them.

I made some good pictures as a journalist, but my understanding wasn’t deep enough. Now I’ll be able to go back to some of the places where I went with my camera, like the annual

“MY MISSION AS A PHOTOJOURNALIST WAS TO PUT HISTORY INTO PERSPECTIVE, SO THAT DISTORTION COULD BE REDUCED TO ITS BAREST MINIMUM.”





‘LEARNING ABOUT  
YOUR WORLD AND  
YOUR ENVIRONMENT IS  
SOMETHING WE NEED  
TO DO ALL THE TIME.  
IT MEANS LOOKING  
BEYOND THE IMMEDIATE.’

Akintunde Akinleye takes a brief  
break in the field in February 2012  
*Photograph by Aderinsola Adebanjo*

voodoo festival in Benin, and look at things in a very different way. With anthropological critical theories in my head, the pictures I take won’t be any more “fantastic” than the work I did in the past, but they’re going to be more shaped, more focused, more purposeful. More “why” than “what” — that’s what I want to do. It’s important to have a variety of experiences, both professional and cultural, whether you’re a journalist or a scholar, or for whatever else you do in your work and with your life. Learning about your world and your environment is something we need to do all the time. It means looking beyond the immediate.

In Lagos, there are 20 million people in a space about one-third the size of Ottawa. That’s like half of Canada. When

you step outside, there’s always a picture waiting for you — a drama is going on, somebody is fighting or singing. The streets of Ottawa are different than the streets of Lagos. My first few months in Canada were a shock. It was the middle of January. Nobody really talked to me. But sometimes you need to see and feel these differences to remind yourself of the value of considering multiple perspectives. People in Canada don’t see snow the same way I see snow, for example. For me, it’s art — it’s something that can tell stories about this place and this space, and how this country is utilized by the people who have occupied it and are living here. You can’t capture everything in one frame. But you can try to capture as much as possible. ■



A young street footballer prepares to play on a dusty  
pitch in Lagos’ Ojokoro district in April 2017





# BIG BLUE

ELEVEN WAYS TO LOOK AT WATER

PHOTOGRAPH BY  
CHRIS CLINE

It covers 70 per cent of the planet's surface and comprises 60 per cent of the average adult's body weight. In utero, we float in a fluid that's mostly water, and after we are born we must drink water or we will die. Without it, plants would not grow or produce oxygen. It regulates the Earth's climate and, like looking at fire, is mesmerizing to behold. Spending time in "blue space" — any aquatic environment, including oceans and lakes — has a psychologically restorative effect. Water is how our ancestors travelled around the world and across continents, determining where most of our communities took root. And it cradles the Carleton campus, forking into the Rideau river and canal and flowing past the land upon which we work and play.

The ways that members of the university community engage with water vary tremendously, from pollution research and urban planning to marine mammal conservation and studying the science of sweat. Several operate under the umbrella of Carleton's Global Water Institute, a cluster of more than 100 researchers focused on addressing domestic and international water challenges. "Water is essential — it is life," says the institute's director, Banu Örmeci, a Civil and Environmental Engineering professor and wastewater treatment expert. "It's important for us to develop sustainable and appropriate solutions to the world's water problems. We need to develop the right approach for the right location." Academics also need to ensure their efforts have tangible impacts, which is why the institute's operations manager, Evan Pilkington, has been tasked with developing partnerships with government, industry and the non-profit sector. "In the broadest sense, water is a multidisciplinary issue," he says, "and the university is uniquely poised to bring together disparate parties." The following pages contain a small sprinkling of first-person stories that show our deep and diverse connections to an often overlooked yet vital and unifying resource.





DOING SCIENCE  
OUTSIDE REMOVES  
INTIMIDATION  
BECAUSE IT'S  
CURIOSITY DRIVEN  
AND FUN.

Sampling stream invertebrates during Riparia's summer 2019 expedition to Quebec's Poisson Blanc Regional Park north of Ottawa  
Photograph by Mikayla Wujec

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## THE BEST CLASSROOM

INSPIRING THE NEXT GENERATION OF WATER PROTECTORS

*Carleton PhD student **Andrea Reid** does research on Pacific salmon migrations, tracking the fish's movement across space and time through threat-laden landscapes using techniques such as radio telemetry, and talking to Indigenous communities about changes they've observed — a challenging mix of ecological and social science. But Reid, a member of British Columbia's Nisga'a Nation, believes it's increasingly important to study natural systems in a holistic way and that a scientist's impact should not be confined to academia. So even though she's busy working on her thesis (which she hopes to finish next summer) and already has a job secured (as an Indigenous Fisheries Science professor at UBC), Reid and a pair of collaborators, Dalal Hanna and Mikayla Wujec — all three of whom are affiliated with National Geographic — have launched a non-profit, Riparia ([www.riparia.ca](http://www.riparia.ca)), that takes female-identifying youth on paddling trips with the goal of inspiring the next generation of water protectors.*

Science has been a way for me to reconnect with my Indigenous heritage, which I grew up separate from on Prince Edward Island. But I grew up surrounded by water, fish and fishing communities, and the strong connections between fish, people and place instilled in me a massive amount of passion for this sort of work. Later, spending time in my second home, the territory of the Nisga'a Nation, which is where my father is from, I've come to learn that fish, people and place are truly indivisible. I now work precisely at this intersection — on conserving culturally-significant fish and fisheries by interweaving Indigenous and scientific knowledge systems and approaches.

There's no organization out there that we're aware of like Riparia that pairs freshwater science with river expeditions for youth. Freshwater systems are often overlooked; oceans get all the glory. It's also an extremely gratifying way to add value to my research — I've spent long, hard hours learning the

fundamentals of freshwater ecology, limnology, fish dissection, radio telemetry and so much more — and now I get to distill my knowledge and skills into bite-size pieces and watch as they transform the youth who participate in our programs. My learning then stretches far beyond my thesis and these university walls.

Riparia is a passion project for Dalal, Mikayla and me. The Indigenous and non-Indigenous teens we bring on trips wouldn't otherwise have access to these experiences. Our first expedition last summer was a five-day canoe circuit through the Poisson Blanc Regional Park two hours north of Ottawa. Most of the youth had not camped for that length of time before, nor had they carried all their gear on a multi-day trip. We canoed from site to site and spent each day looking at different freshwater issues. One day, for example, we focused on stream invertebrate sampling, so we paddled out to remote streams and started turning over stones and found tons of little crayfish and so many different organisms, like dragonfly larva, at various life stages. When we got back to camp, we took out our microscopes so the students could play around and get a whole new perspective on stream life. They loved it! Doing this outside of a lab setting removes intimidation because it's all curiosity driven and fun.

In another activity, we tested water quality and talked a lot about the importance of water to people and to ecosystems. We had every tool we could get our hands on to measure every aspect of water — its temperature, depth, hardness, acidity, conductivity and more — many of which are based on chemical reactions. The youth would collect water samples off the sides of their canoes, then combine different chemicals in steps to see, for example, the amount of bromine or chlorine in the water. Seeing a chemical reaction in front of their eyes really pulled them in. The youth worked together as an amazing team.

Fundamental to people caring about the natural world is being able to spend time in it comfortably. The natural world is the best classroom there is. Outreach of this nature is a fantastic way to give back, while also sparking interest and curiosity in science in the next generation of potential scientists. For us, however, success doesn't necessarily mean that our participants all go on to become scientists like us, but instead, we want to produce informed advocates who go on to champion science and stand up for freshwater protection in whatever path they follow. ■





THERE'S NO DEBATE  
ON WHERE PLASTIC  
COMES FROM —  
HUMANS — AND  
THERE'S NO BENEFIT  
TO ITS PRESENCE IN  
NATURE.

Carleton students and citizen scientist volunteers look for plastic pollution in the Ottawa River

Photograph by Martin Lipman/Courtesy Ottawa Riverkeeper

The microplastics issue is, to me, part of a larger concern around the sustainability of plastic use. We're using millions of tons of plastic now every year and we don't really know what to do with it. In Canada, we only recycle around nine per cent of it, and we landfill the bulk of it, which is really expensive, and a percentage of that — about one per cent of our plastic production — slips out as litter that breaks down into microplastics. We use so much plastic, that one per cent really adds up.

There has been some progress, such as Canada's ban on microbeads — tiny plastic particles that were often added as exfoliates to personal care products. It took just one study in the Great Lakes for both government and industry to take steps, and in two years there was a ban. That's exceptionally fast compared to how we're responding to climate change and other environmental problems. There is huge public interest in plastic pollution right now and there are great opportunities to tackle this problem. I think that's because there's no debate on where plastic comes from — humans — and because there's no benefit to its presence in nature.

Reducing the amount of plastic we use is the first step toward reducing plastic pollution. But we can also improve and harmonize our recycling facilities, so it's easier for producers to make plastics that can be recycled. And we can also improve our wastewater and storm-water systems, with better filters and other engineering solutions, to reduce the flow of plastic. Knowing how much is out there is an important foundation for all this work. ■

A lot of people think the biggest concern is wildlife ingesting microplastics, which adversely affects not only their health but also our health if we eat them. But to me, just the fact that microplastics are everywhere, floating in the water and in the sediment, is hugely significant. Microplastics are in snow in the Arctic and in really pristine lakes. They're being transported in the atmosphere; we're breathing them in. It's a clear sign of human influence on ecosystems and has been proposed as a marker in the future geological record as the onset of the Anthropocene.

## 2 NO SMALL MATTER

THE SPREAD (AND SCOURGE) OF MICROPLASTICS

*Geography and Environmental Studies researcher Jesse Vermaire, who studies human impacts on freshwater ecosystems, has been collaborating with the Ottawa Riverkeeper organization, as well as students and citizen scientists, to sample microplastics pollution in the Ottawa River watershed. These tiny pieces of plastic are smaller than five millimetres in diameter and typically come from clothing, cosmetics and other everyday products. They can slip through wastewater treatment plants and may be eaten by fish and other animals.*

## 3 SWEATY MANIFESTO

AN ODE TO OUR SALTY WATERS

*Sarah Everts, the CTV Chair in Digital Science Journalism in Carleton's School of Journalism and Communication, is writing a book about the science, history and culture of sweat for W.W. Norton.*

Human beings have a mercurial relationship with sweat. Our perspiration saves us from feverish delirium and death on hot days, yet this temperature control system is not sympathetic to our social goals. Sweaty palms divulge leaks in our self-confidence; dampened armpits and goaty odours betray an otherwise self-assured composure.

Many would wish away the floods but settle on pretending that perspiration doesn't actually exist. Globally, we spend more than \$18 billion every year on deodorants and antiperspirants in an attempt to block sweating and its smelly consequences. Worries about excessive perspiration propel some people to pay for invasive treatments, such as laser ablation of their sweat glands, surgery to cut nerve fibres, or Botox injections in their sweat pores. Yet if sweat puts a wrench in our social goals, it may have once enabled our romantic ones. Scientists have long searched for human pheromones in

sweaty emanations, wondering if attraction could be catalyzed by the chemicals emanating out of our armpits. It begs the question: Has curbing our odorous emanations been counterproductive to finding true love — or, at least, sex?

Sweat has other connections to catharsis. Most cultures have sweating rituals — if not in modern times then at some point in their

history. There are marbled hammams found across the Middle East, Indigenous people visit sweat lodges, Koreans frequent jjimjilbangs, Russians drink vodka in banyas, and the Finnish have exported their saunas across the western world. In modern-day North America, there's an unending supply of fitness fads and wellness routines that promise to make you sweat. But once we've sweat to catharsis, many of us smear on deodorant or antiperspirant to limit future perspiration, as if we had some real control over this bodily function.

The truth is, we don't, really. Sweating is co-ordinated by a part of our nervous system that is outside of conscious control — think: organ function or digestion. Given that every person has, on average, about 2.5 million sweat glands on their body, and given that their proper functioning is a matter of life and death, it's probably just as well that evolution took perspiration control off our conscious to-do list. In fact, as humans evolved away from our primate predecessors, we optimized sweat's cooling properties. By losing our fur, we could easily evaporate water off our naked skin. This cooling capability — as well as bipedalism — enabled us to run long distances without overheating, and allowed us to escape from furry predators and race after furry prey until they died from heat exhaustion. Not a bad trade-off, at least in our prehistory, for a bit of salty residue and the need for a wardrobe change.

Our sweat has helped humans — for better and for worse — dominate the natural world, and it will help us cope with rising global temperatures. It's time we got over our revulsion about sweat and gave this fundamentally human body function the reverence it deserves. ■



4

# A SIGNAL AMONGST THE NOISE

SAVING THE WHALES WITH DATA SCIENCE

*Dave Campbell, a statistics professor at Carleton, studied environmental science as an undergraduate. He loves the natural world and wanted to work in that realm, but despite his passion, his lab science marks weren't great — but his stats marks were strong. That sent Campbell in a new direction. His research today varies tremendously, from developing machine learning frameworks that can process decades of eagle's nest webcam footage to identifying problems with BC Ferries scheduling and looking for regional differences in how Canadians describe beer. But like a project he started last year with collaborators from Simon Fraser University and Dalhousie University, much of it has environmental applications.*

The southern resident killer whale population — there are only about 70 of them — tends to spend its time around the southern tip of Vancouver Island and in the Salish Sea. This is a very busy shipping area. With a Department of Fisheries and Oceans grant, we're trying to figure out how best to monitor the whales to predict where they're going, so we can alert ships to slow down or take evasive action

and avoid colliding with whales. The whales are monitored in different ways, including underwater microphones called acoustic hydrophones and sighting logs from whale watching tours. We're trying to combine data of mixed quality from a variety of sources, and factor in information such as whether they're near a feeding ground, so we can make real-time predictions about their location and the direction and speed of their movements.

My expertise is in computational methods and uncertainty models, whereas my collaborators bring oceanographic and marine mammal backgrounds, and as with a lot of data science, domain-specific information needs to get folded into the analysis. But this work could help these whales, and the methods we develop could be applied to other whale or animal populations in other parts of the world.

In data science, there's often quite a bit of signal amongst the noise — and if we can account for the noise and decode the signal, we can make decisions that offset all kinds of problems. I talk to really smart people about the challenges they face and look for opportunities to provide statistical insight in areas where data is available in one form or another. I've worked with companies in the past where our goal was to get people to buy more stuff, which seems to be the most funded problem in data science, if not the world. There are a lot of ways that we can use our data superpowers for social and environmental good, and these kinds of projects provide excellent training opportunities for students. Statistics and data science are exceedingly employable fields right now. ■



Statistics professor Dave Campbell is using his data-science "superpowers" to help prevent collisions between ships and killer whales  
Photographs by Jeremy Koreski



Alumna Waneek Horn-Miller in the pool with the national women's water polo team at the 2000 Olympics in Sydney  
Photograph from Canadian Press Images

5

# EYES ON THE BALL

AN ATHLETE AND ACTIVIST FINDS PEACE IN THE POOL

*Waneek Horn-Miller, a recent inductee into Canada's Sports Hall of Fame who graduated from Carleton with a political science degree in 2000, is famous for two main reasons. She was a water polo star, leading the university to a pair of provincial championships and representing Canada at the 2000 Olympics, the first time a female Mohawk athlete competed in the games. This accomplishment is made more impressive by the fact that a decade earlier, at age 14, Horn-Miller almost died when she was stabbed in the chest by a soldier's bayonet during the Oka Crisis, a standoff over development on traditional Mohawk land.*

I learned to swim at Carleton when I was four or five. My mom put us into swimming lessons because she wanted us to have big dreams and goals, but also to have perseverance and to work hard. She wanted us to learn that through sport, but not be in judged situations. She wanted us to race against the clock. That's how I got into competitive swimming. By age 13, that got boring. My oldest sister

was playing water polo for her high school team, so I tried out and then tried out for the city team, whose coach also coached at Carleton. I didn't know what I was doing but I loved it. I was a swim sprinter, so racing for the ball was not a problem.

I wanted to be a part of a team. To be part of a collective. And it was cool to be a trailblazer. There haven't been a ton of Indigenous athletes on university or national teams. When you're in it, it can be hard and lonely and challenging. You feel like you're on the outside looking in and are trying to make other people understand you. We fear diversity in sport and society sometimes, but on teams you need diversity. You need people with different strengths to work together for a common goal.

There's something about the weightlessness of water that I've always loved, but also something about playing water polo that makes you focus on the present. If you don't focus on the present, you drown. All of the responsibilities that I've carried in my life, whether real or imagined, I was able to park them for a while when I was in the water and just enjoy that feeling of flow. From an Indigenous perspective, water is the first medicine. It's one of the most sacred elements in our culture. Now that I've given birth and carried three children, I feel an even stronger connection to water. There's not an English word for it — it's just a beautiful place for me to be. ■



# 6

## UNFROZEN

HOW DIGGING AND DATA CAN HELP MITIGATE PERMAFROST THAW

*Last year, to help Canada adapt to thawing permafrost, NSERC created the \$5.5-million Permafrost Partnership Network, or PermafrostNet. Led by Carleton climate change researcher Stephan Gruber, the network brings together scientists from a dozen universities and more than 40 partner organizations, including industry, Indigenous communities and government agencies, nationally and internationally. Permafrost is ground that remains at or below zero degrees for two years or more, creating a unique environment that permits the preservation of buried ice. PermafrostNet's data scientist, **Nick Brown**, who met Gruber while running a fly-in geological services field camp on the tundra east of Yellowknife and later did his master's degree with Gruber, explains how the new network will address one of climate change's biggest challenges.*

After my undergrad, I went north for a summer in 2012 and moved up permanently the following year, staying until 2015. I helped teams do everything from drilling core samples to doing geophysical surveys to moving hundreds of fuel drums by helicopter. We also compiled a lot of the geoscience data, analyzing it and creating reports. I love doing fieldwork in these remote places and getting an understanding of the science behind it.

Some people tend to focus more on fieldwork and others more on modelling and data analysis, and there are

### PERMAFROST PLAYS A SIGNIFICANT ROLE IN THE CLIMATE FEEDBACK SYSTEM.

PermafrostNet data scientist Nick Brown got the hang of fieldwork before going back to school

Photograph by Stephan Gruber



big strengths to both ways of studying phenomena such as permafrost, but a blended approach can also be very effective. Stephan's research program combines a strong fieldwork component with computer simulations using big data sets. PermafrostNet has been set up to help field scientists and data modellers collaborate, and to harness the data sets that various agencies have already collected. My role is to help make this happen.

Permafrost is important in both a global and Canadian context. Within Canada, thawing permafrost has tremendous implications for any sort of northern infrastructure — roads, pipelines, airports — and northern ways of living. Highways buckle and heave, houses sink, and pipelines and other linear infrastructure are particularly susceptible. Globally, as it thaws, carbon emissions are projected to increase. There are still questions about how much carbon is stored and what form it's in, but we know that permafrost plays a significant role in the climate feedback system.

Some permafrost can have a significant amount of ice in it — as layers, veins or wedges of ice, which arise from the repeated contraction of the ground producing cracks that fill with water, a process that's repeated year after year. When this ice melts, you can get dramatic landscape changes, especially if there's a slope to the ground and large thaw slumps develop. More often though, these impacts are much less visible, unlike shrinking glaciers. This hidden nature makes PermafrostNet's national-scale simulations and forward-looking models an important tool. But having been up north and seen some of these changes firsthand still provides the best motivation. ■

# 7

## CASH FLOW

THE BUSINESS OF CANAL CONSTRUCTION

*Sprott School of Business, has a different take on the UNESCO World Heritage Site. For the past dozen years, she's been working on a multifaceted accounting history of the canal, publishing academic papers that explore, for example, early budget estimates and cost-benefit analyses in correspondence about the project.*

I've lived almost my entire life at one end of the canal or the other, either in Ottawa or Kingston. I've always been fascinated by its history, and nobody had really looked at it from an accounting perspective before. I knew there had been overspending when it was built, but I was curious about the nitty gritty details, such as what kind of spending controls were in place. Accounting information provides a really good record of the challenges that were encountered. It's a record of the planning process, the evolution of management practices, the relationship between the British royal engineers who designed the canal and the contractors who built it, and even of the portrayal of Indigenous peoples.

I see strong links between this history and contemporary construction projects, including the new LRT system in Ottawa. The language and rhetoric that's used to describe these big infrastructure projects is actually quite similar, even though it's 200 years later. We can learn lessons from the past, such as knowing that you're going to encounter challenges when you start digging and should factor uncertainty around costs and timelines into your plans in a formal way.

The thing this project brings me back to again and again is the importance of water. All of our major cities and towns are on water, but when you listen to traffic reports on the radio, commuters backed up in their cars on bridges, water is often an impediment. Yet historically, waterways were fundamental mechanisms for connecting people and places. They were the main transportation routes. Some archival British government documents even call the Rideau Canal an inland communication. A noun, not a verb. There's a really expressive and eloquent way that people wrote in the 1800s, albeit for persuasive purposes. You never know what you're going to find in the archives, things that might otherwise stay buried. ■

*To most people, the Rideau Canal is something to skate on in winter and something to walk, run or cycle beside in summer. **Merridee Bujaki**, an accounting professor at Carleton's*

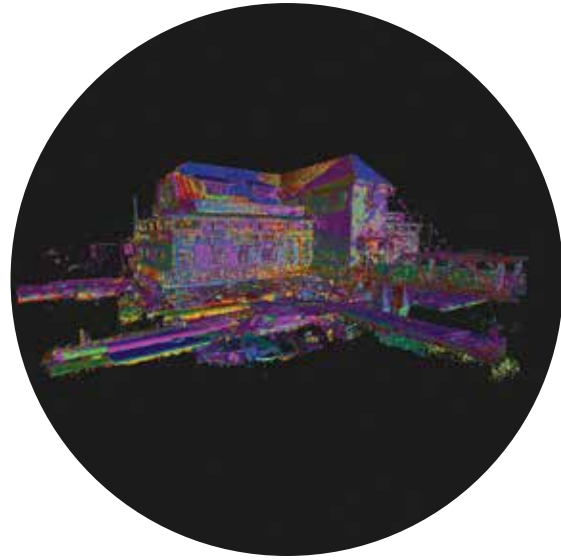


YOU'RE GOING TO ENCOUNTER CHALLENGES WHEN YOU START DIGGING AND SHOULD FACTOR UNCERTAINTY INTO YOUR PLANS.



Historic construction projects can provide valuable context for today's infrastructure work  
Photographs from Library and Archives Canada





IT WAS A  
PLACE FOR  
COMMUNITY,  
AND THAT'S  
SOMETHING  
WE'RE LOSING.

Digital documentation work at  
the Ottawa River Boathouse  
Photograph and point-cloud image  
courtesy Mariana Esponda

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## RESURRECTION

BRINGING OUR RIVERSIDE HERITAGE  
BACK TO LIFE

*building's dilapidated conditions and its strong bones. Esponda, who seeks projects for students that involve real-world clients and problems, immediately knew that she wanted to help bring life back to a site that has hosted regattas and raucous dances for decades, most recently as the home of the Ottawa New Edinburgh Club. Her students spent months digitally documenting the pavilion and painstakingly creating 13 detailed proposals for its future use — creative designs that informed the National Capital Commission's ongoing multimillion-dollar revitalization effort, which will preserve the landmark building and transform the space into a four-season facility that welcomes people back to the riverside.*

There's a real feeling of discovery in that building. Every time you turn around, you get a different view and have a different relationship with the water. Sure, it's been neglected — the paint is peeling, there is oxidation on the metal — but there's a beauty to that as well. It's the aging of the building. The upper floor is a huge open space, surrounded by windows, with doors to a balcony. When you step outside, it's magical. And then you go down to the lowest level, where the club's kayaks and canoes are stored, and onto the docks, and you are floating. You are part of the river.

I wanted the students to understand the connections between the building and the waterway, and to enhance its environmental and historic values. The building is a testament to early-20th century recreation. It was a place for *community*, and that's something we're losing. I wanted them to re-imagine that era, and also to think about things like the location's Indigenous history, native vegetation and animal species, water treatment, and accessibility from the shore. Collectively, their proposals became kind of a master plan. The National Capital Commission saw the possibilities for what it could become and showed our drawings and designs to potential partners, for everything from conservation and stabilization to commercial uses. What the students proposed is going to become real.

When we started working on this, in spring 2017, there was major flooding, and there was flooding again last spring. The students are very aware of how climate change is affecting this site, and aware that we have to respond. When people come and enjoy this area, they'll have more of a sense of stewardship. Many people in Ottawa don't know this amazing location. The best way to protect a place is to use it. If we don't give life to it, nobody is going to care and it's going to be forgotten. ■

*The first time architecture professor Mariana Esponda walked up to the Ottawa River Boathouse — a century-old, three-storey, gable-roofed heritage building perched over the water on stilts in the east end of the city — she was struck by the interplay between the structure and the natural setting. Inside, she noticed both the*

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## MAP QUEST

POLICY CHANGE  
THROUGH STORYTELLING

*Sheryl-Ann Simpson, who joined Carleton last year from the University of California, Davis, does research at the intersection of urban planning, environmental justice and health, exploring the role of government in our*

*everyday lives. How, her work asks, are municipal laws made? How can policy support equity? While in California, she was approached by the Community Water Center (CWC), which supports the right to safe, clean and affordable water. The CWC wanted help making a map that linked access to water to health concerns, leading to an ongoing collaboration with Simpson that she has brought to Carleton.*

WE WANT TO TRANSLATE  
PEOPLE'S EXPERIENCES  
INTO SOMETHING THAT  
POLICYMAKERS CAN TAKE  
ACTION ON.



The connections between water, climate change and health in California hold lessons for other jurisdictions

There is a lot of inequality in California, which is related to the fact that there are so many vulnerable migrant workers, including a large Mexican-American population, in the state. This inequality has been exacerbated by climate change. Groundwater has been drained off by agricultural practices, which has multiplied the impacts of drought. Wells went dry or were contaminated, but because there wasn't enough oversight people kept drinking this water. This can contribute to incidence of certain types of childhood cancers, to premature births and low birthweights, which are some of the things that the CWC asked me to map.

There's a long history of using this type of approach to measure problems in a community, because quantitative tools generally have a lot of sway with policymakers. But maps aren't always sensitive enough to actually register what people are seeing and saying, and a lot of health concerns are long term and cumulative — and they're not only related to drinking water but could also be connected to the water you bathe in, the water you use to clean your fruit, the water you're using or the chemicals you're exposed to in your agricultural job. You can't always get at these relationships with conventional data gathering, so we're trying to make maps that are also qualitative, and we've discovered links between water contamination and health markers such as low birthweights.

Right now, I'm working with an interdisciplinary team — it includes an environmental policy analyst, a public health nurse, another health geographer, a public policy specialist and two of my undergraduate students — to build qualitative tools that capture people's stories and experiences and are also legible to policymakers. We're trying to translate people's experiences into something that policymakers can understand and, more important, take action on.

California is a canary in the coalmine. Drought, fires, pollution, poor air quality — the impacts of climate change are being felt more strongly there, and these things all feed back into health questions. California has pretty much the same population as Canada, so paying attention to how communities there adapt could have lessons for us. ■



Last fall, as Google subsidiary Sidewalk Labs' controversial plan to develop a high-tech district on the lakeshore in downtown Toronto moved through the approvals process, Waterfront Toronto emerged as an important watchdog. Created in 2001 by the federal, provincial and municipal governments to revitalize 2,000 acres of former industrial land beside Lake Ontario, Waterfront Toronto is currently evaluating the Sidewalk Labs proposal, including questions around data privacy. It's all part of the challenge of creating sustainable mixed-use communities and public spaces in a mega city — and another day's work for **George Zegarac**, a Carleton Master's of Public Administration graduate and 33-year senior provincial government official who became the president and CEO of Waterfront Toronto last summer.

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## ON THE WATERFRONT

TORONTO'S LAKESHORE DEVELOPMENT PUZZLE

This part of Toronto was once a large manufacturing area. The lake was used for transportation and industry. It is no longer the industrial hub it once was. When the city was bidding to host the 2008 Olympics — which went to Beijing — there was a lot of excitement about redeveloping the waterfront. That catalyzed all three levels of government, who created Waterfront Toronto to work with public and private partners and oversee the revitalization. The main focus from the start was to give everybody access to the waterfront: to build complete communities with affordable housing, to build and improve parks and other public spaces, to create places to live and work and play.

I spent nine years with the province's Ministry of the Environment and helped create the Ontario Clean Water Agency almost 30 years ago. That was about finding a transformative way to protect our environment, and I've been intrigued by transformational opportunities throughout my career. That's what really attracted me to Waterfront Toronto. As CEO, I have to make sure that we follow the direction of our board and partners, and make sure we secure appropriate funding to build world-class projects. We get input from all three levels of government, but engaging with the public is our top priority. We need to ensure that a variety of community voices are embedded in early discussions about any development.

When I started this job, I got on my bike and rode along the waterfront. There are municipal gardens, art installations and ferries to the Toronto Islands. Beside the old sugar refinery, there's Sugar Beach, which has gorgeous sand and big umbrellas and a promenade with beautiful trees. It's a great place for de-stressing, and now companies, shops and a college are moving into the area. I don't think people realize how much the city's waterfront has changed and how much potential it has. Which is why it's so important to get things right. ■



THE MAIN FOCUS FROM THE START WAS TO GIVE EVERYBODY ACCESS TO THE WATERFRONT.

The Simcoe WaveDeck at Queens Quay in downtown Toronto  
Photograph courtesy Waterfront Toronto

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## TAKE ME TO THE RIVER

WHAT MY STUDENTS LEARNED FROM PASAPKEDJIWANONG

Carleton's Collaborative Indigenous Learning Bundles project — one of the university's responses to the Truth and Reconciliation Commission's calls to action around integrating Indigenous knowledge and teaching methods into post-secondary institutions — has led to the creation of a series of focused Indigenous knowledge modules that are available for faculty to deliver in their classes. The Bundles provide the factual and theoretical basis for understanding Indigenous history and politics in Canada, while prompting students to consider how this knowledge might be applied in their areas of study. English professor **Janice Schroeder** shares an account of using one of the Bundles with her students.

The Bundle on Indigenous environmental relations doesn't include English in its list of possible courses. Yet its knowledge keeper, Kitigan Zibi elder Albert Dumont, is a poet and author of a children's book. He works in genres we study regularly in English. Indigenous literatures and, increasingly, environmental awareness inform our English courses at Carleton. So I decided to introduce the Bundle last September in a required course I've taught for years on 18th- and 19th-century British

literature. That was the era of the so-called Enlightenment and the Industrial Revolution, the age of global colonial expansion, and the period that spawned some of the first examples of environmental writing in English. The Bundle helped decentre western conceptions of "nature" expressed in the texts we had been discussing. It also led us outside the classroom to the side of Pasapkedjiwanong.

I learned from Bonita Lawrence's excellent book *Fractured Homeland* that Pasapkedjiwanong means "the water that runs between the rocks." When Samuel Champlain renamed it the Rideau River, he performed an act of colonial erasure — one of many. Part of the great Kiji Sibi (or Ottawa River) watershed, Pasapkedjiwanong holds Indigenous stories that are not mine to tell. But prompted by the Bundle, I asked my students to follow me outside on a beautiful autumn morning, to sit quietly by the river, to listen to its voice, to observe its movements and inhabitants, and to reflect on their relationship to the river.

I asked them if they had ever really considered this river before. Did they know its settler or its Algonquin name? I asked my students what it means to study at Carleton, which is nestled between Pasapkedjiwanong and the Rideau Canal, a colonial nation-building project that permanently altered the river's original path. When we say before events that "Carleton University is located on unceded Algonquin territory," do we understand the implications? Does the river that runs past our campus have anything to teach us? One student later reflected that, although initially skeptical about learning from the river, she has begun to see how Indigenous values of relationality and reciprocity between human and more-than-human agents could reshape her understanding of literature.

The teachings shared by Métis/Otipemisiw anthropology professor Zoe Todd in this Bundle challenge us to think about rivers, trees and other species as "parts of society." One thing this could mean for us in English — or any program — is questioning the division between nature and culture that structures knowledge in the western university. In his response to the Bundle, one student later described cherished memories of his family's cottage. "I don't remember ever discussing with my family which people's traditional land the cottage was built on," he said. My hope is that he takes the time to find out. ■



# BIRDS AND A PLANE

CARLETON RESEARCHERS PILOT A UNIQUE  
APPROACH TO WILDLIFE CONSERVATION

**The Morris Island Conservation Area is only about an hour's drive west of Ottawa, but on a brilliant autumn morning, the city feels a world away.** The 47-hectare mix of forested woodlands and wetlands is bursting with crimson and gold, with reflections of towering maples and a cloudless sky shimmering in the glassy back bays of the Ottawa River. And even though it doesn't look the part, Morris Island is a stand-in today for distant James Bay, which stretches south from Hudson Bay about 1,000 kilometres north of the National Capital Region.

BY TYRONE BURKE  
PHOTOGRAPHS BY  
FANGLIANG XU



**B**acked by low-lying marshland, James Bay is sparsely populated and lined with broad beaches and nutrient-rich mudflats. It's an ideal place for more than two dozen species of shorebirds to rest and feed before they continue their epic migrations. Every summer, a team of volunteers travels to this roadless region; they count shorebirds by walking back and forth on transects that run perpendicular to the shore — about 10 kilometres each day — noting which species they spot and how many there are. But this type of survey can be invasive, disturbing birds such as the endangered red knot — a hefty, long-legged sandpiper that flies to Tierra del Fuego at the tip of South America — and adding risk to southbound journeys on which they must navigate coastal habitats damaged by ports, resorts and urban development. Which is why one of those volunteers, Gerhard Bruins, asked an engineer at Carleton how the bird counts could be made more comprehensive, accurate and efficient. And why a small group of professors and students have gathered at Morris Island to test fly a new approach.

At the conservation area, master's student Brendan Ooi is tiptoeing along the water's edge, planting hyper-realistic 3D-printed models of shorebirds including red knots and greater yellowlegs among the rocks. Overhead, a small drone is hovering. The low buzz of its rotors is interrupted only by the clicks of its integrated camera system and the occasional splash of a Canada goose coming in for a landing. The drone is piloted by Mechanical and Aerospace Engineering professor Jeremy Laliberté, Ooi's academic advisor and one of the country's leading autonomous aerial systems researchers. Laliberté and Ooi are working out how best to use aerial photography to count birds on the ground. They're taking photographs and video footage of these model birds from different elevations to determine the optimal balance between covering terrain and accurately identifying birds.

"We've been trying to find the ideal flight path," says Ooi. "We want to know whether it's better to fly in a grid pattern or in a line. We want to automate the image taking and video recording process, so a drone can be set up in advance and is easy enough to use that the volunteers can go north and run the bird count program even with little or no experience flying drones." But automating drone operations is one thing; processing the imagery is another. "Sometimes you can collect too much data," says Ooi, "and you don't know what to do with it."

That's where Cheryl Schramm comes into the picture. The Systems and Computer Engineering instructor was the first person approached by Bruins, a former Canadian Wildlife Service scientist and director of the ecological consulting firm Species Inc., who has travelled to James Bay three times to count shorebirds the old-fashioned way. Schramm recognized that the bird counting process could be automated by training a neural network to recognize aerial images of shorebirds — and that the artificial intelligence application could process this visual data much more efficiently than humans. But getting that information into a format the neural network can handle is an additional challenge, and two of Schramm's fourth-year computer science students are working to solve it.



Previous spread: Engineering instructor Cheryl Schramm deploys a 3D-printed bird at the Morris Island Conservation Area

This spread, right: master's student Brendan Ooi gets ready for take-off

This spread, far right: aerospace engineering professor Jeremy Laliberté at the helm with ecological consultant and bird-count volunteer Gerhard Bruins looking on



'WE WANT TO AUTOMATE AS MANY OF THE STEPS AS POSSIBLE TO REDUCE THE AMOUNT OF HUMAN EFFORT REQUIRED. PEOPLE HAVE TO GO OUT THERE FOR WEEKS AT A TIME AND CAN BE IN DANGEROUS SITUATIONS WHEN THEY DO.'





THE LOW BUZZ OF ITS ROTORS IS INTERRUPTED ONLY BY THE CLICKS OF ITS CAMERA SYSTEM AND THE OCCASIONAL SPLASH OF A CANADA GOOSE COMING IN FOR A LANDING.



This collaborative project began when Schramm was approached by Bruins, who wanted to find a way to make bird counts more comprehensive, accurate and efficient. Schramm and Laliberté, along with their students and other Carleton faculty and students, have come together to develop a unique solution that involves drones, artificial intelligence, 3D printing and wildlife painting.



Simon Dewilde and Rachel Myrah are developing a photo stitching system that will merge the imagery captured by the drones into larger files and automatically eliminate the overlap between images. They've also started training a neural network to recognize shorebirds, so they can automate the process of counting birds in those stitched-together panoramas. "We want to automate as many of the steps as possible," says Dewilde, "to reduce the amount of human effort required. People have to go out there for weeks at a time and can be in dangerous situations when they do."

Dewilde and Myrah are striving to make a system that can count birds at least as accurately as people can, while allowing volunteers to stay close to the hunting camps they rent from local First Nations during these annual counts (and far from any polar bears that happen by). But training a neural network to recognize and classify features in images can take thousands of photos; each classification can require a thousand images. And when you're dealing with rare or endangered birds, there aren't thousands of photos to choose from, especially from an aerial perspective. "It requires a ton of data," says Myrah. "Right now, we're getting sample images, and even though they are not actual birds, they'll let us train the neural network, which will hopefully enable us to count the real birds."

'SOMETIMES YOU CAN COLLECT TOO MUCH DATA, AND YOU DON'T KNOW WHAT TO DO WITH IT.'

For this approach to work, the model birds needed to be realistic. And for that, the researchers turned to biology professor Jeff Dawson. "We collected photographs of the different shorebird species," says Dawson, who worked with undergraduate computer science student Skyler Bruggink to create the digital models. "To make sure we had modelled the birds accurately, we compared the 3D models to actual taxonomic specimens and made sure they had accurate dimensions and attributes." Skyler's father Ed Bruggink, a wildlife artist who has managed the biology department's greenhouses for nearly 40 years, then painted the models to give them a lifelike look and feel.

For ease of use, Laliberté chose to work with an off-the-shelf platform. The DJI Mavic 2 is a small quadcopter with a high-quality integrated camera. It's a widely used aircraft for drone photography. By using a ready-made setup, Laliberté and his team could focus on how best to collect the data, rather than having to build a drone or design a photography system for one.

As Ooi places the model birds among the rocks on the sandy shores at Morris Island (whose maple trees belie the simulation of sub-arctic tundra), he notes that even if all the technical hurdles can be overcome, there will be one more challenge: not disturbing the living, breathing birds that are sharing Morris Island's airspace with the drone. "The biggest issue is how they react," he says. "If the birds don't like you, you can't really do this. If they stopped flying, we wouldn't fly either." ■





# EYE OF THE NEEDLE

A CONVERSATION ABOUT CHEMISTRY, OPIOIDS AND PERCEPTION

PHOTOGRAPHS BY  
MARTIN LIPMAN

**Charlotte Smith** is a sociology master's student at Carleton. Her research is exploring the experiences of homeless youth, many of whom struggle with substance abuse — two major threads in her own life.

**Jeff Smith** (no relation) is a chemistry professor and director of the Carleton Mass Spectrometry Centre. One of his projects is using mass spec — an analysis technique that can determine the molecular structure of a substance — to find out what's in the drugs that people bring to the supervised injection site at Ottawa's Sandy Hill Community Health Centre. — as told to Dan Rubinstein

► **Charlotte Smith:** I moved to Canada from England in 2002 when I was 12 to be with my biological mother. My adopted uncle had been sexually abusing me since I was four or five. My mum gave me a choice: stay in England and she would tell the police and I would have to go to court and talk about everything, or come with her. She was in Dunrobin, outside Ottawa. We had a lovely honeymoon period, like we were the *Gilmore Girls*, then it deteriorated. She didn't have any other kids and I wasn't the way she wanted me to be. Even my Yorkshire accent upset her because she had grown up in a different part of England.

► **Jeff Smith:** As a teenager, I really got good marks in science. The fact that right answers were right and wrong answers were wrong, and that the data either supports a hypothesis or doesn't, I found that appealing. I liked putting my efforts towards outcomes that weren't based on opinions. In my undergrad, I did a lot of chemistry and biochemistry. In grad school, I got into mass spectrometry, which allowed me to work with my hands and analytical equipment to come up with data that gave me a better understanding of how biological systems worked.

► **Charlotte:** The week before my mum kicked me out, when I was 15, she dragged me to the Children's Hospital of Eastern Ontario (CHEO), to the psych

ward, because I'd been cutting my arm. I was in this new country and was so homesick. My mother begged CHEO to admit me: "She's a danger to herself!" And they were like, "She's not — she's just a teenager." Mum couldn't handle it, and a week later she dropped me off at a foster home. I was so afraid. A few weeks after that, I started letting the foster dad have sex with me. I saw this guy at the top of the stairs and thought, "OK, I'm safe now, I'm going to make this my family," and I hugged him. He told me later, "When you hugged me I knew you were in love with me and we were going to be together." How can one person be thinking one thing and another person something completely different?

► **Jeff:** The drug checking project started when a harm reduction worker from the AIDS Committee of Ottawa (ACO) approached Carleton Front Door, an initiative we launched with the goal of working with the community to find new ways of dealing with problems that people are facing. I've used mass spec to work with a coffee company and a craft brewery and was meeting with a lot of potential partners from the food industry, and he asked whether a mass spectrometer could tell us what's inside street drugs. I also do research on cancer therapies, but public health issues like the opioid crisis were not on my radar. Mass spectrometry was basically built by the





**'WONDERFUL OPPORTUNITIES — THAT'S AN OXYMORON. ALL OPPORTUNITIES ARE WONDERFUL. YOU DON'T REALIZE THAT UNTIL YOU DON'T HAVE ANY.'**

Ten years ago, Charlotte Smith woke up one morning and didn't know her own name. Now she's on the cusp of earning a master's degree and is working to address youth homelessness through research and street smarts. Photographs taken on Rideau Street near the Sandy Hill Community Health Centre.

pharmaceutical industry to analyze drugs, which is the field's main bread and butter. I took a quick survey of the main molecular structures of opioids. All of them are highly conducive to analysis by mass spec.

► **Charlotte:** The foster home dissolved and all the kids lost their placements when the wife called the police. I was still trying to attend school and wasn't doing well. I floated between working on and sleeping at farms and staying with my former foster dad. That's when I started doing drugs. When my mum kicked me out she suspected I had been doing drugs, even though I had never even tried pot. So I said, "Fuck it — everyone thinks I'm a junkie anyways, I'm just gonna do whatever I can." I started popping ecstasy and speed and any pills I could get my hands on. I had switched to an alternative high school and drugs were easy to get.

► **Jeff:** A mass spectrometer is like a very sensitive balance. You take a sample that contains different molecules. The instrument puts a charge on each molecule that turns them into ions. Those ions, because they're charged, can be manipulated by an electric field. Based on how they move, you can determine what their mass is, and when you know the mass of a molecule you know its identity. Conventional mass spectrometers take up an entire bench top, need 30 minutes to do an analysis and consume nitrogen gas. A new one costs about \$500,000. They have pumps and fans that whirl and buzz loudly. To a pharmaceutical company, none of this is big deal — it's the cost of doing science.

► **Charlotte:** I didn't consider myself homeless even though things like couch surfing and survival sex for shelter fall under the definition of homelessness. When I met somebody who had been prescribed OxyContin, I became street-level homeless. She gave me a couple pills and I taught her how to snort them, which gets you way higher. I didn't realize they were so addictive. She's dead now. It was a huge mistake, although Oxy gave me the courage to finally leave the foster dad. I moved in with a bunch of people who were addicted to Oxy. That lasted less than a month. Eventually I started sleeping in cars with people who were using drugs, and then on the streets. Not all homeless young people do drugs, but many of the ones I have met do. It's escape. Even now, I constantly feel like I don't want to be inside my own body.

► **Jeff:** I went to a mass spectrometry conference in the U.S. in 2017 and, amongst hundreds of booths set up by people from industry, I saw a prototype I had never seen before. It was from a company called BaySpec, which had gotten a contract from the American military to build an unique new mass spectrometer. It was about 13 inches by 16 inches by 9 inches high and weighed 22 pounds. The military wanted to strap these things to the bottom of vehicles and use them to drag a probe along the ground to test for chemical warfare agents. I asked, "Have you thought about using it for anything else?"

► **Charlotte:** I was in and out of jail, and every time I got released, it was the same: I'd go straight back downtown, back to crack. All the social services and support that people need are downtown, so even if you're trying to get help, you're putting yourself into a high-risk situation. If somebody was picking me up from jail and we weren't smoking crack in the car, then we were going to get some. Crack was my drug of choice, but I also used Oxy and heroin and morphine — any type of downer I could get just to keep from being sick from withdrawal.

► **Jeff:** Lynne Leonard, a social epidemiologist at the University of Ottawa, and her research team, along with the ACO, secured funding from the Canadian Institutes of Health Research (CIHR) towards understanding the ramifications of telling a drug user what's in their sample. Does it cause them to act any differently when they know what's in their syringe? Through the CIHR grant, I was able to broker a deal. BaySpec gave us the instrument for a free 30-day trial, we took it to the Sandy Hill supervised injection site, and I was convinced in about 20 minutes. It blew my mind how well this instrument worked. We saw all the different components of the drugs immediately.

**Charlotte:** One time, when I was getting out of jail, I was able to reach a friend from elementary school, Seb, and he took me straight to Orleans. There, Seb and others encouraged me and helped me to get a job on a horse farm. I didn't come into Ottawa for a year and a half, because I couldn't be around any drugs. I was very happy getting paid 50 bucks a day for 10 hours of shovelling horse shit. One of the girls who owned a horse on the farm, Jennifer, became my friend and helped me apply to Carleton. She helped me write about my life. That's one of the things people don't understand about homelessness and drug use — it's



so important *who* you know. When everybody else is struggling with the same issues as you, there's nobody to lead you out.

► **Jeff:** Once we realized it was going to work, we bought the instrument through the CIHR funds and have been using it in Sandy Hill for more than a year. For me, it's been eye-opening exposure to a world I didn't know anything about. Clients bring their own pills, which they crush and heat with water in a cooker — a small metal bowl — which dissolves the drug into a liquid that they pull into their syringe. A lot of times they'll set the syringe down and go through a ritual of preparing their skin or working themselves up to do an injection, which takes a few minutes. In this small window, with their permission, we're able to take a single drop from the syringe and tell them what's in the drug.

► **Charlotte:** When I got off drugs I wanted to become a social worker and retrieve my friends who hadn't been as lucky as me and were still on the streets. But I didn't get into the social work program, so I did my undergraduate degree in sociology. In second year, I met a professor named Jackie Kennelly who hired me as a peer research liaison to interview homeless youth because I had answered a question about homelessness in one of her classes and she suspected that I had been homeless. As a peer researcher, I'm a peer first and a researcher second. It's not just about collecting data. I have a vehicle and an income as a research and teaching assistant. I can drive somebody to an appointment or give them \$10 if they don't have any food.

► **Jeff:** We've just finished the first part of this project and have seen a behavioural change among clients commensurate with the information that we've been giving them. Without knowing what's in their drugs, a lot of people take a full dose. Maybe because they gave themselves a full dose last time and they were OK. Possibly because they don't want to risk an underdose. They're looking for a therapeutic level. When we tell them that there's fentanyl when they thought they bought heroin, we see a change. People will reduce their dose. Some throw out their syringes. Each reaction is slightly different.

► **Charlotte:** In the summer of 2018 I got a \$7,500 research internship. I interviewed homeless youth specifically about their school-based experiences. In my work with Dr. Kennelly, I had noticed that schools

came up in conversations again and again, because everybody had been in school prior to or during their homelessness. I realized that schools often could have helped but didn't — which was the same as my own story. We found that overwhelmingly schools are neglecting homeless young people or punishing them for the symptoms of their homelessness. Sometimes individual teachers try to take it upon themselves to help but without the support of their institution. Schools are typically either causing harm or failing to intervene.

► **Jeff:** Part of our strategy has been not only to tell the individual user what they have but also to share the data, in an anonymous aggregate fashion, with the broader community — to tell the wider truth about what's in the drug supply. We put up posters and disseminate information to public health officials and law enforcement agencies. When we first started, I was surprised every time we saw fentanyl, and we'd put out an immediate advisory every time we saw carfentanil, which is even more potent. The unfortunate reality is that today, even in "heroin" samples, we don't see any heroin. It's all fentanyl. Both are opioids, both are going to elicit the same response, but fentanyl is a lot cheaper for whoever is making the drugs.

► **Charlotte:** I'm planning to defend my master's thesis in April. I want to make it very clear that while schools are failing homeless youth there is potential for them to help. Ensuring that teachers have the capacity to spend time with individual students to build trusting relationships would be a huge step forward. Teachers can spot problems like sexual abuse or drug abuse and direct students to appropriate support. But it's not teachers' fault that they're too busy, with class sizes increasing and budgets being cut.

► **Jeff:** The CIHR funding is wrapping up, but we received additional support through the federal government's Impact Canada drug testing technology challenge last spring to further develop our approach. We would like to take it from simply a qualitative observation — "You have fentanyl or carfentanil" — and start telling clients the exact amounts in grams of what they have. This would be a huge transition. Currently, the best way to solve an addiction is to "taper" down and wean yourself off a drug. But without knowing what's in your drugs, you are playing roulette every single time you inject something, and it becomes almost impossible to stop using.



Chemistry professor Jeff Smith was drawn to mass spectrometry because it gave him a better understanding of how biological systems work. He has used this technology to help develop cancer therapies and to do research for coffee and beer companies, but his work on opioids has revealed another dimension to mass spec.

**'THIS OPIOID RESEARCH HAS A FACE TO IT, AND IT'S THE MOST IMPACTFUL WORK I'VE DONE. I THINK IT'S EXTREMELY IMPORTANT FOR SCIENTISTS TO ENGAGE WITH THE COMMUNITIES WE SERVE.'**



**'WITHOUT KNOWING WHAT'S IN YOUR DRUGS, YOU ARE PLAYING ROULETTE EVERY SINGLE TIME YOU INJECT SOMETHING, AND IT BECOMES ALMOST IMPOSSIBLE TO STOP USING.'**

► **Charlotte:** I think we all have the capacity to put ourselves in other people's shoes. The first step is listening to people who have been through things like homelessness or drug addiction. Harm reduction is one small drop in the bucket in terms of how we can help. A lot of people think it enables users. But if we can keep people alive and provide opportunities for mental health support, for employment support, for family reconnection, for community, one day hopefully they'll be alive to accept an opportunity. I would have fewer dead friends if there had been safe injection sites a long time ago. My model of recovery was to find a farm, but that's not going to work for everybody. Which is why it's important to have a range of wonderful opportunities. "Wonderful opportunities" — that's an oxymoron. All opportunities are wonderful. You don't realize that until you don't have any.

► **Jeff:** When you go to an injection site, you realize right away that everybody who steps inside is a real person. They all came from somewhere. This project has opened my eyes to the difficult issues that we face as a society. Supervised injection sites support individuals through tough times. When somebody falls down, you lift them up. You don't just leave them in a hole.

► **Charlotte:** Ten years ago, I didn't know what a master's degree was. One day, when I was 20, I remember waking up and not even knowing my own name. I've never had such a fucked-up feeling: I wake up, smoke some crack and don't know my name. So, no, I didn't know that I'd ever go to university— and I feel so lucky that I am. I know that I have to help other people get here as well.

► **Jeff:** I work towards cancer therapies, but cancer is such a difficult disease to understand. I'm grateful that part of my career is contributing to that base of knowledge. But this opioid research has a face to it, and it's the most impactful work I've done. I think it's extremely important for scientists to engage with the communities we serve, because the research we do is generally funded by public dollars. And I think that's the reason that I and so many of my colleagues are into research: to understand this world better and figure out how to interact with one another in a more holistic way.

► **Charlotte:** When I was using, I used to go to the Sandy Hill health centre to get clean needles. Now I drop off people there pretty regularly. I try to avoid places

where I'm too emotional, but I go there once a year for the annual drug user memorial. It's a cardboard wall they bring out with pictures of people who have died. Every year, the wall gets bigger. Stigma is just like a wall. Even when you're trying to do all the right things, you have to fight through that wall. That's one of the reasons we're creating a scholarship at Carleton for youth who have experienced homelessness, with help from Cora MacDonald at A Way Home Ottawa. It will cover tuition and housing. Almost all the homeless youth I've talked to want to go to school. I've been told that policies can't involve kindness. I think that's bullshit. One of my drug counsellors told me to get a PhD and said that if people who have been through things get into positions of power, that's how structures become kinder. And then eventually, hopefully, we'll have a kinder society. ■

**'I THINK WE ALL HAVE THE CAPACITY TO PUT OURSELVES IN OTHER PEOPLE'S SHOES. THE FIRST STEP IS LISTENING TO PEOPLE WHO HAVE BEEN THROUGH THINGS LIKE HOMELESSNESS OR DRUG ADDICTION.'**







# PIPE DREAMS

A STORIED ORGAN'S NEXT CHAPTER

BY MEREDITH BOERCHERS

PHOTOGRAPHS BY  
CHRIS ROUSSAKIS

Praised by Mozart as “the king of the instruments,” the pipe organ reigns over church sanctuaries and has become a stalwart symbol of ecclesiastical tradition. But at the Carleton Dominion-Chalmers Centre (CDCC), the university’s arts, performance and learning hub in downtown Ottawa, the recently-restored, seven-storey, 5,179-pipe organ tells a surprising story of innovation and transition.

The instrument’s roots pre-date the amalgamation of Dominion United Church and Chalmers United Church. In 1955, smoke and humidity during a fire at Chalmers significantly damaged the organ. “Playing in chords,” the music director at the time, William France, said about the fire’s impact, “has taken on the sound of marching armies.” The cost of restoration was prohibitively expensive, so the instrument remained unattended until after the 1961 fire that destroyed the Dominion church and led to the union of the two congregations. Enriched by the insurance payout funds received by

Dominion, the newly-amalgamated church chose the battered organ as its first major project.

Two established firms submitted bids: Quebec-based Casavant Frères (which had built the original Chalmers organ in 1928) and England’s William Hill & Son & Norman & Beard Limited. While the English manufacturer recommended a restoration, Casavant proposed a complete replacement. Faced with two costly options, the church sought advice. A Royal Conservatory of Music organist thundered that the Hill, Norman and Beard organ he had recently played was “the worst instrument I have ever experienced.” A musician in Kingston called Casavant’s building techniques “wasteful” and “sinful.” France was outspoken about his preference: “Frankly I mistrust a rebuild on an organ that has been tried by fire and water. There is the parallel of rebuilding a 1928 car!”

SIX MILES OF COPPER WIRE WERE USED TO METICULOUSLY ATTACH EACH OF THE ORGAN CONSOLE’S KEYS TO THE WIND CHESTS.

These passionate responses provide a snapshot of the organ reform movement, which started in early 20th-century Germany. Both the construction and timbre of organs had radically changed in the previous decades in concert with technological developments and musical taste, transforming a predominantly ecclesiastical instrument into an imitator of the orchestra within theatres and fairs. Musicians and builders in the 1920s sought to re-create organs capable of playing the contrapuntal masterpieces of the past, and this “neo-classical” aesthetic spread to North America after World War II, when organists on duty with military forces had visited the historic organs of Europe. By the time Dominion-Chalmers began its search, the new approach to organ building was at its climax, with firms like Casavant returning to classic principles of mechanical action, wind systems and casework.

Convinced that Casavant’s organs were among the best in the world, Dominion-Chalmers chose the Canadian manufacturer in 1963. Established in 1879, Casavant is Canada’s oldest organ building firm still in operation, and the organ built and installed in Dominion-Chalmers represents a unique intersection in the history of both the company and Canada. During the organ’s construction, the neo-classical clarity of sound was already established as the desired tonal palette, but the transition back to classical construction practices had not been completely

implemented. It was during the years of Dominion-Chalmers’ organ construction that Casavant made the switch away from electro-pneumatic action — which uses electric current to send signals from the console to the wind chest — back to tracker action. Rather than



Dominion-Chalmers music director Ian Bevell revels in the recently restored instrument

installing a series of mechanical linkages to the organ console as they would with future organs, Casavant used a total of six miles of copper wire to meticulously attach each of the organ console’s keys to the wind chests. Thus, the organ was built with the timbral qualities of French and German organ music of the Baroque and classical renaissance but retained 20th-century technology.

The installation of a new Casavant Frères organ in 1965 paved the way for a flourishing of music activities, and today the CDCC is repeating history. Like the Dominion-Chalmers congregation 60 years ago, one of the first projects undertaken by Carleton upon its purchase of the church was a full restoration of the 1965 organ. In the same way that Casavant blended tonal tradition with modern improvements, the repairs to the organ completed last year significantly updated the attachments running between the console and the rest of the organ body: organ technician Sylvain Brisson replaced the massive cable of 500 copper wires with a single cord. With this alteration, the organ console has become completely mobile, creating a more versatile space and opening the door to musical growth in the centre for students, community groups and the congregation to cherish for decades to come. ■

*Meredith Boerchers is a graduate student in Carleton’s Curatorial Studies diploma program who researches and retells stories from the CDCC’s past on digital platforms.*



# CANINE CONNECTIONS

CARLETON'S THERAPY DOGS PROVIDE MORE THAN EMOTIONAL SUPPORT

**A dozen years ago, when Allie Davidson was an undergraduate psychology student, she would have loved Carleton's Therapy Dogs program.** Davidson, who now works in the university's Educational Development Centre, enrolled at Carleton through the Enriched Support Program, which helped her feel more confident about her studies and smoothed the transition from high school to post-secondary. The Therapy Dogs program, which started as a pilot project in 2017 with a Great Dane/Pointer mix named Blue, gives students an opportunity to pet and play with trained dogs — a calming, therapeutic experience for students who might be away from home and family for the first time or stressed in some way about the challenges of university life. Over the last two years, the program has expanded to include 15 dogs and their handlers, all Carleton staff or faculty who bring their own dogs to campus, which distinguishes the program from other universities where external volunteers visit with their pets.

BY JOSEPH MATHIEU  
PHOTOGRAPHS BY  
MARTIN LIPMAN

*Murphy*

Youngest Carleton therapy dog ever,  
super chilled-out disposition



Davidson regularly ran into Blue and his owner, Shannon Noonan, a mental health outreach manager in Carleton's Office of Student Affairs and founder of the Therapy Dog program, and knew she had to get involved. "The only problem," says Davidson, "was that I didn't have a dog."

Enter Murphy.

Davidson — already a horse owner dedicated to studying the psychology of animal-human relationships, which she believes has a bearing on the instructor-student dynamic — got the jet-black Golden Mountain mix puppy in January 2018 and he immediately began to display the right stuff: a good temperament, a willingness to learn and a talent for affection. After six weeks of training and two formal evaluations, Murphy became Carleton's youngest therapy dog last September. ("I pretty much love everything in the world," Murphy says in his online profile, which includes a link to his Instagram page. "I love humans, I love other dogs and animals, I love walks, I love cuddles, I love doing tricks, I love *all* foods, and even though I don't know you yet, I'm pretty sure that I'm going to love you too.")

Although every other therapy dog on campus has scheduled hours in locations such as the main library for

students or staff to stop by and spend time with a friendly pooch, providing a few minutes of respite and a chance to connect with a range of university wellness services, Murphy has a unique role as a mobile dog. He and Davidson are available during the office hours of five different professors. "Approaching a professor can be intimidating, especially in a large undergraduate course," says Davidson. "Knowing there will be a friendly dog in the office can help ease the anxiety a student might feel. He can help students connect with their instructors on a different level."

Participating in the program has also provided unexpected connections for Davidson, who has to budget extra time during her walks across campus with Murphy — some students call out his name and stop the pair, and she invites the shyer ones to approach. Davidson's job is to help instructors use technology in their teaching, which doesn't lead to interactions with students. "Now, with Murphy tugging me around, I recognize students and they recognize me all the time, and they say hello and we talk," she says. "I'm not just an anonymous person in the coffee lineup anymore. This was a way for me to get to know and help students in a way that goes beyond my regular role." ■

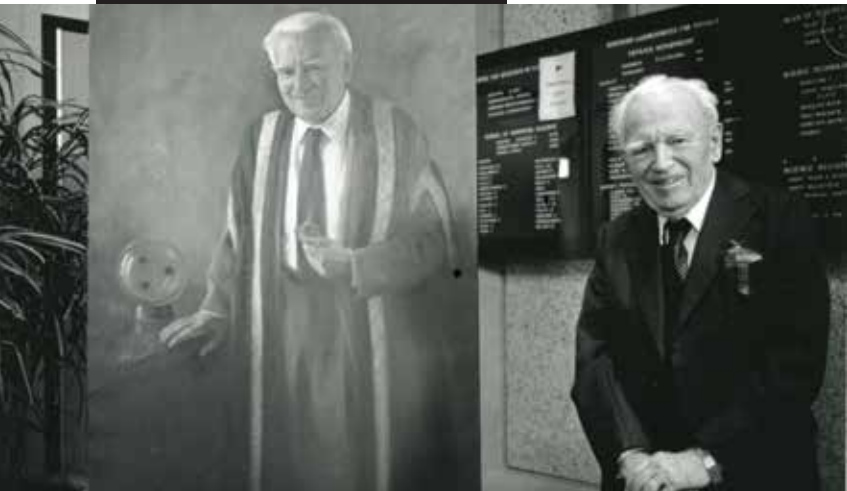
**'APPROACHING A PROFESSOR CAN BE INTIMIDATING, ESPECIALLY IN A LARGE UNDERGRADUATE COURSE. KNOWING THERE WILL BE A FRIENDLY DOG IN THE OFFICE CAN HELP.'**

*Allie Davidson*

Educational technology development  
coordinator, human touch







# Mind The Gap

NOBEL PRIZE WINNER GERHARD HERZBERG, CARLETON'S FORMER CHANCELLOR, ON SCIENTIFIC VS. HUMANISTIC THINKING

Most scientists have found in their non-scientist friends a lack of understanding of even the most elementary concepts of scientific thought and I am sure humanists have had a corresponding experience in their relations with scientists. This “gulf of mutual incomprehension” is clearly understandable since both the scientist and the humanist pursue their studies with the same aim of achieving a better understanding of man and his world — the scientist by his efforts to interpret the physical world and the humanist by creative works that try to understand the human mind.

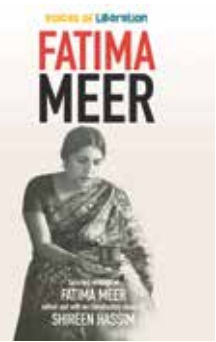
There is, of course, a fundamental difference between scientific and humanistic knowledge. This difference becomes particularly apparent when we look at the relations of each group to the masters of the past. To understand mechanics

or astronomy it is not necessary to read Newton in the original; to understand present-day nuclear physics it is not necessary to read the original papers of Rutherford, one of its great pioneers. Once a scientific discovery has been made it ceases to be personal to the discoverer and becomes part of the university body of scientific knowledge. Except for historical reasons, the original papers are quickly superseded by superior accounts that are rapidly provided by teaching experience and didactic skills. But the writings of a great critic or historian — and even more those of poets and other artistic creators — are part of their own message and to paraphrase the argument would be to destroy the effect. Knowledge and insight here are private and personal and the message can be obtained only by constant reference to the original work.

In spite of this fundamental difference in their attitude to the past there is no intrinsic reason why a scientist should not have some knowledge and appreciation of art, literature and music, or why a humanist (or lawyer or politician) should not have some knowledge and appreciation of science and mathematics. The lack of understanding between scientists and non-scientists is positively dangerous at a time when the applications of science determine more and more of our lives, when indeed the survival of the human race is dependent on our ability to apply our scientific knowledge to overcome the undesirable effects of technology and to remove the great disparity in standard of living between the developed and developing countries. ■

*From Gerhard Herzberg's installation speech when he became Carleton's chancellor in November 1973, published in The Value of Science in Society and Culture: Selections from the Speeches, Essays and Articles of G. Herzberg (Queen's University School of Policy Studies, 2019), edited by Agnes Herzberg and Paul Dufour.*

*Herzberg poses beside his official chancellor's portrait. Photograph from the Heritage Photograph Collection, Archives and Special Collections, Carleton University Library.*



# RAGE AGAINST INJUSTICE

Fatima Meer was one of the most prominent, and yet most under-recognized, voices in South African academia in the twentieth century. She epitomized the public sociologist, described by Michael Burawoy as one who “brings sociology into conversation with publics, understood as people who are themselves in conversation.”

She was driven by an activist sociology

for a common society, by a rage against injustice and by a profound belief in the value and capacity of research to convince the powerful of the consequences of their choices. An intense humanism overlay all of her writing. Ideas about human

freedom, equality, sociability and progress run through her work. In numerous books and essays, she offers a set of ideas that ran counter to those of the colonial and apartheid state, and at times counter to the theories of other engaged scholars on the left. Where her colleagues foregrounded, and indeed privileged, class in their analysis, she focused on uncovering the life experiences of subaltern groups in ways that understood human life as a complex encounter between structure and agency. This led her to consider race as determinant of life chances, and as a form of power to be exposed in every manifestation.

*From Fatima Meer: A Free Mind (HSRC Press, 2019), by Shireen Hassim, the Canada 150 Research Chair in Gender and African Politics at Carleton.*



# NEURONS FIRING

Imagine a jar of peanut butter. When you do this, you're creating, in your mind, something that doesn't exist — even if you're imagining the jar you actually have in your cupboard, you're creating something new. There's the actual jar of peanut butter, and then there is a separate thing in your mind: a representation of the jar, here and now, not where and when the physical thing

actually is. The actual jar of peanut butter is made of plastic and peanut butter. The thing in your head, the “imagining,” is some pattern of neurons firing in your brain. Even when you use your imagination to remember something that actually happened to you, you're creating a simulation of a time and place that no longer exists.



# DYLAN IN LAGOS

Although I do not recollect the exact date I encountered Bob Dylan's work in Lagos, Nigeria's densely populated commercial and cultural capital city, I remember the circumstances that brought the inimitable artist into my consciousness. I had graduated from the University of Ibadan, Nigeria's premier university, and had moved to Lagos to pursue a career in journalism

and creative writing. It was in the early 1990s and Lagos — like other cities that serve as cultural hubs (such as New York, San Francisco, Paris, Dublin, and London) — was the dream site for young people determined to “make it big” in life....

Like Dylan's New York, Lagos was the metropolitan beast where artists armed only with their talents and dreams struggled to find the muse and direction in life. It was not difficult, therefore, to see why Dylan cast a spell on our small Lagos group. Besides Dylan's artistic ingenuity and counter-cultural disposition, our group was drawn to artists whose rebellious and anti-establishment personae advertised the kind of fierce creative temperament that we aspired to possess. Nigeria in the late 1980s and 1990s writhed in the death pangs of military dictatorship and a torturous process of transition to democratic governance. Writers, journalists, activists were jailed for their work. The writer and environmental rights activist, Ken Saro-Wiwa, was gruesomely executed by hanging within this period. So, more than ever before, writers found therapy in their art, while some sought escape through liquor or fled into exile. ■

*From Polyvocal Bob Dylan: Music, Performance, Literature (Palgrave Macmillan, 2019), edited by Nduka Otiono — a professor in Carleton's Institute of African Studies — and Josh Toth.*

This is the essence of imagination: the creation of ideas in your head, composed from ideas, beliefs, and memories. Often, they are not simple ideas, but complex structures. The most spectacular use of imagination is in creativity, but this book isn't about creativity, which requires the generation of something new and effective in some way. Acts of imagination need not be new or useful. Imagination also has great uses in more mundane tasks we do every day, such as planning the day. When you think of what route you want to use to get home, or you go through the logistics of where to park your bike, or figure out what order you should run your errands in, you're thinking of possible realities that do not yet exist. ■

*From Imagination: Understanding Our Mind's Greatest Power (Pegasus Books, 2019), by Jim Davies, a professor in Carleton's Institute of Cognitive Science.*



# SLEEPING PROBLEMS

In the spring of 1971, the Vietnam Veterans Against the War (VVAW) fought the courts for the right to sleep on the National Mall as part of their weeklong demonstration, Dewey Canyon III. When the courts denied their petition, veterans decided to break the law by sleeping anyway. Turning good rest into a form of dissent, hundreds

of veterans fell asleep, wondering whether or not they would be arrested by daybreak. Clearly, sleep played a part in the movement to stop the U.S. war in Vietnam. Still, I wondered, why did the government see fit to let veterans stay overnight on the Mall — singing, talking, even lying down — while refusing to let them fall asleep there? Why did veterans decide to sleep and risk arrest? This book began as my effort to understand what was at stake in this contest, and, from there, my story grew, traversing the fields of military and mainstream psychiatry, popular and institutional film, documentary sound technology, methods of brain warfare, and the tactics of postwar social movements to arrive back at the scene of soldiers sleeping soundly in the public square.

The VVAW sleep-in speaks powerfully in no small part because it flies in the face of a clinical and cultural record of war trauma that is rife with scenes of troubled sleep: the sleepless soldier and the insomniac veteran are protagonists of an evolving narrative of trauma and its aftermath that spans the course of the twentieth century. ■

*From Fighting Sleep: The War for the Mind and the U.S. Military (Verso, 2019), by Franny Nudelman, a professor in Carleton's Department of English Language and Literature.*



It was an unusually warm fall day in September 2015 when I travelled to Ottawa from Thunder Bay for the first time since the Idle No More protests. Over the ensuing few days, I helped transform the Carleton University Art Gallery (CUAG) into a space that would hold ceremony. The gallery was hosting Walking With Our Sisters (WWOS), a commemorative art installation that honoured the lives of missing and murdered Indigenous women, girls and two-spirit people. The installation was made up of more than 1,000 moccasin vamps — the intricate, decorated tops of moccasins — laid out on deep red cloth. Visitors walked along a path of red, with the vamps symbolizing those who were missing. As a member of the WWOS national collective, I was

# LOST & FOUND

A NON-LINEAR ROUTE TO HIGHER EDUCATION

at CUAG to provide logistical and emotional support to local organizers. It never occurred to me that I would be walking back onto campus three years later as a student.

Growing up in Thunder Bay and Val d'Or, Que., the importance of education was imparted to my siblings and me as children, although I didn't take that message seriously in my younger years. I was fortunate to be part of the first generation in my family that wasn't forced to attend residential school. My father, and his father before him, are both residential school survivors who went on to post-secondary education. My own route to higher education wasn't quite so linear. High school was tough. In fact, I never finished it. Struggling with my queer Indigenous identity, along with family dysfunction, began when I was a teenager and fuelled addictions throughout my 20s. Today, I can clearly see how intergenerational trauma impacted

my life in ways that I was unable to cope with as a young adult.

In spite of my addictions, I understood that I had to work twice as hard as others to compensate for my lack of education. I had a knack for finding unique jobs. I worked for software companies, political organizations, Indigenous art associations and non-profit community groups. Which is how, after hitting rock bottom, fresh out of a treatment program, rebuilding my life, I found myself in Thunder Bay working within the criminal justice system.

As a Gladue writer, I worked with Indigenous people who had been convicted of crimes, writing reports that were submitted to the courts for sentencing considerations. Gladue reports are a response to the Supreme Court's ruling in *R. v. Gladue*, a 1999 decision which recognized that Indigenous peoples face racism and systemic discrimination leading to overrepresentation in courts and prisons. My role was to provide historical context to a client's life circumstances by connecting their experiences to systemic factors. My — and my family's — familiarity with residential schools and addictions helped me connect with clients. This understanding of how colonialism continues to harm Indigenous communities sent me on the journey that I'm on now.


In fateful fashion, volunteering for WWOS in Ottawa sparked a long-distance relationship that had me moving to the city the following year. I continued to write Gladue reports until a heavy case load and the weight of carrying all those horrific stories of trauma led to burnout. Still, doing that work had given me a sense of responsibility; I wanted to do more to help end Indigenous overrepresentation in the justice system.

In 2018, I enrolled in the Indigenous Enriched Support Program (IESP) at Carleton, and I'm now a second-year student in the Bachelor of Law honours program. The IESP — and hard work — are the reasons I've been able to overcome my own challenging past and find success at school. But I also believe that people and opportunities come into one's life at the right time. That first step onto campus for WWOS was the start of a new chapter for me, and it has put me on a path that will allow me to help others in a powerful way. ■

BY KARA LOUITTIT  
PHOTOGRAPH BY  
ROBERT PROULX







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When you immigrate,  
you are always searching.  
Then you discover that  
feeling welcome and safe  
is home.

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*Kagiso Lesego Molohe*  
Master's student and novelist



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